Cross-National Indicators on Teachers and the Conditions of Teaching

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*Network C develops indicators on policy malleable conditions of the learning environment at the system, school and (possibly) classroom levels. To date it has produced system-level indicators on teachers and on the locus of decision making. School-level indicators, seen as hypothetical determinants of educational success, have also been developed. Major new activities concern developments in the area of indicators on teachers and teaching. Efforts to expand and improve the set of indicators on teachers are explained and recent development activities on preservice training, teacher qualifications, and professional development are clarified, along with recommendations for further work. To illustrate data currently available, indicators on teaching time and teacher salaries published in *Education at a Glance 2002* are presented. In conclusion, further development of indicators on teachers is likely to be time consuming and costly. Both short- and long-term data strategies are needed to weigh the policy relevance, feasibility and costs of the types of data suggested in this article.*

Introduction

Indicators on the functioning of schools and school systems (i.e., indicators about human resources in education, decision-making processes, the curriculum, and organizational and instructional processes at the school level) are the responsibility of Network C in the Indicators of Education Systems (INES) program. Inspired by the outcomes of the INES General Assembly in Tokyo, September 2000, and endorsed by the Ministerial meeting in April 2001, Network C has two priority areas: 1) to continue the work on further opening the "black box" of learning processes, with information on how inputs are

transferred into outcomes, and 2) to expand and improve the set of indicators on teachers and the conditions of teaching. This article addresses efforts in the second priority.

First, the theoretical perspectives and policy relevance of indicators on teachers and the conditions of teaching are described followed by an explanation of the network's activities both in general terms and the efforts on teacher indicators in particular. Recent developmental activities on preservice training, teacher qualifications, and professional development are clarified, along with recommendations for further work. In addition, the data currently available on teacher working conditions published in *Education at a Glance 2002* are presented. The conclusion explores both conceptual and practical issues, as well as the challenges, involved in developing teacher indicators that are both policy-relevant and comparable across countries.

Teachers and the Conditions of Teaching

Although technology has changed the way that much of the developed world conducts its economic affairs, the technology of teaching remains primarily a face-to-face interaction between teachers and students (Hendriks & Smith, 2002). The considerable share of total educational expenditure that is dedicated to teacher compensation alone necessitates the close monitoring of how this critical human resource is utilized in the education enterprise. Teaching staff represents about three percent of the total labor force, on average, in the 30 or so highly industrialized countries comprising the Organization for Economic Cooperation and Development (OECD), while the percentage of all staff employed in education amounts to more than five percent (OECD, 1998a).

Policy Relevance

Ensuring that there will be enough skilled teachers to educate all children is an important policy concern in all OECD countries. The supply and demand of teachers is affected by demographic factors shaping the size of the teacher labor force and the student population, as well as factors influencing the attractiveness of teaching relative to other professions. Many OECD countries will soon, if they do not already, face a problem of teacher supply, as a large number of teachers reach retirement age over the next two decades (OECD, 1996). The need to monitor the factors influencing teacher supply has increased. Efforts to recruit new teachers, as well as to retain current teachers,

depend on the conditions of teachers' work (OECD, 1998a). Factors underlying the attractiveness of teaching in different countries, relative to other professions, can inform policy makers about alternative models for structuring incentives to teach.

Although a wide range of external factors influence teaching effectiveness, the training and background of individual teachers is linked to their ability to provide quality instruction. Empirical findings from the school effectiveness research and the empirical link between teacher characteristics and student achievement suggest that differences between teachers account for more variation in student achievement than differences between schools, that is, teacher effects may be more important than school effects (Luyten & Snijders, 1996; Rivkin, Hanushek & Kain, 1998). According to Hanushek (1992), "The estimated difference in annual achievement growth between having a good and having a bad teacher can be more than one grade-level equivalent in test performance" (p. 107). The quality of initial teacher training as well as the attractiveness of teaching relative to other professions are two important factors shaping the quality of the pool of new teachers. Opportunities for professional development, both pedagogical and subject related, can help teachers already in the classroom maintain or improve their teaching skills.

Rationales for Considering Teacher Indicators

Although much of the indicator development within Network C has focused on issues defined as important national issues – as well as the fact that education and the technology of teaching depend heavily on human resources and the considerable share of total expenditures dedicated to teacher compensation – could be taken as sufficient cause to invest efforts in the development of internationally comparative indicators on teaching, such an ad-hoc approach is not appropriate for the long-term planning of teacher indicators (Scheerens, 1995; Hendriks & Smith, 2002). In order to focus attention further and to come to grips with the question of which specific aspects of the teacher domain should be covered, three perspectives can be useful for evaluating the policy relevance of data that might be collected in the future:

Investment in the quantity of human resources. Descriptive statistics on the size of the teaching force and the non-teaching force can provide benchmarks of the magnitude of the investments of countries in human resources for education, in other than strictly monetary terms. Measures

of the number of instructional staff, school management personnel, and non-instructional staff per student can be viewed as a counterpart to financial indicators on the relative size of educational budgets and expenditure per student. Observed differences in staffing patterns are starting points for examining alternative staffing models. While country-level (or in some cases regional-level) aggregates of the quantity of human resources invested in education are currently available, data on within-country variation in the quantity and quality of human resources in schools are more limited.

Political economy of the teaching profession. This perspective regards the motivation and satisfaction of the members of an organization (i.e., school) as either a criterion for organizational effectiveness or as a means to the ultimate objective of organizational productivity. Much of the current debate on the status of the teaching profession and the concern over the conditions of teachers' work can be interpreted as a desire to influence the various factors affecting the supply of qualified teachers. Indicators that identify key differences in the conditions of teaching, relative to other occupations, and the potential sources of supply of new teachers are useful to policy makers and educational planners who are trying to ensure that there is an adequate number of skilled teachers.

Educational effectiveness. The educational effectiveness perspective focuses specifically on the educational inputs or processes that research has shown to be related to educational goal attainment. With respect to staffing, strong educational leadership and a success-oriented ethos in schools tend to be positively associated with the educational achievement of students. With regard to teachers, this perspective focuses primarily on those teacher characteristics and instructional behavior that are associated with increases in student achievement. High levels of motivation and strong commitment to teaching have been suggested as qualities that make effective teaching possible (OECD, 1994; Sergiovanni, 1987). Other teacher characteristics linked to higher student achievement and higher teacher performance on evaluations include teacher preparedness, both in subject matter knowledge (Goldhaber & Brewer, 1997, 2000; Darling-Hammond, 2000; Monk & King, 1994) and pedagogical knowledge (Ferguson & Womak, 1993; Guyton & Farokhi, 1987; Scheerens, 1995); teachers' intentions, objectives, and expectations (Brophy & Good, 1986); as well as subject-specific didactic skills (Monk, 1994; OECD, 1994). Opportunities for teachers to participate in sustained professional development activities focused on content specific pedagogy have also

been linked to higher levels of student achievement (Wenglinsky, 2000; Cohen & Hill, 1997; Wiley & Yoon, 1995). The link between teachers' educational background (e.g., field of study), subject matter and pedagogical skills, as well as other factors and student achievement is likely to depend on the organizational context in which the teacher labor market is situated in different countries.

A crucial outcome of the process through which teacher supply and demand comes into balance is the quality of the resulting teaching workforce (Santiago, 2001). The remainder of this article is devoted to the empirical evidence and conceptualization of some policy relevant and measurable dimensions of teacher quality on the one hand and on policies and antecedents to maintain and provide a high quality teaching force on the other hand.

Teacher Quality

There is a strong consensus around the idea that teacher quality is indeed extremely relevant for student achievement (Santiago, 2001). However, far less consensus exists when it comes to defining a good measure for teacher quality. According to Darling-Hammond (2000), variables presumed to be indicative of teacher competence include measures of academic ability, years of education, years of teaching experience, measures of subject matter and teaching knowledge, certification status, and teaching behaviors.

According to Santiago (2001), the several studies that look at the impact of teacher quality on student outcomes have used many different observable characteristics of teachers as a proxy of teacher quality. The most common observable characteristics Santiago found are: (1) teacher education/subject-matter knowledge (number of undergraduate or graduate courses completed in field taught, whether a teacher has a degree in the field he/she teaches, teachers' scores on a National Teacher Examination to assess subject matter knowledge, selectivity of college attended, highest degree earned, education/pedagogy coursework), (2) teacher certification status, (3) academic ability (scores on tests before entering a higher education institution, measures of IQ), (4) teaching experience, and (5) degree of inservice training.

Unobserved characteristics are verbal ability, clarity, communication skills, teamwork skills, classroom skills, motivation to

work with students, commitment to students' success, flexibility, creativity, task-oriented behavior and vision of purposes of instruction.

Teacher Education

Preservice training and teacher qualifications. Research shows that students tend to learn more from teachers with strong academic skills than they do from teachers with weak academic skills (Ballou 1996; Ehrenberg & Brewer, 1994, 1995; Ferguson, 1991; Ferguson & Ladd, 1996; Mosteller & Moynihan, 1972). In addition, a distinction has to be made between the requirements to qualify as a teacher today (from initial teacher education programs) and the actual education levels of the teaching workforce. It cannot be assumed that all those employed have completed a level of education equivalent to what is required today. Research on teacher knowledge and preparation suggests that some kinds of preparation may make more of a difference than other kinds. For example, some studies show that standard knowledge of subject matter is important up to a threshold level, implying that teachers teaching subjects in which they have inadequate training are less effective than teachers who have prepared to teach a given subject (Monk, 1994). Beyond that threshold, however, it has been argued that greater preparation in child development, learning theory, curriculum content, and teaching methods has a stronger influence on teacher effectiveness than additional subject matter preparation (Darling-Hammond, 1997, 1999). Induction programs help guide new teachers in curriculum planning, classroom management, academic knowledge, and diverse teaching methods. According to Huling-Austin's review (1990), the goals of induction programs typically include improving teacher performance, increasing the retention of promising beginning teachers, promoting the personal well-being of beginning teachers, transmitting the culture of the system to beginning teachers, and satisfying mandated requirements related to induction and certification.

Professional development. Enhancing the professional development of the current teaching force is a prominent reform issue in a number of OECD countries. Professional development experiences in the past have been synonymous with "inservice" workshops, whereby knowledge is presented to teachers by an outside "expert" in the field and teachers assume the role of passive learners. While this type of direct instruction may be effective for conveying factual information, training in well-defined skills, and introducing teachers to new ideas, critics argue that such instruction provides a questionable means of promoting critical thinking or deeper levels of understanding (Sykes,

1996; Ball, 1996). In the new paradigm, staff development is: a shared, public process; promotes sustained interaction; emphasizes substantive school related issues; relies on internal expertise; expects teachers to be active participants; emphasizes the why as well as the how of teaching; articulates a theoretical research base; and anticipates that lasting change will be a slow process (Hawley & Valli, 1999). The new paradigm would encompass all kinds of external and internal support, varying from inservice training in the traditional sense to advising, coaching, reciprocal class visits, or the support of internal coaches. Research on the effects of professional development on student achievement is limited, although several U.S. studies have found that higher levels of student achievement are associated with mathematics teachers' opportunities to participate in professional development focused on content-specific pedagogy (Cohen & Hill 1997; Wiley & Yoon 1995) and one recent Israeli study found that on-the-job training for teachers is a less expensive strategy for raising test scores than reducing class size or adding school hours (Angrist & Lavy, 2001).

Professional development has traditionally focused on the characteristics of teachers and teaching. As the effectiveness of education systems is increasingly called into question, however, there has been a tendency to be concerned more directly about student learning. This has affected teacher development in different ways. In countries where there is particular concern about insufficiently high standards, attempts have been made to link inservice training and professional development to the raising of student achievement levels. In countries like Japan, where students do well on tests and there is a strong national system for maintaining standards, inservice training and professional development are meant to create more diversity and creativity in the system. In these instances reform efforts are aimed at a more flexible thinking between students and teachers (OECD, 1998b).

Teacher Characteristics

Teachers bring a number of given characteristics to the teaching and learning situation. To a degree these characteristics can be shaped and altered by preservice training and professional development. The most relevant variables are subject mastery, pedagogical skills, and beliefs and attitudes about student learning.

General knowledge. A consistent finding in the literature is a relationship between student achievement and teacher verbal knowledge and other measures of general teacher knowledge

(Ferguson, 1991, 1998; Ferguson & Ladd, 1996; Wayne & Youngs, 2001). Teachers with greater levels of general knowledge may influence learning in the classroom through modeling learning strategies, and through the use of advanced vocabulary. Interacting with knowledgeable teachers may also place considerable cognitive demands on students and may heighten students' expectations of their own behavior and intellectual growth. In this sense, teachers with greater general knowledge may be helping to set high standards within the learning community of the classroom (see Rogoff, 1990, on learning as joining a community of learners).

Content knowledge. Subject matter knowledge is an important resource for teachers. Teachers with greater knowledge of the subject they are teaching have been shown to raise student achievement in some subjects and at some grade levels (Goldhaber & Brewer, 1997; Rowan, Chiang, & Miller, 1997; Wayne & Youngs, 2001). The domain of content knowledge for teachers includes both substantive knowledge of a subject as well as syntactic knowledge of how experts in the subject evaluate and build knowledge in the field (Shulman, 1987). Teacher knowledge of subject matter content should contribute to their ability to model effectively for students, as well as to assess student knowledge.

Pedagogical knowledge/knowledge about learning processes. Teachers need to know how students take in information and process it during learning in order to consistently present content effectively. This involves more than knowing the generic processes of learning. Each subject has peculiarities that require knowledge specific to how content knowledge in that subject is typically built by students and teachers. The term "pedagogical content knowledge" is sometimes used to describe this content-specific knowledge of pedagogy (Shulman, 1987). Teachers with sufficient pedagogical content knowledge know the prior knowledge or preconceptions that students typically bring to the subject; they know the stumbles that students typically make while learning and they know many ways to represent content knowledge in ways that students can understand.

Knowledge about students. Teachers need to know their students well in order to intervene effectively in students' learning. Teachers need to know about their students' prior knowledge in order to provide students access to content matter at the appropriate level. Knowledge about their students can help teachers to select content matter that will engage students. Furthermore, such knowledge provides teachers with

insights into ways to motivate students and help them focus on their learning. Knowing their students also helps teachers to keep track of when and how much students are learning.

Beliefs and attitudes about teaching and learning. Teachers can know a great deal about content and pedagogy, but their actual instructional performance can be filtered through their belief systems. For example, teacher expectations of how individual students will perform have been shown to influence student achievement growth (Brophy, 1984; Humphreys & Stubbs, 1979).

Motivation. Teachers may have varying levels of motivation to teach and be motivated by goals not entirely consistent with increased student learning. A variety of influences, both internal and external to the teacher, can motivate teachers both toward and away from what they believe to be good instruction.

Active Policies and Antecedents to Maintain and Provide a High Quality Teaching Force

An adequate supply of teachers is a fundamental resource to achieve the goal of educating youth. This issue bears not only at the local school level, but also more broadly at the regional and national levels. Santiago (2001) mentions the following aspects as particularly relevant to teacher supply:

- Relative salaries
- Career structure
- Merit-based incentives (performance-based compensation)
- Working conditions
Most often associated with factors such as class size, number of classes taught, teaching load, percentage of class time spent in areas outside a teacher's certification area, flexibility to take temporary leaves, composition of the student body, composition of the faculty, percentage of time spent in out-of-classroom activities, safety, quality of facilities, quality of instructional materials, opportunities for participation in professional development activities, opportunities for collaboration and decision making.
- Teacher professionalism – Status of the profession
Although there is little research evidence to prove this, the professionalism of teaching involves policies such as decentralization of authority over major aspects of school operations, well-defined certification standards, inservice training,

peer instruction and evaluation, rewards for teachers who earn additional credentials or who are more productive and, career ladders.

- Personal circumstances
- Teacher training and certification
- Relative availability of positions

Looking into the "Black Box"

Network C is responsible for the development of indicators that can peer into the "black box" linking educational inputs and outputs. These types of indicators should reveal some of the key characteristics in the learning environment and the organization of schools that can lead to effective educational practice. While it is impossible for process indicators to describe explicitly how educational resources should be most efficiently employed, they do give policy makers the opportunity to examine and evaluate alternative models of educational organization. To the degree that the indicators developed highlight processes that are recognized as "good practice", they can also be deemed school outcome indicators in and of themselves. In addition, school process indicators serve as important contextual information for interpreting outcome indicators of schooling.

The main categories of indicators that Network C has produced concern decision-making structures, staffing and intended curriculum at the system level, and school/classroom processes, time and implemented curriculum at the school/classroom level.

Each year Network C administers an administrative questionnaire to collect data on the characteristics of educational personnel (salaries, teaching time) and intended instructional time in different curricular areas. Responses to these questionnaires are supported by references to formal guidelines and regulations.

The network has also developed a planned series of school surveys in order to address issues that go beyond the types of information available in ministries of education or national statistical offices. In 1995/96 the network conducted an international survey of primary schools. The survey instruments were administered to school principals and produced indicators on stability in educational staff, time use of head teachers/principals, degree of staff cooperation, frequency of monitoring and evaluation of primary students, differentiation practices used across and within classes, and parental involvement. At this

moment, the International Survey of Schools at the Upper Secondary Level (ISUSS) is being conducted. The main set of indicators to be developed from the survey will be prepared for *Education at a Glance 2003*. A first indicator will be based on the classification of upper secondary education and provide insight into the program structure of upper secondary education and the relative importance of program types and programs in terms of student enrolments. Other indicators will address staffing and professional development of teachers, ICT application and use, measures and practices that schools take to enhance transitions to the labor-market and tertiary education, and aspects of school functioning that are conducive to enhancing the general quality of education at this level.

As well, secondary analyses of the International Association for the Evaluation of Educational Achievement (IEA) data sets and OECD's Programme for International Student Assessment (PISA) have been and will be used to develop process indicators. For instance, the PISA 2000 school questionnaire asked for information about the school's resources, the number of teachers in the school and their qualifications, characteristics of the student body, the relationship the school has with students, some of the administrative structures within the school, and some of the pedagogical practices of the school. The PISA 2000 student questionnaire asked for information about the student and his/her family, the student's experience in his/her school, and future plans. Network C has also used data from IEA's Third International Mathematics and Science Study (TIMSS) to examine how much time 8th grade mathematics teachers spend on school-related activities outside the formal school day, how instructional activities are organized in mathematics classrooms, and the size of 4th and 8th grade mathematics classes (OECD, 1997).

Network C's major new activities focus on developing indicators on teachers and teaching. Moreover, Network C joined forces with Network A (responsible for educational outcomes) in considering major new data strategies in this area. The Network A C Task Force is convened by the countries participating in the work of Networks A and C to develop an INES data strategy for indicators on teachers, teaching and learning. According to the Terms of Reference, the Task Force will be responsible for preparing a data strategy for INES on teaching and on how teachers foster student learning. In preparing the data strategy, it is anticipated that the Task Force (either through members or invited experts) will develop the required conceptual and methodological underpinnings to justify its recommendations and to document the

feasibility of its proposed strategy. The joint Task Force had its initial meeting in March 2002.

Over the past several years, Network C has undertaken activities to develop a coherent framework for designing indicators on teachers and teaching. Activities on preservice training and teacher qualifications, and professional development are discussed below, along with recommendations for further development work. Illustrations of what the Network has learned from data currently available are also presented (cf. Hendriks & Smith, 2002).

The Current State of Indicators on Preservice Training and Teacher Qualifications

For both the 1995 and 2000 editions of *Education at a Glance*, Network C prepared indicators on initial teacher education, specifically the number of years of education required to begin work as a fully qualified teacher according to the current formal policy in different countries. Information was collected through a qualitative questionnaire that asked members of the network to describe systems of preservice training in their countries. The feasibility of collecting data on the types of qualifications of teachers held by the current teaching force (i.e., a stock comparison) at the primary and secondary levels was also explored.

Although few countries collect data on the level of educational qualifications held by current teachers, data reported as part of the 1999 repeat of the Third International Mathematics and Science Study (TIMSS) shed some light on this topic regarding mathematics and science in a single grade.

In most countries, school-level surveys that do not survey teachers directly are often an inadequate means of producing reliable information about their educational backgrounds. While many schools have teachers' resumes or academic records on file, a school-level database would be needed to determine how many teachers actually hold different levels of degrees, as well as the fields in which the degrees are held (Sherman, 1998). Given this limitation, questions about teacher qualifications in cross-national surveys must be designed in a way that can produce valid data even when a school-level database of its teachers' qualifications is not available.

Currently, Network C is attempting to collect such data at the upper secondary level in 18 countries. In the 2001 Network C International Survey of Schools at the Upper Secondary Level, the following two questions regarding teacher qualifications were asked of school administrators (i.e., principals or head teachers):

1. What is the percentage of the teachers currently teaching at the upper secondary level in this school that are fully qualified?
2. In which study areas is it difficult to hire a fully qualified teacher at the upper secondary level in your experience?

In the first question, "fully qualified" is defined as including a teacher who has fulfilled all training requirements for teaching a certain subject and meets all other administrative requirements (e.g., probation period) in the formal regulations in each country for different educational programs at the upper secondary level. This definition, however, may have reliability problems. For example, how stringent should a school administrator be in deciding whether or not a teacher has an educational qualification in a particular subject? Would it cover only those teachers teaching mathematics that had studied mathematics as their primary field of study in their preservice training or should minor or secondary fields of study count as well? If a teacher has an educational qualification in pedagogy, but a specialization in the teaching of mathematics and science, should he/she be counted under both of these categories? Furthermore, having a relatively high number of teachers certified in mathematics does not guarantee that a teacher knowledgeable in this subject area teaches all students mathematics. If we want to know how many teachers are teaching subjects for which they do not have adequate knowledge, or conversely how many students are taught a particular subject by a teacher who has inadequate subject matter knowledge, a targeted question to teachers is required. A direct assessment of subject matter knowledge and teaching skill would be even better.

In the second question, administrators are asked to indicate the study areas for which it is difficult to hire a fully qualified teacher at the upper secondary level. As many schools do not maintain systematic data on this topic in their school records, responses will only be illustrative of school administrators' perceptions of the adequacy of teacher training in their school.

While these questions may provide some insight into the quality of teaching resources in schools, financial and logistical constraints for

this survey did not allow for the surveying of teachers within schools. If teachers could be surveyed directly, however, a number of additional areas could have been explored, for example:

- the percentage of teachers who have a degree in the subject area in which they are teaching;
- the percentage of courses in different fields (e.g., mathematics, biological or physical sciences) taught by a teacher without an educational qualification/specialization in that field; and
- the percentage of teachers who hold different types of certification (including temporary and emergency certification).

Given sufficient resources, these indicators could be complemented with qualitative data on the structure of teacher education programs in different countries, including the balance of curriculum content presented in preservice education (e.g., the time spent on subject matter versus the time spent on pedagogical training); the amount of time in preservice training spent on theory and practice; and, possibly, an estimate of the per-teacher costs of preservice training.

Professional Development

Cross-nationally comparable data on professional development are scarce, although the OECD's Network C has developed country descriptions of the national system of inservice training and professional development, including aspects such as the purposes of professional development, the content, formats, providers, and methods of funding.

From the contextual data compiled by Network C, few countries have a formal national policy on professional development. In addition, the shift in focus from inservice workshops and courses to professional development makes it less relevant to collect data using traditional measures, such as the percentage of teachers involved and the mean number of hours involved in inservice training.

For the medium and long term, developmental work could be undertaken in the following areas:

- The types of professional development undertaken in schools in different countries and the extent to which teachers participate in these activities (e.g., number of hours and kinds of activities).

- The level at which decisions are made about the design of professional development programs (e.g., school, central administration).
- The policies that support or impede collegial activities such as mentoring, peer coaching, and time for teachers to share, discuss, and reflect on their practices.
- The kinds of follow-up that are built into the professional development activities offered (e.g., classroom observations, consultations, mentoring, or follow-up workshops).
- The incentives and supports provided for teachers to participate in professional development.
- The ways in which the outcomes of professional development are measured.

A number of these issues can be addressed through a questionnaire administered to school principals/directors (i.e., the more policy related issues such as decision making or funding, as well as the kind of activities offered and the methods used to evaluate outcomes). Topics that may be more difficult for a school administrator to answer include the types of professional development activities teachers have participated in, the extent of their participation, and the impact of these activities on classroom practice. Obtaining such information would require a sample survey of teachers in different countries.

Network C's International Survey of Schools at the Upper Secondary Level (ISSUS), asked school administrators three questions on professional development:

1. In which ways does your school support or encourage the professional development of upper secondary teachers?
2. Consider the past school year. What percentage of upper secondary teachers participated in professional development activities?
3. In the past 12 months have teachers in the program to which this questionnaire relates participated in the following activities related to education?

While these questions only examine a limited number of the core issues outlined above, the ISSUS data should contribute to our understanding of how professional development is implemented at the school level in a number of OECD countries.

Teacher Working Conditions

The results of the OECD/INES Network C International Survey on Teachers and Curriculum in 2001 can be used to compute indicators on teaching time and teacher compensation. The survey covered four ISCED¹ levels (pre-primary, primary, lower secondary, and upper secondary education). Indicators on teaching time and teacher salaries published in *Education at a Glance 2002* are presented in Figure 1 (p.101) and Figure 2 (p. 103) to illustrate data currently available.

Organization of Teaching Time

Together with factors such as student/teaching staff ratios, the number of hours that students spend in instruction each year, and average teacher salaries, the amount of time teachers spend teaching directly influences the quantity of financial resources devoted to education. At the same time, teaching time is an important element of teachers' working conditions as it affects the amount of time available for planning and other professional activities, and is also related to motivational aspects of the teaching profession.

In the data presented below, teaching time is defined as the number of hours per year that a full-time teacher is required to teach students in his/her country. Periods of time formally allowed for breaks between lessons or groups of lessons have been excluded. Teaching hours per year are calculated on the basis of teaching hours per day multiplied by the number of teaching days per year, or on the basis of teaching hours per week multiplied by the minimum/maximum number of periods a full-time teacher is supposed to spend teaching a class or group, multiplied by the length of a period in minutes and divided by 60. Excluded are the number of hours per year accounted for by days when the school is closed for festivities and celebrations. Figure 1 shows the number of teaching hours per year in primary, lower secondary and upper secondary education. Data refer to the 1999/2000 school year.

Countries vary in the number of required teaching hours per year of public school teachers in primary and secondary education. In most countries, the number of teaching hours is greater in primary education than in lower secondary and upper secondary education. In Hungary the number of teaching hours per year is comparatively low at all levels of education reported (around 580 hours or less), while in Australia, the Netherlands, New Zealand and the United States it is high (860 hours or more).

Figure 1: Number of Teaching Hours Per Year (2000)
Net contact time in hours per year in public institutions, by level of education

*Countries are ranked in ascending order of the number of teaching hours in lower secondary education.
 Source: OECD, 2002, Chart D7.1, p. 342.*

Relationship Between Teacher Salaries and Per Capita GDP

Teacher salary levels can affect both the desirability of entering the teaching profession and the ability of schools to retain the most skilled teachers. Teachers' salaries relative to per capita GDP are an indication of the extent to which a country invests in teaching resources, relative to the financial ability to fund educational expenditure. Statutory salaries refer to scheduled salaries according to official pay scales. The salaries reported are defined as gross salaries (total sum of money that is paid by the employer for the labor supplied) minus the employer's contribution to social security and pension (according to existing salary scales). Salaries are 'before tax', i.e., before deductions for income taxes. Gross teachers' salaries were converted using GDP and Purchasing Power Parities (PPPs) exchange rate data from OECD National Accounts 2000. The reference data for GDP per capita is 2000 (January 1 to December, 31, 2000), while the period of reference for teachers' salaries is June 30, 1999 to June 30, 2000. The reference date for PPPs is January 2000. Data are adjusted for inflation with reference to January 2000 for those countries with deviating fiscal years or where the exact period to which salaries apply is slightly different, but only if this results in an adjustment of over one percent (OECD, 2002).

Wealthier countries do not necessarily spend a greater share of their wealth on educational resources. Some countries, such as the Czech Republic and Hungary, have both relatively low GDP per capita and low teacher salaries. Others have a relatively low GDP per capita and teacher salaries that are comparable to those in countries with much higher GDP (e.g., Greece, Korea, Mexico, Portugal, and Turkey). Yet other countries with relatively high GDP per capita have lower than OECD average teacher salaries (Iceland and Norway) whereas others have a high GDP per capita and high teachers' salaries (Switzerland and the United States) (see Figure 2).

Conclusions

This article has highlighted both conceptual and practical issues, as well as challenges, involved in developing teacher indicators that are both policy relevant and comparable across countries. The emphasis has been on measurable aspects of teacher quality and teacher working conditions.

Figure 2: Teachers' Salaries in lower secondary education (2000)
Annual statutory teachers' salaries in public institutions in lower secondary education, in equivalent USD

Countries are ranked in descending order of teachers' salary in lower secondary education after 15 years of experience and minimum training.
 Source: OECD, 2002, Chart D6.1, p. 331.

The ultimate purpose of education indicators can be described as providing a basis for monitoring the quality of education. Policy relevance and comparability are the main criteria of INES indicator development work. New policy issues often call for new indicators while one of the main sources of information is trend analysis, which assumes that the same indicators are produced with the same methodology over years (see the article by Kádár-Fülöp). Education is highly dependent on human resources, which in itself could be taken as sufficient cause to invest efforts in the development of internationally comparative indicators on teaching. Network C also uses theoretical perspectives to seek and select well-informed expert answers on country priorities for teacher indicator development.

Available data form only a small subset of data required to explore these topics in depth. Currently, Network C is limited to basic descriptive information on teachers, including the number of years of initial training, the type of initial training, the number of teaching hours per year, the number of working hours per year, minimum and maximum salaries, years from minimum to maximum salary, additional benefits, and the age and gender distribution of teachers.

Lack of comparable data continues to limit the scope and policy relevance of teacher indicators. Indicators on preservice training and professional development of teachers are still at the conceptual stage and further data development would require a substantial commitment from individual countries.

Given the lack of readily available data at the national level, however, further development in the areas of teachers and teaching are likely to be time consuming and costly. Teacher surveys can provide a basis for these comparisons, particularly if they are targeted towards issues related to teachers' subject-matter and pedagogical knowledge, professional development, financial and non-financial aspects of teacher compensation, as well as how teachers in different organizational contexts respond to external standards and norms.

Consideration should be given to consolidating existing tools. The relationship among existing surveys (e.g., PISA, IEA Second International Technology in Education Study [SITES]) and the follow-up to the IEA's TIMSS study should be considered and the feasibility of developing joint instruments and data collection methodologies should be explored. Further, triangulation should be examined in different combinations (e.g., combining results from school surveys,

teacher surveys, student surveys, teacher assessment situations, video registration, classroom observations, etc.).

The establishment of the Network A C Task Force on Teaching and Learning can serve as an important step for OECD and its member countries to weigh the policy relevance of the types of data suggested in this article with the additional costs that mounting these surveys would entail. The Task Force should consider the extent and comparability of available data, as well as the relevance and feasibility of collecting comparable data where gaps exist. It should consider alternative approaches for collecting data and make recommendations for cost-effective and feasible solutions. Multiple methods for collecting data should be anticipated given the wide range of topics. The Task Force is expected ultimately to design an implementation strategy that addresses the scope and frequency of data collections, data collection procedures, coverage, expected international and national costs (as appropriate), and timelines.

The data strategy should include both short- and long-term recommendations. Options for assessing teaching quality at different levels (classroom and school system) will be specified including feasibility and limitations. Further possibilities of using more student information as well as existing teaching surveys will be considered as a starting point for defining a core set of relevant questions for internationally harmonized data collection on teachers. Novel approaches in describing good practice, teachers' role perceptions and goal setting, as well as actual events in the classroom will be studied from the point of relevance, international comparability, feasibility, and costs.

In the meantime, while the Task Force develops its strategy, Network C will continue its ongoing work on teacher indicator development.

NOTE

1. The International Standard Classification of Education (ISCED) is a taxonomy designed to transform data collected under different educational structures into a comparable international framework. First implemented by UNESCO in the mid-1970s, and revised substantially in 1997, this framework has allowed the development of internationally comparable indicators of educational performance. ISCED level 3 corresponds to upper secondary

education, levels 5A and 5B correspond to theoretically based tertiary-level programs (e.g., those designed to lead to a bachelor's degree or above) and more technical and occupationally specific programs (e.g., those leading to a vocational associate's degree), respectively.

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