[Panelist]

Aiming at Education for All in Brazil: quantitative and qualitative perspectives

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The main purpose of this short talk is to contribute to the discussion of the theme Promotion of Education for All, especially from the viewpoint of Teacher Education.

It has been remarkable in last decades the phenomenon of globalization of the world making much more visible the contrasts as well as the issues of common interest in education problems especially in Mathematics Education. Mathematics is one fundamental part of school curriculum in all countries so the contemporary world of fast communication invites to develop international collaborations beyond the frontiers of geographic, cultural, economic, language levels in order to broaden the knowledge about this research area as well as to amplify the efficient teaching and learning methodologies.

I first introduce the characteristics of Brazil, because in order to understand the world educational issues going beyond the knowledge about small local and familiar environments, one must look at the quantitative and qualitative scale of other countries that would lead to finding the common grounds of educational issues.

In this talk, I will display how the influence of Lesson Study principles in Problem Solving Lessons and Singapore Mathematics bar model are contributing to a Brazilian Project of Professional Development for Lower Secondary Mathematics school-teachers. This project helps teachers to overcome the difficulty of paradigm change in teaching style, deepening the understanding about the role of teacher in the dynamics of participative learning and the improvement of quality assessment. Other initiative is Master Program especially designed for in-service teachers.

Brazil is a continental size country in South America (8.5 million km^2), being a colony of Portugal starting 1500, so its young history is quite different from of old countries like Japan. The massive immigration in 19^{th} and 20^{th} centuries from Europe and Japan after the end of slavery system contributed to extensive diversity of Brazilian population from North to South, economic as well as ethnic and culturally. Brazil has a rich environment as different as Amazonian tropical region to arid Northeastern region and Industrial and agriculturally developed Southern region in which the Metropolitan area of São Paulo is larger than Tokyo.

The growth of population in Brazil is a big challenge for any government, for in 30 years it has doubled, from 93 million in the decade of 70's to 190 million in 2000. Currently it is around 200 million. Since the development and the prosperity of a country depend strongly on the education level of its population, it is a duty of every governmental administration to rule a policy to offer Quality Education for All.

The establishment of Educational Regulations to make the Fundamental Schooling (1 to 9 grades, 6 to 14 years old) mandatory 25 years ago was the start of the struggle to achieve the goal of young generation with literacy in language and mathematics. Before 80's the school education was a privilege of few.

In the recent education census of 2011, one sees that about 92% of children of ages 6 to 14 years old was enrolled in the school system, still having more than 5 million out of the classrooms. It sounds that quantitatively the picture is not that bad. However, the school dropping and functional analphabetism is huge educational problem reflected in the poor result in international comparative examinations, for example in PISA-OECD (57^{th} out of 64 countries).

In this challenging scenario, as mathematician and mathematics educator, focused in the improvement of Teacher Education, I am convinced that the key factor that will contribute to demanded transformation of education is a constant monitoring of the modernization of Teacher Education Curricula, simultaneously to reinforcing the many professional development courses for teachers towards research type activities "in and for" **practices**.

In Brazil, we see increasing need for qualified teachers aligned to the quantitative dimension as consequence of inclusive policy of providing Education for All. Besides the number factor, the teacher education system presents a gap between the profile of teachers working in 1^{st} to 5^{th} grades of elementary cycle of Basic Education and of working in 6^{th} to 9^{th} grades and upper secondary level (10^{th} to 12^{th} grades). The mathematics and methodological knowledge gap between the levels is one of the reasons that the quality of Brazilian students' knowledge has not improved in decades, though the quality of higher research in basic sciences has achieved international level, being a young Brazilian researcher the first awardee of Fields Medal in South America.

In this difficult scenario, my research projects aim to take the advantage of the knowledge exchanged between CRICED-U. Tsukuba to integrate the best strategies of teaching and learning mathematics to diminish the gaps, especially between levels, focusing in developing hands-on workshops with materials followed by conceptual mathematics that would explain the evolution process of learning.

My current projects concern a Master level graduate course for mathematics teachers, and a professional development courses for lower secondary school teachers, with theoretical framework of Pedagogical Content Knowledge, Lesson Study principles, Problem Solving Lesson Design through inquiry and discovery to enhance the content knowledge and capacity to teach through error analysis. The research trend follows the PBPD (practice based professional development) as distinguished in ICMI Study 15, and we make progress in production of PLT (professional learning task). The PLT of the project PROF-OBMEP uses a series of teaching material developed for in-service teachers to learn how to teach, to change the paradigm of the classroom dynamics, to understand the pedagogical meaning of problem solving steps, to amplify the meanings of assessment of students' learning through qualitative analysis of errors.

In this talk, I will illustrate with pictures taken from field experiences of the projects based on Lesson Study principles in Brazilian environment since 2004, as well as from

the Graduate Master Program in Teaching Mathematics of UFSCar. I acknowledge the many collaborators, students and schools that have taken the proposal of the projects to the classroom-practices.

I have the privilege of collaborating with CRICED- U. Tsukuba for profitable exchange of experiences and knowledge that goes beyond the frontiers of countries and culture towards a meaningful research in Mathematics Education. Many thanks are due to professor Masami Isoda for generous partnership in this collaboration.