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Secondary schools and the transition to work

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This paper discusses the organization of secondary schools. It deals with the confusing and controversial matters of providing schools for an increasingly heterogeneous clientele and the triple role of preparing for higher education, forming solid citizens and offering whatever training is needed by those who will finish their schooling at this level

It is a paper about deciding whether to put students together or tracking them in different institutions. About offering the same content to all or teaching different contents, depending on the profile of students. About using the same delivery strategies or adapting them according to groups of students. About deciding where and when to offer job training and deciding how close to real occupations this training/education will be. There is a lot more to education than such organizational matters, so to speak, playing with boxes and arrows. Yet, if the organization patterns chosen are not appropriate to the circumstances, it becomes much harder, if not impossible to offer a good education for the diversity of students present and to the even greater diversity that is already invading secondary schools.

(i) The paper starts by discussing the nature of the problem, namely, the difficulties resulting from conflicting roles for secondary schools and the increasing diversity of the students.(ii) It then presents the usual solutions for organizing schools, mostly borrowed from Europe, and discusses their shortcomings. (iii) It shows then the new tendencies and the new solutions under discussion or being implemented here or there, in attempts to escape the difficulties previously discussed. (iv) Finally, it draws some lessons from experience and observes some general tendencies.

The paper states the position of the IDB with respect to secondary education. However, when discussing the options between different manners of structuring secondary education, there are many open questions. The alternatives chosen strongly depend on cultural preferences and difficult options regarding equity. In those situations, the paper takes a less prescriptive approach.

I. The old models: Too Many Roles for Secondary Education.

As countries rediscover secondary education, after over a decade of neglect and oblivion, they grope for answers that are not there. Sometimes even the problems are not clear. This section explores the different meanings, functions and problems of secondary education, as well as the different responses that are being offered.

To set the stage for the discussion ahead, it is worth taking stock of the occupational training that takes place inside and outside academic schools. Notice that the data are very imperfect, since names and denominations of programs are not comparable and statistics are unreliable.

<i>Table 1. Shares of General and Technical Education at the Secondary Level (Most Recent Estimates)</i>			
<i>REGION: LATIN AMERICA AND THE CARIBBEAN</i>			
Country	Year	% Gen. Ed.	% Vo-Tech
Argentina	1985	39.75	60.25
Belize	1994-95	98.78	1.22
Bolivia	1990	---	---
Brazil	1985	33.11	49.10
Chile	1996	56.39	43.61
Colombia	1993	75.76	20.99
Costa Rica	1995	77.61	22.39
Dominican Republic	1994-95	91.34	8.17
Ecuador	1992-93	65.62	34.28
El Salvador	1993	25.00	73.63
Guatemala	1980	69.74	17.32
Guyana	1994-95	100.00	0.00
Haiti	1985-86	96.98	2.41
Honduras	1991	65.22	30.18
Jamaica	1985-86	96.34	3.66
Mexico	1994-95	88.51	11.49
Nicaragua	1993	91.55	7.22
Panama	1990	73.86	25.33
Paraguay	1994	91.53	8.47
Peru	1995	100.00	0.00
Suriname	1992-93	59.00	35.20
Uruguay	1995	83.56	16.44
Venezuela	1992-93	82.33	17.68
REGION: NORTH AMERICA			
Country	Year	% Gen. Ed.	% Vo-Tech
Canada	1994-95	100.00	0.00
United States	1994-95	100.00	0.00
REGION: CENTRAL AND EASTERN EUROPE			
Country	Year	% Gen. Ed.	% Vo-Tech
Bulgaria	1995-96	71.80	28.20
Croatia	1995-96	63.59	36.41
Czech Republic	1994-95	55.67	43.87
Hungary	1994-95	26.83	72.92
Poland	1994-95	29.22	70.74
Russia	1993-94	90.47	7.33
Ukraine	1993-94	88.82	10.73
(Former) Yugoslavia	1990-91	66.05	33.27
Yugoslavia, Fed. Rep.	1995-96	66.39	33.56
REGION: WESTERN EUROPE			
Country	Year	% Gen. Ed.	% Vo-Tech
Austria	1994-95	60.58	37.98
Finland	1994-95	70.75	29.25
France	1994-95	71.62	28.38
Germany, DDR	1985-86	75.07	24.93
Germany, FDR	1985-86	64.40	35.60
Italy	1993-94	56.47	39.68
Norway	1994-95	68.15	31.21
Spain	1994-95	74.98	25.02
Sweden	1994-95	68.58	31.42
Switzerland	1993-94	67.37	30.95
United Kingdom	1994-95	60.83	39.17

Source: UNESCO, Statistical Yearbook, 1997, Table 3.7.

In most LAC countries, students attending secondary technical schools remain a minority – less than 30 percent in the region as a whole. Only in a few countries, notably Argentina, the majority of students attend vocational, technical, and professional schools. In the English-speaking Caribbean countries and Mexico, to the contrary, 5-12 percent of secondary school students attends vocational schools. In Brazil, with only about 16 percent of the age cohort in secondary schools (post-8th grade education), the percent of the age cohort in technical shows a net enrollment rate at the extreme low end of the range in the LAC region. Notice, however, that the meaning of technical schools can be elusive. Teacher training, secretarial and accounting are often counted as technical, even though these courses are quite different from the classical manufacturing sector technical programs. To complicate matters further, most Latin American countries have large training systems that operate at the margin of academic schools.² Given the significant occupational training offered by them, examining only what academic schools offer, yielding a very distorted picture of occupational training.

Another hurdle to examine secondary education is variable frontier between secondary and whatever comes below. The years between the sixth and the ninth may be formally attached to the secondary, to the primary or remain a stand-alone level (as the American middle schools). This variation in modes of structuring schools complicates comparative analysis. Enrollment rates of secondary school from Mexico are not comparable to Brazil, since secondary starts on seventh grade in Mexico and ninth grade in Brazil.

But, in addition, the very nature of this intermediate level is unclear and differs from country to country. It may be an extended primary education in content and style of teaching or, it may be an earlier beginning of secondary education. This paper does not delve into the intricacies of these differences in intermediate schools but merely warns the readers to the dangers of misinterpretation of the data and the special problems faced by it.

a. From Elite to Mass Education: Preparing for Higher Education, for Citizenship and for Work.

Like other levels of education, secondary schooling is partly organized around transmitting knowledge, and partly (perhaps mainly) organized around selection, i.e., who moves farther and who is blocked. The selection process in schools sets expectations, responsibilities, and accountability among teachers, administrators, and parents; it therefore has a major influence on the way schools are organized, on the teaching and learning process.

As secondary education expands, its selection function also changes. In most Latin American countries (with some notable exceptions, such as countries of Central America and the poorer regions of Brazil), lower secondary education (grades 7-9) is becoming the level of schooling with which most young people in the region enter a rapidly changing economy. In the middle-level developing countries, including many Latin American economies, even upper secondary education

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For a discussion of these training systems see C. M. Castro, *Economists vs Trainers*.....

(grades 10-12) is becoming mass education. As consequence of that expansion, its selective function is changing. Enormous numbers of new students coming from previously "excluded" socioeconomic strata have entered and completed secondary education. Their average "cultural capital" (Bourdieu, 1979) is considerably lower than those in previous generations who attended secondary schools. A generation ago, upper secondary education prepared a relatively small group of students (largely pre-selected at lower levels of schooling) either for university education or for technical occupations requiring only secondary education. Now it selects and prepares a much larger group for further studies in higher education. It separates them from a second group that is headed for a still ill-defined post-secondary vocational/technical education. It also creates a third group that enters directly from secondary school into the labor market but with levels of general knowledge of math and language accessible in the past only to a more limited group, although perhaps not as great as the average graduates of secondary education had in the past (particularly after the recent "low quality" expansion of the past 15 years).

It is interesting to notice that Latin America (but not the Caribbean) parts company with the European tradition of strong examinations at the end of secondary (*baccalaureate, maturité, abitur, A Plus* etc.). The absence of such rigid criteria to get a secondary diploma has at least three consequences. First, the criteria for getting diplomas are lower, putting less pressure on students and schools - which is a bad feature. Second, schools are less polarized around examinations (with the exception of those predominantly catering to students who want to enroll in the most competitive universities) - which is a good feature. Third, the system avoids a painful but common situation where an overwhelming proportion of the students fail to get a secondary diploma and are branded as failures, as happens, for instance, in the Magrheb countries which set standards comparable to a French *Bac*. Do the gains of not having rigid standards overpower the losses? There is no right answer.

Although many educational reforms in the region pay lip service to preparing a socially more diverse student body for economies competing globally in the information age, it took a long time before the need to change the structure of secondary education became obvious. Reform ought to face the need to improve student achievement. Yet, since educational expansion has changed the types and ability levels of students served by this stage of schooling, improving quality is not the same thing it was in the past. *Lower average socioeconomic background of the student body means less academic support from home and more effort required by schools just to stay even, quality-wise.* Not only the learning ability of the new crop of students is more limited but the content of what they need to learn and can effectively learn is different. But above all, they need different methods and pedagogy in order to master the contents and escape rote learning.

One problem that reformers need to address is how to manage the multiple roles of secondary education with its ensuing ambiguities. Primary schools are supposed to prepare pupils cognitively for functioning in a modern society - reading, writing, and math skills, as well as some knowledge of science - and to socialize them to be good. Higher education for the most part is job-oriented, preparing people for their future work, and, in some universities, for elite roles, including the public sector. The roles are clear in both cases.

The situation with secondary education is not as clear. With the rapid expansion of primary education in the region after the mid-1950's, secondary education became the logical channel for

social mobility for children of middle and lower income families, many of whom aspired to professional jobs and secure public employment. At the same time vocational specialization was pushed up to the end of the secondary, crowding its academic objectives. *This rapid expansion of the secondary level* (both lower and higher secondary) *clouded its original objectives even as it continued to rely mainly on traditional academic curricula originally meant for students destined for university education* (even technical schools rely on traditional academic curricula in their “theoretical” sections).

Therefore, the challenges facing secondary education have to do not only with rescuing quality – however defined – as well as rethinking its roles and strategies. And, of course, it has to deal with the stubborn ambiguity of roles: prepare for higher education or prepare for the market? There are no easy solutions. Each alternative has advantages but implies paying a price. Solutions are not always portable from one country to the next. And once a solution is adopted, the remaining of the system has to be compatible with it.

b. The old models

Industrialized countries have traditionally provided the models for secondary education. Latin America traditionally adopted the separation of academically-inclined from vocationally-inclined students into different schools (European model). A less common alternative is grouping students within a single comprehensive secondary school that is, at the same time, "academic" but provides different levels of subject difficulty for differently "able" students and a vocational or business tracks – known as "diversified" or "comprehensive" secondary education (United States model). For the sake of completeness one could also mention the German Dual system which is based on alternance between work and school but remains quite uncommon in Latin America. Below is a description of these models and their use in Latin America.

The European Model and the dilemmas of technical schools

Latin American countries generally followed the European model. It means that they prepared students in, at least, two separate tracks. For that reason, it is important to understand the logic and merits of multiple path systems.

Since France has been the source of inspiration for most countries, it might be worth a short explanation of the French secondary cycle. The main feature of the European tradition, here illustrated by France, is the idea of creating a different school for each profile of student and for each educational trajectory. Students who want to learn an occupation will go to a trade school to learn it and pass the CAP examination (Certificat d’Aptitude Professionele). Those who have greater academic aptitudes and still want to learn a trade may go to a *Licée Technique*. Those who have a stronger academic orientation will take one of the *Baccalaureate* secondary schools. These courses of study are secondary schools leading to the one of the “Bacs.” These are courses each stressing a broad area of studies such as mathematics and natural sciences, humanities, commerce and so on. The *Baccalaureate* certificate is obtained after passing a strict and difficult examination. While the “Bac” gives legal access to higher education, some are more twostigious than others and

example, Fiszbein and Psacharopoulos, 1993, on Venezuela, that shows somewhat higher rates of return to technical than to academic secondary education). In more rapidly growing economies, such as Hong Kong, the rate of return to technical education for occupations that are in great demand (electronics, for example) is higher than to investment in general secondary education, but for other occupations, in lesser demand, the rate of return is lower to technical (Chung, 1991).³

The idea of adding practical skills to regular schooling is an old one and is found in almost every country in the world. But the problems resulting from this combination are equally old and universal. How late or how early should trades be offered? If too early, the accusation of premature specialization may apply. If too late, those interested in the trades taught will have already left school, whereas those still enrolled hope to achieve higher status occupations. In the case of secondary technical education which offer good quality education, the overwhelming proportion of its students aspire to university education, devaluing the technical trades taught.

The expansion of secondary education exacerbated the already persistent ambiguities in preparing youth to become skilled workers. The occupational profiles of the graduates prepared by industrial vocational education were never very clear. As industrial training moved higher in the secondary cycle (and as the heterogeneity in the technical sophistication of Latin American industry increased), the focus of such education became even less clear: Should they produce skilled workers? Technicians? Supervisors? *Ambiguities in focus have ended up producing graduates who are neither competent skilled workers, technicians, mid-level supervisors or competitive in the entry tests for higher education.* This has been observed in most Latin American countries.

As vocational/technical education and training gradually shifted up into the upper secondary cycle, the practical track has become less "vocational" and more "technical." In essence, this has meant less shop training and more academic curriculum, with some of the academics related to technical subjects. Practical training has tended to shift to more "theoretical" preparation in the context of technical education and, within occupational training, from more specific to much broader definitions of occupations.

There is nothing wrong with this tendency. But unfortunately – except in Brazil – most technical schools provide low quality preparation in academic subjects (even lower quality than most academic/general secondary schools). In addition, being more “theoretical” implies that it may become an inadequate preparation for the market and, often, merely rote learning technical disciplines. Instead of using machines, students read handouts about them and memorize their parts and functions. This has less to do with pedagogical theories or something inherent in technical careers than with the fact that these are poor schools, staffed by unprepared teachers who are, most of the time, school teachers who received second rate training in schools which are themselves removed from the realities of the labor market (in contrast to true vocational schools following the

³ In Germany, with its "dual system" of apprenticeship, the tendency for companies now is to rank gymnasium graduates among their top recruits into apprenticeships (Bock and Timmerman, 1995). In other words, the vocational stream increases its intake of students with an academic secondary diploma. Research in Brazil suggests that those students who went to good vocational schools (SENAI) earned higher incomes and had greater occupational mobility than those who had up to five additional years of academic education and on-the-job-training (Castro, 198?).

SENAI, SENA, INA tradition where instructors are real workers who know their trades and tend to have factory experience).

The changing role of secondary schools, from relatively elite to relatively mass education is prompting reformers to rethink its structure and the kind of teaching and learning that takes place there. Both university-preparatory secondary school and secondary technical education, whether their students ultimately enter university or not, are recognized as of too low quality to prepare students for a 21st century economy and society.

Major changes are needed in teacher preparation. It does not matter whether we refer to academic or technical, the process of teaching and the curriculum need a much greater focus on higher standards, problem-solving, and participative teaching-learning. In addition, vocational-technical education (including teacher education) is viewed region-wide as needing to emphasize practical, job-oriented curricular approaches to improving students' problem-solving capacity and giving them 21st century job skills (this subject is also discussed in the companion background paper "Secondary Education in Latin America and the Caribbean: Critical policies for growth and Reform").

The bottomline to this discussion is sobering. *The two-track model needs serious revision.* It is hopeless to look for a final word on whether academic or technical are better rewarded in the labor market. Some outstanding technical schools perform better but there is no consistency to be found and the dynamism of the economy plays a major role in determining such outcomes. However, there is one point in which we can agree. *Both academic and technical tracks tend to offer a particularly weak education and some of the faults are common to both.*

The United States Model: few takers and even fewer successes

At the beginning of the century, American educators struggled between an European-styled system with a vocational track and what was finally adopted which is the so-called diversified or comprehensive high school. The core idea is to have one single school for all students who reach secondary level. *Poor and rich, academically or trade-training oriented, all students go to the same school. The differentiation is inside the school, not between different schools.* Those more interested in higher education, take more academically oriented courses. Those who want to acquire a marketable skill take vocational courses. Those who are more advanced take honors or more difficult courses, the others take easier or watered-down versions of the same course. Indeed, American high schools offer different levels of Mathematics, English and Science courses even for those who are following an academic track. In addition, schools while keeping the same overall model, tend to cater to the typical students in their catchment area, those in working class regions tuning down their academic levels and focussing more on trade training. But any school will offer vast array of disparate disciplines.

The model has served the United States for many years, but it has weaknesses. The co-habitation of trade training, hair dressing, office technology and seminars interpreting Shakespeare's plays tends to devalue the former tracks. Vocational subjects have a low status and are even considered a punishment for students who are performing below academic standards. In many ways, the

differentiation between categories of schools – which is ideologically frowned upon – migrates into the inside of the school walls, making it more visible, more painful and even more dysfunctional.

The USAID and the World Bank tried to export this model to Latin America. Several attempts were made to recreate a diversified secondary school. Colombia, Venezuela, and Panama attempted to introduce diversified curricula into secondary schools in the early 1970's, and Peru experimented with comprehensive high schools, all without much success (Corvalan, 1986). *It seems that the presence of higher status internal tracks created a strong prejudice against the manual occupations taught, making innocuous the attempts to prepare students for them.*

Perhaps the most ambitious attempt was the INEM in Colombia, strongly supported by the World Bank. These were expensive and well-supported schools, following the American model. They created a strong organizational culture, offered solid education and are still around. The problem is that they are too expensive to be replicated and the vocational end is just what it is in the United States, i.e. an exposure to a variety of different activities within the school walls. It seems that the high selectivity and consequent elitization of the student body frustrate the vocational objectives.

The German system without German institutions.

Close to two thirds of the German youth (the same happens in Switzerland and Austria), instead of going to secondary schools take up an apprenticeship for a period of three to four years (after completing at least 9 to 10 years of schooling). Parallel to the work experience, they take one day per week to attend a school that offers academic disciplines and technological subjects. This model is highly successful in the Germanic countries (despite some recent difficulties due to the economic problems of Germany). Hence, the idea of exporting it to other nations has had a continued existence.

To make a long story short, these attempts have remained very limited, even though some are considered as successful. It seems that replicating it at a larger scale requires institutions and a level of information and dialogue between the social partners that is uncommon even in other European nations. It is interesting to notice that the United States has experimented with such schemes and it has worked well with dropouts, but as elsewhere, these experiments remain limited in scope. The only exception is the Tech Prep program which is a variation of apprenticeship training and has been quite successful.⁴

But it is worth keeping this model in mind because it remains attractive and feasible in small and well-controlled experiments, particularly in areas where technology changes very rapidly and schools could not hope to maintain up-to-date laboratories and workshops. And these tend to be exactly the skills that are very critical for the competitiveness of some industrial sectors. It is also viable in the case of training programs inside large enterprises (particularly when they are local branches of German firms) which have been successfully operating dual apprenticeships for many years (In the city of São Paulo, thousands of workers of German firms are enrolled in this system.

⁴ See Dan Hull, *Opening Minds, Opening Doors* (Waco: Cord Communications, 1995)

II. The New Models

Since the present forms of organizing secondary education are not satisfactory, what are the possible replacements for them? The challenge is formidable. Secondary education must resolve the academic/vocational dichotomy. Simultaneously it must convert academic secondary education into a more general, high quality, problem solving-oriented extension of basic education, successfully retaining the increasing numbers of low-income students who are the new clientele of academic "university prep" education. At the same time, it has to provide high quality job training for the large numbers of secondary graduates who will need to get jobs right out of secondary school or with limited post-secondary vocational education. Are LAC countries taking steps in these directions? *Some important issues are where to put job-oriented training, how late or how early to offer it, and how separate job training should be from mainstream academic education.*

The key to clear thinking about the interplay between academic and vocational contents starts by *not mixing up the necessary interplay of theory and practice with the possible but not necessary interplay between theory and job-oriented subjects.* When academic subjects are not linked to vocational preparation, it is imperative that they be as applied to the real world and to practical activities as it is often done in the academic *cum* vocational solutions. In sound academic schools, there ought to be practical applications, explorations of the real world, experimentation and student research. The laboratories and workshops are meant to educate the mind via experiments and construction of real objects and processes – by contrast to shops meant to teach a trade. This is what prepares the students for whatever they are going to do later on. After the academic education, if they want to move immediately to the labor market, in some occupations, students might benefit from taking technical or vocational courses that delve into the specifics of the occupation chosen. In some cases, this might be a short preparation (e.g. hairdressing). In others, it might take much longer, as is the case with electronics. When these courses come after a sound academic education, they can be much shorter and specifically tuned to labor market needs.

Some of the solutions mentioned ahead – which postulate the separation of job training from academic schooling – have met strong objections from some areas. However, the previous paragraph tries to demonstrate that this criticism is not justified. Granted, preparing for jobs is not an add-on activity that can be reshuffled around freely. Also granted, the integration of vocational content to the academic curricula allows the creation of bridges between academically-oriented subjects and job-oriented subjects, which enrich both sides. But that is not to say that this is the only solution or that it is a solution which is able to overcome some of the objections mentioned before. But of course, any of these solutions require better teachers, a chronic shortcoming of Latin American education.

Summing up the last two paragraphs, a good education blends theory and practice. Practice gives meaning and concreteness to theory and allows a deeper understanding of concepts. Theory lifts occupational training out of manual and repetitive routines, giving it a broader meaning and the potential to transfer learning from one situation to another. Schools can be organized in such a way that occupational training is the concrete counterpart to the conceptual development offered by

academic subjects. But they can also bring practical content to academic programs without an occupational orientation. In fact, this is what high quality schools have done for a long time.

Below we present some of the new solutions that are being proposed or implemented. Notice that these are not mutually exclusive alternatives, since most countries tend towards greater complexity in their systems, with many alternative paths being offered to students. Hence, what follows is a description of trends and possibilities, not a prescription of ideal solutions.

Remove jobs training from the academic curriculum

Vocational and technical schools anywhere in the world face as their number one challenge the difficulty of matching the training offered to existing jobs. This is the acid test for such institutions. Demand for the occupations offered may have been good when the courses were created, but as markets evolve, a glut of graduates may be produced. It has been observed that, in most cases, there is inertia to readjust and few incentives to cut enrollment and find new market niches. But when the vocational or job-oriented program is coupled to an academic degree, the inertia is even stronger. First of all, it makes little sense to reduce or increase education opportunities following the business cycle. Surely, schools are not to be closed when unemployment increases, even though it might make sense to reduce offering of a job-specific training when there are no jobs in that particular occupation. Education has a “raison d’être” which goes beyond immediate jobs. Training does not. Secondly, given present patterns of organization, schools are usually not rewarded when they adjust to shifting markets, at the same time that change definitely has a political cost to those who undertake it. The result is inertia, with technical/vocational courses being offered long after the corresponding markets are saturated. But just as important is the powerful *ethos* of academic schools that overpowers the lower status of the job-training end of the school, further confusing its goals.

While most experiments to add vocational content to regular academic schools have met with very limited success, the region is the site of a number of highly successful outside-of-school, payroll-tax financed, publicly (and privately)-run vocational training programs and a few innovative alternatives to traditional vocational education. Good examples are SENAI, SENAC, SENAR, and SENATI in Brazil, SENA in Colombia and INA in Costa Rica ⁵ – discussed in the forthcoming Training Strategy of the IDB. The presence of these alternative vocational systems is not without consequences, because it warrants the existence of secondary school models which offer a minimalist menu of occupational training, leaving the task of real vocational schools to this parallel system. Even though these system are facing problems of their own in recent years, *the alternative of altogether removing vocational preparation from academic schools gains acceptance in the discussion of new models of secondary education.*

Brazil is a clear case of the tendency to separate occupational training from academic programs. In 1997 a Presidential decree broke down secondary schools into two different segments: the regular

⁵ Whereas public spending for academic and technical education in Latin America was held down, even in the economic recovery beginning in the late 1980’s, private sector growth produced increases in payroll taxes, expanding such programs. They are primarily – but not exclusively – for workers who hold jobs and are sent to the programs for training by employers. (These programs are discussed in a different paper being prepared: “Strategy for Training”).

secondary track and technical programs. Instead of an integrated programs blending (in theory) an academic curriculum with technical and occupational training, the two are split into separate programs (which could continue to be offered in the same building or become totally separated). Students can take one, the other or both. In other words, students who are college-bound will only enroll in the academic program, students who already have a secondary diploma will only enroll in the technical and some may enroll in both if they want a technical career and do not have a secondary diploma. This eliminates the previous and persistent tendency of high end (and high cost) technical programs to enroll students who only are interested in the academic segment of the program – effectively blocking more modest students from taking these courses and depriving the economy of the skills taught. All technical and academic schools have already separated the two programs. But, of course, this is only the first stage. Creating a viable and independent set of training programs is the next step, facilitated, one must add, by the long tradition of SENAC of offering short vocational courses in a wide range of service areas.

Move job training to the post-secondary level

As the education level of society increases and as the conceptual requirements of skilled trades increase, there is a worldwide trend towards pushing technical education into the tertiary level. This trend finds its strong counterpart in Latin America where some countries are expanding relatively low-cost polytechnics or community colleges at the post-secondary level. The range of names and titles for these initiatives is wide: “técnicos,” “tecnológicos,” “terciaria no universitaria,” “politecnicos,” “colegios tecnicos” and others.

It is worth mentioning that while higher education enrollment in Latin America rose more slowly than in other regions, Latin America remained a leader among developing countries (although behind the Asian NICs) in the proportion of young people reaching higher education, with 17 percent of the age cohort enrolled. Third level education increased by slightly more than 3 million students between 1980 and 1992 (UNESCO, 1995). Again, the proportion varies greatly from country to country. In both the secondary and tertiary levels, Latin America leads the developing world in the percentage of young women enrolled and in the percent of women university graduates.

Mexico has developed a system of tertiary polytechnics, and they have been particularly successful in regions with higher growth rates, such as the border area with the United States. Mexico's polytechnics link up to local businesses, with students working at local firms part-time during their studies as part of their training program. By the same token, Venezuela also has many post-secondary programs.

Chile has seen a considerable growth in these institutions. They are mostly private and receive neither a significant support nor a serious inspection from the government. They are, for all practical purposes, taken as private business, conducted by proprietary institutions and controlled by market forces.

After a long period in which private institutions were not favored by official policies, Argentina has seen an explosive growth in the “terciaria no universitaria,” mostly offered by proprietary institutions. These tend to be mediocre or low quality programs. To increase the level of offerings

at this level, there has been a growth in provincial initiatives to create short post-secondary institutions (an IDB loan is in place to support the expansion of such institutions).

Brazil has been slow in this area – except in computer courses. But the recent split of technical from secondary makes most of the courses *de facto* post-secondary programs since there is a strong tendency to offer the course to students who already have a secondary degree. With a substantial IDB loan, these courses are expected to grow.

One problem with this solution, particularly in case of countries where the rate of secondary completion is low, is the premature elitization of training. Poorer youth who are not able to reach this education level may be alienated from training opportunities. In addition, becoming *de facto* higher education puts these courses in competition with more traditional careers at this level, a challenge which Europe and the United States met with relative success but Latin Americans are still struggling with it ⁶.

Create tracks with different "flavors" but not real vocational training

Some recent reforms have evolved to a secondary system based on the separation of tracks. It introduces a "theory" already focused on some broad area of knowledge but removes a strict job preparation from the mainstream secondary programs. This is not different from the French system of offering different "flavours" to the Baccalaureate.

This tendency is illustrated by a new generation of courses that are more like "general" technical education that focuses on "practical" approaches to academic subjects, but with little attempt to prepare students for specific jobs. This type of education is organized around broad technical categories, such as biological sciences, commerce, applied arts (visual, graphic etc). This can be seen as a somewhat specialized academic secondary education or "general" technical education. It costs about the same and is intended to prepare students for entry into post-secondary institutions or to jobs where on-the-job training is an appropriate transition (such as business and commerce occupations), or as an introduction to job-specific training to be taken subsequently. It is this tracked and soft type of technical education that is expanding most rapidly within the LAC secondary education system.

Good examples of that are Mexico and Argentina that have created "polimodales" which are different tracks within academic education. Like the French "baccalaureates," these are essentially academic tracks, with a stronger orientation in, say, humanities, biological sciences, business and commerce and so on.

If properly implemented, these schools hold promise. In general (although not in every case), broad-based problem-solving knowledge seems to be more valuable to graduates over their work lives than specific vocational skills because it enables graduates to "adjust to disequilibrium" (Schultz, 1975). In the increasingly "flexible" labor markets of the new global economy, general knowledge of mathematics, science, computers, and language that prepares graduates to learn a variety of specific, job-related skills either on-the-job or in short job-training courses appear to

⁶ On the issue of post-secondary education, see the IDB Strategy for Higher Education

have become more valuable (Carnoy and Castells, 1995). Surveys of employers in the United States suggest that besides basic cognitive agility, they most value communication and cooperation skills in new hires (Capelli, 1994). But there may be exceptions to this rule, especially for technical education linked closely with employers and high quality on-the-job training (described ahead).

On the negative side, this structure tends to create a set of second rate tracks, reminiscent of what happened with the vocational programs inside the academic schools. It is a fact that the presence of semi-vocational content offers a great potential to make academic education more real and applied. But this potential may easily remain unexploited, as happened with many technical and vocational programs in which the supposedly technical side was mere bookish descriptions of practical work. The potential to use the concrete situations of vocational subjects to enrich theory has been foregone in them. These were foregone “learning to learn” opportunities.

Applied academics

American high schools have been wed to the combination of academic and vocational education in the same institution. Just about all schools adopted this solution at the turn of the century. However, the link between the academic track and the scattered vocational disciplines has not been seamless and lack of effectiveness has plagued the vocational tracks.

In the last ten years, the United States launched a new and better-structured version of this solution. It is undeniable that broad-based problem-solving skills can be built into vocational content, with considerable advantages and success. The Applied Academics and the Tech Prep movements in the US (J. Hull) are the Federal programs structuring and funding these experiments. The key idea under those new orientations is to use vocational subjects to frame “situated” or “contextualized” learning of academic subjects (for instance, mathematics is learned as a tool to calculate the gauge of wiring for an electrical circuit). The idea of bringing practical and enterprise experience closer to academic subjects is not different from what German or Swiss apprenticeships do. Yet, the germanic Dual System is all done in institutions which have no administrative links with regular academic schools, by contrast to Tech Prep which is an add-on to existing high schools.

[Box Tech Prep]

Latin America does not seem to be moving in this direction. The other alternatives mentioned in this chapter illustrate the most frequent alternatives chosen. Yet, there are good reasons to believe that some of the ideas and, in particular, the concepts and learning theories behind them can become a good source of inspiration for Latin America.

Create a single national curriculum with some optional subjects

A variation of the American comprehensive school is being adopted in Brazil. This will be a single national core academic curriculum comprising 75% of the disciplines. The remaining disciplines will be offered at the discretion of individual schools and may include vocational

offerings. Under the new system, the classical technical and vocational training – particularly for the manufacturing sector – would no longer be offered within secondary schools. They are either offered in parallel or moved up to the post-secondary level.

Trinidad and Tobago are in the process of implementing a similar scheme which reduces the wide range of school types. Classical vocational schools would be replaced by a single-curriculum school. Some schools may continue to specialize in trade training but the bulk of the secondary schools would eliminate the classical juxtaposition of academic and vocational subjects.

These models are simple and elegant. Yet, a single solution leads to a single curriculum which can be a problem in countries with highly heterogeneous levels of students and schools. For instance, if the mathematics syllabi include derivatives and integrals, low scholastic ability students will get little from this learning (and forego learning more applied elements of this discipline). However, if such subjects are not in the syllabi, engineering-bound students may be deprived of this vital background. Ultimately, this is *the ugly face of the decision to offer the same education for all, or a watered-down or more applied version to the less academically able*. There is no way to escape this unpleasant issue. Cognitive theory suggests that some students can learn more when theory comes through practical applications (this is the gist of the “applied academics”). But the fact of the matter is that offering a school for the rich and another to the poor is strongly objected by some groups.

Blending office technology with academic curricula

For those students who are not bound to higher education, a more practical education is in order. For this reason, most countries try to offer a great variety of job-oriented educational and training programs inside academic schools (these are mostly the classical technical schools offered in just about every Latin American country. Yet, as mentioned, training for the industrial arts and for other areas with high technological density and specificity seems to face very serious problems due to the conflicts between the lofty culture of academic schools and the very specific needs of these programs. The alternative of moving such programs elsewhere seems more attractive, in most cases.

However, there are subjects that are much more congenial to the *ethos* of regular schools. And from a quantitative point of view, they can be large, as is the case with accounting and secretarial programs, which are a favored choice for students of less affluent background. By the beginning of the 1980's, more than half of technical-vocational enrollments were in business education, oriented toward clerical/commercial jobs. Unfortunately, these programs desperately need reform. They tend to teach an old and stale version of legalistic bookkeeping, without computers and without a clear focus on managing small enterprises.

The present trend to "academize" secondary-level technical education for office work may be an important step toward making secondary education more interesting for the region's youth while not locking them into specific vocational skills. Technical education of this type uses job-oriented courses (largely business/commercial jobs) to make mathematics, computers, science, and language more interesting and relevant to students who do not do well in a traditional academic-

style teaching-learning environment. The concept here is to increase cognitive agility using techniques that involve students in new ways.

On the other hand, some of the “vocational skills” that are taught at those programs are just as well general education for a modern economy. Using a computer is a vocational skill for an office worker but it also general education for everybody else. It hard to imagine someone with a secondary education who will not be soon using a computer, even in Latin America.

The business-academic mix is much more likely to succeed than the traditionally antagonistic combinations of academic and industrial arts. Business skills are “paper and pencil,” much closer to the *ethos* of academic schools and much less often the market demand for them fluctuates erratically.

Although there is no definite evidence that career education increases the employability of graduates, compared with traditional academic tracks, it does appear to improve retention rates and learning (Stern et al., 1992), and the possibility for some students to go on into tertiary level technical education. It is interesting to notice that some years ago, research on the vocational trades taught at American high schools revealed that business programs for girls were highly successful in leading them to jobs, at the same time that the record for other skills, at best, was mixed (cite source).

The elite technical schools and their links to industry

Most Latin American technical schools are totally disassociated from labor markets. In fact, their staff does not visit enterprises, firm’s personnel do not visit them and they know little about the labor market of their graduates. This is in part why they can remain insensitive to changes in occupational profiles and to obsolete curricula. However, there is a small number of "elite" high level technical secondary schools that are well tuned to local labor markets and also provide a broad academic preparation to their graduates as part of the "technical" curriculum. Such schools are the technical training equivalent of the best academic secondary schools and tend to comprise a minority of schools that select the ablest students.

A number of studies have argued that vocational courses of this type tied more closely to jobs and industries present major advantages over preparing students in programs not directly linked to jobs. Since the specific skills learned in vocational training require constant updating, close links with the labor market are absolutely essential to make such education relevant and students employable. Unless the skills learned are used rapidly they risk getting lost. Educational programs that enable students to be employed immediately have much higher returns to both employer and employee.

Chile has experimented with turning over the management of some of its secondary technical schools to associations of industries while still subsidizing them with substantial public funds. The positive side of this strategy is that once accepted to such schools, students have an "inside track" to employment in the industries associated with the schools. Students seem to have a much higher likelihood of getting work after completing the courses, and they have access to internships while

in school. The drawback is that such schools may be quite expensive (Chilean students attending industry-run technical schools receive a voucher that is five times the amount of a "ciencias-humanidades liceu" voucher). Already, close to 20 percent of students in technical/professional secondary education are in schools run by associations of employers (Comite Tecnico, 1994, Table 1). Such "industry-run" technical schools have also existed for decades in Monterrey, Mexico, where they are also entirely publicly funded.

A very interesting and ambitious model is given by about two-dozen technical schools operated by SENAI (not to be confused with their odd 700 hundred vocational schools geared to craft and industrial training). These schools operate very close to firms and tailor their curricula and offerings to their needs. But in the last two decades they have gone farther. At first, they started offering quality control and physical essay services, since they often have laboratories that are better equipped than those of many firms. They progressively moved to technical information about products, markets, processes, and new equipment. The next step has been technical assistance, trouble-shooting technical problems, industrial layout, organization and method studies and lately, total quality and ISO 9000 norms. In addition, a majority of them have graduated to industrial R&D. They conduct development projects for firms, usually improving efficiency of processes and machines, retrofitting old equipment with numerical control devices, doing market research, developing new products or new uses for old products or rejects. This is a highly successful model which, thus far, has not been reproduced outside of Brazil.

A parallel adjustment in these programs has to do with the redefinition of their graduates. The old programs tried to prepare supervisors rather than skilled workers. The new tendency parts company with the former understanding of technical education - of European tradition - as a preparation for intermediate management, i. e. those who stand between the engineers and the skilled workers. There is considerable ambiguity in this area, as modern organizations shrink intermediate cadres and most firms have always preferred to promote their best workers to supervisory roles rather than use out-of-school technicians on those positions which involve managing highly experienced line workers. By contrast, the "new" technician is a worker, not a foreman. He is the worker of the technically complex processes. The mechanic fixes automobiles but the mechanic who fixes computers is a technician. The new breed of technicians correspond to the "high tech" mechanic, not the supervisor. Rather than supervisors, this new breed of courses and schools prepare students to be "workers" in well-defined occupations, such as X-ray technicians, car mechanics, computer technicians, maintenance technicians and so forth.

To sum up, it is possible and highly desirable to create technical schools that operate very close to the productive sector and benefit strongly from this proximity. These can be highly effective schools. Yet, they need many pre-conditions to work well, in particular, sufficient resources and alert management.

III. Lessons?

The first lesson is very clear: *the traditional structure of secondary education is obsolete*. It neither offers a sound academic education that is compatible with the needs of a modern society nor does it handle well the task of preparing some students to enter the labor market. However, there is *no single new model* which can be recommended to Latin America. Advanced countries

adopt different models and several of them are also in the process of transforming their own systems. In addition, *cultural traditions cannot be ignored* in the new choices.

Yet, a few major conclusions can be singled out:

- In many new alternatives there is a *progressive separation of vocational preparation from the academic streams* (the major exception being in the areas of business and office training which have a natural affinity with academic studies)
- In many cases, technical courses are pushed up to the post-secondary level
- In others, the technical tracks become less an occupational training than an academic education with emphasis on some broad family of occupations.
- The most successful technical schools, at any level with or without academic studies, are closely tied to industry, even though they remain a small percentage of total enrollment.
- In all cases, there is the need to *make theory more applied, more concrete, more focused on solving problems, rather than being the memorization of facts and theories*. Notice that *being practical is not the same as being vocational* and one of the new tendencies is to make academic education practical and concrete but not vocational. This is true both for academic and to vocational education, as academic needs practical applications and vocational needs stronger theoretical foundations.

Careful observation of the real world allows the above conclusions to be reached without resorting to conflictive value judgements. However, what *remains highly ideological is the alternative of offering the same syllabi to all and the other alternative to track students and offer some easier or more applied program to some and academically more demanding paths to others*.