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ACRONYMS AND ABBREVIATIONS

ACM	Association of Cities and Municipalities
AKs	Agro-kombinats
AMS	Aggregate Measurement of Support
APMC	Agency for the Protection of Market Competition
ARD	Agency for Rural Development
PSE	Producer Support Estimate
CCBS	Croatian Central Bureau of Statistics
CAP	Common Agriculture Policy
CAP	Country Action Plan
CCE	Croatia Chamber of Economy
CDA	Croatian Securities Depository Agency
CEECs	Central and Eastern European Countries
CEFTA	Central European Free Trade Agreement
CEM	Country Economic Memorandum
FDI	Foreign Direct Investment
FIAS	Foreign Investment Advisory Service
CERC	Croatian Energy Regulatory Council
CGG	Consolidated General Government
CNB	Croatia National Bank
COM	Council of Ministers
CPF	Croatian Privatization Fund
CROSEC	Croatian Securities Commission
CSIPO	Croatian State Intellectual Property Office
DASB	State Agency for Deposit Insurance and Bank Rehabilitation
EAs	Europe Agreements
EPL	Employment Protection Legislation
EU	European Union
FTAs	Free-Trade Agreements
GHG	Greenhouse Gases
HAC	Hrvatske Autoceste
HBOR	Croatian Bank for Reconstruction and Development
HEP	Hrvatska Elektroprivreda d.d.
TERFN	Trans-European Rail Freight Network
TINA	Transport Infrastructure Needs Assessment
TPA	Third-Party Access
TTFSE	Trade and Transport Facilitation in Southeast Europe Program
UCTE	Union for the Coordination of Transmission of Electricity
ULC	Unit Labor Costs
HPB	Croatian Postal Bank
IACS	Integrated Administration and Control System
IAS	International Accounting Standards
IFIs	International Financing Institutions
IP	Intellectual Property
IPPC	Integrated Pollution Permit and Control Regulation
IPPC	Integrated Pollution Permit and Control Regulation
JANAF	Jadranski Naftovod d.d.
MBIs	Market Based Instruments
MFN	Most Favored Nation
MJALSG	Ministry of Justice, Administration and Local Self-Government
MMATC	Ministry of Maritime Affairs, Transport and Communication
MoES	Ministry of Education and Sports
MOJ	Ministry of Justice
MoST	Ministry of Science and Technology
MOU	Memorandum of Understanding
NEAP	National Environment Strategy
NGOs	Non-governmental Organizations
NSC	National Steering Committee
OECD	Organization for Economic Cooperation and Development
PBZ	Privredna Banka Zagreb
PCO	Pan-European Cumulation of Origin
PIFs	Privatization Investment Funds
PSE	Producer Support Estimate
R&D	Research and Development
SAA	Stabilization and Association Agreement
SEECs	South-Eastern European Countries
SIGMA	Support for Improvement in Governance and Management
SOEs	State-owned Enterprises
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VET	Vocational Education Training
VSE	Varazdin Stock Exchange
WBES	World Business Environment Survey
WTO	World Trade Organization
ZSE	Zagreb Stock Exchange

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Assessing Educational Needs

6.73 Croatia's aspirations for European integration have major implications for Croatia's education and training system and its research base. Regardless of prospects for EU accession, Croatia's economy would be more competitive and robust if it were to move increasingly to innovation-driven growth. Characteristically, innovation-driven economic activity consists of rapid change in production processes and products in response to international competition and volatile market opportunities. It depends on the aggressive invention of new ideas and application of existing ones. Typically, stages of economic development include a factor-driven phase – where land, labor and capital are mobilized, an investment-driven phase – in which FDI helps to incorporate technology and integrate the country into the world economy – and an innovation-driven phase – characterized by a high rate of innovation and adaptation and commercialization of new technologies. EU members have features of each of these three phases; however, innovation-driven growth fundamentally characterizes their economies and certainly the future of their economies. Croatia's economy is based primarily on investment-driven growth, although it has problems in its factor markets and some innovation-based activity. The growth strategy proposed in this Report is heavily reliant on the efficient working of good and factor markets. However, as Croatia prepares for European integration, it has to take actions that stimulate the gradual shift to innovation-based growth.

6.74 Innovation-driven growth means that employers have to restructure work; workers need different skills; and education, training, and knowledge production systems have to be restructured to meet employer and employee needs. Employees in an innovation-based economy face different labor markets than those in investment-driven economies. Knowledge-based jobs steadily increase as a share of total jobs. Returns to higher education increase, while relative returns to secondary education weaken, and returns to basic or incomplete secondary education decline sharply. The skill demands of the jobs that workers hold are more apt to change, and workers are more apt to change jobs. Both kinds of change confront workers with the need for continuous retraining.

6.75 To cope with these changes, workers need different skills than those valued in highly stable work environments. They need the foundation skills that position them for continuous learning, especially literacy (comprehension, information-processing, interpretation, and writing), mathematics, and science. They need the capacity to act autonomously and reflectively (critical thinking, problem-solving - the higher order cognitive skills[135]). They need the metacognitive skills - the executive thinking or "knowing how to learn" skills that give them the ability to mobilize and monitor

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[135] Higher order thinking occurs with regard to problems that have certain characteristics. The path of action is not fully specified in advance, nor is the path to a solution mentally visible from any single vantage point. The problem yields multiple rather than unique solutions and requires nuanced judgment and the application of multiple criteria that sometimes conflict with one another. Not all of the knowledge needed to solve it is available (Resnick 1987).

alternative strategies for solving unfamiliar problems. They need to be able to function in teams that are often socially heterogeneous. Since specialized knowledge and skill is more valuable in highly stable environments and rapidly outdated in rapidly changing ones, they need more flexible and less specialized knowledge. Although they need facts to build cognitive frameworks, they need more experience in using skills to solve problems and less time spent on memorization.

6.76 The major purchasers (and therefore financiers) of problem-based knowledge are technocratically-oriented governments, innovation-based firms (including multi-nationals), and in some cases, donors, foundations, and intermediary financial institutions such as economic development banks. *In the absence of a government that seeks and uses knowledge or of a critical mass of innovation-based firms, the arrangements for producing problem-based knowledge do not emerge in any meaningful way.*

Is Croatia Positioned to Create the Human Capital and Knowledge that It Needs for Innovation-Driven Growth?

6.77 Comparisons with OECD countries and other countries within the region, interviews with managers of Croatian firms and policymakers, suppliers, and analysts in the education and training sector, and reviews of the many strategy papers sum up a judgment of significant gaps between what Croatia now has and what it needs to fuel innovation-driven growth.

6.78 The adequacy of Croatia's human capital can be rapidly judged by:

(a) evaluating Croatia's enrollment rates and expected years of education, relative to those for the OECD;

(b) comparing the educational profile of Croatia's working age population (25-64 year olds) with the average for the OECD;

(c) assessing if the graduates of Croatia's education and training system have the types and levels of skills characteristic of EU students and labor forces;

(d) asking if Croatia's graduates meet the skill demands of Croatian companies that are knowledge-based.

6.79 The status of Croatia in each of these areas is summarized below:

(a) Croatia has relatively low pre-school enrollment rates, very high basic education enrollment rates, respectable rates at the upper secondary level, and relatively high rates for tertiary education. However, the number of years of education that the average five year old Croat can expect to

complete over his/her lifetime is about four years less than that which the average OECD five year old can expect to complete.[136]

(b) Table 6.7 compares the educational attainment of the working age population (25-64 years of age) for Croatia and the OECD average. Relative to the OECD, Croatia has a smaller percent that have completed only primary or lower secondary education. It has a much higher percent that have completed some form of secondary education (academic, vocational, basic vocational) - **58 versus 44 percent for the OECD**. Croatia has **only half** the OECD share of tertiary completers.

(c) Among those that have completed some form of secondary education, Croatia has a much higher percent that have completed only the basic vocational program of 1-3 years that ill-equips graduates for a modern workplace - **32 percent versus only 3 percent for the OECD. Against this standard, only 37 percent of Croatia's working age population - versus 64 percent for the OECD -** might be expected to have acquired the competencies required by a modern workplace.

(d) **Croatia does not know how its students perform relative to Croatian or international standards.** Government and the MoES are to be commended for planning to participate in the 2006 round of OECD's Program for International Student Assessment (PISA) and for applying for OECD membership. In the absence of reliable measures of the performance of Croatian students, the performance of countries comparable to Croatia that have participated in international tests can be used to infer where Croatia may also stand in those tests. PISA and the OECD's International Adult Literacy Survey (IALS) assessments are particularly relevant for assessing how well students are prepared to function in an innovation-based economy. Both PISA and IALS measured respondents' ability to manipulate information to solve problems in the real world, not their academic skills per se or their mastery of a specific school curriculum. PISA assessed literacy in reading, mathematics, and science for a sample of 15 year olds, evaluating their understanding of key concepts, mastery of certain processes, and ability to apply knowledge and skills in different situations. IALS assessed the information-processing skills needed by 16-65 year olds to perform literacy tasks encountered at work, at home, or in the community. It measured individuals' capacities to

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[136] Introduced by UNESCO, this now standard measure uses current enrollment rates for students at each level of education to estimate the number of years that a hypothetical five year old child in the country could expect to complete in his/her lifetime. The data cited here are from the World Bank's public expenditure review in 2000. At that time the hypothetical Croatian child could have expected to complete almost four fewer years of education than the average OECD five year old in 1998 and less than children in selected other countries in the region, such as the Czech Republic (14.4 years), Hungary (13.9 years), or Poland (14.8 years). By 2002 the expected years of education could have increased, but not significantly.

expand and interpret the meaning of verbal and quantitative texts, using three scales: prose, document, and quantitative.[137]

Table 6.7: Highest Level of Education Completed for 25-64 Year Old Population for Croatia (2001) and OECD (1999)

Country	Primary/lower Secondary	Basic Vocational	Secondary	Tertiary
Croatia[1]	30	32	26	11
OECD average	36	4	39	22

[1] Croatia's numbers sum to 99 percent because one percent of its 25-64 year olds had completed no education.

Source: 2001 Census, Republic of Croatia Bureau of Statistics; Table A2.1a, p.43, OECD, 2001.

6.80 *Except for the Czech Republic, neighboring countries did not perform well on PISA.* The average scores for ECA countries that participated in PISA were significantly below the OECD average on all three scales: literacy, mathematics, and scientific literacy.

6.81 Scores on IALS were found to correlate strongly with the probabilities of unemployment, wages, and per capita GDP. The amount of variance in literacy scores within a country correlated with the extent of income inequality in that country. Again, except for the Czech Republic, neighboring countries performed poorly on IALS. Three of the four participating ECA countries (Slovenia, Poland, and Hungary) had about 75 percent of 16–65 year old workers who tested at levels 1 and 2 on all three scales.[138] Levels 1 and 2 predict that the individual will have difficulty functioning in a modern workplace. Analyses of IALS data for all participating countries found that achieving the literacy levels required in modern workplaces (Level 3 and above) was associated with having completed upper secondary education. The performance differences between the tested skills of adults in Hungary, Poland, and Slovenia versus those of Czech adults and adults in participating OECD countries could not be attributed to the quantity of education that low performing ECA populations complete. Had Croatia participated in

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[137] *Prose literacy* is defined as the knowledge and skills needed to understand and use information from texts including editorials, news stories, poems and fiction. *Document literacy* is defined as the knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables, and graphics. *Quantitative literacy* is defined as the knowledge and skills required to apply arithmetic operations, either alone or sequentially, to numbers embedded in printed materials.

[138] *Level 1* indicates individuals with very poor skills. For example, the person may be unable to determine the correct amount of medicine to give a child from information printed on the package. *Level 2* respondents can deal only with material that is simple, clearly laid out, and in which the tasks involved are not too complex. It denotes a weak level of skill, but more hidden than level 1. Individuals may have developed coping skills to manage everyday literacy demands, but their low proficiency makes it difficult for them to face novel demands, such as learning new job skills. *Level 3* is considered a suitable minimum for coping with the demands of everyday life and work in a complex, advanced society. It denotes roughly the skill level required for successful secondary school completion and college entry. It requires the ability to integrate several sources of information and solve more complex problems. *Levels 4 and 5* describe respondents who demonstrate command of higher-order information processing skills.

IALS, its lower secondary completion rates alone relative to the OECD average (26 versus 39 percent of 25-64 year olds) would predict Croatia's lower performance on IALS.

6.82 On the basis of the PISA and IALS results and the comparability between Croatia and Slovenia and between Croatia and Germany, it seems safe to predict that, *had* Croatia participated in these two assessments, their youth and adult populations would have had relatively low mean scores and high inter-school variances.

6.83 How well do Croatia's students perform relative to the skill demands of its knowledge-based firms? As one of the world's 10 largest generic drug companies, PLIVA is a clear example of an innovation-based Croatian firm. It is based on research and development. This firm expressed alarm over the quality of the graduates of Croatian secondary schools and universities. PLIVA has its own skill assessment system that it uses to select among job applicants. It was stated that every year the number of good students shrinks. Fewer than 10 percent of the university graduate applicants meet PLIVA's criteria. In PLIVA's more demanding research and development division, it is fewer than 5 percent.

6.84 The statistics for measuring Croatia's R&D activity and effectiveness are inadequate. However, qualitative and some quantitative evidence indicates that Croatia's R&D system—its universities and research institutes—is limping. **The state micro-manages exactly that sector that most needs to be nimble, flexible, and entrepreneurial.** As of 1996-97, Croatia had about half the number of fulltime researchers per million population as the average for the OECD countries (Flego et al., 2002, Appendix Table A). In 1997-2000, it had about 60 percent of the fulltime researchers per thousand economically active individuals as the EU countries (Flego et al., 2002, Appendix Table B). Research productivity, **as measured by published articles in chemistry only,** is less than EU and most East European countries (Berryman-Drabek 2002).

6.85 Currently, Croatia has 28 public research institutes, one public research center, and several private-sector research institutes, the exact number varying from three to 13, depending on the source. The Scientific Research Activities Law of 1993 constituted a major assault on Croatia's R&D system, fragmenting it and weakening the institutional and functional links between the research institutes and universities. It took away from the universities all research institutes that had been administered by the universities, changed their status to "public institutes", and brought them under the direct administration of the MoST. The adoption of the Law was followed by what Croatians call "purges in science", with ministers of MoST changing many institute directors and replacing them with individuals that were usually not distinguished scientists. The public institutes are now tightly controlled by political appointees, specifically the ministers of the Ministry of Science and Technology. Under the Law on Research and Development the Minister of Science and Technology is responsible for the management and administration of the public (state) R&D institutes.

6.86 **In sum, Croatia's public R&D system has become highly centralized,** with the Minister of MoST directly or indirectly appointing members of the management and scientific councils of the public institutes, appointing and dismissing directors of institutes, and making final decisions on each individual research project. Several of those interviewed said that MoST's bureaucratic micro-management had killed or crippled most of the research institutes. The situation of the institutes has improved over the last two years as MoST has handed over some of decision-making powers to the institutes.

Proposed Reform Agenda

6.87 Policy recommendations fall into three main areas, respectively (a) restructuring the role of the State in education and R&D; (b) improving the State's performance of its functions; and (c) restructuring the curricula, instructional pedagogy, and accountability mechanisms for educational outcomes. There are as well some specific areas where policy initiatives are required; (d) avoid disadvantages of the vocational school system.

Restructure the Role of the State in the Education and R&D Sectors

6.88 The role and performance of the State is one of the causes of many problems in education and R&D and one of the impediment to fixing them. The State has centralized power in ways that cripple the initiative and accountability of the educational and R&D institutions. It regulates student enrollments, makes decisions on new employment and financing of higher education programs and research activities, and approves new investments. An international consensus about a workable allocation of decision-making powers in the education and R&D sectors among different levels of government and providers implies that the central government should wield a light hand, in contrast to today's heavy hand. It implies a shift (a) from a supply-driven to a demand-driven system of education, training, and research; and (b) from centralized control to decentralized control combined with an accountability for results that should be monitored by the center. *This perspective implies that Government should work with stakeholders to set priorities and standards and use public finance to create incentives for players in the system to meet them*

6.89 At the same time, the central government has critical roles that it should be and is not now playing. For example, the State now controls inputs and processes and turns accountability for learning outcomes over to the schools. This is upside down. *The State should hold schools accountable for learning outcomes and give them the freedom, and, as needed, the technical support, to figure out how to produce them.*

6.90 In particular, Croatia should structure its tertiary education system flexibly to let institutions, faculties, students, and supplier markets adapt to change. Croatia's tertiary system is so rigidly structured that institutions, faculties, students, and suppliers are unable to seize opportunities or adapt to change. Croatia's universities should have single university-wide budgets and the autonomy to take actions in terms of staffing, program, and structure. Government should facilitate private provision where possible, restricting its controls to ones that protect the consumer. These include quality assurance through

mechanisms such as accreditation and impartial information about public and private institutions relevant to consumer choice. The MoST Draft Law on Science and Higher Education proposed some reforms, in mid-2002, that seem to be consistent with these recommendations, but the University of Zagreb challenged these and other proposals envisaged. The biggest risk perhaps was a stalemate due to lack of compromise.

6.91 The new Minister of MoST, appointed in 2002, however, reconciled the two proposals and submitted the final draft Law on Science and Higher Education to the Government. This proposal has received the endorsement of the Croatian Rectors Conference and, most importantly, has been submitted to the Parliament. It contains proposals that are intended to eliminate: barriers to the development of innovation-driven growth, such as university and research institute fragmentation, co-management of higher education and R&D by the State, centralized financing, underdeveloped quality control of higher education institutions and programs, and unequal regional development of higher education and R&D. It also proposes establishing two independent agencies (one for higher education and one for R&D) that will be responsible for evaluating programs and institutions. Decisions on financing individual institutions and programs will be made on the basis of these evaluations. Finally, it provides the basis for integrating into the European Area of Higher Education and Research by introducing the European Credit Transfer System.[139] It is important to stress that the EU is supporting these reform efforts through 16 projects within the TEMPUS program and 3 CARDS projects.

6.92 The analysis implies two roles for Government in R&D. One is dealing with market failure. Individual companies do not have incentives to invest in basic research because of the "free rider" problem, i.e., one pays and many benefit. Since basic research enters the general domain of knowledge, a company cannot monopolize the returns on its investment. Thus, *the State should focus its direct R&D investments on basic research.*

6.93 The other R&D role for the State is creating a positive institutional environment for companies to invest in R&D. As a percent of GDP, Croatia's public investment in R&D is below the average of that for the European Union, but not significantly so. Low investment by the private sector seems to account for the fact that Croatia's public and private investment is about half that of the European Union. *MoST should contract for a competent evaluation of corporate impediments to investing in R&D.* The evaluation should identify Government actions that can create a positive institutional environment, e.g., easing the patent application process, enforcing patents, protecting intellectual property rights, or using tax policy to create fiscal incentives for firms to invest in R&D.

6.94 The State should clear away legal and regulatory impediments to R&D and use public financing to create incentives for high quality, entrepreneurial R&D. For example, increasing the production of young scientists is instrumental to meeting the R&D objectives. The research institutes could become a training base for university graduate students. Fully functional research institutes have the equipment, laboratories, the cross-disciplinary teams, and the project focus that PLIVA identified as missing in the training

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[139] The European Credit Transfer System is already being piloted in some institutions of higher education.

of young scientists. Using competitive grants, the State might fund the costs of properly equipping the winning institutes and some staff time in exchange for training graduate students.

6.95 The State might want to reward the institutes for relying heavily on university faculty to conduct their R&D work instead of building up expensive permanent R&D staffs. This arrangement reduces costs, supplements faculty salaries, gives faculty access to equipment, laboratories, colleagues in other disciplines, and projects, and creates a dense functional collaboration between the institutes and the universities. The State might reward institutes that meet certain targets over time in terms of the quality and marketability of its intellectual and technological products. It could reward institutes that merge or weed out unproductive staff or that create productive partnerships with private companies.

6.96 The Government strategy aims to address some of these issues. The MoST 2002 strategy for science development anticipates a facilitative role for the State. For example, it discusses concepts of science and technology parks; incubators that have access to scientific, financial, legal and managerial services; an Agency for Commercial Utilization of Scientific Research that connects firms and research entities; providing incentives for institutes to create centers of excellence; reducing the brain drain of good young scientists by improving their career options; establishing collaborative links with Croatian scientists abroad; and encouraging small and medium-sized enterprises to use R&D by exploring collaborations between MoST and the Ministry for Small and Medium Enterprises.

Improve the State's Performance of Functions Appropriate to It

6.97 The Government in Croatia has great difficulty in managing horizontal (i.e., cross-sectoral) reform. It has problems of policy consultation and coordination, strategic capacity, analytic capacity, and policy continuity. These management weaknesses are echoed in Government's management of the education sector. In fact, the MoES and MoST seem to have the will, but lack the capacity, to produce change. The Government is better today than it was five years ago at diagnosing problems in the sector. However, it is stronger at seeing pieces than at identifying causal links. *It lacks policy-relevant statistics, analyses, and evaluations.* Accordingly, diagnoses are impressionistically, not empirically, based. It cannot really set up and run an effective change process that demands technical, political, and operational skills. Today's leadership can identify what is wrong, but does not know how to fix it. The endless reports have a number of good ideas. However, they reflect an ability to describe and an inability to transform the system. These reports thus remain "theoretical" in that resources are not mobilized to implement the changes proposed in them. The MoES was successful in having the Government adopt its reform proposal. The proposal was then submitted to Parliament for approval. The Parliament rejected the proposal, returning it to the MoES.

6.98 In the absence of a broader public sector reform, the education ministries (MoES and MoST) can still take some steps. Both ministries should start with a performance audit that evaluates how well each is organized to conduct the generic tasks for which

they should be responsible. The audit review should produce recommendations on how to restructure each ministry to perform these functions, e.g., amalgamating scattered functions; identifying staffing and capital requirements, such as particular software packages for financial estimates, performance audit systems, job descriptions, and hiring criteria; and the technical assistance that will be required to train staff to perform their new responsibilities effectively.

Significantly Restructure the Curricula at All Levels Of Education, Instructional Pedagogy, and Accountability Mechanisms for Educational Outcomes

6.99 Modernizing Croatia's education system requires changing what is taught (curriculum), how it is taught (pedagogy), and the accountability of those at the point of service delivery for results.

6.100 **Curriculum.** For all levels of education the curriculum emerged as the major culprit and barrier to developing the human capital that Croatia needs to support innovation-driven growth. The curriculum has age-inappropriate material that does not fit the cognitive capacities of the students, or grade-inappropriate material, where topics introduced in a grade presume knowledge that is not introduced until later grades. It requires the learning of large numbers of detailed facts that are divorced from meaningful context. There is a broad consensus that the curriculum needs to support more project-oriented learning, and to develop the higher order and executive thinking skills. Revising the curriculum will have to include setting new learning standards by grade and subject as a basis for (a) setting targets for teachers and students; (b) evaluating the learning performance of the schools, i.e., a basis for accountability; and (c) comparable assessments of student learning.

6.101 A significant revision of a curriculum in and of itself is not particularly costly. However, major curricular changes are worthless if they are not accompanied by corresponding changes in (a) all textbooks, teacher guides, and learning materials; (b) teachers' classroom practices; and (c) measures of learning outcomes. New textbooks and changes in teachers' classroom practices will have a significant budget impact.

6.102 **Pedagogy**. Although the curriculum (what is taught) and pedagogy (how it is taught) are not the same, they are deeply intertwined. The "right answer" focus of the current curriculum significantly restricts pedagogic options. *The education sector needs a very different pedagogy, one that develops students' responsibility for their learning, rewards their initiative, and develops the higher order and executive thinking skills.* If the attempt to modernize the system fails at the level of the classroom and the school, it fails overall. Its success depends on what teachers do and think—it is as simple and as complex as that.

6.103 **Build the implementation of the system's modernization around teachers and school administrators**. Although bureaucrats, parents, and students are also important parties to implementation, the burden of a quality reform is on those whose daily professional behaviors have to be recast if the experience of learning is to be changed. To be successful, reform has to respect the world confronted by those asked to change. The

point of the implementation process is to exchange the policymakers' reality of what should happen with that which is faced by implementers. Typically, however, teachers are often viewed as conduits for instructional policy, not as actors. This view encourages policymakers to invest in controlling teachers rather than working with them to help them develop understanding and changed practice. Studies show that successfully implementing reform at the level of the school and classroom depends on sharing power and allowing discretion and initiative at the school level, instituting well-designed and continuous staff development, and holding school-level staff accountable for results.

6.104 **Accountability.** Build accountability for results around interpretable international and national assessments of learning. The first step is to benchmark the learning outcomes of Croatian students against those of their EU counterparts by participating in PISA. As noted above, the MoES has made progress in this direction by receiving an endorsement from the Government to request Croatia's participation in the next round of PISA (2006).

6.105 The second step is to conduct regular **national** assessments of learning at different levels of education. Learning assessments for the different cycles of pre-tertiary education are mostly school-based, i.e., written and administered by the school. Since school-based assessments are not comparable to each other and therefore not interpretable nationally, Croatia needs to engage in **nationally** written, administered, and scored learning assessments. The MoES has made progress in this direction by piloting such nationally and independently written, administered and scored learning assessments (the so-called "state matura") of secondary graduates in several Zagreb gymnasiums this year. This pilot will be succeeded by a nation-wide external assessment of general academic graduates conducted by an independent assessment institution in 2004.

Ensure That Secondary VET Students Are Not Disadvantaged by This Track

6.106 In 2001, 72 percent of Croatian secondary students were enrolled in some form of vocational/technical education. Thirty percent were enrolled in the shorter and less demanding vocational program. EU economies are much less forgiving of low skills than mass production economies. Croatia's education system tends toward earlier and narrow specialization that can stunt the development of the foundation skills for those in "applied" or vocational tracks. This policy deserves to be revisited. It is inconsistent with the education found to be preferable for a modern economy: broad-based preparation with specialization reserved for higher levels of education. The MoES 2002 strategy anticipates several types of secondary VET education. The proposed reform has desirable elements designed to increase the horizontal and vertical mobility for students. At the same time, Germany has similar opportunities for mobility, but very few are able to use these successfully. More worrying, the various VET options—especially programs of three or fewer years—open up chances for significant variation in students' mastery of the foundation skills. This does not mean that all students have to go through academic curricula at the upper secondary level. Vocational/technical programs can have substantial academic content. For the academically less inclined, instructional programs

that *integrate* academic and vocational content are highly effective at achieving a quality education.[140]

6.107 It is reassuring that Croatia is working with the EU through the CARDS 2001 VET project to develop the foundations of a modern, flexible, demand-driven, and high-quality vocational education and training system.[141] As Government reforms its VET system, it is recommended that it consider these proposals:

- restrict occupationally-specific training to the tertiary level,
- limit its secondary VET programs to ones whose completion give students access to faculties in their secondary fields of study *and to the* matura, and
- use the academic/vocational integration model to shape these programs.

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[140] For example, LaGuardia High School in New York City is organized around the repair of aircraft engines. In the context of learning something that real people do in the real world, students acquire the academic foundation skills and knowledge that position them for adult learning and adaptation. The students have to use mathematics, decode the complex manuals published by the manufacturers of different kinds of engines, and exercise diagnostic and problem-solving skills.

[141] The CARDS 2002 (VET: Modernization and Institution Building) and CARDS 2003 (Upgrading of VET Schools - Establishing Centers of Excellence) projects are expected to build on CARDS 2001.