

Reform in Mathematics Teacher Professional Development in Poland

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ABSTRACT This paper consists of two separate but connected research reports. The first is a recent history and current status of teacher professional development in mathematics education in Poland. The second is a summary of the findings of a Pilot Study in which questionnaires were given to Mathematics Teachers and School Directors in selected Polish Schools during 2013. This paper concludes with suggested ways for improving the quality of professional development courses based on the detailed findings of both research reports. The recommendations include (1) better work conditions and salaries of teachers to encourage them to pursue in-service courses, (2) accreditation of private educational companies to hold in-service courses, (3) modernizing the curriculum content and teaching methods, based on best practice globally and (4) introducing modern technology to re-shape teaching and learning in the classroom.

INTRODUCTION

Reforms in Polish Education after the Year 2000

Poland has more than 1000 years of history, a population of almost 39 million people and a long tradition of respect for, and promotion of, education. This paper will be devoted only to Teacher Professional Development Programs, especially following the reforms of the Polish educational system after the year 2000.⁽¹⁾

In 1991 new education laws were passed in Poland which called for the “autonomy of schools as societies of students, teachers, and parents” granting schools final responsibility for instructional content and methods. The implementation of these new laws after 2000 had a profound effect on all aspects of Polish Education, including Teacher Professional Development Programs. It was now required that all Polish teachers should (a) have a higher education qualification in order to teach in any Polish school, (b) undergo continuous professional development, (c) be competent to teach two subjects, (d) be computer literate and (e) have a good command of a foreign language.⁽²⁾

Since 2000 in Poland emphasis has been placed on decentralisation and greater autonomy for schools and teachers, to encourage innovative teacher practice. Teachers now participate in many professional development programmes which promote innovative curricula and

active teaching methods.⁽³⁾ The number of teachers with university diploma qualification has risen from 50% to 98% of 600,000 teachers. Professional development is now undertaken by 90% of teachers. The government introduced a new salary system for teachers in 2007. The new system calls for salaries to be based on what tasks teachers are asked to do, what they need to do to accomplish them, and what results they achieve, as well as on their professional qualifications and experience. The new system also provides for flexibility according to location, and for bonuses in the event of a school achieving excellent results. along with the introduction of a teachers’ career promotion system Teacher salaries by 2011 had increased to Poland’s average salary. According to many authorities and commentators, changing the status and the role of the teacher was considered crucial for the successful implementation of the overall reforms in Poland. “The primary role in the process of formal education is played by the teacher”.⁽⁴⁾

“The many plans and aspirations for educational reform in Poland will depend, to a large degree, for their success on the quality and morale of the teachers. Every effort should be made to ensure that the long-term perspective is borne in mind when laying down the foundations for a reformed teacher education system and a restructured teaching profession. The success of education reform will be dependent on the change of teacher’s attitudes, on their qualifications.”⁽⁵⁾

Initial Teacher Education

Initial training of teachers in Poland is either within the higher education sector (graduate or postgraduate) or in teacher training colleges. The latter takes three years of day, evening or extramural courses⁽⁶⁾ and leads to a B.A. equivalent teaching qualification valid for all levels of school from primary to gymnasium and lyceum. In practice, however, those who want to teach at secondary level also do a 2 year M.A.

Initial Teacher Training school practice can have five strands: school-based with strong links to the training courses, experiential where the theory is tested in practice, problem-centred related to real life problems in the classroom, developmental which takes into account each individual stage of development and open ended which caters for lifelong learning and professional renewal. Methods of initial teacher training can be both top down (lectures, micro teaching, video sessions) and bottom up (structured and open-ended feedback in seminars, tutorials and projects)

Initial teacher training in Poland has changed as a result of the reforms of 1991 and 1999 and especially following the overall re-structuring of Polish universities, training colleges and schools. This is now leading to a generation of new teachers better trained for the challenges of the 21st century, especially in the areas of ICT and the use of technology in schools.⁽⁷⁾

Continuing (In-service) Teacher Education

In-service teacher education is not compulsory for qualified teachers in Poland, although it is difficult to gain promotion without it, and *professional development is now undertaken by an estimated 90% of teachers. There is a wide range of providers for continuing teacher education including Oœrodka Rozwoju Edukacji (ORE) - the Centre for Education Development, which was established in 2010 as the merger of the National In-Service Teacher Training Centre and Methodological Centre of Psychological-Pedagogical Counselling. ORE is a national teacher training institution whose objectives include: actions for quality assurance in education, particularly through supporting schools and educational institutions, and support of changes in the system of education in the field of teachers' professional development.*⁽⁸⁾

In addition there are other providers such as local education authority networks, universities

and teacher education colleges. the British Council, the Alliance Française and the Goethe Institute. Following the granting of more autonomy (and funding) at the local level, many schools now undertake their own in-service training, paid for either by school funds or by special grants from district, regional or national bodies. Most medium to large cities in Poland have an ODN (Oœrodek Doskonalenia Nauczycieli), a regional in-service centre which holds courses for teachers in all subjects.⁽⁹⁾

After 2000 teachers were increasingly encouraged, for salary and promotion motives, to attend innovative in-service courses, and not only those organized by the Polish Ministry of Education and regional and local authorities. The demand for such courses was so high that the state created a legal accreditation process for private educational companies to organize and administer in-service courses throughout Poland. In 2001 the researchers created their own private educational non-profit company, CDN ALMA, one of the first to provide in-service support in all subjects for teachers in the Wielkopolska region of Poland. CDN ALMA certificates of satisfactory completion of courses were valuable to teachers for promotion and higher salaries, so this strategy was not only essential to meet the enormous national demand for courses, but was extremely successful in training teachers throughout Poland in innovative curriculum content and new active teaching methods⁽¹⁰⁾

April 2012 saw the start of the Digital School program, in the pilot stage 380 schools were equipped with hardware and free digital textbooks for grades 4-6 in primary schools. The scheme was the result of a deal between central government, publishers and other stakeholders. "Cyfrowa szkoła" (Digital School) is the newest governmental program dealing with the use of ICT in Polish schools and raising ICT competences. The program is divided into four: e-school (infrastructure and equipment for schools), e-teacher (teacher training), e-student (ICT equipment for students) and e-resources (creating open textbooks, redesign of Scholaris, the national platform for educational resources, and production of ICT tools for school management).

The implications of this reform (effectively a revolution) for this study of Teacher Professional Development Programs should be clear. UNISA is already at the global frontier in distance and e-learning and this expertise, combined with the adoption of mobile phone/tablet technology,

could provide the breakthrough in reaching millions of students nationwide. Relatively inexpensive but powerful communication devices are already linked to a global “cloud” of unlimited e-learning resources, as seen in the ever-growing number of virtual schools. We should look for ways to incorporate this revolution in our planning for future Teacher Professional Development Programs so that initial and in-service training will prepare our new teachers for the very different kind of schools, and students that are emerging now.

Mathematics Teaching and Learning in Poland

Through the 1990s enormous changes took place after Poland became independent and was able to choose its own mathematics curriculum and to implement many of the curriculum changes that they knew of from the West: the spiral curriculum, “modern mathematics”, problem-solving, modelling, calculators and computing, statistics and probability⁽¹¹⁾ and mathematics in society and real life themes. During the 1990s mathematics teachers were also introducing new methods of teaching in their classes including individualized learning⁽¹²⁾, group work, continuous assessment, project work, cooperative learning and the expert/jigsaw method.⁽¹³⁾ All of these reforms were encouraged and promoted by the large and very influential Polish Mathematics Teachers Association (SNM)⁽¹⁴⁾, whose conferences at their peak were attended by more than 1000 mathematics teachers each year from all over Poland

All of this was reflected in the new Teacher Professional Development courses in mathematics organized by both state and private teacher training institutes, and especially by SNM. In almost every aspect of reform and innovation Poland has now caught up with the rest of the developed world. After the year 2000 Poland has strongly contributed to international innovative projects which developed problem solving, modelling, thematic mathematics, use of technology and innovative ways of teaching mathematics.

The Developing Quality in Mathematics Education (DQME) European Union Projects

DQME I was an EU funded project from 2004-2007 and DQME II was its continuation network

project from 2007-2010. The total budget for both projects was more than a million and a half euro. Four EU countries were partners for DQMEI and eleven for DQMEII. In all there were 35 partners for DQMEII including schools, teacher training institutes and universities. Poland was represented in both projects by the researcher and his late wife, Maria Fryska and from 2004-2010 we organized more than 100 DQME in-service workshops for approximately 2000 Polish teachers. About a dozen such workshops were fully funded from the Poznan Kuratorium, the regional Ministry of Education for Wielkopolska.

The DQME homepage www.dqme2.eu now has more than 1300 original worksheets, projects and real-life themes in 10 languages including Polish, tested for up to 6 years, and now available for teachers to use in their classrooms. In addition to these student materials DQME developed and disseminated videos showing new teaching methods, including group and cooperative learning and the expert-jigsaw method. In many ways DQME was a successor to earlier innovative projects including: MISP (Mathematics In Society) 1980-, MUED (in Germany) 1977, Mathematics Education Into the 21st Century Project 1986- and SuperCourse/Superkurs (in Poland) 2001-.

One of the DQMEII working groups produced materials and workshop plans for both initial and in-service teacher training. This working group was chaired by the researcher and Maria Fryska, alongside two colleagues from Germany and three from Slovakia. Their overall objective was to develop instruments to show teachers how to use the existing DQME materials, and also how to develop teaching material themselves, how to adapt and modify existing learning materials, and how to use or modify innovative teaching methods.

The 6 years work of DQME was followed by a dissemination project called DQME3, whose inaugural international planning meeting was held in Poland in June 2010 and it continues work globally to publicise and disseminate the enormous output of the DQME project. It is clear from all of this how important has been the contribution of Poland not only to the project itself but in the outreach to Polish schools and teachers, and also to mathematics educators world wide through conferences, symposia and seminars.

METHODOLOGY OF THE UNISA PROJECT

The UNISA Project members met together early in 2013 to devise a series of instruments in the form of 5 questionnaires for Mathematics Teachers, School Principals, District and Ministry Officials and In-service Providers as well as a Subject Advisor's Interview. These instruments were designed both to obtain statistical data and information about those participating in the surveys, and also to collect specific feedback on existing teacher education provision and ways in which it might be improved. These instruments were tested in a Pilot Phase in each partner country during 2013. Another meeting of Project members was held in late 2013 to evaluate the instruments tested in the Pilot Phase, after which revised and improved instruments were agreed upon in each participating country for use in the Main Study in 2014 for a wider audience of respondents.

The sample sizes of respondents in each country were relatively small and not strictly speaking statistically significant in terms of the overall national populations. Nevertheless, it was felt that the raw data collected would be useful in giving us a snapshot of the current situation, and also objectively valuable in terms of the ideas suggested by the respondents as to how the situation could be improved in each country. The main objectives of using these instruments was therefore to understand better the overall national situation and to collect concrete ideas for improving teacher education in the future. The questionnaires therefore asked the respondents to reflect on their current practice, evaluate it, and suggest ways in which it could be improved. An analysis is to be made in each country of the data collected in order to correlate responses from different categories of teachers, for example in terms of qualifications of the respondents, experience in their roles, experience of teacher education, personal motives for their participation in teacher education etc.

Report of the UNISA Pilot Study in Poland

In 2013 the UNISA Project questionnaires were translated into Polish and distributed to 19 mathematics teachers and 6 School Directors in both primary and secondary schools. Some designations were changed to fit Polish terminolo-

gy, for example, unlike many other countries, all Polish teachers are trained to teach two subjects and many of them have dual roles as school teachers and teacher trainers. The only major and general criticism of the questionnaire for Teachers was that it was too long. In general the questionnaires were deemed suitable for further testing in the Main Testing Programme to follow in 2014.

From the detailed responses of Polish teachers and School Directors it is clear that many teachers and schools are now taking advantages of the reforms made since 2000 and most of them are now actively engaged in professional development

In answer to the question: What does Continuous Professional Development (CPD) mean to you? typical responses were: keeping up with changing youth, ability to adapt to new needs in terms of teaching...teachers help and advise each other...the need for new skills, transfer of knowledge, to inspire students motivation to learn, explore new teaching methods, use of media, etc...to adjust methods and forms of work to the specific group of children, to treat them individually, to draw conclusions from parents' experience, from the experience of other teachers...systematic improvement, searching for new ideas, new solutions, the use of modern technology...

This strong ideological commitment was evident throughout all of the teachers' responses even though teachers were of course aware that in-service training was also necessary to improve their competence as teachers and thus to enhance their careers and increase their salaries. The amended Polish Teachers' Charter, adopted in 2000, introduced four categories of teacher: trainee teacher; contract teacher; appointed teacher and chartered teacher. The last two enjoy the status of career civil servants. In the school year 2009/10 there were about 494,900 full-time teachers in Poland, of whom 4.6 % were trainee teachers, 19.3 % contract teachers, 30.9 % appointed teachers and 43.4 % chartered teachers.⁽¹⁵⁾

In answer to the question: *In which way did your participation influence your professional practice?* typical responses were: *to deliver more interesting lessons more efficiently... improved material for new programs, encouraged individual innovation...greater contact with students...my satisfaction increased, year by*

year the number of children “having problems with mathematics” decrease...it is a proof that a teacher has to search ceaselessly....to introduce new teaching into school practice.

CONCLUSION

Poland has, in a relatively short period of time, adopted most of the best practice in education from around the world and has embedded this practice in a new and much more efficient education system. What lessons can we learn from this study of the recent changes in Polish Teacher Professional Development Programs?

- (1) It was necessary for the government to analyze and clarify the ideological and practical changes needed, and then approve and put into law the desired reforms.
- (2) There had to be a strong ideological will on the part of the Polish people, in particular teachers, parents and students, to support and even demand change, and then to accept these changes and reforms as they were implemented. It is this cultural context that is so important in evaluating so-called success in the PISA and TIMSS studies. The socio-cultural factors unique to each country are an essential backdrop to reform and improvement.
- (3) Many of the changes made in Poland were based on a long-term examination of what had worked and not worked in other countries, combined with an awareness of the current state of education in the 21st century, especially in relation to technology.

RECOMMENDATIONS

These are recommendations from this pilot study aiming at:

1. giving equal opportunity to all students and, based on merit alone, to encourage many more of them to study at university
2. giving more autonomy, control and finance to local regions, districts and schools (decentralization) and to give teachers more freedom in deciding the content and method of their teaching.

3. improving the work conditions and salaries of teachers, creating a career path that encourages them to pursue in-service courses for promotion and higher salaries.
4. re-structuring all educational institutions to better fulfill the above objectives.
5. allowing accreditation of private educational companies to hold in-service courses throughout Poland to satisfy the growing demand from teachers and schools.
6. modernizing the curriculum content and teaching methods, based on best practice globally.
7. introducing modern technology into all schools and to re-shape teaching and learning in the classroom to accommodate the globally accelerating revolution in technological devices.

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NOTES

- 1 The most complete account of the Polish Education System is [B] by the Foundation for the Development of the Education System (FRSE) National Agency for the Lifelong Learning Programme, Polish EURYDICE Unit. See [http://www.theglobalvillage.dk/education_in_poland.htm] p1, and for full statistics of all Polish schools see [<http://www.eurydice.org.pl/sites/eurydice.org.pl/files/system2012.pdf>] p.122 et seq, & [European Commission: National system overview on education systems in Europe, 2011 http://eacea.ec.europa.eu/education/eurydice/documents/eurybase/national_summary_sheets/047_PL_EN.pdf] [<http://www.euroeducation.net/prof/polaco.htm>]. For more details of the reforms see [<http://www.valuenetwork.org.uk/Documents%20for%20Website/Bibliog%20docs/Education%20system%20Poland.pdf>] [Poland: Changing the structure of the school system to give better education opportunities for all <http://www.pearsonfoundation.org/oecd/poland.html>] [See the excellent video http://www.youtube.com/watchfeature=player_embedded&v=Q5Kva-Ta-6EJ] [www.oecd.org/poland/48357781.ppt] [<http://www.frse.org.pl/foundation-development-education-system-frse>]
- 2 See [<http://www.eurydice.org.pl/sites/eurydice.org.pl/files/system2012.pdf>] p.12 et seq & [www.oecd.org/poland/48357781.ppt] for details of the way decentralisation gave much greater educational control and responsibility through Regional, Local

- and District levels and even to teachers, students and parents in individual schools.
- 3 see [www.oecd.org/poland/48357781.ppt] : 'Poland: Successes and Challenges: Educational Reform, 28-29 June 2011', see also [http://snm.edu.pl/] : David Weston, Research of the week #6 – Poland – Encouraging Opportunities for all, 2012.
 - 4 The Review of the National Policy of Education in Poland, 1996, (OECD), (pp.85-6)
 - 5 [http://www.euroeducation.net/prof/polaco.htm] Teacher education section, [THE SYSTEM OF EDUCATION IN THE REPUBLIC OF POLAND, SCHOOLS AND DIPLOMAS http://www.buwiwm.edu.pl/publ/edu/index.htm] section 8.2
 - 6 [THE SYSTEM OF EDUCATION IN THE REPUBLIC OF POLAND, SCHOOLS AND DIPLOMAS http://www.buwiwm.edu.pl/publ/edu/index.htm] section 8.2
 - 7 [http://creativecommons.pl/open-educational-resources-in-the-digital-school-program/ https://mac.gov.pl/dzialania/cyfrowa-szkola-i-nowe-umiejtnosci-program-pilotazowy-rzadu/ http://creativecommons.pl/category/eng/] [http://www.computerbasedmath.org/computer-based-math-education-estonia.html,http://www.computerbasedmath.org/resources.html http://en.wikipedia.org/wiki/Conrad_Wolfram]
 - 8 The recent history of in-service training in Poland is detailed in [http://www.teqjournal.org/backvols/1995/22_1/W95_zawadoska.pdf] [http://ifa.amu.edu.pl/sap/files/28/07Komorowska.pdf]. see also [http://www.ore.edu.pl]. For specialist in-service work in vocational/continuing education see [http://www.koweziu.edu.pl/index.php?id=english]
 - 9 See the webpages listed in [Some sample webpages of regional ODNs, all of which my late wife and I worked with from 2000-2010 : http://www.odn.poznan.pl/, http://www.odn.kalisz.pl/, http://www.odnkonin.pl/ , http://www.cdn.leszno.pl, http://www.cdn.pila.pl/]
 - 10 See the webpage of CDN ALMA [http://www.cdnalma.poznan.pl/]
 - 11 See: Rogerson, Alan 2008
 - 12 See: Rogerson, Alan 1979, 1986, 1990, 2009, 1979
 - 13 See: Rogerson, Alan 2010. and [http://www.dqime.uni-dortmund.de/]
 - 14 SNM = Stowarzyszenie Nauczycieli Matematyki See [http://snm.edu.pl/]
 - 15 [http://www.frse.org.pl/foundation-development-education-system-frse] p.8, [http://education.stateuniversity.com/pages/1217/Poland-TEACHING-PROFESSION.html]

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