14 July 2017

PhD Scholarship in Education

Norwegian University of Science and Technology (NTNU – Norway) in collaboration with Bahir Dar University – BDU (Ethiopia) invites academic staff from BDU and University of Juba (UJ) to apply for a PhD scholarship within the framework of the NORHED funded project on "**Advancing Quality in Education in the Primary and Lower Secondary Schools in Ethiopia and South Sudan**". The project will be implemented over a period of 5 years (August 15, 2016 - August 2021), led by BDU with grant funding from the Norwegian Agency for Development Cooperation (NORAD) NORHED Programme.

About the Project: Background Information

Ethiopia's national strategic policy for Science, Technology and Mathematics Education emphasizes the improvement of teaching and learning science and mathematics from pre-school through tertiary levels of education. The policy is aligned to the objectives stated in the second Growth and Transformation Plan (GTP II), the fifth Education Sector Development Program (ESDP-V) and Climate Resilient Green Economy (CRGE) and supports for the achievement of these objectives. The policy also guides the education sector on how to develop the human resources required to achieve the national objectives of leading the country's rapid and demanding economic growth. Hence, this project is expected to contribute to the national development goals by developing the capacity and competence of the human resource in STEM education.

The proposed PhD projects need to focus on the following three areas.

Focus area I: Improving Science teaching and learning (two positions)

The two positions are one in Chemistry Education and one in Biology Education. Students' interests and attitudes towards Science, Technology, Engineering and Mathematics (STEM) subjects will influence the learning outcomes, achievements and ultimately their desire to choose STEM related careers.

Research indicate that inquiry based learning (IBL) approaches have positive impact on students' interests and motivation towards STEM subjects. Learning and teaching of mathematics and science are indeed deeply rooted in the culture, and thus the status depends significantly on the country and the subject, but apparently, IBL is not implemented as widespread as expected. Connecting IBL in school with the contexts found in the world of work (WoW) and students' everyday life, is also seen as a way to make science more meaningful for young students and motivating their interest in careers in science.

Providing rich opportunities for collaborative reflection and discussion among teachers (e.g., of teachers' practice, students' work, or other artifacts), e.g. using lesson or learning studies, presents a core feature of effective change processes. Another way to support teachers' professional development is through carefully designed teaching materials being situated in teachers' daily practice.

The PhD candidate is therefore encouraged to frame the proposal in the context of teaching and learning biology particularly on how to enhance teachers' pedagogical content knowledge for implementation of inquiry-based science teaching and learning in primary or lower secondary school. Possible directions are development of inquiry-based instructional designs, teaching practices promoting inquiry, materials development and implementation of lesson studies.

Practical work is reckoned to be an effective instructional strategy in science teaching. For chemistry in particular, laboratory work must be considered an obvious and integral part at all levels. Understood as hands-on activities dealing with materials, laboratory practical work can motivate students' imagination and curiosity, help develop their understanding of science content as well as the nature of science, and invites inquiry-based teaching and a closer classroom interaction. Although practical work has been recognized as important for science teaching in Ethiopia, lack of infrastructure, laboratory facilities and sufficient teacher training suggest that much remains to be done in order for a practical work to be properly integrated in science teaching in the country.

Candidates with a solid background in chemistry are encouraged to map existing misconceptions within a chemical area and develop and test experimental activities adapted to local contexts. Potential students are also encouraged to develop their own research themes but within the overall project framework. A concept note on the selected project must be included in the application.

Candidates without a solid background in science subjects can do research in gender mainstreaming related to science education. Gender mainstreaming is a cross cutting issue throughout the project's education and research activities. Gender issues are important in STEM education and research. Recent studies have shown a narrowing of the gender gap in STEM achievement, but such differences still exist among students, mostly at the high school level. Students' attitudes toward STEM subjects is also bound to affect their learning and performance. Improving the quality of STEM education and research will require integrating gender issues.

The PhD candidate is encouraged to write a concept note on **"**Investigation of female students' attitude and achievement in STEM subjects (especially chemistry), or developing and testing student-learning activities fitted to girls' needs" – including 'indigenous' science.

Focus area II: Improving Mathematics teaching and learning

National learning assessment results in Ethiopia show that mathematics performance is among the lowest of all the school subjects. Recent national learning assessment results indicate that 56.30% of grade 4 and 61.30 of grade 8 students performed below basic level. Furthermore, 85.3% of grade 10 students' mathematics score was found to be below 50%. This necessitates conducting further investigation to improve the teaching and learning of mathematics. Hence,

proposals pertaining to the improvement of classroom mathematics teaching and learning practices at primary and lower secondary schools are encouraged. Such proposals could be targeted at studies with the aim of developing mathematics teacher education and/or further education of mathematics teachers.

It can include, but are not limited to: Inquiry-Based Learning (IBL), Experimenting and discovering, problem-based mathematics instruction, Realistic Mathematics Education (RME), the effective use of manipulatives (virtual or concrete), language and mathematics, technology in mathematics education, digital platforms for mathematics education research, Quantitative and experimental methods, gender in mathematics education, high-leverage mathematics and the use of rehearsals in mathematics teacher education, mathematical knowledge for teaching, in particular content knowledge special for mathematics teachers, digital platforms for mathematics education research, history of mathematics education, teacher knowledge, especially, the Pedagogical Content knowledge (PCK), comparative studies. Also topics related to the teaching and learning of specific topics: geometrical thinking, number sense, algebraic thinking, fractions, algebra, data and probability.

Focus area III: Environmental education

Sustainability is a global issue which should be a major concern for every country. Likewise, developing countries like Ethiopia and South Sudan, need to give priority for sustainability. Environmental sustainability concerned about issues related to climate change, land degradation, resource scarcity and other national and regional issues would be pertinent in current efforts to promote science and technology or STEM driven economies in the global south. To integrate concern for sustainability into the development of the society, it is important to start with primary and secondary education and give children relevant understanding of environmental problems and how society can deal with them. A PhD research proposal pertaining to climatic change, land degradation, resource scarcity or other issues of regional importance are welcomed. Specifically, the study may focus on how to give pupils a reflexive and informed view on key environmental issues such as the degree to which new research on environmental issues trickle down into school, in what way do the schools have a critical perspective on the relation between environmental problems and the social costs and benefits to environmental policies. Environmental problem should be touched to be interpreted both in a scientific and political sense – demanding a reflexive way of thinking. Further the study has to look at how those issues can be touched in a manner actually motivating the pupils to learn more and engage in social action towards greater sustainability as well as how environmental knowledge can be transferred through environmental and geographical education to give environmental engagement and concern.

How to apply: Interested applicants should submit applications by e-mail to the Project Coordinator at BDU: Dr. Dawit Asrat Getahun, Director of the Institute of Pedagogical and Educational Research; Email: dawitas@yahoo.com

The application should include:

1) A brief statement of interest or cover letter not more than two pages describing your motivation to apply

2) a PhD research proposal of no more than ten pages (page format A4 with 2.5 cm margins, single spacing and Times New Roman 12-point font) outlining the thematic focus and specifying how it relates to the overall project, research questions or hypothesis, methodological and theoretical focus, a timeframe of activities and a list of expected outputs,

3) A detailed curriculum vitae (CV),

4) Certified copy of masters degree certificates and certified transcripts of academic records

5) Publications, if any. It is often difficult to judge the applicant's contribution to publications with multiple authors; hence a short description of the applicant's contribution must be included and

6) Contact information of two referees (preferably one from a previous supervisor) with phone numbers and e-mail addresses

Eligibility requirements, qualifications and experience: The applicant should be employed at BDU (Ethiopia) or at the University of Juba (South Sudan). The position related to math and chemistry education will be located at BDU, while the positions in biology and environmental education will be located in University of Juba.

Applicants must have a strong academic background with a five-year Masters degree within Science or a suitable Teacher Education subject, or possess corresponding qualifications which could provide a basis for successfully completing a doctorate. Both the grade for the Master's thesis and the weighted average grade of the Master's degree must individually be equivalent to or better than a B grade. Experience with teaching (minimum of 2 years) and conducting research in teacher education and strong analytical and writing skills (any peer-reviewed publications) will be considered a major advantage. Female candidates are encouraged to apply.

Language skills: To be qualified the applicant should also have very good English skills both oral and in writing.

Age limits: Not more than **45 years** at the time of application

PhD Scholarship and study conditions: The successful candidate will have PhD scholarship for a period of three years and will be expected to register at the Norwegian University of Science and Technology (NTNU) in Norway. The student will be expected to follow the registration procedures at NTNU. The student will be expected to spend a total of 14 months at NTNU and the rest of the PhD study period will be spent at the University of Bahir Dar (BDU) in Ethiopia. The monthly stipend will be **NOK 15200** while in Norway and **NOK 10670** each year for the period spent in Ethiopia. The successful candidate will become part of an organized research team on the NOHERD Project and will be expected to write a paper based thesis which will contribute to the project's publication targets. Thus, the candidate

should be able to work independently but also as part of the project team. Research and travel expenses to and from Norway will be covered by the project.

The selection process: Applications will be evaluated by the Project Team. The final decision will be made by the potential supervisors at NTNU and BDU based on recommendations from the project team. When assessing the applications, emphasis will be put on: 1. The quality of the project proposal and 2) The proposal's alignment with the project goals, and 3) the Masters study grades. The successful applicant must qualify for formal admission as a PhD student at NTNU. See http://www.ntnu.edu/studies/phprolus for information about PhD studies at NTNU.

Expected start date: The planned starting date is **mid October 2017**. The student will be expected to refine the research proposal at NTNU, review literature, participate in seminars and possibly take some methodological courses.

Application deadline: All application materials (including scanned copies of academic documents) must be received by **20. August 2017.**

Women are encouraged to apply for all the positions.

Further information is available by contacting Jørund Aasetre, e-mail: jorund.aasetre@ntnu.no / phone: +47 93211139 or Charlotte N. Jjunju charlotte.jjunju@ntnu.no at the Department of Teacher Education, Norwegian University of Science and Technology.