

International Cooperation in Science and Mathematics Education in Africa

Editorial

This special issue of the *Journal of International Cooperation in Education* focuses on “International Cooperation in Science and Mathematics Education in Africa”. The contributions provide descriptions and lessons that might be learned from projects that have involved some form of inter-country collaboration - usually between a developed country and one or more developing ones. Regrettably, only a few of the many projects that have been undertaken in the past few years will be featured here. Nevertheless, it is hoped that this small sample will make for interesting and thought-provoking reading. In the past ten years, Japan has emerged as a factor in cooperation in science and mathematics education in Africa, bringing her own unique perspectives on ODA, rooted in her own history, to the table. In this special issue, a number of persons involved in international cooperation in science and mathematics education in Africa will share their experiences and lessons learned. In most cases, the articles are joint reflections by representatives of both the donor and recipient countries. Donor countries of Japan, the USA, the Netherlands, Britain and Norway are represented, as are Ghana, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia in Africa. Together these articles raise a number of crucial issues for debate and reflection, some of which are high-lighted below.

International cooperation in science and mathematics education in Africa, as viewed from the beginning of the 21st century, has a relatively long history. The decade of the 60s saw many African countries attain independence from the colonial powers of Europe. It was also the decade of ambitious curriculum development projects in science and mathematics education in Britain and the USA - the so-called ‘sputnik-inspired’ initiatives. The Nuffield Foundation sponsored curricula in Britain and their National Science Foundation sponsored counterparts in the USA were seen to be at the cutting edge of the revitalised science curricula in these two countries. So what could be better for the newly emerging African countries than the transference of these cutting edge curricula, perhaps in modified form? Today little remains of these early valiant, but naive, efforts. Both donor and recipient countries have moved on and have learned, to some extent anyway, lessons from the past. One clear trend has emerged. The emphasis has shifted from the adaptation of curricula and curriculum materials to the building of local capacity and the development of partnerships. Almost without exception, the contributions in this issue of the journal are concerned with issues of sustainability, and see the creation of a critical mass of local expertise as a pivotal step in this direction. Most of the capacity building efforts, which are often viewed as two-way enterprises, and the emerging partnerships described in this issue are at the tertiary level. The rationale for this development is that a strong and vibrant community of researchers and

curriculum specialists at this level is key to the continued development and improvement of basic science and mathematics education. Nevertheless, some of the initiatives described in these pages focus on the teachers themselves, and on the quality and type of the INSET that they receive. Capacity building, then, is a commonality that runs through all the contributions in this special issue. But underlying this broad area of agreement are a number of issues raised by some, ignored by others, and on which there appears to be little consensus. It is on these issues that those engaged in collaborative initiatives in whatever capacity, donor or receiver, need self-awareness in order to make informed and sensitive decisions regarding the direction of the endeavours in which they are engaged. It is hoped that these issues, four of which are touched on below, will stimulate critical self-reflection and perhaps even initiate a vigorous debate.

Some of the contributions pick up on a paradox raised in a previous special issue of the CICE journal (Volume 7.1); can outside aid, however well meant, ever foster self-reliance, or will it always result in greater aid-dependence? One contribution explicitly raises this issue and goes on to suggest that there are types of outside assistance that can indeed lead to greater self-reliance. For example, projects that are initiated by persons in the recipient country are more likely to become self-sustaining than those that are imported. Projects that are lodged within host-country structures fare better than those conceived as add-ons. Most of the other articles, in one way or another, touch on these issues of sustainability and self-reliance. None, however, are able to show that the initiatives with which they are involved have indeed attained sustainability, or contributed towards overall self-reliance. Nor is it possible for them to do so within the funding time frames. While individual projects almost always have a date by which that program is to be “self-reliant”, it is not clear, and seldom asked, what happens to these programs in the longer term - five or ten years after the funding has ended. Nor is it customary to evaluate the overall picture in an area such as science and mathematics education, as opposed to the fate of a single project. For example, is it the case that as one project (and hence source of funding) comes to an end, the recipient country merely finds a new funding source based on some new project? And so it is not clear whether recipient countries are moving towards self-reliance or becoming more aid-dependent

If this sample of articles is anything to go by, there is a clear trend away from support to basic (and even secondary) education in favor of building capacity at the tertiary level. The underlying assumption is that a strong and vibrant community of science educators at the tertiary level will ultimately benefit all levels of education, especially teacher development, and even the country as a whole. As stated in one contribution, “It is anticipated that improved MSTE, in turn, will result in more efficient use of resources and greater socio-economic development within the countries concerned, thus contributing directly to poverty reduction.” (Lubben and Sanders, In this issue). This assumption in one form or another underlies many of the projects described in this issue, but it remains an untested one. It is in fact part of a larger assumption that science and mathematics education underlie the development and

economic growth of a country as a whole. So the question remains concerning the validity of the assumption, and indeed whether this capacity building, in the long term, will lead to self-reliance.

One rationale sometimes put forward for Japan's involvement as a donor in mathematics and science education is that these subjects are culturally "neutral", a premise questioned by the authors from Japan (See Kuroda, In this issue). It is argued in at least one of the contributions that mathematics and science education, like any other subject, come with cultural baggage - that they are conveyors of particular values and worldviews. A given science project, for example, could be used to develop a questioning attitude towards authority (science demands scepticism), or to provide legitimacy for a ruling regime - and perhaps even both at the same time. The values held by members from the donor country may be different from those of the recipient country. Indeed, not all members of the recipient country necessarily share the same set of values. Even the nature of science itself is being hotly debated, and any curriculum materials will almost inevitably reflect some bias in this regard. For those contributors who deal with this issue, there appears to be a clear consensus that no mathematics and science initiatives involving donor and recipient countries can ever be culturally or politically neutral. Some of the contributions in this issue describe how their project has taken a deliberate stance, for instance by promoting indigenous knowledge as part of a mathematics curriculum. Others feel that such actions are best left to the host country, rather than the project itself taking a value position. Persons on the donor side may not want to be seen as "cultural imperialists", and so naturally avoid controversy. But how neutral can one be in the face of human rights abuses, such as female mutilation, or harmful misconceptions, such as having sexual relationships with (or raping) a virgin cures AIDS, or that one race is inherently superior to another? Do players in a collaborative project have roles to play, and if so what are these roles, when such practices or beliefs are legitimised with the cloak of "culture", be it of the donor or recipient?

The question of whether to start small - a pilot project - versus beginning at scale (i.e. country wide) surfaces in some of the contributions. Some have opted to begin as pilots in order to show immediate results, and to provide a model for future expansion. Such projects have then faced the problem of scaling up. Others have opted to begin at scale with the realization that the impact will be spread thinly, and that little mid-term benefit is likely to be demonstrated. But no matter what approach is adopted, a larger issue inevitably arises - that of accountability. A number of contributions speak to the pressure on and by funding agencies to show concrete results, such as improved student test results. Although well intended - after all, all projects are designed to produce results and are in the end supported by taxpayers - such pressures tend to focus attention on short terms gains, rather than long term strategies such as capacity building, and result in the initiative being taken away from the recipients.

The question of cultural sensitivity is stressed, either explicitly or implicitly, in most of the contributions. The need of all involved to understand the culture of “the other side” in order to avoid misunderstandings is a reoccurring theme. Curiously, the need to understand, or even question, the agendas of those involved in collaborative projects does not receive much attention. Although the persons involved from both sides have an obvious common goal to “improve science and mathematics education”, it is the unstated motivations that ultimately might be the real driving forces. Why do persons from either side become involved in collaborative projects? What is in it for them - promotion, recognition, remuneration, altruism - and how does this motivation affect their role? Few contributions offer any insights here, especially concerning players from the developed countries. On a macro-level, what do the donor and recipient countries hope to achieve through the collaboration? These are questions that readers may wish to keep in mind as they engage in these illuminating accounts of projects as told by the players themselves.

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