Ridwan Abdullah Sani

The Gender Dimension in Learning Achievement and Transition to STEM

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Preface

This book is a report about study of gender gap of learning achievement in mathematics and science of junior high school of Indonesia, and student transition to study in Science Technology Engineering and Mathematics (STEM) related study programs of higher education. The analysis of student progression to STEM related study program is including socio-cultural and psychosocial aspects such as student and teacher attitudes and motivations, families' perceptions and factors related to school environment.

This study is carried out under contract number 4500239610 of May 15th 2014, between UNESCO and Ridwan Abdullah Sani from Indonesia as individual consultant. I would like to thank you to Alienor Salmon and Ramya Vivekanandan of UNESCO Bangkok who arranged for this study. Special acknowledgment to Ferry Yulmarino from Education Quality Assurance Center of ministry of Education and Syawal Gultom from Education Quality Assurance and Human Resources Development of ministry of Education who supports this study and provided school evaluation report data.

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Executive Summary

The main objective of this study is to explore gender gap in learning achievement in mathematics and science of junior high school of Indonesia, and student transition to study STEM related study programs in higher education. Primary data is collected using questionnaire from 5 urban schools and 5 rural schools of North Sumatera, South Sumatera, Jakarta, West Java, East Kalimantan, and South Sulawesi provinces. Observation of teaching and learning process is also carried out at 4 urban schools and 4 rural schools. Secondary data was collected from internet sources, especially related to national examination results, PISA/TIMSS results, labor forces statistics, student enrolment and STEM related study program graduate of university, school evaluation report, teacher competency, and previous report related to gender research.

Female and male student learning achievement in mathematics and science is correlated to transition to higher education in STEM-related fields of study, and also correlated to the proportion of women working in STEM fields. The analysis of student progression to STEM related study program is including socio-cultural and psychosocial aspects such as student and teacher attitudes and motivations, families' perceptions and factors related to school environment. Finally, all factors are interrelated in order to identify and formulate education policy recomendations to mitigating the gap of girls and boys learning in mathematics and science.

The result of Indonesia student of grade 8 in TIMSS and PISA are of the lowest category of cognitive level. Compared to another country, Indonesia student are also in the lowest achievement

group. This condition is relevant with the low quality of educational process reported in the school evaluation report. Students realize the important of mathematics and science for further study and their future career. Most of female and male students try to improve their achievement in learning mathematics and science, although they find that the subject is difficult to understand. Their parents and teachers also influence and support them to pursue study program and career related to STEM in the future.

Female student in this study seem interested in STEM related sector career, and they are not influence by any socio-cultural factors. Several students decided not to pursue further education related to STEM fields, because they do not like mathematics and science. Psycho-social factors related to school environment seem affect female student in determined their future career, especially the teacher support and parent encouragement. However, most of student decided the study program for higher education by their own goal of future career. Current participation of women in STEM sector employment is quite high. Students had determined their plan for future study/career depends on their learning achievement at junior high school level. Labor market also play an important role of female career choice, the STEM related sector offer better remuneration and wider variety of job possibility.

Education policy of gender mainstreaming implementation in education is influence girls learning achievement and career choice in STEM related fields. The education policy has impact better school environments to encourage girls to learn better. However the quality of teaching and learning is still the main problem encountered. Indonesia must reform the education, especially the

quality of teacher, teaching and learning process, and better assessment. New rule for teacher education, recruitment, and evaluation must be proposed and implemented. Reward and merit system related to teacher and school headmaster performance must be control by the society and central government. Reformation of assessment to measure student thinking ability rather than low level of thinking must be implemented at school, district, and national level.

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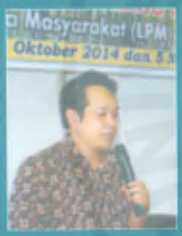

RIDWAN ABDULLAH SANI dilahirkan di Pangkalpinang, Propinsi Bangka Belitung pada tanggal 10 Juni 1964. Menyelesaikan kuliah S1 pada tahun 1987 di jurusan Pendidikan Fisika IKIP Bandung, lulus S2 pada tahun 1993 di jurusan Fisika di ITB, dan lulus S3 pada tahun 2000 di jurusan Fisika ITB. Bertugas di Universitas Negeri Medan (dh IKIP Medan) sejak tahun 1988, menjadi kepala laboratorium Fisika periode 2003-2007, Direktur SPMU TPSDP Unimed periode 2004-2007, Ketua Lembaga Penelitian Unimed periode 2007-2011, Ketua Lembaga Pengabdian kepada Masyarakat Unimed periode 2012-2016. Pelatih Olimpiade Sains di Dinas Pendidikan Propinsi Sumatera Utara tahun 2004-2009, reviewer Dewan Pendidikan Tinggi Depdiknas tahun 2005-2012, pembimbing KTI-online P4TK Bandung sejak tahun 2009, dan konsultan Unesco untuk penelitian pendidikan MIPA pada tahun 2014. Menulis beberapa buku Fisika dan Pendidikan, serta membina Asosiasi Guru Fisika Propinsi Sumatera Utara.

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