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A case study of technology education in a developing country: Colombia

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Abstract

Currently the Ministry of Education of Colombia is in the process of implementing a proposal for technology education to be incorporated for all school pupils within a general curriculum. This represents an attempt to overcome the inherent limitations of the previous status given to this curriculum area and its precursors, and to seek an appropriate curriculum for a developing country.

Goldsmiths Technology Education Research Unit (TERU) was invited to assist in the development of this programme which would become a pilot project with a representative sample of Colombian schools. This paper charts the development of the project to date in case study form, using this as a platform from which to make comparisons which might usefully illuminate curriculum developments in the field of technology in other countries.

It would be untrue to claim that technology education did not exist in Colombia prior to this initiative being launched in 1992. The teachers involved in the project were trained either as general primary practitioners experienced in whole curriculum approaches to learning, or were teaching as subject specialists within the secondary sector - many holding their specialism in the field of science and technology as precursors to contemporary technology education. However, what was novel about the initiative was its practical, participatory teaching methodology, as well as the notion that technology might form a new subject as a focus for the development of practical capabilities for all school students.

What David Layton has termed “the vocationalisation of general education”¹ and the origins of the impulse for change can be seen to be features of an international trend. In this context it is useful initially to outline some of the concerns within Colombia which have resulted in the changes in technology education currently underway.

Education in Colombia, by necessity, has been formally and didactically organised. How else, one might ask, would a teacher organise and manage the learning of typically 40 - 50 pupils in a classroom not blessed by an abundance of the type of resources that we would take for granted? Where technology has featured it has tended to be within technical institutions taking the form of occupational training rather than vocational education.

Not surprisingly, the present education system in Colombia has been strongly influenced by social and economic factors which prevailed in the 1960s when the dominant mode of development centred on the training of individuals for specific jobs and

occupations, and where there was a need for them to be able to work with imported technologies from industrialised countries.

In practice this led to the not untypical dual system of education characterised by the academic on the one hand and the technical on the other, resulting in the mutual distinction between theory and practice knowledge and thus negating any productive connection between the two. At the technical end of the spectrum practical knowledge was dismissed as merely instrumental, with little value given to knowledge underlying the creation and design of products, resulting in a theoretical approach to technology.²

Contrary to expectation, the technical education followed by 25% of secondary school pupils produced a majority of graduates who preferred to seek entry to university. Those who immediately entered the job market earned acceptable incomes in the short term but, in the medium term, lost their job mobility and could not keep pace with technological change because of the deficiencies in the general content of their training.³

Frank Safford has identified the “fallacy of the technical school” whereby he states that Colombian leaders have invested too much faith in formal education as the instrument by which a change in values could be achieved. Technical training on its own without the support and stimulus of a growing economy could not be expected to bring about the changes sought.⁴

As outlined by Rosa Maria Salazar⁵, employers have not appeared to value technical education as it is taught in schools. They do not identify school as the most appropriate place to learn practical skills,

consider what is taught in them outdated and prefer to teach required technical skills on the job. At the same time they do expect from schools a good level of basic education upon which to build specific occupational skills.⁶

For their part, teachers feel that they cannot teach realistic skills within the scholarly context, yet anything else is seen as non-legitimate or second class in educational terms. They are also concerned that their programmes are outdated for the needs of today's young generation, responding neither to the needs of industry nor the country's development. Given the innumerable and constantly changing skills required in the workforce of any modern economy, it is impractical to expect the education system to provide its students with all the skills they will require throughout their lives.⁷ Rather the role of education is more appropriately to provide students with flexibility and the capacity to continue learning, as part of the concept of education as a lifelong process: that is, extending general education and making it more democratically available, including emphasis on the technological component.

By the late 1980s the reform of high school education had become imminent, both from the social and economic points of view. The aims of such reform were to extend coverage, improve quality, reduce inequality in the provision of the service and seek to establish a common curriculum of a general and basic nature. General education (a new type of education for all) came to be defined as "that which emphasises the acquisition of knowledge which develops in the person the ability to know, understand, assimilate, analyse and explain concepts, theories and general laws applicable to diverse situations". As such, it places emphasis on the acquisition of practical knowledge which is aimed at developing specific skills and abilities based on continuous practice - a knowledge geared towards the execution of concrete tasks or activities.⁸

The 1991 proposal of the Ministry of Education, established the teaching of technology within the context of general education, taking into account all of these recommendations and research findings and with the expectation that its development would contribute significantly to characterising the new high school required by society, with training separated out from general education.

Scientific and technological developments have resulted in the emergence of a technological culture for which it is necessary that education prepares young people to operate effectively in relation to it.

The new approach to teaching technology in schools will make it possible to understand technology as the result of social processes and as a major factor shaping contemporary societies. Technology as part of the general curriculum is seen as a way to bridge the gap between academic and technical education. It aims to instill into young people the adaptability and competence required to deal with the rapid changes taking place in social, technological and scientific developments. It spans grades 0-11, offering the possibility for individuals to comprehend technology: its relationships with nature, society and culture.

Against this background came our involvement with the project supported through the collaboration of the Colombian Ministry of Education, the Fundación Corona and the British Council. The project was designed both for the professional development of the teacher, as well as focusing on curriculum development with the young learner in mind. Our purpose was not to impose a western model of technology education onto a developing country, but to assist key representatives of the country to enhance the development of an appropriate and relevant technology curriculum in each of our countries through a process of equal exchange and mutual interchange.

It was also our intention not to duplicate the weaknesses and less productive approaches which we have learnt about through our experiences in the UK.

These key representatives were targeted to include the expertise of teachers and managers in schools. Approximately 20 schools became pilot schools in this national initiative where the focus was on educating young people for capability, by which was meant enabling them to be reflective and active in responding to the challenges of the technological world in which they operate and from which they negotiate meaning - thus crucially promoting the development of initiative and creativity in young people through technology education.

The first stage of the course, following a number of initial lectures and workshops⁹ introducing Colombian teachers to a model of technology education developing capability, was a one week course in Bogotá in January 1993. It was during this week that the 40 participating teachers were introduced to the Ministry of Education's proposal for technology education in the general curriculum. This was based on the vision that technology education must offer the scope for young people to understand technology, appreciate how it impacts on their daily lives, as well as providing opportunities

for them to develop the knowledge, skills and understanding with which to use for themselves the materials, tools and processes of technology.

Our emphasis throughout the course was on technology as a practical, relevant and concrete subject through which young people are enabled to be (a) creative, innovative and competent as designers and makers, and (b) reflective and initiatory in relation to the knowledge, skills and understanding of designing and making with a range of materials, tools and equipment, always in relation to identifiable human needs.

The second stage of the course took place the following July/August 1993 when 20 of the original 40 teachers were (selected on the basis of development work they had carried out in the interim) to travel from Colombia to London for a 5 week educational and cultural programme based at Goldsmiths College. In planning the course we took the view that learning by active participation and engagement is so much a part of developing capability that teachers, as well as school students, should also be acquiring new knowledge and skills by these means. Consequently the course was planned as a programme of inter-related projects, workshops, lectures and visits through which the visiting teachers would develop both their subject and their teaching skills. Over the course the teachers handled a broad variety of materials - food, textiles, construction materials, control materials, graphics and IT - in tackling their own technological projects. The experiences were devised to raise issues and to stimulate interest and ideas which would be implemented in Colombian classrooms on the teachers' return.

In April this year we followed up the London course by returning to Colombia, this time to visit the teachers in their schools, to observe technology education in a variety of Colombian contexts (rural, urban, primary, secondary, public and private schools) and to evaluate the early implementation of the initiative.

It was to be expected, given the commitment and enthusiasm of teachers for the project, that they would work hard to put new ideas and approaches into practice, but it would have been difficult accurately to predict the extent of their achievements - not only the scope of those achievements, but also the short space of time within which they had been gained and, in most cases, despite an acute lack of resources.

It is worth attempting to outline some of the reasons underlying what can only be described so far as overwhelming success.

Teacher training in Colombia includes a strong grounding in educational philosophy and theories which translate well into practice when that practice is rooted in a sound educationally developmental model. Given such a grasp of educational principle and theory, the teachers took what they saw in the UK and what they learnt about our approach to technology education, evaluated it, adapted it to their needs and transposed this onto their curriculum, thus introducing new approaches and methodologies to teaching which already had a substantial theoretical justification.

Teachers have suggested to us, and it is entirely possible, that the lack of material resources has proved to be an opportunity rather than a constraint, having the ironic effect of promoting innovation and creativity within the teacher and the students. This is certainly not to suggest that technology does not require resourcing, but that there are hidden benefits to be gained by starting with little more than a real and located need, and having to be ingenious about resourcing the meeting of that need. Consequently we saw many projects which relied on found materials, for example for making hammocks, containers, toys and puppets, as well as those which considered how locally grown produce could be processed and preserved so as to prolong its shelf-life. Whilst this is a rich starting point for the development and realisation of ideas, we are also involved in encouraging the Ministry of Education and industrial sponsors to appreciate the need for young people to be challenged by materials other than those which are found.

A further impressive aspect of the project has been the extent to which some of the schools have recognised the benefits from working co-operatively with local industries, utilising them as a potential source of support and resourcing. In the same spirit some schools have sought the support and approval of parents by getting them involved in technology activities in school.

The need for collaborative working, despite this being untypical amongst teachers in Colombian schools, has been very much acknowledged. Once a model of collaborative teamwork, albeit one which has not been universally successful in UK schools (for a complex of reasons) had been presented and its benefits appreciated, the Colombian teachers adopted this as an essential ingredient to the success of the project. The need to work together, to develop a common understanding, to collaborate to plan and implement a relevant educational experience and to make the very best use of available resources - all this was established and helped to provide the right messages within schools.

Although only approximately 50 % of the school-age population have access to a formal education in Colombia, education is seen as a real opportunity for improvement in a developing country, whereas in the UK it is long established as an entitlement for all, and differently valued - quite possibly undervalued or, at least, taken for granted. This has a considerable effect on student motivation and the ethos of the learning environment. Whilst problems obviously exist within Colombian schools, as with any others, we observed almost unanimously a joy and willingness to learn amongst students of all ages - a very real appreciation of what was understood to be a privilege.

It was important that teachers were encouraged to build on their own existing strengths, as well as those of their culture; for instance using traditional crafts as a starting point to provide an excellent "ready made" context from which to explore technological techniques and procedures, hence providing a context within which to look at the appropriateness of various technologies.

Colombians are very proud of their achievements and celebrate them - they have usually been hard won. They have been prepared enthusiastically to embrace a development in which they believe and which, fortunately for them, has not been imposed upon them. They have willingly become involved and for the right reasons and are, consequently, in a stronger position to enlist the support and involvement of their colleagues. They have also been in a strong position to win over the sceptics by demonstrating the level of success which the project has brought to pupils and teachers alike. Importantly, they have not been encouraged to "throw the baby out with the bathwater" and so have been able to build this initiative on the firm foundation of existing strengths.

Perhaps most significantly the teachers have been motivated to use the technology curriculum as a means by which to promote learning in young people. Whilst providing a vehicle for education, albeit an important and stimulating one, technology has been seen as no more or less than a vehicle for learning itself. The focus is on the potential for learning through technology and how this can be achieved, rather than a concentration on putting a National Curriculum document into practice as we have been required to be preoccupied with here in the UK in recent years.

A number of activities are planned or currently being implemented in order to exemplify good practice in Colombian technology education as widely as possible and on a number of fronts simultaneously.

Plans have already been made for a publication which disseminates the achievements of the project more widely to schools in Colombia, exemplifying for them what is involved and what can be achieved through such an approach to technology education, and providing ideas which can be adapted or adopted. This will be jointly produced by the Colombian Ministry for Education and TERU in collaboration with the pilot schools. The publication will be sponsored and distributed by the Fundación Corona.

The Fundación Corona plans to produce and distribute a "technology kit" for primary schools - a resource to get technology underway and to help teachers to establish appropriate resources for technology activities.

Pilot schools will be encouraged to promote themselves as centres of excellence within their regions and to invite other teachers to visit and attend training sessions there, thus observing the environment at first hand.

Officers at the Ministry of Education, who have been involved in all stages of the project, are currently putting together a technology curriculum adapted from our National Curriculum and specifically devised to address the particular needs of their country.

Teachers involved in the pilot continue to develop classroom activities, building these into a curriculum which promotes progression and continuity in their schools. They are also increasingly involved in disseminating their work on the project as widely as possible within their communities, courting the support of parents and industrialists, as well as encouraging other teachers to adopt technology within their schools.

Teacher training and continuing professional development programmes at the Pedagogical University in Bogotá are supporting the technology project, including discussions with Goldsmiths for joint tutoring of study at Masters Level.

A one week subject-focused training course has been identified as being desirable to meet the next stage of training needs and this is planned for January 1995 in Bogotá, where the emphasis will be on equipping teachers with practical knowledge and skills required for them competently and confidently to engage in the teaching of a repertoire of technological tasks.

I would like to close with some reflections of the project from a 17 year old female student from a

school in San José del Guaviare (the gateway to the Amazon). “Fortunately life is full of changes and breakthroughs, which allow us to build a strong basis for training men and women in ways which are appropriate to today’s society. The work on this project has been full of difficulties and obstacles as well as the positive aspects which have strengthened the lives of all the individuals who have been involved. It has involved radical change for teachers and students and it has been important to be able to break with traditions, as well as to take the best things from the traditional. We, at this school, are privileged to be taking part and to do what we can to prove that this project is worthy, because we believe that with time the process which we have started should be spread not only to our school but to the whole country.”

Why, then, is all this such a surprise? Perhaps because we have found it so difficult to achieve precisely this in the UK that we cannot imagine that it can be put into place so effortlessly elsewhere and, more to the point, in a developing country? Certainly it has been illuminating and humbling to escape briefly from a country bogged down by curriculum reforms and reviews to one which, exempt from some of the complications which this brings, is more able to see the wood for the trees.

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