

the Open University of Tanzania in August 2015, to promote distance learning programs between the two institutions. The University of Bahr el Ghazal entered a similar arrangement with Makerere University in Uganda and the University of Oslo in Norway. Also, Texas's A&M University and the University of New York signed an MoU with John Garang Memorial University in June 2010. Following the outbreak of war, however, the international community suspended its assistance to the universities, as it shifted its attention to the humanitarian crisis.

#### CONCLUSION

South Sudan's tertiary sector is confronted with many challenges. Although universities are unable to entirely overcome the problems, they employ strategies to live with them. This experience offers invaluable lessons for comparable higher education systems in (post-)conflict contexts. ■

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## Gender Inequity in African University Engineering Programs

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The African philosopher and educationalist James Aggrey (1875–1927) stated that if you educate a man, you educate an individual, but if you educate a woman you educate a family, indeed a nation. This statement suggests that the education of women is significant to the development of Africa. Though African men contribute to development, African women carry a heavier portion of the continent's underdevelopment burden in the fields of health and child-care; agriculture; and food production, processing, and preservation. For instance, invariably, African rural communities have no access to pipe-borne water systems and nonfossil fuel. It is the lot of African women to travel long distances to fetch water and firewood for household consumption.

Enrollment statistics indicate that African women are underrepresented in university engineering programs

across the African continent. For example, at Fourah Bay College, University of Sierra Leone, while marginal progress has been made in female enrollment in the engineering program, the percentage of male enrollment is about 90 percent.

Similarly, at one of the oldest African universities, Makerere University, Uganda, 2160 students enrolled in the engineering programs in the 2009–2010 academic year. Among them, only 22 percent were women. At the University of Rwanda, the percentage of women enrolled in engineering programs in the 2013–2014 and 2014–2015 academic years was 20 percent and 19 percent respectively. The University of Mines and Technology, Ghana, matriculated 503 undergraduate students in the 2014–2015 academic year. The proportion of women was only 16 percent. In the previous year, it was almost 20 percent. In average, the percentage of matriculated female students of that university hovers around 15–20 percent.

The underrepresentation of women in university engineering programs in Africa cannot be attributed solely to a lack of interest, ability, or intellectual capacity. Instead, a traditional presentation of science and mathematics as a male domain; societal cultural practices that prioritize the education of men over that of women; and an unsupportive science and mathematics teaching environment in secondary school contribute to the paucity of African women studying engineering in African universities. Thus, it is palpably an issue of social injustice, involving an unfair distribution of engineering education opportunities.

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#### GENDER PARITY OR EQUITY?

Most African universities publish enrollment statistics showing the percentage of women and men. The University of Cape Coast, Ghana, is an obvious case. It publishes its enrollment statistics displaying the year and the corresponding gender distribution. In the 1962–1963 academic year, for example, a total of 155 students were recorded, with only 8 percent women. In 2011–2012, by contrast, the proportion of female enrollment was 33 percent. Jomo Kenyatta University of Agriculture and Technology, Kenya, has also improved its female enrollment from 14 percent in 2012–2013 to 29 percent in 2013–2014. So did the University of

Yaoundé, Cameroon, which increased its female enrollment in 2015-2016 to about 38 percent compared to 27 percent the previous year.

Other African universities have posted similar improvements in their enrollment of women. Though these statistics are a useful tool to monitor the access of women to university, they do not show the programs in which women enrol, in particular engineering. This is equally relevant for South African universities, which have achieved an average of 53 percent female enrollment. It appears that most African universities have focused more on gender parity, to the neglect of gender equity, which looks at gender access and distribution per academic programs, particularly engineering.

#### **SOCIAL JUSTICE STRATEGIES: WHAT CAN BE DONE?**

Some African universities have implemented four strategies of affirmative action to boost women's enrollments in their engineering programs:

- *Admission quotas:* a percentage of study places in engineering programs are specifically allocated to women. A common variation of this strategy is to offer admission to prospective female students almost meeting entrance requirements. While empirical evidence from the University of Ghana and the University of Dar es Salaam, Tanzania, supports the viability of this strategy, it has been criticized for lowering academic standards and giving preferential treatment to female candidates. Regrettably, in most cases, female students admitted under this policy strategy are not provided the academic support they need to succeed in their chosen engineering programs.
- *Priority consideration:* qualified female candidates are given priority over their male counterparts. It is a simple strategy to implement, since it does not require any elaborate planning. Many African universities, notably the University of Mines and Technology, Ghana, and others, have implemented this policy strategy with tremendous success. But the problem is that it does not concern itself with how female candidates originally attained the necessary qualifications for admission.
- *Academic upgrading:* a variant of this policy is that female candidates with credits close to the required admission standards are offered admission based on their willingness to participate in, and pass, an academic upgrading program. Despite its merits, it focuses exclusively on knowledge acquisition and skills development, not on confidence building.
- *Conditional admission:* female candidates who have achieved what are considered reasonable marks are offered admission contingent upon their ability to attain

specified marks in their first year courses. For example, female candidates who have achieved 75 percent in their mathematics grade may be offered admission into engineering programs on the requirement that they obtain 70 percent or better in their first year mathematics courses. This strategy tends to exert too much pressure on female candidates to satisfy the condition.

#### **A WAY FORWARD**

Affirmative action strategies of quota admission, priority consideration, academic upgrading, and conditional admission are all important for addressing the underrepresentation of women in engineering programs in African universities. However, they do not make any dent in the fundamental causes of gender disparity in engineering enrollment. Two major factors, namely girls' enrollment in upper secondary school, and the difficulties of girls studying science and mathematics at that level, must be addressed. African universities should not stand aloof while gender disparity worsens. They should engage in strong advocacy for girls' education and let their voices be heard as development partners.

Upper secondary school is the major source of students to undergraduate engineering programs. Only a few girls do well in courses that enable them to apply to these programs, owing to unsupportive classroom environment; teachers' use of referents outside of girls' daily experiences; a strong preference for boy students; and a patriarchal image of science and mathematics in society.

African universities could influence the number of secondary school girls opting for engineering programs by designing and teaching science, mathematics, and technology programs specifically for girls as part of their community outreach programs. Such interventions aim at helping girls to develop interests, skills, and confidence in those areas. ■

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## Mongolia: Higher Education and Mobility

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The number of Mongolian students abroad has increased tremendously since the country's transition from a Soviet-aligned communist state to a market econo-