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Science teacher shortage and the moonlighting culture: The pathology of the teacher labour market in Uganda

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ABSTRACT

The Ugandan Government promotes the rapid expansion of secondary education and requires an emphasis on mathematics and science subjects at that level, but has a "market" approach to the recruitment of teachers. This study uses both national and local evidence to demonstrate that, not only are the teachers of these subjects too few for the policies to be effective, but many of them are employed in more than one school, and some in other work. This "moonlighting" trend, which contributes to problems of poor service, is seen as part of a questionable tendency to commercialise teaching. Policy changes and practical steps are suggested in order to regulate and reduce moonlighting.

1. Background and rationale

This study illustrates the tensions between two educational agendas that have been adopted widely in low-income countries. On the one hand, governments seek to widen access to primary and secondary education, in keeping with the goals of the Education for All movement. On the other hand, they seek to promote scientific and technological education in order to enhance national economic prospects. Both agendas have some political appeal internally and both have been encouraged by international agencies. But lack of attention to the dilemmas involved, combined with a less than rigorous appraisal of the resources needed, can lead to a widening gap between the objectives and the actual delivery of education.

In response to perceived global advances in knowledge, the Government of Uganda initiated a Science and Technology Innovation Policy in 1994. Within this general framework, it has taken some measures since 2005 intended to prioritise the study of mathematics and science in secondary and tertiary education. These measures have been driven by a perception that the results in these subjects, especially in the Uganda Certificate of Education (O level), are poor and that relatively few students enter degree programmes in the sciences.

The measures taken include, firstly, a requirement that all students in lower secondary education study three natural sciences (biology, chemistry and physics) throughout the cycle; secondly, provision of a new, in-service training programme (SESEMAT) for secondary level teachers of mathematics and science and, thirdly, a quota of 75 per cent for scientific and technological fields of study in the government sponsorship of students in first degree programmes. The policy of three compulsory sciences up to O level is somewhat at variance with the ideas of the Education Sector Strategic Plan of 2004–2015 (MOES, 2004), which advocates a simplified curriculum at the lower secondary level, and it is very ambitious in the context of rapid expansion of secondary education. The expansion has been intensified since 2007 by the "Universal Secondary Education" (USE) programme, which has reduced the financial barriers to attendance by students from poorer backgrounds. The USE policy was adopted with little regard for available resources (see Chapman et al., 2010, pp. 77–78).

The combination of these various policies has considerably increased the demands, both quantitative and qualitative, on the teaching of the natural sciences at the lower secondary level. Mathematics too comes under pressure because of its foundational role in the sciences. The demands on teaching at higher levels are likely to rise also in response to the sponsorship quota mentioned above. But a missing element in this scenario is national planning of the supply of teachers for mathematics and science. While shortages of secondary level teachers in these subjects are a common problem internationally, Uganda seems to represent a notable case of failure to tackle them systematically. Partly as a result, market mechanisms strongly influence the way in which teachers are distributed and the capacity of schools to implement the curriculum.

An important element in this situation is "moonlighting" by teachers: their simultaneous employment in more than one school and also in non-teaching work. While this phenomenon occurs

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widely at the secondary and tertiary levels in Uganda and probably elsewhere, teachers of secondary mathematics and natural science are in relatively high demand and therefore illustrate it well. Most of the moonlighting is actually done in broad daylight, as teachers allocate specific days or half-days to different schools.

The research on which this discussion is based was prompted by the findings of a recent research project on teacher effectiveness in secondary school mathematics and science in Uganda (Centre for Global Development through Education, 2011), which include some limited evidence, in specific clusters of schools, of the teacher shortage problem and sheds light on its implications for classroom processes. The authors, as participants in the latter project, saw the need to study this particular problem in greater depth. The study focuses on teachers of four school subjects—biology, chemistry, physics and mathematics—and for convenience the term, "science teachers" will be used to describe them.[1]

2. Purpose and structure of the study

The general purpose of the study is to explore the dimensions, circumstances and implications of the science teacher shortage in secondary education, with due attention to teachers' multiple employment (moonlighting). Both the pattern of supply and demand affecting science teachers at the national level, and the way in which teachers are actually deployed at more local levels, are considered. The study seeks to clarify the ways in which employers' practices, the labour market, working conditions and individual preferences influence the employment and work patterns of science teachers. The issues that arise from the findings, relating to the management of the secondary education system, are then considered.

In the next section a conceptual framework is presented, based on relevant literature, for understanding the connections between national policies, the distribution of teachers, the manner in which education is delivered and learning outcomes. This framework is wider than the scope of the findings, but provides a context for them. The research methods are described briefly and the evidence is then discussed in three stages. Firstly, an analysis of national and regional data is used to show the extent of the science teacher shortage and some correlates of the shortage. Secondly, the general prevalence of multiple teaching appointments is illustrated with national data. Thirdly, evidence from a local area is used to illustrate science teachers' multiple work commitments, income patterns and workloads. Attention is then drawn to the partially cyclical nature of the teacher shortage and to the ways in which the shortage interacts with other influences on learning. Lastly, the wider implications of the findings are outlined and some measures to alleviate the situation are suggested.

3. Concepts and relevant literature

It has already been mentioned that Uganda's policies of rapid expansion of secondary education and of making three sciences compulsory up to O level have, in combination, increased the demand for science teachers. A situation of rapid expansion and of constrained public expenditure also makes it more difficult for a low-income country to pay teachers adequately (Lewin, 2008) and to attract science graduates into teaching rather than industrial or commercial employment. This is exactly the situation in Uganda, where an incentive allowance for science teachers, approved in principle in 2009, had still not been implemented two years later.[2]

The planning of the teaching force for a given level of education could in principle be attempted at the national level, using enrolment trends, pupil–teacher ratios, school staffing models and teacher attrition data to estimate "demand", while "supply" is planned mainly through the provision of pre-service teacher education and of pay that is sufficient to retain those who are trained. Williams (1979) sets out a convenient methodology for this kind of centralised planning, which is useful especially at times of rapid expansion of enrolment or demographic change. However, in addition to the problem of limited national capacity for such planning, there is considerable variation, among low-income countries, in the extent to which teacher recruitment is centralised or localised (Gaynor, 2005; Bennell and Akyeampong, 2007, pp. 48–49; Urwick, 2011). In Uganda, where there is a mixture of public and private ownership and funding of schools, teacher recruitment is left mainly to district authorities in the case of government schools and to proprietors in the case of private schools. In principle governments can nevertheless monitor the recruitment, payment and management of teachers in order to limit inequalities of supply and standards. But their capacity for such governance (Grindle, 2007) is a relevant issue, especially where multiple agencies are involved.

The combination of a shortage of teachers and of low pay creates a situation where their scarcity value may be exploited through supplementary employment. One possible outcome is the engagement of teachers in private tutoring, on which considerable research has been done (e.g. Bray, 2007; Sobhy, 2012) and of which Hallak and Poisson (2007) provide an overview. But in the case of Uganda the characteristic outcome takes a different form: as we have stated, many secondary level teachers (especially science teachers) work in more than one school, through locally negotiated arrangements. Little research has been done on this pattern of multiple teaching appointments. Hallak and Poisson (2007) simply recognise that secondary employment is often related to low or irregular pay for the main job (pp. 161, 166). Bennell and Akyeampong (2007) mention the prevalence of secondary employment among teachers in some African and South Asian countries, but focus attention on private tutoring and farming activities (pp. 51–55).

Teacher shortages tend to make class sizes larger and to reduce the "time on task" for students. Comments will be made on the links between these two variables and learning outcomes. First, however, it is important to note that moonlighting may be expected to reinforce the undesirable effects of a teacher shortage in both respects, In some situations, class sizes can be reduced by increasing teachers' contact time: but it is unlikely that teachers who are moonlighting would wish to increase their contact time for no extra pay. This implies that, in science practical lessons, there would be less opportunity for student initiative and "guided enquiry" (McComas, 2005), as opposed to teacher demonstration. With regard to time on task, such teachers would not go out of their way to reschedule lessons that were cancelled for unforeseen reasons or to spend any extra time to advise individual students. Our case study findings will shed more light on these issues.

In Uganda excessively large classes are common at the secondary as well as primary level: secondary mathematics and science classes of more than sixty are readily visible and teachers widely blame large class sizes for shortcomings of achievement and pedagogy (CGDE, 2011). Although large class sizes are attributable to general shortages of classrooms and teachers and not only to those affecting science subjects, large classes may have particular negative effects on the time allocated to science practical work and on the manner in which such work is supervised.

[1] This demarcation is convenient partly because secondary level teachers in Uganda are expected to specialise in two subjects and the combinations of (1) biology and chemistry and (2) mathematics and physics are more common than any other combinations involving these subjects. Further details are given below.

[2] Information from a teachers' union representative interviewed.