

New Reforms to Improve Professional Development of Mathematics Teachers in Morocco

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ABSTRACT This paper has emerged from a research undertaken in the framework of the Project Mathematics Teacher Professional Development Programs (Math-TPDP) in selected Developed and Developing Countries, initiated by the College of Education, University of South Africa (UNISA). It deals first with a brief survey on the introduced actions to improve the quality of Education in Morocco with the main objective to strengthen teachers' professional skills. The paper results reveal that the Moroccan Educational System has not yet placed the Mathematics Continuous Professional Development (MCPD) in a strategic position to respond to the real needs of teachers. It is recommended that mathematics teachers be retrained to get a better understanding of recent reforms for effective integration into their profession. It is also recommended that established reform commissions in the country come out with policy strategies to implement MCPD programmes.

INTRODUCTION

The Continuous Professional Development (CPD) is a national priority in Morocco to improve the Education quality. In 1999, the "Special Commission on Education and Training" has been set up to elaborate a draft of a reform of the Moroccan Educational system. A National Education and Training Charter "*Charte Nationale pour l'Education et la Formation*", of ten years duration (2000-2009), emerged from that commission, under the auspices of the Ministry of National Education, Higher Education, Professional Training and Scientific Research, with primary goals to universalize the education up the age of 15, to reduce the dropout rates, to improve the quality of teaching and to better align curricula with the job market needs. This National Charter recommended in particular: the commitment and the quality of teachers for the renewal of the school, the Educational performance as a promotion criterion and a relevant strategy for CPD. For an efficient follow up of the progress and the achievement of the National Education and Training Charter, a Higher Council of Education and Training "*Conseil Supérieur pour l'Education*" (CSE) has been created and committed to provide an annual report. One year preceding the term of the National Charter, the Higher Council of Education and Training (*Conseil Supérieur pour l'Education* 2008) reported that although the substantial progress accomplished in the development of

the educational system, important challenges persist and continue to hinder the human development process. An Emergency Program "*Programme d'Urgence*" known also as "NAJAH PLAN" (UNESCO 2008) has been then launched for the period 2009-2012, to accelerate the reform process, by consolidating gains and making the necessary readjustments.

Concerning CPD, the Emergency Program (*Agence Francophone pour le Développement* 2009) aims to introduce a clear and perennial policy for a more efficient achievements, with as objectives to upgrade the current staff of teachers and administrative, to align their profile on the best standards in terms of teaching skills and professional qualifications, and to optimize the teachers' redeployment, by providing them with requalification sessions offering them the possibility of retraining.

The NAJAH PLAN (Najah means "success" in Arabic) had the financial and technical support of five development agencies: the French Development Agency (afd), the African Development Bank (ADB), the World Bank (WB), the European Investment Bank (EIB) and the European commission (EC).

In July 24, 2012, the Minister of Education (El Ouafa 2012) reported in the Parliament Session that the objectives relating to the Emergency Program have not been fully achieved. Nevertheless the Emergency Program has succeeded (Dali 2012) to structure the initial training of teachers in a new way.

To continue and fulfill the Emergency Program actions, a Middle Term Plan for Education “*Plan d’Action à Moyen Terme (PAMT) 2013-2016*” (European Commission 2013) was adopted by the Ministry of National Education. The World Bank (World Bank 2013) advised: “The focus is on the quality of education through, for example, the establishment of regional teacher training, assessment and testing centers and on improved sector governance by decentralizing teacher career management.”

An effective CPD of teachers and all the educational role players appears among the *PAMT* objectives (European Commission 2013) but a clear and effective policy of CPD is not really obvious in the accompaniment of the *PAMT* policies. Also, the authorities of coordination and planning at the central or district level, are not enough identified and structured.

A Brief Survey on Mathematics Teachers Professional Development

To access to the various teachers initial training institutions (Dali 2012): “*Centre de Formation pour Instituteurs*” (*CFI*) for primary school teachers, “*Centre Pédagogique Régional*” (*CPR*) for Mathematics teachers for grade 7 to 9, and “*Ecole Normale Supérieure*” (*ENS*), for Mathematics teachers for grade 10 to 12, the Baccalaureate (Bac) diploma was required since 1970, and it was conditioned by holding a License (Bachelor), or “*Diplôme de l’Enseignement Universitaire Général*” (*DEUG*: Bac+2) and up a selection through a contest entrance since 1980. All these institutions were affiliated since their respective creation to the Ministry of Education in charge of Primary and Secondary Education. Even *ENSs* were not connected with the Ministry in charge of Higher Education.

In the framework of the National Education and Training Charter, a new reform was launched in 2007 for *CFI* (Dali 2012), it was based on the international trends in teacher professionalization, calling the trainers to adopt changes in approaches, methods and techniques, as well as changes in their practice conditions. In particular the “*Alternation*” principle combining “*learning by doing*” to “*learning by teaching*” was introduced. The alternation was extended to *CPR*, in order to facilitate the training / employment. It was based on the articulation of the two training areas: *CPR* (space of acquisition of

knowledge) and school (space of achievement of the teacher activities), which contribute to a progressive and dynamic professional skills construction. As for *ENSs*, the training provided in the recent years is the so-called access to the “*fifth training year*” open to the holder of the license (in the previous system: Bac + 4 years, and Bac+ three years under the “*Licence Master Doctorat (LMD)*” system, set up in the Moroccan universities since the academic year 2003/2004), for one year educational training in the *ENS*.

In its annual report (*Conseil Supérieur pour l’Education* 2008), the Higher Council of Education and Training emphasized that the teacher training should stick to the international standards. In particular *ENSs* should be affiliated to the Ministry of Higher Education and Scientific Research and join the universities for widening the trainees’ knowledge fields, develop their critical sense, initiate them with research and institute footbridges between the disciplines. So an important reform for the initial teachers training has been adopted within the Emergency Program with objective to secure a teacher professional development of a good standard, ensuring teacher’s requirement in number and capacity. The fundamental principles underlying the reform are the professionalization of the teacher training through the integration of basic training in the University Courses of Education “*Filières Universitaires d’Education*” (*FUE*), of 3 years duration, providing a Professional Bachelor “*Licence Professionnelle*”, to be created within the universities, and the obligation of the professional qualification in Regional Centre for Trade Education and Training “*Centre Régional Métier Education et Formation*” (*CRMEF*), providing a training leading to qualification before reaching the position of teacher. So the University will provide initial prevocational training consisting in: disciplinary and interdisciplinary Training; training in Mathematics Education and History of Mathematics; strengthening of skills in languages and Information Communication Technology (ICT); initiation to the methodology of educational research. *CRMEF* will be responsible for the educational qualification. In order to recruit the best profiles, the access to the *CRMEF* will be done up to an entrance contest organized by the Ministry of Education in collaboration with the various Official Districts representative of the Ministry of

Education, namely the Regional Academies for Education and Training “*Académies Régionales pour l’Education et la Formation*” (AREF). The successful candidates will attend one year of educational qualification as trainees with a privileged status (scholarship). After the validation of theoretical and practical modules, they will be assigned in the schools and will benefit from a monitoring and coaching during the first one or two years, provided by inspectors and educational advisors.

This scheme is in line with the current international trends, in particular the duration of the initial training and the professional qualification is longer than by the past (Bac+3+1 instead of Bac+2+1, for teachers at any level even primary and lower secondary school) what would enhance the teacher instruction level to the international standards. Also the disciplinary and trans-disciplinary knowledge is insured and the qualification in the profession is guaranteed by the collaboration between the university (providing the prevocational training) and the CRMEF (providing the professional training ensuring the proximity of the school establishment). The cycle of Preparation of the “National Mathematics Agregation” would be ensured by CRMEFs.

Now, let us focus on the Continuous Professional Development (CPD): there is a general policy set up by the Ministry of National education, the CPD training sessions aim to improve the curricula when change rose and the using of new textbooks; to integrate or reinforce languages like Tamazight, Arabic, French; to initiate for new educational methodologies.

At the Primary level some teachers participated to several CPD programs for professional upgrading. Otherwise, an important CPD program (TVI 2003): Distance Education by the Interactive Technologies “Project TVI” (interactive television) was launched in 2001 and was operational since 2003; it lasted 9 years including 2 of preparation (training of the teams, purchasing of equipment, equipment of the sites etc...) and ended in 2010. It was an ambitious and innovative project by its objectives, its structure, its modalities of coaching, its approaches and strategies for teaching and technology. The Project TVI was initiated since 1998, in collaboration with UNESCO, and was supported by the World Bank, for the training of teachers in rural areas. The training focused spe-

cifically on: improvement of the academic knowledge for Arabic, French and Mathematics; training for the computer tools using; development of educational projects. TVI enabled the beneficiaries to exchange their know-how through a forum devoted to different problems related to the school. By connecting on <http://intranet.tvi.ac.ma>, the beneficiary was able to follow in his/her region the provided training from the capital Rabat. This distance training was positively perceived by the teachers, they consider that it was an opportunity for them of learning how to use technologies, to exploit the services of Internet and to evolve in virtual environment!

At the Secondary level, teachers participated more in the Mathematics Continuous Professional Development (MCPD) programs for career progression. Some MCPD programs have been organized by the Ministry of Education in a sporadic manner (EC 2008) on: Teaching by Competences; Pedagogical content knowledge; Curriculum interpretation or implementation; classroom leadership and organization of the Mathematics knowledge for teaching. The training modules are proposed by the Ministry of Education and ensured by Inspectors, university trainers are exceptionally involved. Also, the real needs of teachers are not gathered nor analyzed prior the development of the contents of the MCPD modules.

During the past decade, the MCPD sessions were organized and devoted to the integration of ICTs in education in the framework of a special program on the implementation of ICTs in Education (GENIE 2009) “*GENéralisation des technologies d’ Information et de communication dans l’Enseignement*” (GENIE). These sessions were the more regular and successful ones in the MCPD programs. Also some Open Distance Learning (ODL) initiatives have been introduced (Messaoudi 2012) but most of them remained confined to the experimentation stage, and this mode of training is still embryonic in Morocco. Its development is dependent on the government conviction and willing. Of course, it requires an efficient and well trained staff of key players, managers and tutors.

Otherwise, at the organizational level, the Regional Academy for Education and Training “*Académie Régionale pour l’ Education et la Formation*” (AREF) are supposed to be involved in CPD and monitor its programs in collabora-

tion with the General Inspection and Educational Affairs Departments, but their interventions faced some problems that will be given in this paper's results.

METHODOLOGY

The objectives of the Math-PDP research are: to examine mathematics teacher professional development programmes of the participating countries in international systemic assessments and professional development programmes; to learn from exemplary practices of mathematics teacher development programmes in use (from countries in the sample) in efforts to improve mathematics teacher development programmes in these countries; to propose a systemic and nationwide improvement of mathematics teacher professional development programmes for South Africa and other participating countries; to facilitate sharing of research skills and output, networking and forming partnerships and to publish articles dedicated to this study in a *Special Issue*.

The Key Research Questions concerned the nature of mathematics teacher professional development programmes that exist in participating countries; the challenges experienced in implementing current initiatives in mathematics teacher professional development programmes; the aspects of mathematics teacher professional development programmes that can be adapted from exemplary programmes for use in South Africa and other participating countries and how can these programmes be adapted for use in an ODL context.

Seven research instruments have been set up during the first workshop of the Project Team, held in Pretoria, in March 2013, namely: Ministry Instrument, Providers' instrument, District official instrument, Principal's interviews, Mathematics teachers' instrument, Subject advisor's interview, Observation schedule-facilitators. For Morocco all the instruments have been translated and administered in French, they have been all used for the Pilot research except the Observation schedule-facilitators instrument because no session of MCPD was organized during the piloting period.

The collected data has concerned the Primary (grades 1 to 6), Secondary (grades 7 to 9 and 10 to 12) and (Bac+1, Bac+2) school levels. The interviewed population (directly or through the

questionnaires) included Representatives of the Ministry of National Education, Directors of *AREF*, principals, Mathematics inspectors and Mathematics teachers. The ratio women /men of participants is approximately 20 percent.

It is obvious that involving some educational authorities concerned by the CPD in Morocco was necessary for a good piloting of the study, so contacts have been undertaken with: University Mohammed V Rabat, *ENS Takaddoum* - Rabat, the Central Unit of Management Training of the Ministry of Education "*Unité Centrale de Formation des Cadres*" (*UCFD*), the National Centre of Educational Innovations and Experimentations of the Ministry of Education "*Centre National des Innovations Pédagogiques et d'Expérimentation*" (*CNIPE*).

An official letter from the Director of *ENS Takaddoum* was sent to the *UCFD* Director asking him to assist me to access research participants, namely, District officials of the Ministry of Education (*AREF* Directors), Principals, Mathematics inspectors and Mathematics teachers.

RESULTS

The paper results confirmed that the Ministry of National Education is the official provider of CPD in the country. The interviewed representatives of the Ministry of National Education emphasized that there is a general policy of the Continuous Professional Development (CPD) for teachers in general in Morocco. It is formulated by the *UCFC* in collaboration with other Ministry of National Education services like: *CNIPE*; *CURRICULA*; Secretariat General of the Ministry of Education; Informatic Technology (IT) systems; General Inspection for Educational and administrative affairs ... The vision and mission of CPD in the country are the strengthening of teachers' professional skills. Academic knowledge is strengthened in the initial training and the professional skills are supposed to be acquired in the CPD programs. The provided CPD programs consist on sessions for professional promotion and also for continuous training on some special items like: Integration or reinforcement of languages (Tamazight, Arabic, French); Pedagogical directives; Use of the textbooks; Skills-based approach (*APC: Approche Par Compétence*); Integration of ICTs in Education etc... These professional development programs are valid for Mathematics Con-

tinuous Professional Development (MCPD) with some variants, for example ICTs have been more developed. The MCPD programs consist in organizing training sessions to improve the curricula, to initiate for new educational methodologies and tools useful for the teaching/learning related to the using of ICTs in Mathematics courses. But political decisions resulting from a government change, lack of long-term agenda of continuing training sessions and of involvement of real competences in the training staff with teachers' unavailability, are hindering the effective and efficient integration of MCPD in the country.

The MCPD programs are monitored by the Regional Academies for Education and Training "*Académie Régionale pour l'Éducation et la Formation*" (AREF) in collaboration with the General Inspection and Educational Affairs. Representatives of some AREFs brought up the lack of: coordination between the different departments of the Ministry of Education in charge of the CPD in general; human resources; multiannual programs of CPD; a strategy and long-term national program; a particular strategy for the development of a continuous training based on an identification of human needs and of a structure totally devoted to the CPD programs. They apologized that the Regional Councils for CPD created within some AREFs, are not yet really operational except in a very few AREF, where international workshops have been organized in partnership with some Moroccan and French universities with the support of the United States Agency for International Development (USAID).

As for Principals, they unanimously apologize for not being efficiently involved in the MCPD programs. They outlined that their task consist of forwarding the MCPD invitations to teachers or assisting in providing venues or materials, and that they are not associated in programming the MCPD sessions, in defining the training modules, in contributing in the selection of trainers etc... They emphasized that the training modules subjects are set up by the Ministry of Education without taking into account of the teachers' needs and that the period is often not adequate. They suggested that the MCPD be valorized by certification and that the sessions be organized in the beginning of July and/or September, which is the beginning and the end of the summer holiday period, for

not disturbing teachers during their teaching sessions in school, and also to let them benefit from their holidays. To end they underlined that a particular attention should be given to teachers in rural areas.

Concerning the Mathematics inspectors, the main MCPD trainers, they confirmed that the MCPD programs are included in the school policy, but such activities are carried out in the school in a sporadic manner in time and space, and that a set up agenda for regular regional sessions of MCPD is often not available, except for training sessions devoted to the integration of ICTs organized within the framework of the GENIE Program. They underlined that the MCPD priorities are defined by the Ministry of National Education, that the training sessions are set up taking into account of the introduced innovations in the Moroccan educational system only and are closely linked to the government notes and guidelines, they are rarely organized upon the inspectors' initiative. They apologized that teachers' needs are not collected prior the MCPD sessions and emphasized that the MCPD programs in general, as they are currently provided, are not really improving the teaching in school, in particular at the secondary level. They reported that the integration of ICTs and the use of digital resources in the teaching/learning in mathematics courses are currently the more needed professional assistance requested by mathematics teachers. They concluded that the absence of a strategic vision of the MCPD consisting in analyzing the teachers' needs and the useful skills related to educational innovations, in programming the adequate training modules, in operating an open evaluation and ensuring an efficient follow up, is strongly hindering a relevant and efficient implementation of the MCPD programs. The Mathematics inspectors feeling is that the current weakness of the MCPD programs is due to the absence of an annual agenda, the sessions venue is often located far from the schools where teachers are acting, the material placed at the disposal of the activity is not adequate, the period is often poorly chosen, it is not taken into account of the requirements in terms of training of teachers, the overload of teachers hampers their motivation for a continuous training. They suggested that the piloting of the MCPD programs be entrusted to a single instance at both central and regional levels to avoid the current lack of coordination between the various servic-

es of the Ministry of Education concerned by the CPD in general.

Now, Mathematics teachers are globally wishing for more efficient MCPD programs. They consider that the MCPD programs should take into account of their real needs and that it is not wise for the continuous training to be ensured by the inspectors. Various kinds of training should be envisaged: face to face, distance learning, etc....for them the MCPD sessions mean, to assist them in updating their discipline knowledge and ensuring a professional development by acquiring mathematics education skills, educational methodologies, by involving the student in building lessons, by integrating the ICTs in courses (How to use computer software in the teaching of mathematics) and the MCPD activities should also focus on how the teacher could be aware of the cognitive difficulties of pupils and let them be able to react and also encourage to explore different teaching ways for a relevant lesson to improve the mathematical knowledge by themes (Algebra, Analysis, Probabilities and Statistics) useful for the teaching.

The Mathematics teachers feeling is that very few MCPD programs are provided currently, except on ICTs. Sessions are organized during holidays and sometimes during the school lessons time, their venues are generally far from schools. The participation to such programs is motivated by upgrading qualification and then salary increase. They consider that attending the MCPD programs would be fruitful if they could better succeed in the classroom practice in particular by letting students enjoy mathematics and having good scores in exams. They apologized that there is no follow-up of the MCPD programs. They suggested that the MCPD sessions be compulsory and be given a value through certification. The MCPD agenda should be set up at the beginning of the academic year and the sessions scheduled outside of the school lessons time, July and September could be used for such programs. The modules should be chosen by taking into account of the teachers needs, the introduced innovations in the curricula, in the teaching methodologies, in the assessment etc.... They underlined that they often have to manage their adaptation, self-instruction even their self-tuition by their own efforts.

DISCUSSION

Beyond the acquisition of Mathematics knowledge, the teacher is asked to be professional. The teacher training is taking a new way, based on the development of professional competences, and concerned by the "Alternation" which would favor the adequacy training/employment. As for The MCPD programs, their effective implementation would be facilitated by stating the training compulsory (which has been already included in the Emergency Program policy, but is not yet a reality), by intensifying the training sessions, by selecting relevant training modules responding to the teachers needs and the reforms introduced in the Education, by setting up an adequate and regular annual agenda for the MCPD sessions and by choosing their venues where computer hardware or other requirements for the program are available. The current strategies need a re-thinking and improvement by involving more efficiently the various Regional Academies for Education and Training (AREF), by providing special funding and other support for such programs (useful materials, multimedia rooms etc.).

The MCPD sessions need to be organized to assist teachers to strengthen their discipline or content subject knowledge and ensuring a professional development by acquiring mathematics education skills, educational methodologies, by involving the student in building lessons, by integrating the ICTs in courses (How to use computer software in the teaching of mathematics). The sessions should influence the professional practices and help in considering the student as a partner in the construction and appropriation of knowledge, in developing the "student - centered learning" educational strategy. The various activities should also focus on how the teacher could be aware of the cognitive difficulties of pupils and let the teacher be able to react. The provided sessions should help to explore different teaching ways improving the mathematical knowledge by themes (Algebra, Analysis, Probabilities and Statistics) useful for the teaching. It is obvious that the modules should be chosen by taking into account of the introduced innovations in the curricula, in the teaching methodologies, in the assessment, but also upon the inspectors' reports, in order to respond to the teachers' needs. It is necessary that the MCPD agenda be set up at the begin-

ning of the academic year and the sessions scheduled outside of the school lessons time. For more efficiency, the attendance to MCPD sessions should be valorized by certification.

CONCLUSION

Regarding the various references used for this paper and the results research, we can deduce that currently, the implemented strategies to develop the MCPD in Morocco, consist organizing training sessions to improve the curricula, initiation of new educational methodologies and tools useful for the teaching/learning related to the using of ICTs in Mathematics courses. The MCPD programs don't have projects or explicit objectives, no institutionalized and organized sessions, no research at the national or regional level, no initiative to identify the needs of teachers in order to develop adequate goals. Political decisions resulting from a government change, lack of long-term agenda of continuing training sessions and of involvement of real competences in the training staff with teachers' unavailability, hinder the effective and efficient integration of MCPD in the country.

RECOMMENDATIONS

The setting up of the *FUE* should be encouraged and generalized to the various universities in the country, for an initial training to a good standard. *CRMEF* and schools should collaborate closely to provide to student-teachers professional competences needed by this new century. University lecturers should also be involved in MCPD programs to train mathematics teachers to acquire needed knowledge for teaching in schools. Also, it would be relevant to introduce the Open Distance learning for MCPD. A progressive implementation of ODL-MCPD would be more appreciated and easily integrated, for example by alternating "distance" and "face to face" before using the "fully on line".

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