Romanian Policy on Teachers Training for Early Childhood Education

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Keywords: Creativity, Early education, Inquiry-based learning, Science and mathematics teaching, Teachers training.

Abstract. The paper presents the results of a desk-research run in the frame of the project "Creative Little Scientists" aiming to investigate the relation between the development of creativity and science and mathematics teaching in Early Education, as it concerns teachers training and professional development as reflected by official policy documents.

1. Introduction

Teachers' training in science and mathematics is a hot topic at European level as demonstrated by the conclusions of reference reports in the field [1-4]. These and other similar studies call for the promotion of innovative approaches such as:

- "the introduction of innovative, hands-on Science education into all Europe's primary schools; the introduction of Creative Science Teaching modules into the formal training period of all primary school teachers"[5];
- the "obviously need to prepare young people for a future that will require good scientific knowledge and an understanding of technology; improvements in science education should be brought about through new forms of pedagogy: the introduction of inquiry-based approaches in schools, actions for teachers training to inquiry-based science education - IBSE, and the development of teachers' networks should be actively promoted and supported" [1];
- the teaching on the "knowledge of how science works" [2];
- the development to students of "patterns and mechanisms, [and] the adopted learning design strategies and didactical approaches to involve students in significant and exhaustive hands-on activities, within meaningful learning contexts" [6].

Early education in science and mathematics is also of interest: "the teaching of mathematics, science and technology should be an entitlement for all children from the early stages of education and should be mandatory at all levels; more effective and attractive teaching methods should be introduced in mathematics, scientific and technical disciplines at both primary and secondary level, in particular by linking learning to real-life experiences" [7].

ISBN: 978-605-64453-0-9

According the "Conceptual Framework" set by the FP7 project "Creative Little Scientists" (http://www.creative-little-scientists.eu/) creativity development can be linked to science and mathematics teaching at this age [8].

The Center for Science Education and Training – CSET, at the National Institute for Laser, Plasma and Radiation Physics, in Bucharest (http://education.inflpr.ro/ro/home.htm) coordinates in Romania this educational research project. The project provides a clear picture of existing and possible practices, as well as their implications and the related opportunities and challenges.

The present paper analyses the Romanian national policy on teachers' training for science and mathematics teaching in Early Childhood Education (preschool and primary school level) as depicted in official documents. According to the "Conceptual Framework", the main foci of the study are two sets of basic questions: a) approaches to teaching, learning and assessment (rationale or vision; aims and objectives; content; learning activities; teacher role/location; materials and resources; groupings; time; assessment) and b) approaches to teacher education (initial teacher education; continuing professional development).

Through the national report prepared in the project frame, a coherent review of the official approaches "in use" in relation to pre-service and in service teachers' training is available to policy makers and interested researchers. This study will help a more structured development of science and mathematics education in Romania at early age level. It provides also the fundament for a sustained promotion of IBSE principles and practices in Romania.

2. The context of the research

As per the project deliverable D3.2 [9]:

- "The term policy is used in this paper to refer to policy texts, which are defined as any *«vehicle or medium for carrying and transmitting a policy message»* [10]. However, in accordance with the aims of the project, policy was examined according to messages in formal written documentation. This may include either statutory requirements or guidance.
- The term curriculum is often used to refer to different aspects of educational policy. In a narrower sense it refers to the content and activities prescribed. In contrast, the term can be used to capture the wider aspects of educational policy. For example, the curriculum is seen as *«what is intended to be taught and learned overall (the planned curriculum); what is taught (the curriculum as enacted); what is learned (the curriculum as experienced) »* [11]. In a similar way, the three levels of curriculum policy are described as: what is intended (the ideal and formally written), what is implemented (perceived and enacted by practitioners) and what is attained (experiences and outcomes of learners) [12]. In this light, policy texts are an element of the intended or planned curriculum: what is formally written.

As reported in the "Conceptual Framework" [8] the focus is on the little *c*, or personal, or everyday, creativity, i.e. *«purposive imaginative activity generating outcomes that are original and valuable in relation to the learner»*. Within this context, the following definition is used in relation to creativity *«generate alternative ideas and strategies as an individual or community, and reason critically between these»*."

2.1 General issues on the Romanian educational system

The goal of the Romanian educational system is to develop the human personality in an integrated, free of any constrains, and equilibrated manner, based on a system of values which integrates the entrepreneurial skills, for the active citizenship participation, social inclusion and access on the workforce market. Education is a national priority [13]. Generally speaking, the educational institutions have as major task the improvement of human personality by: obtaining scientific knowledge; the development of intellectual capacities, affective state and practical skills through

ISBN: 978-605-64453-0-9

acquiring scientific and technical knowledge; assimilation of learning abilities able to help self-education and life long learning [14].

The Romanian National Ministry of Education is the main body of the central public administration in charge with the design and implementation of the national policy at pre-university level. It accounts also for the management of the human resources active in this educational segment, by coordinating and monitoring the Initial Teachers Education (ITE) and Continuing Professional Development (CPD) of teachers. At each Romanian county level and for the municipality of Bucharest, school inspectorates apply the Ministry policies and strategies as it concerns, among other of its duties, teaching activities, implementation of recommended standards and indicators, periodic audit of human resources [13].

The Romanian pre-university educational system covers the following age intervals: early childhood education and care for which the Ministry of Education is responsible (grădinţa, from the age of three to the age of six); primary education (şcoala primară, from six to 11 years old); secondary general education (şcoala gimnazială, from 11 to 15 years old; liceul, from 15 to 19 years old); secondary vocational education (liceul tehnologic, from 15 to 20 years old; învăţământul profesional, from 16 to 18 years old) post-secondary non-tertiary education (şcoala postliceală, from 19 to 21 years old) [15] The Early Education covers the child life interval from the birth to six years, and is divided in the ante pre-school early education (0 to 3 years old) and pre-school early education (3 to 6 years old) [13]. For the scope of the project we run, only to ISCED 0 and ISCED 1 levels were addressed.

According to the newly adopted "Law of National Education" (2011) the compulsory full-time education starts at the age of six, ends at the age of 16, and covers 10 grades [13]. The compulsory education spreads over the primary school ("clasa pregatitoare" – pre-primary level and "invatamantul primar" - grades I to IV), and the lower secondary school level ("gimnaziu", grades V to IX). The changes introduced by the new Law refer to the inclusion in the primary school of the preparatory class, and the addition to the first grade of the higher secondary school ("liceu") to the lower secondary school level ("gimnaziu").

The national strategy for science education in Romania assumes that science teaching is performed in an integrated manner, as opposed to the separate subject science teaching model. At Early Education level, the same teacher teaches Romanian language, science (natural/ environment), and mathematics. Foreign languages, religion and physics education are taught, according to the circumstances, by special personnel. In general terms, at pre-school level science and mathematics are studied together, as this holistic approach is expected to increase students' interest and help them in the learning process. In the case of primary education, if mathematics and environment exploration (or natural sciences) are taught together, mathematical concepts can be perceived by the learner in their concrete form, bound to applications, and more accessible.

The subject of teacher's training and education was treated in our national report quite extensively as information on this issues is abundant.

3. The investigation method

In preparing the country report the team faced a major difficulty: the mapping process is planned to follow the "Conceptual Framework" by trying to localize in official Romanian policy documents answers to a previously defined "policy questionnaire". This questionnaire addresses two major issues:

A. approaches to teaching, learning and assessment (rationale or vision; aims and objectives; content; learning activities; teacher role/location; materials and resources; groupings; time; assessment);
B. approaches to teacher education (Initial Teacher Education - ITE; Continuing Professional Development – CPD).

ISBN: 978-605-64453-0-9

From the beginning, by analyzing the project's "Conceptual Framework" (Deliverable D2.2) and the project "List of Mapping and Comparison Factors", and by scanning the Romanian policy documents accounting for science and mathematics in relation to early education and *creativity* development it was obvious that the information addressing basic concepts acting as pillars of the "CreativeLittleScientists" project is poorly represented in Romanian official documents. For this reason, the Romanian team was forced to dig quite a lot in the available literature in order to compose an image from numerous little pieces of information spread in many documents, trying to find similar meanings or at least vague formulation of the investigated problems.

The desk research, completely based on Internet-located documents, focused on the following categories of official documents which were used: different versions of the Law of Education; laws and projects of laws concerning pre-university education; orders of the Minister of Education; school curricula and pedagogical methodologies on science, mathematics, technology and development of practical skills, environment and/or health education; official documents and recommendations on teachers' competences and their training programs; teaching plans and curricula on ITE and master degree programs on education from major accredited providers; best practice guides for teaching science, mathematics and ecology; strategic plans for the development of specific educational segments; recommended evaluation standards and norms; national reports on the educational system situation; European reports concerning pre-university education in which the Romanian educational system is presented/ analyzed; several scholar papers analyzing the pre-school or primary education. Overall, more than 100 such documents were examined.

Wherever there is not an explicitly articulated answer to the question we are trying to respond, similar formulations to those expressed in the question or some more or less implied ideas/ strategies/ solutions at policy level were indicated in the study.

4. Research results and discussion

At this moment Romanian is in a transition period as it concerns early age education; a new law of education was just promoted and its implementation is under way. Until now, it was a distinction between persons involved in pre-school education ("educatoare") and primary school teachers ("invatatori", "institutori"). As far as the present system requires for such personnel a higher education degree, this distinction disappears. Only in the last three years several universities started to offer courses and Master degree in Early Education. For this reason, to speak about an established policy in this field, is a little bit hazardous. In 2012 the preparatory class was included in the compulsory educational system as part of primary school. Implementing this new system proved to be a difficult task, with a lot of unanswered questions. In this transitory regime, a smooth transition from the preparatory class to lower primary one seems to be a far to reach objective for the moment.

A change appeared also in the way science and mathematics are planned to be taught in pre-school and primary school. Science and mathematics are proposed as a common body of knowledge, mathematics being more applicative, closer to the real life situations.

As in the case of factors relating to the curriculum, the project "Conceptual framework" identified the *teacher factors* as very significant in the teaching, learning and assessment approaches in the classroom. Consequently, this study focused on the examination of "teacher factors" addressed in policy, in particular the issues documented in relation to:

- Initial Teacher Education: What are the requirements for initial teacher education?
- Continuing Professional Development: What are the opportunities for Continuing Professional Development?

Direct teachers' evaluation is done for classroom activities and extra curricular activities, and its fundaments are questionnaires/ interviews with students, parents and other interested parties [16]. These results are correlated with an analysis of teachers' activities outcomes: publications, books,

ISBN: 978-605-64453-0-9

guides, students notebooks, practical works, video and audio recordings, lesson plans, projects, portfolios, didactical materials, results from school evaluation reports, certificates, diplomas. Teachers attending courses devoted to special training programs receive a recognition based on their portfolio and practical work [17]. Indirect evaluation of teachers is done during national tests for students, when qualification and results of teachers are assessed [18].

4.1 Initial teacher education

A grid indicating educational requirements for pre-school and primary school teaching personnel is given in Table 1.

Table 1. Background educational requirements for teaching personnel in pre-school and primary school education [19-24].

Teaching position	Required studies
"educatoare"	graduates of "pedagogical high school/ specialty pre-school education"/ five years studies in teacher-training schools
"institutori"	graduates of pedagogical high school & superior studies in another field/ "teacher-training colleges in a two-year course (for those who have completed an upper secondary teacher-training school) or, in a three-year course (for those who have completed another type of upper secondary school)"
"institutori invatamant prescolar"	graduates of "College for Preschool Teachers"
"profesori pentru invatamantul primar si prescolar"	graduates of double specialties: teacher for pre-school and primary school

Few years ago, to become a teacher for pre-school/ primary school required the completion, according to the case, of appropriate studies: "high school (no pedagogical education); high school pedagogical / «şcoala normală»; college of primary school teaching; university degree without psycho-pedagogical module; university degree with psycho-pedagogical module" [17], [18].

Initial teacher training as teacher or tutor requires completion of courses of a HE institution, completed by pedagogical training. Teacher / tutor diploma can be received by means of [25]: "professional lay-out, "pedagogical notebook"; written examination; diploma essay (with psycho – pedagogical - methodological contents)".

According to the new regulations, teachers for pre-school and primary school have to be trained in a University for three years, obtaining a first degree in pre-school and primary pedagogy. Those already active in the educational system, who completed courses to a pedagogical high school can pursue their studies by considering a first degree or a Master degree at a University [20], [26]. Graduates of "educational sciences" are certified, at the Bachelor level, by a license diploma after they attend specific courses, some of them compulsory and other optional, such as: psychology of education, educational sciences, subject focused studies, ICT, a foreign language, fundamentals of pedagogy and curriculum, theory and methodology of instruction and assessment, theory of education, logic, the subjects to be taught and their specific didactics, practical work, methodology of

ISBN: 978-605-64453-0-9

education research, pedagogy for preschool education, psychological and pedagogical counseling, the education of children with special needs, sociology of education, computer-assisted instruction, pedagogical doctrines" [17], [26], [27].

Practical activities of pre-service teachers are organized in schools under a double tutor scheme (a person nominated by the HE institution and a mentor selected from school teachers), based on an agreement existing between the school and the teachers' training department [17], [27].

The teacher– mentor is defined as "the teacher responsible for guidance and evaluation of teaching practice students or students and teachers in the period of probation" [28]. He/ she acts as a model to the student/ teacher doing the practical work; provides advise and is a resource person; offers feedback to the supervised person; is a counselor; is involved into the evaluation process of the supervised person. Official documents detail the competences of the teacher-mentor [28]: didactical competences; competences for planning and organizing the mentoring activities; communication competences; evaluation competences.

The entry requirements for university studies are set by the HE institution to which the would-be student applies for a degree. The minimum requirement is to have a high school graduation degree (in Romania the "Bacalaureat" diploma). The admission in some cases implies an interview, the pass of an examination (or the presentation of a certificate) for linguistics competences for a foreign language, and a test for physical education [12], [27], [29]. Initial teachers' education for pre-school and primary level adopted a "concurrent model" [30]. Tables 2 to 4 summarize the existing regulations for initial teacher training in primary education.

Table 2. Regulations in initial teacher education for subject specific teaching knowledge and skills in primary school, 2004/05 [31]

Knowledge/ skill	Status
Knowledge of school science curricula and their objectives	Science as an integrated subject
Scope for experimental/ investigative activities	Science as an integrated subject
Knowledge of children's 'common sense' understanding of scientific concepts and phenomena	Science as an integrated subject
Taking account of children's 'common sense' understanding of scientific concepts and phenomena	Science as an integrated subject
Ability to keep up to date with recent scientific developments	Science as an integrated subject

Table 3. Regulations in initial teacher education for scientific knowledge and skills in primary school, 2004/05 [31]

Knowledge	Status
Scientific concepts and theories	There are regulations
Scientific experimentation/investigation	There are regulations
History and epistemology of science	No regulations

ISBN: 978-605-64453-0-9

Table 4. Regulations in initial teacher education for scientific experimental/ investigative skills in primary school, 2004/05 [31]

Skill	Status
Laboratory-based work	No regulations
Science-related projects	No regulations
Type of activity not specified	There are regulations

As an example of the curriculum pre-school teachers have to study, curriculum which is set by the HE establishment offering such a qualification is given for the Department of Pedagogy for Primary and Pre-school Education, in Bucharest (teacher education - 3 years, 6 semesters, 180 ECTS credits) [21]:

- "Information and communication technologies – compulsory, Credits Total (4PS); Hours per week (2+2); Evaluation (written/ oral - WO);
- Mathematics – compulsory, Credits Total (10PS); Hours per week (4+3); Evaluation (WO);
- Methods of mathematical activities – compulsory, Credits Total (4PS); Hours per week (1+2); Evaluation (WO);
- Methods of teaching Arithmetic – compulsory, Credits Total (4PS); Hours per week (2+1); Evaluation (WO);
- Geography and methods of teaching Geography – compulsory, Credits Total (4PS); Hours per week (2+1); Evaluation (WO);
- Sciences/ Environmental sciences education and methods of teaching Sciences/ Environmental sciences education – compulsory, Credits Total (4PS); Hours per week (2+1); Evaluation (WO);
- Methods of teaching Practical abilities – compulsory, Credits Total (4PS); Hours per week (2PS); Evaluation (WO)".

Teachers' trainers responsible for initial professional training of science teachers have to fulfill the following requirements [31]: scientific qualification - minimum at Bachelor level; teaching and teaching training qualification - compulsory; teaching experience - compulsory; experience in education research - recommended.

Upon the graduation, teachers enter a probation period when they can be supervised by a school inspector working in cooperation with a teacher-mentor designated by the school principal [27].

4.2 Continuing professional development

CDP is offered through public or private institutions, agencies or NGOs run courses [17]. Those courses have to be accredited by a special department of the Ministry of Education. Such courses are provided by Teachers Training Centers (Casa Corpului Didactic – CCD) in cooperation with county school inspectorates, and are finalized with: a) a participation certificate; b) "atestat" (for < 89 credits); c) certificate (for > 90 credits). An Order of the Ministry of Education lists the categories of institutions and public/ private bodies which can offer CPD courses for in-service teachers [32]. In addition, specific programs for professional development of teachers, graduates of university studies, are available such as: Master degree, doctoral studies or post-university studies in specific fields [32-34].

Teachers' CPD can be organized as [24]: a) modular courses delivered during school holidays, weekends, or specially designed period; b) distance learning schemes; c) courses without obligation to attend, based on self-study, combined with ordinary courses requiring attendance to the course; d) additional seminary, laboratory practice, and independent learning.

The methodology for teachers' CPD requires teachers to participate every 5 years to a training/ development program, accounting for 90 credits [27], [32].

ISBN: 978-605-64453-0-9

Competences acquired by teachers are assessed based on their results in different types of activities [17], [32]:

- scientific, methodical and pedagogical activities, made at the school level or within a group of schools, methodical commissions, departments or educational circles;
- methodological, and scientific communication sessions, symposia and professional exchange and pedagogical sessions;
- attending specialized scientific information and science education sessions;
- attending courses organized by scientific societies and professional teachers organizations;
- attending special, methodological and pedagogical training courses;
- participating to internship / mentoring programs conducted by professional organizations;
- training scholarships and internships and documentary study, conducted in the country and abroad;
- participation in distance learning courses organized by HEI;
- distance education programmers;
- postgraduate specialization;
- Master degree studies;
- post-university and doctoral studies.

The described situation applies to pre-school and primary school teachers' CPD without any special emphasis on Science and Mathematics education. The only initiative up to now are the two accredited courses (the first ones in Romania) for primary and secondary school teachers in relation to Science teaching by *inquiry-based* methods, courses delivered by the Center for Science Education and Training at the National Institute for Laser, Plasma and Radiation Physics (http://education.inflpr.ro/ro/Descopera.htm). These courses include both classical frontal delivered sessions and an e-learning platform, and is assisted by a video conference system through which educational videos can be accessed.

5. Conclusions and future work

A study on teachers training in Romania in relation to science and mathematics education in pre-school and primary school is reported. In the future, our intention is to continue this research by comparing educational policies with teachers' perceptions and practices.

6. Acknowledgement

This research was financially supported by the European Union Seventh Framework Programme (FP7/2007-2013) under area of activity 'Research and Coordination Actions on new methods in science education' (Grant agreement no. 289081), project "Creative Little Scientists: Enabling Creativity through Science and Mathematics in Preschool and First Years of Primary Education" and by the Romanian Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI) (Grant EU 176).

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ISBN: 978-605-64453-0-9