An Educational Revolution to Support Change in the Classroom: Colombia and the educational challenges of the twenty-first century[1]

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ABSTRACT As developing countries strive to strengthen their educational institutions to meet the challenges of the economic and social demands of globalization, tension often arises between providing more access to traditional public education and reforming the quality of the education provided. With its Revolución Educativa, Colombia offers an interesting case study of comprehensive education reforms that are grounded in a shared vision of quality and that make skillful use of information and communication technology to meet their goals. In designing the reforms, the Colombian Ministry of Education identified a series of complementary strategies that attempt to address five critical policy dimensions that keep the drive towards quality in the forefront. This article describes these strategies: Local Capacity Building; Enrollment and Efficiency; New Technologies; Curricular Reform; Improving Teacher Quality; and the Assessment System.

Introduction

Educational Reform: the twin forces driving change

Colombia, like many developing countries, faces a common set of challenges in meeting the increasing economic and social demands of globalization. As a process of economic integration and market openness to external trade, globalization offers the possibility of accelerated economic growth. Yet, to take advantage of the opportunities that globalization presents, countries must be able to increase their competitiveness (Stiglitz, 2002) by developing a competent and flexible work force. In the early years of the twenty-first century, success in achieving greater levels of competitiveness is based on significant and sustained efforts in educational reform (Kozma, 2005). As economic systems require new skills and abilities, education systems must prepare young people to meet these challenges.

However, education reform is not purely an economic issue. National educational policies must also respond to a country's interests and social needs. Many Latin American countries, including Colombia, share the goal of building a democratic, participatory, and responsible society (Astiz et al, 2002). At stake is students' ability to become active citizens and to participate in the creation of politically and economically stable and prosperous societies.

Embracing a Twenty-First Century Vision of Education

Since 2002, the Colombian government has pursued a well-structured and coherent reform effort that is designed to transform its public education system. To meet its goals for its citizenry, the country is moving from a traditional model of education to a comprehensive 'twenty-first century' educational paradigm, working to enhance quality, expand school enrollment and improve access to education, and increase administrative and financial efficiency. Colombia's reform strategies emphasize the use of information and communication technology (ICT), and the country is not alone in this.

Around the globe, ministries of education are using ICT to strengthen the foundations of the twenty-first education systems they are building. The educational policies in countries such as Australia, China, Finland, Ireland, Singapore, South Korea, and the United Kingdom are based on the strong relationship between the use of new forms of ICT and the development of capacities such as reasoning, knowledge creation, problem-solving, and creativity (Honey, 2006). For example, the I-Curriculum Project (NESTA Futurelab, 2004) is studying how five European countries are using curriculum requirements for teaching digital technologies to help students meet the challenges of living and working in the digital age. Worldwide, these and other ICT efforts start with the premise that technology is transforming the twenty-first century and changing the nature of human activity itself through the use of new tools.

Yet, to establish twenty-first century education systems, countries' adoption of ICT must be part of a larger process of conceptual and systemic change. A growing body of literature identifies five policy dimensions that must be part of this process and that are key to the transition to a twenty-first century education paradigm: curriculum, pedagogy, assessment, teacher professional development, and school organization (Hepp et al, 2004). Policy research demonstrates that successful reform of education systems requires close alignment of missions, investments, and goals across these dimensions, clearly defined and well-coordinated short-term and long-term goals, and benchmarks to track and monitor progress throughout the reform process (Osín, 2000; Lee, 2001; Kozma, 2005). This type of multi-dimensional approach is long term and incremental; reform cycles can extend over decades and require sustained investment in schools' physical and technical infrastructure. To progress, ministries must tackle systemic change head-on by embracing a shared, system-wide vision of and commitment to good teaching and learning.

Therefore, the first component of this new education system is a clear vision for educational technology as a facilitator of school reform aligned with a well-defined set of the educational goals that cut across the entire educational eco-system. But creating such a system requires making broad, systemic shifts in approaches to teacher training and certification, to curriculum and assessment frameworks, and to the overall vision of good teaching and learning that is promulgated within an educational system. Robert Kozma and his research colleagues from SITES2 (Kozma, 2003) suggest that there are four key points of alignment needed to promote an effective twenty-first century education system.

1. ICT integration must be aligned with curricular and pedagogic reform: Traditionally, curricula have emphasized memorization of discrete facts with little focus on either connecting this knowledge back to the real world of learners' lives or connecting it to the skills and competencies that enable students to become critical thinkers and problem-solvers. As education ministries begin to promote ICT use and more complex critical thinking skills in their school systems, decision-makers need to align these new tools and skills with national curricula. When curricula and ICT use are not aligned, teachers are hesitant to implement changes. Curricular reform also has to contemplate changes in instructional practices. Research indicates that to use technology effectively, the pedagogical paradigm must shift toward learner-centered or constructivist learning. This represents a fundamental shift in the teacher's role that should not be underestimated.

2. ICT integration must be aligned with infrastructure policies: Teachers need to have appropriate infrastructure in their schools in order to use ICTs in their teaching. Governments need to consider not just the provision of ICT hardware and software, but also policies around access, maintenance, and use. Although different education systems and schools make their own decisions about how to distribute ICT resources throughout schools, the infrastructure on the ground has to align with the guiding vision for ICT integration and with the strategies and practices that teachers are learning in

teacher education programs. Small group work, Internet research, and so on, which represent common components that cut across most ICT literacy instruction, require sufficient resources, such as enough computers to allow classrooms to divide into groups, enough time in the school day for both classroom teachers and computer teachers to engage their students in ICT-supported activities, and access within the school to Internet-connected computers for students to use throughout the school day.

3. Effective ICT integration requires an alignment with teacher education: Increasingly, teachers are being asked to transform their classroom environments through the introduction of technology-rich learning activities. To make such transformations a reality, teachers need to understand the pedagogical reasons for ICT use. Teacher training and ongoing professional development must cover not just technical skills but also pedagogical approaches to ICT use, if teachers are to succeed in changing their classroom practice. Teacher training, both pre-service and in-service, also needs to recognize the particular classroom context (technological and school infrastructure) in which teachers are operating. Commonly, educational technology professional development programs provide little, if any, discussion of the pedagogical reasons for using technology in the classroom and/or they train teachers to use practices that require an ICT infrastructure unavailable within their schools.

4. New assessments are required to support ICT in education: As ministries of education consider producing assessments of their students' learning, it is critical that a variety of factors, both what countries want to assess as well as how such assessments will impact teaching and learning, be considered. While student achievement tests provide useful information about academic progress, these increasingly high-stakes tests also absorb a significant amount of teaching time and resources. The intense focus on teaching test subject matter and test-taking skills often reduces teachers' ability to tackle a broader range of skills and competencies associated with knowledge building and project-based learning. If the ministry's learning goal is that students be prepared to solve complex problems, collaborate with peers, and apply past knowledge to new challenges, then the type of national assessment developed should reflect this goal by assessing student acquisition of these sets of skills.

Bringing about these changes is a long-term, incremental process. Policy research (Osín, 2000; Lee, 2001; Kozma, 2005) demonstrates that successful reform of educational systems requires both close alignment of missions, investments and goals across these dimensions, and well-specified and coordinated short-term and long-term goals and benchmarks to track and monitor progress throughout the reform process. Reform cycles can extend over decades: consider the United States, which is still reforming its education system in response to the 1983 report, *A Nation at Risk*. Other Latin American experiences with education reform would suggest that the reform process is further complicated in countries with a weak tradition of local educational management and administration, since reform efforts need to attend to changing learning and teaching as well as developing the institutional capacity to support those changes (Navarro et al, 2000). Effective reform requires sustained investment and support along multiple dimensions of the educational system, including physical and technical infrastructure, human resources, curricular frameworks, standards and assessment.

A Systemic Change Case Study

With its Revolución Educativa (Education Development Plan),[2] Colombia offers an interesting case study of a country that has instituted comprehensive education policies – that are grounded in a shared vision of quality and that make skillful use of ICT – to tackle economic and social concerns. Developed by the Ministerio de Educación Nacional (MEN) (Ministry of Education), the Revolución provides an example of how ministries can coordinate educational reforms to create twenty-first century education systems. This article presents an in-depth description of the plans and actions that compose the reform with special attention on the role of ICT.

The Role of Education in Colombia's National Development Plan

Since the late 1980s, Latin American countries have used similar strategies to reform their education systems to meet the challenges of the new era (Tedesco, 2000; Kaufman & Nelson, 2005). Increasingly, the leaders of these countries are viewing educational services as a mechanism of modernization, democratization, and national development (Corrales, 1999). Colombia's leaders, for example, believe that education is the key to addressing two of the country's biggest challenges: (a) the concern for social peace, inclusion, and social integration; and (b) the need for economic development in an era of competitiveness and globalization. They believe that a revitalized, twenty-first century education system is the pathway to a fair, tolerant, and stable society.

Colombia's educational vision and reforms grew out of broad social dialogues that involved a diverse group of representatives from social, political, and economic arenas. These dialogues culminated in the 1991 Asamblea Consituyente (Constitutional Assembly), which rewrote the national constitution (Cajiao, 2004). Thus, for more than a decade, debates about education reform have been connected to larger discussions about Colombian society. As a result, the Revolución Educativa was woven into the country's Plan Nacional de Desarrollo (PND) (National Development Plan). As an integral component of a larger social change agenda, the Revolución calls for a complete transformation of the education system.

The Goals of the Plan Nacional de Desarrollo

A national effort formulated for the period 2002-2006, the PND emerged from lessons learned during the country's difficult years of violence and social and economic turmoil in 1999 and 2001. The government recognized that political and social stability is the result of an increase in a country's productive capacity. This capacity is, in turn, supported by three factors: educational advances, enhanced abilities of the labor force, and technological development (Departamento Nacional Planeación, 2003). Based on this knowledge, the government sought to establish programs in four strategic areas. Education is a fundamental component of three of these areas – social equity, economic growth, and democratic security – and, as noted below, ICT work in the Revolución Educativa has provided some useful models for the fourth strategic area, transparency and efficiency of the state.

The Role of ICT in the Plan Nacional de Desarrollo

The PND directly addresses the issue of ICT in Colombian society with the Agenda de Conectividad [3] (Connectivity Agenda). Working through the Ministerio de Communicaciones (Ministry of Communications), the Agenda is an inter-ministerial group that is attempting to extend Internet access by creating access points in public locations (e.g. libraries, community centers, low-cost cyber cafés) throughout the country. The success of ICT in the schools and programs like Computadoras para Educar (Computers for Education) has fostered increased collaboration between the MEN and the Ministerio de Communicaciones on the work of the Agenda.

Colombia: a model of twenty-first century education reform

The Seeds of a Revolución

Current reviews of Latin American education reform suggest that the efforts of the 1990s often failed to address basic questions around the changing role of education in society and the quality of public education (Martinic, 2001; Kaufman & Nelson, 2005). These efforts often began by focusing on challenges of decentralization and institutional changes, and have yet to change classroom practice and the learning environments that most children in the region experience.

Colombia followed a similar pattern in the 1990s, adopting an early emphasis on institutional change rather than initiating a broad discussion of the role of education (Cajiao, 2004). By the end of the 1990s, parts of the Colombian education system had begun to change in terms of

decentralization and institutional structure. Despite innovative changes in education laws and an initial restructuring of the education system, however, schools still used traditional methods (e.g. teacher-centered learning, rote memorization) (Gajardo, 1999), and there was little impact on the nature of teaching and learning in most classrooms (Borjas & Acosta, 2000; Cajiao, 2004).

According to the country's SABER test in 1999, only 20% of the students in the fifth and ninth grades could read and understand texts at an acceptable level, and only 11% could solve problems that required abstract and conceptual thinking. In 2002, Colombia's college entrance exam results indicated that 61% of the public schools could be considered 'low performing'. International measures of educational performance also served to highlight Colombia's educational challenges. The results of the tests of the Laboratorio Latinoamericano de Evaluación de la Calidad de la Educación (Latin American Laboratory of Evaluation of Educational Quality) revealed that Colombia was below the region's average, and the Progress in International Reading Literacy Study ranked the country 30th among 35 participant countries (Ministerio de Educación Nacional, 2002).

Colombian leaders' acknowledgment of the deterioration of the quality of their country's education system drove the government to place a high priority on improving quality. In launching the Revolución Educativa, the MEN's goal was not only to increase students' performance on educational tests, but to transform how they learn and what they learn and to support them in becoming critical thinkers and lifelong learners (Ministerio de Educación Nacional, 2002).

Designing a Model with Quality at the Core

As countries strive to strengthen their educational institutions, a common tension often arises between providing more access to public education and improving the quality of education. The MEN, however, perceived that Colombia's educational quality and accessibility challenges were inextricably linked and enmeshed in an outdated traditional educational paradigm. To achieve its goals for its citizenry, the MEN recognized that it needed to take a holistic approach to transforming this paradigm and establishing a shared responsibility and vision for its system.

In designing the Revolución Educativa, the MEN identified a series of complementary and synergistic strategies that attempt to address all five policy dimensions critical to a twenty-first century educational paradigm and that keep the drive towards quality at the forefront (Ministerio de Educación Nacional, 2002). The next sections of this article describe these strategies:

- Local Capacity Building;
- Enrollment and Efficiency;
- ICT: Programa Nacional de Nuevas Tecnologias (New Technologies Plan);
- Curricular Reform;
- Pedagogical Reform, Improving Teaching, and Professional Development;
- Assessment System.

Local Capacity Building

In recent decades, Colombia has shifted educational authority from the federal government to secretariats from the *departamentos* (provinces) and major municipalities, and again from the intermediate levels to the schools themselves (Martinic, 2001). In the resulting highly decentralized, three-level education system, local leaders bear a great deal of responsibility for implementing education reforms. At the highest level is the MEN, which is in charge of defining policies and bringing technical support to other levels. The *departmental level* includes the secretariats of education, the Regional Educational Fund, and the Training Committees.[4] The third level is composed of the *municipal secretariats of education*, which are mainly in charge of supervising the provision of services and investing in and maintaining school infrastructure. Each level of the system must play a pivotal role in the Revolución Educativa, and all must share in its vision for a twenty-first century educational system.

This type of multi-level, decentralized system has many benefits (e.g. responsibility for education is much closer to parents and communities; parents and communities have a greater voice in decision-making). However, in many countries – including Colombia – decentralization

has created a demand for qualified leadership that has overwhelmed capacity. The lack of local capacity was particularly acute in Colombia (Kaufman & Nelson, 2005), and there are still not sufficient numbers of trained and experienced educational leaders at every level of the system. In an interview, Juana Inés Díaz Tafur, Vice-Ministra de Pre-Escolar, Básica y Media (Vice-Minister for Preschool, Primary, and Secondary Education), emphasized the importance of strengthening the local entities so that they have the capacity to efficiently run their education system (personal communication, 3 August 2006).

Redefining the MEN's role. In response to this need, the MEN has attempted to transform its relationship with the secretariats to provide support, rather than just issuing decrees and mandating reforms. According to Mónica López, the MEN Sub-directora de Mejoramiento (Sub-director of Educational Improvement), the MEN now provides guidance and training that enables regional authorities to effectively change their practice:

> I would say that the aspect that is new is how to connect everything and the mechanisms to move it down into the classroom. Before, policy was sent out as memos if not as posters or edicts. What's novel about the improvement efforts in this case is to be able to reach the classrooms and to actually reach into the secretariats. Even though the law requires the MEN to strengthen the secretariats, it has always stayed out. The novelty is that the MEN is advising and supporting the secretariats, working hand in hand with them. Strengthening the institutions is a central theme of the policy.[5] (Personal communication, 3 August 2006)

The secretariats, then, provide support and guidance to the schools. To further the objective of strengthening institutions, the MEN brings together people who are dealing with common challenges. The MEN has required that the secretariats create specific positions (if these do not yet exist) that mirror key positions in the Ministry to create a network of administrators with common functions. For example, each secretariat must appoint an ICT coordinator who interacts with the national advisor on ICT. The MEN officials and their counterparts from the secretariats meet every month to share problems and discuss solutions and strategies. This allows the MEN to keep up with each secretariat's needs and to provide appropriate support. The meetings also allow secretariat staff to learn from each other.

Toward a shared vision: the Ciclo de Calidad. To realize the goals of the Revolución Educativa, however, the secretariats must not just possess the capacity to carry out the work; they must share the MEN's commitment to the core vision of quality and twenty-first century education underlying the Revolución's reforms. Ms López believes that one of her primary challenges is to cultivate this shared understanding with the secretariats. She noted that, 'What we are looking for is that our counterparts at the secretariats understand the perspective and also how to make it happen'[6] (personal communication, 3 August 2006).

At the nexus of the MEN's thinking on promoting a shared vision of quality is what the MEN calls the Ciclo de Calidad (Quality Cycle), an improvement process that places the school, municipal, and departmental secretariats in control of identifying their issues and devising strategies to improve (Ministerio de Educación Nacional, 2004b). The model is composed of three stages: (a) defining shared standards of skills and competencies that can be aligned across the education system; (b) assessing student, teacher, and school performance on those standards to evaluate progress; and (c) designing and implementing a Plan de Mejoramiento Institucional (School Improvement Plan). The Ciclo de Calidad can be used at all three levels of the system to evaluate and improve performance. But, it also provides a structure that allows the MEN to engage local leaders in a twenty-first century education system visioning process in which they assess their schools' strengths and challenges, devise strategies to address those challenges, and identify needed resources and supports.

The third stage, developing a Plan de Mejoramiento Institucional, helps schools chart a clear course to improving and transforming the education they offer students. Schools design these plans based on their knowledge of their own unique needs and contexts, and the plans are conceived as 'the "compass" that guides the path the institution will follow to improve all the time.'[7] The MEN expects schools' plans to strive to help students meet or exceed the new basic standards. The innovative proposal of the Revolución Educativa is based on the assumption that when schools

develop these plans they will be better able to connect the management of the institution with a student-centered pedagogic proposal and teachers' professional development.

According to Ms López, while the plans contribute to the establishment of a shared vision of quality, secretariats retain the ability to tailor their strategies to fit the unique needs of their regions. For example, the Secretariat of Education for Bogotá shares the MEN's vision of quality learning, but usually has its own strategies for moving forward.

Enrollment and Efficiency

By the end of the 1990s, enrollments in *enseñanza primaria* (primary education) were reaching acceptable levels. However, levels of enrollment in *enseñanza media* (upper primary education) and *enseñanza secundaria* (secondary education) remained low. In 2002, the MEN estimated that two million children and adolescents, mainly from rural areas, were outside the system. In rural areas, the coverage rate for secondary school was 15% (Ministerio de Educación Nacional, 2002). Half of the children between ages 5 and 6 remained outside of the education system, as did youths between 16 and 17 belonging to the poorer classes. The system was also characterized by low levels of efficiency, with rates of grade repetition and desertion for the first grade at 11% and 12% respectively. According to the results of a Quality of Life Survey for 1997, 64% of the low enrollment was due to the fact that schools did not have the physical space to accommodate students, and 29% was due to students' lack of motivation and interest in attending school (Ministerio de Educación Nacional, 2002).

These poor results persisted in spite of major efforts to improve education in the country and an increase in the budget assigned to education, which went from 3.2% to 4.7% of the Gross National Product during the 1990s (Borjas & Acosta, 2000). By the beginning of the twenty-first century, and prior to the launch of the Revolución Educativa, there was a clear need to modernize the system's institutional structures, processes, incentives and supervision schemes to boost enrollment and to promote a more effective use and allocation of resources.

The Revolución Educativa uses a number of different strategies to address enrollment and efficiency issues. An improved ICT-based information management system is fundamental to many of these strategies. Previously, the MEN did not have the ability to collect reliable data about schools and students, nor did it have mechanisms for monitoring and evaluating the use of financial resources by departmental agencies (Ministerio de Educación Nacional, 2002). Under the leadership of the MEN's Oficina de Tecnología (Office of Computer Services), the Ministry now has a modern, nationwide information management system that contains student, school, regional, and national data. The system allows the MEN, as well as local and provincial administrators, to track attendance and enrollment issues, and it provides educators, parents, and communities with data about the performance of students and schools.

The new system more efficiently aligns schools that have space for students with populations of students. According to Javier Orlando Torres Páez, head of the Oficina de Tecnología, 'In basic education, the role [of information systems] is simply to support the management of enrollment and coverage, in order to make decisions about where we are going to increase coverage and where there are children who are not being served'[8] (personal communication, 3 August 2006).

The MEN is also using a program that subsidizes the demand for services to the private education sector. According to Juana Inés Díaz Tafur (Vice-Minister for Preschool, Primary, and Secondary Education), the MEN achieved 96% of its 2002 goals for expanded coverage and enrollment. Ms Díaz Tafur reported that 700,000 spaces had been generated just through improved alignment of students and current schools with the capacity to accommodate new students (personal communication, 3 August 2006). Through the Revolución, the MEN expects to increase coverage by 10% through efficiency alone.

ICT: Programa Nacional de Nuevas Tecnologias

As noted above, ICT has helped Colombia meet its enrollment goals and enhance the efficiency of its education system. Yet, the MEN's concept of ICT integration goes far beyond a focus on achieving a single goal or addressing just one challenge. Instead, the MEN views ICT as a strategic

thread that connects all of the efforts of the Revolución Educativa. As the centerpiece of many new models of teaching and learning that encourage students to explore and build their knowledge through the productive use of technology, ICT is especially important to the Revolución's quality improvement strategies.

In an interview, Javier Orlando Torres Páez, said that:

In the Revolución, there are five strategic projects that explicitly use information technology. These are basically:

– program for the use of new technologies in teaching;
– strengthening the use of ICT in Higher Education;
– creation of a national information management system;
– modernization of the MEN;
– modernization of the secretariats.[9]
(Personal communication, 3 August 2006)

The starting point for Colombia's Programa Nacional de Nuevas Tecnologías (New Technologies Plan) is the perspective that ICT by itself will not improve learning. A change in quality will only come about if technology is integrated into schools along with a deep understanding among teachers of how these new resources should be used. The Programa de Nuevas Tecnologías has three axes: access to infrastructure, access to quality content, and educational use and adoption of ICT.

The first axis of the Programa de Nuevas Tecnologías, the provision of ICT infrastructure, is supported through various initiatives in coordination with the Agenda de Conectividad (mentioned above). The secretariats and municipalities have their own initiatives to equip schools in their regions. But the major national initiative is through the public foundation, Computadoras para Educar (Computers for Education: CPE). CPE is an association of three public entities: the MEN, the Fondo de Comunicaciones (Communication Fund), and the Servicio Nacional de Aprendizaje (National Service for Learning), that reconditions old computers donated by private firms that are then distributed to schools. CPE also provides technical support and teacher training. According to their own statistics, CPE has distributed over 60,000 computers to 6600 schools (Computadoras para Educar, 2006).

The second axis of the Programa de Nuevas Tecnologías is represented by a number of activities. One of these, Colombia's educational portal, Colombia Aprende (Colombia Learns) (http://www.colombiaaprende.edu.co/), offers resources – including collaborative projects, school texts, and images – to teachers, students, and the community. Colombia also has a new educational television initiative, SeñalColombia (ColombiaSignal), which seeks to provide improved audiovisual resources to schools. In addition, within the activities of the Sub-dirección de Mejoramiento (Sub-directorate for School Improvement), there is a special project targeting media literacy and the use of new media resources. Mónica López commented that to support and expand the work being done around computers in the classroom, the MEN also encourages teachers to think about a broader set of resources like libraries, digital libraries, and television. The Intel® Teach professional development programs are seen as an example of the possible interconnections because these help teachers think about how to integrate these new resources into their classrooms.

The third axis of the Programa de Nuevas Tecnologías, supporting appropriate educational uses, is directly related to efforts to improve quality. Cecilia María Vélez White, Ministra de Educación Nacional de Colombia (Minister of Education), believes that part of her role is to be an 'evangelizer' for ICT in the schools. Her goal of changing the daily teaching practices of 300,000 in-service educators with little prior exposure to ICT will require a 'paradigm change' in how these teachers see their role in the classroom (Vélez White, 2006). To achieve this goal, the MEN offers a number of professional development programs, including a comprehensive program sponsored by Intel® (see below for more information about professional development).

ICT also plays two important supporting roles for the Ciclo de Calidad described above. First, as noted earlier, ICT-based information management systems provide an easy flow of information that allows leaders at all levels to create improvement plans and to evaluate their progress. The transparency of information also increases accountability since parents, the community, and the

MEN all have access to information about students' and schools' performance. Second, ICT also facilitates the communication and sharing that is fundamental for the MEN personnel to shift from mandating policy to supporting and advising the local educational authorities in a process of change.

Changing the Educational Paradigm and the Curriculum

A central quality component of the Revolución Educativa is its focus on curricula. During the reform attempts of the 1990s described above, leaders debated the goals of Colombian education for the first time (Cajiao, 2004). As part of the strong public debate called the Movimiento Nacional Pedagógico (National Pedagogical Movement), these discussions prompted the country to begin to move away from rigid and technocratic approaches; more open curricular guidelines targeting intellectual competencies, not only content memorization, began to be valued (Dussel, 2006). However, as noted previously, these efforts resulted in little change to what teachers were teaching and how students were learning. Efforts at effective curricular reform stalled amongst the complexities of decentralization (Tedesco, 2000; Cajiao, 2004) and a focus on curricular reform processes rather than producing an actual curriculum (Ferrer, 2004).

A reassessment of the state of education conducted under the current Ministra de Educación Nacional, Cecilia María Vélez White, culminated in 2002. Ferrer (2004) considers that the government's impetus was not to redesign Colombian education, despite the term Revolución Educativa, but to provide schools with more effective guidance in developing and improving educational practice within the curricular guidelines already established. An assessment of Colombia's national curricular guidelines characterized them as overly 'rhetorical,' or theoretical, and lacking in the precision necessary to guide schools in making practical decisions (Ferrer, 2004). Transforming the curriculum to be more student centered and to support learning through exploration and discovery is not just part of a twenty-first century education, it is fundamental to the effective use of ICT. Most research suggests that ICT is most effective in supporting and improving students' learning when used to support constructivist teaching and learning (Kozma, 2005; Lemke, 2006).

The Ministry's efforts led to a reevaluation of the country's curricular frameworks and resulted in a number of concrete changes. In a process called the Expedición Pedagógica Nacional (National Pedagogical Expedition), in which teams of educators visited schools around the country, the MEN played a role as facilitator of a national conversation among educators to redefine the curriculum and the expected student outcomes (Dussel, 2006). Three official resolutions, Decree 230-2002, Curricular Alignment, and Achievement Indicators for General Curriculum, contain the government's redefined guidelines. Two broad changes were made. First, the curricular content was divided into year-long segments and spread across different grades. The previous guidelines had only identified the content to be taught within multi-year cycles. The new scope and sequence was eminently more practical for the type of planning that school principals and teachers typically do. Given the new importance of school improvement plans, the increased coherency and practicality of the guidelines may prove to be a powerful change.

Second, the MEN identified basic competencies and student performance assessments to anchor the curriculum in concrete, measurable outcomes. The MEN established three sets of standards: basic competencies in subject areas (mathematics, language, social sciences and natural sciences),[10] citizenship competencies, and work-related competencies. The standards are designed to turn the curricular guidelines into a clearer prescription of what students need to know and be able to do at each grade in school. These are widely shared criteria that serve as a reference to public official educational leaders and teachers about what constitutes a quality education.

Within this framework, the regional authorities and each school design their own curricula or Planes de Estudio (courses of study). According to Mónica López, '… the competencies indicate to the teacher what they should expect the students to be able to do with the skills acquired at each level of the education system' (personal communication, 3 August 2006). The desire is to move educators away from a traditional, rigid curriculum that is broken down into disaggregated facts that students memorize, towards giving students the skills and processes they need to find, choose, analyze, synthesize, and apply knowledge.

Pedagogical Reform, Improving Teaching, and Professional Development

In the Revolución Educativa, teachers must take the lead in implementing many of the reform efforts. The new competencies and curricular goals require teachers to change their practices and improve their content knowledge. The integration of ICT requires new approaches. Even the school improvement plans have created new expectations for teachers.

In 2002, the first step in changing teachers' roles and status was taken with the creation of a Nuevo Estatuto de Profesionalización Docente (New Statute for Teachers). This statute transformed the career ladder and increased teachers' salaries to reward a teacher's skills, qualifications, and work. Simultaneously, the MEN began to promote the introduction of a new teaching paradigm that complements its vision for a twenty-first century education system. The new paradigm emphasizes teachers' mastery of their discipline and stresses the need for teachers to foster their students' development of critical thinking skills.

In addition to changing its requirements for new teachers, the MEN assessed the needs of in-service teachers and administrators in order to revise and expand its professional development opportunities. In 2003, the MEN conducted the first national evaluation of teachers' and school principals' performance. The results were generally good, but identified a need for improvements in teachers' knowledge of new pedagogical strategies (Programa de Promoción de la Reforma Educativa en América Latina y el Caribe, 2006). This finding was in keeping with the literature on education reform, which highlights training and professional development of teachers as a priority for any attempt to modernize (Kozma, 2005).

The MEN's professional development programs are designed to introduce new ways of teaching, as well as to orient teachers to innovative ICT tools that support student learning. Claudia Zea, Asesora de nuevas tecnologías (Special Advisor on New Technologies) to the MEN, has created a range of ICT-focused professional development opportunities that support teachers in the movement from no ICT skills to a deeper understanding of how to integrate ICT into an innovative, student-centered learning environment. In an interview, she described two programs that the MEN uses to support teachers' acquisition and application of ICT knowledge. 'A que te cojo ratón' ('I am going to get you, Mouse') guides novice ICT users in developing basic skills, and, for more advanced users, the MEN offers Intel® Educar Curso Esencial (Intel® Teach Essentials Course) – a course that engages teachers in creating their own ICT-rich learning units for student projects (personal communication, 2 August 2006). The MEN selected Intel® Educar because it supports two goals: teachers' and students' use of ICT and promotion of its new teaching paradigm. Intel® Educar centers on a discussion of the pedagogical importance and utility of ICT in inquiry-driven, student-centered learning environments while teachers create their own materials (Light et al, 2006). The course was also adapted and expanded to support the MEN's efforts through the introduction of a module on school improvement plans.

The content of Intel® Educar serves to reinforce the broader efforts of the Revolución Educativa in other ways. According to Mónica López, an important objective of the MEN is that all professional development opportunities '… serve to strengthen the institution as a whole, and not only the teacher' (personal communication, 3 August 2006). Intel® Educar meets this objective by engaging cohorts of teachers from the same school in the course, reinforcing each school's sense of itself as a community of learners and professionals. In Ms Zea's view, the course also supports teachers' development of lesson planning skills and covers the use of innovative and holistic assessment strategies for students (personal communication, 2 August 2006).

Assessment System

In addition to instituting new forms of professional development and approaches to curricula, the MEN identified the need to modify its national assessment strategy. The MEN had several reasons for revising the assessment system. First, the MEN needed a transparent accountability system that would serve to keep all of the players accountable. A decentralized system needs an external, objective accountability structure to drive the improvement process and to assure that all players know whether the system is meeting the needs of students. Second, the new curricula and standards promote the mastery of complex content and competencies that previous standardized exams did not measure. If the new system is increasingly holding educators accountable, that

accountability needs to be connected to the desired outcomes. Third, assessment is an important aspect of quality teaching since it lets teachers know where their students are in their learning, who is struggling, and who is excelling.

The Ministry has promoted a variety of assessment strategies connected to the Ciclo de Calidad and school improvement plans described earlier. While the MEN has dedicated substantial effort to establishing a national standardized test of student academic achievement, it has also promoted the use of innovative classroom assessment strategies to enable teachers to easily gather information on their students' progress. The MEN is encouraging teachers to continuously assess student learning with strategies like having students explain their thinking, or using rubrics to holistically evaluate students' work. The expectation is for teachers to evaluate the entire learning process, not just learning outcomes, so that they can support students more effectively. To help achieve this goal, the MEN expects assessment to be woven into all professional development opportunities when appropriate (e.g. Intel® Educar includes the use of rubric assessments to evaluate student-made ICT products).

In the past, the MEN conducted its own national assessments by administering a standardized test to a sample of schools and grades to assess the quality of the overall system. However, the MEN did not have a common evaluation to assess the academic achievement of all students at important points in their education. This has changed under the provisions of the Revolución Educativa, and Colombia has instituted a *censual* testing system – the SABER exams – to evaluate all students in the fifth and ninth grades (Ministerio de Educación Nacional, 2003). An independent institution, Instituto Colombiano para el Fomento de la Educación Superior (Colombian Institute for the Development of Higher Education), is responsible for developing the SABER assessments that measure basic subject area competencies in mathematics, language, and the social and natural sciences. Results from the assessments enable local and national leaders to make comparisons between the regional and national levels and to track schools' progress. In 2007, an assessment of twenty-first-century work-related competencies was still in development.

The SABER exams play a key role in connecting school improvement plans with actual school performance. Each institution uses the yearly SABER results (along with other data) to analyze its situation and identify need for improvement. This analysis is the basic input for devising plans of institutional improvement that address administrative and academic management procedures as well as regulations that rule relationships within the academic community. The following year's exam results let the school assess its progress and revise or change its plans accordingly.

Conclusion

The policies of Colombia's Revolución Educativa address the five dimensions of education reform identified by researchers as most important to systemic change – curriculum, pedagogy, assessment, teacher professional development, and school organization (Osín, 2000; Hepp et al, 2004; Kozma, 2005). The Revolución's approach is comprehensive and coordinated; none of its policies exists in isolation, and all of its strategies are designed to work in unison to strengthen the system as a whole. Curriculum reform, which attempts to support deeper learning with a focus on competencies and skills, is supported by changes to traditional models of teaching and by changes in the assessment process. New accountability and assessment policies, which target the new competencies, also serve to drive changes in teaching and school improvement. Simultaneously, well-aligned professional development programs and improvements in teachers' working conditions build the capacity of the teaching workforce to thrive in the new system. A shift in school organization towards decentralization empowers teachers and schools to take ownership over the reform process. The MEN, in its new role as facilitator of these changes, aids implementation by providing more support to local authorities and by offering professional development programs.

ICT plays an important role within this broad reform effort. From a central organizational level, the creation of an effective information management system clarified issues of accountability and enabled optimal use of resources. This new system supports the alignment of efforts and activities with actual educational challenges and helps focus policy discussions on how to improve student performance. ICT also serves to enhance the entire education system by facilitating

communication among different levels of the system and improving the accessibility of teacher professional development. Perhaps most importantly, ICT plays a central role in the evolution of Colombia's new paradigm of teaching and learning. The MEN in Colombia conceives of ICT as central to student-centered learning and believes that harnessing its productive potential will enrich students' school experiences – enabling them to explore topics, conduct research, and create their own knowledge in new ways.

Notes

[1] This research was funded by a grant from the Intel® Foundation. Any opinions, findings and conclusions expressed in this material are those of the authors and do not necessarily reflect the positions or policies of the Intel® Foundation.

[2] The Revolución Educativa was proposed by the government of Álvaro Uribe as one of seven policy tools that the administration initially proposed as part of its commitment to promote social justice.

[3] For more information see http://www.agenda.gov.co/

[4] Note: The provincial secretariats are in charge of coordinating educational services and administration of public funds. Law 60 of 1993 allows the departmental authorities to decentralize the administration of services and transfer them to qualified municipalities. The Regional Educational Fund was created to administer transferred resources. The training committees are in charge of defining training programs offered to teachers.

[5] Original quote follows: 'Yo diría que lo nuevo es cómo poder articularlo y los mecanismos de bajada de la política si son nuevos. Antes la política bajaba a través de textos regulares sino de cartillas, pronunciamientos. Lo novedoso de la acción de mejoramiento en este caso es poder llegar al aula pero sobre todo poder llegar a las secretarias aunque por ley esta que el MEN tiene que fortalecer las secretarias pero ha estado por fuera. La novedad en el MEN es el acompañamiento a las secretarias, estar trabajando con ellas de la mano. Esto es un tema central de la política: fortalecer las instituciones.'

[6] Original quote follows: 'Lo que buscamos es que los homólogos de las secretarias entiendan la línea y el "cómo".'

[7] Sub-director of Educational Improvement.

[8] Original quote follows: 'En educación básica, el rol (del sistema de información) es simplemente apoyar la gestión de cobertura, para poder tomar decisiones de donde vamos a ampliar cobertura, donde hay niños desatendidos.'

[9] Original quote follows: 'En la revolución educativa hay 5 proyectos estratégicos en los cuales hay temas explícitos de apoyo de la tecnología de información. Que son básicamente, la modernización del ministerio de educación, la modernización de las secretarias, el fortalecimiento del uso de la tecnología en el nivel superior, el programa de uso de nuevas tecnologías en pedagogía, en tecnologías educativas y la creación de todo un sistema nacional de información que hace parte de los lineamientos que quedaron en la ley 715.'

[10] See the example: Ministerio de Educación Nacional (2004a).

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