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**OECD project on the development of value-added models
in education systems**

Czech Background Report

CHAPTER 1

**The Need of Value Added Model in education in the newly created system
of evaluation in the Czech Republic**

The changes in the education system in the 1990s have also affected the area of evaluation. At first this only concerned the introduction of new, ad hoc evaluation activities. It was as early as 1994 that the policy document of the Ministry of Education, Youth and Sports “Quality and Accountability” mentioned the problem of lower effectiveness of the evaluation system as a result of extensive changes, and the need for using evaluation as an instrument of indirect governance. However, it was only the National Programme for the Development of Education (White Paper, 2000) that set out a systematic development of a system of evaluation as one of the pivotal tasks. This became one of the priorities of the follow-up implementation document – the Long-Term Plan for Education and the Development of the Education System in the CR of 2002. This is why, in 2003, the Framework Project of Evaluation in Education was prepared. Its implementation is now underway.

1.1 Changes in education and evaluation

Before 1990 the characteristic features of the school system included centralised governing, uniform education and a rigid supervision over teachers. The Ministry of Education played a decisive role using direct governing and controlling instruments, while inputs and processes were prescribed in detail. School inspection was the main instrument of supervision at school level. School directors and teachers were controlled as regards compliance with curricula in terms of the content and methods of instruction, including time schedules. At pupil level assessment by teachers at school constituted the main assessment method focusing primarily on checking on the knowledge acquired. The standards and effectiveness of the evaluation system as a whole were neither monitored nor evaluated. Periodical reforms were implemented without feedback.

Decentralised education induces all entities involved to face a new situation. Availability of information as to implementation of the relevant objectives and comparison with other schools and education systems in other countries is very important for schools and the education system as a whole. Schools realise the need for structured and systematic evaluation providing feedback based on which work at all levels may be improved. This concerns schools, the education system as a whole and pupils as regards the use of their potential and talents.

Evaluation at student level continues to take the form of subjective assessment by the teacher. The private companies Scio and Kalibro have developed instruments for external evaluation of pupils and schools. Their application is limited and up to each school's decision. However, the number of schools using these instruments is growing despite the fact that they pay for them from their own resources. The Centre for Reform of "Maturita" (which has been transformed into the existing Centre for Identification of Learning Outcomes) plans to introduce a comparable national part of the "maturita" examination, and its activities are branching out to include the development of other evaluation instruments.

Evaluation at school level is traditionally carried out by the Czech School Inspectorate (CSI). It has gradually expanded its focus to cover, in addition to compliance with regulations, evaluation of the conditions in education and its processes and outcomes. CSI aims to bring objectiveness into evaluation, for example by the development of methodologies and participation in international projects concerned with the reliability and stability of quality indicators in evaluation processes. Moreover, CSI has introduced a new type of inspection with a thematic focus on a particular type of school or problem. A new obligation has been introduced in line with curricular reform – schools are obliged to carry out periodical self-evaluation – i.e. to reflect systematically on their work. This is closely related to another new task where schools are obliged to develop so-called "school-based curriculum" as an elaborate version of a binding national framework curriculum. Furthermore, schools are required to write annual reports. Apart from schools this obligation also concerns central administration bodies (Ministry of Education and CSI) and regions. Annual reports of the Ministry and regions are followed by the development of a Long-Term Plan for the Development of Education.

The most striking change at *national and trans-national level* is the Czech Republic's involvement in a number of international projects, studies and surveys concerned with international indicators (OECD, EU). Although the application of their outputs as regards the governance and further development of the Czech education system is still relatively limited, these projects will increasingly provide valuable inputs into the building of a comprehensive evaluation system that is currently underway.

Since the early 1990s the Czech Republic has been involved in the work of international organisations, particularly the OECD. Still as a country with an observer status the CR joined the INES programme in 1992. This was a major step facilitating comparison between the Czech education system and those in the most developed countries. A new approach to comparing and developing the knowledge base in the area of learning outcomes has been provided by the OECD project PISA in which the CR has been involved since the beginning. The SIALS project has brought a broader view of evaluation of education in terms of life and employment prospects.

There was a large response to the results of the 1995 TIMSS study in mathematics and science, as well as to the outcomes of its replication, TIMSS-R. In 1995 the Czech Republic also replicated the RLS survey of reading literacy which had been carried out by IEA in 1991. After 10 years the PIRLS study of reading literacy was implemented in 2001. In 1999 the CR participated in the CivED research concerned with civic education among pupils in 8th grade of basic school and in the final year of upper secondary schooling.

As regards the development to self-evaluation at school level, the Czech Republic was involved in a pilot project within the Socrates programme which was implemented at 101 basic and secondary schools in 1997/98. Moreover, the CR represented by the Czech School Inspectorate was one of 14 countries involved in the two-year project within the Socrates programme, *Effective School Self-Evaluation* (ESSE), which was completed in 2003.

1.2 A comprehensive evaluation system

As we have mentioned, the *Framework Project of Evaluation in Education* sets out, in the form of specific steps, a new concept of evaluation which the White Paper highlights as the key to the proper functioning of a decentralised and participative education system. It involves systematic monitoring of the situation in basic and secondary schooling, generation of the relevant data, and the actual process of examination. This forms a coherent system of evaluation and facilitates the development of an evaluation environment and culture based on self-reflection of each component of the education system at every stage of its operations.

The development of a comprehensive system of evaluation in education must take account of the overall nature of a decentralised education system. The system of evaluation must be built along with other mechanisms within the education system, primarily those concerning curricula and information. It must follow the progress of the student along his/her educational path and support the highest possible use of his/her potential. Moreover, the system must be linked to mechanisms pursuing improvement and further development of each school

The system of evaluation must incorporate the new curricular policy – the framework national curricula (and the school-based curricula derived from these). Framework curricula set out the objectives, content and forms of education and therefore require the relevant evaluation instruments whereby implementation of these objectives will be evaluated. The outcomes of evaluation constitute one of the main inputs into the information system on education which serves all entities at all levels: pupils and their parents in the career choice process; schools in the process of quality improvement and further development; school administration and social partners in their decision-making.

The system of evaluation must be linked to *progression of students along the educational path*. The way of assessing student performance is decisive for his/her progress along the educational path and for career choice. On the one hand, there is completion of a level of education (examination, certification), on the other hand there is selection for the next level of education. Gradually, the importance of the latter (admission examinations) should decrease

along with an increasing importance of assessment of outputs at the end of the preceding education (a link to information, diagnostic and counselling systems).

The system of evaluation should facilitate *improvement of school operations*. Its outputs constitute inputs in terms of reflection at school level and the use of all available resources in order to enhance school activities and stimulate its development. This requires a good functioning of support systems (school administration, methodological support, the counselling function of the school inspectorate, the continuing training of teachers, development of networks of co-operating schools), as well as an appropriate school environment along with the necessary support and motivation for teachers.

The development of a comprehensive evaluation system concerns four *major areas*:

1. Student assessment and examination – continuous and at key points along their education path;
2. Development and application of external evaluation instruments;
3. Self-evaluation of schools;
4. Evaluation at national and international levels.

The approaches to the relevant areas must interlink and take account of all outcomes of the activities and initiatives to date.

Student assessment and examination. *Continuous assessment of students* at school level will be focused on the student's progress in several activities within each subject, including self-evaluation. *Verification of the learning outcomes of pupils in 5th and 9th grade of basic school* is being introduced as a new element of evaluation of the work of students, teachers and schools. The assumption is that the assessment will be obligatory for all students and that the choice of assessment instruments will be based on the framework curricula. Standardised tests should be used in order to assess the levels of language, mathematical and, possibly, scientific literacy in pupils and their general suitability for studies (cognitive skills in particular). The tests should be administered and evaluated at central level and the testing in various areas should take place in the interval of approximately one week. Instruments for a more objective selection during the process of *admission to secondary schools* will be developed. The purpose is to reduce negative impact effecting the work of basic schools and to boost implementation of one of the general objectives, which is to lower the high level of streaming in the Czech education system. *The reform of "maturita"* is continuing with the aim of introducing a common part of the "maturita" examination. There is a growing number of schools that begin to use the tests on their own initiative. *The reform of the final examination in vocational programmes without "maturita"* will include a higher level of involvement of social partners in preparation (selection of topics) and implementation (the presence of experts from industry) of the exam. The objective is to facilitate better comparability of the results of the examination and their relevance as to establishing the standards of the graduate.

Development and application of external evaluation instruments. These instruments have multiple function: for the actual self-evaluation of students and their examination, for external evaluation of schools, for auto-evaluation of schools, for evaluation at regional and national levels, for evaluation of partial outputs and various subject areas within framework and school-based curricula.

Self-evaluation of schools. This is an integral part of the development of long-term plans and annual reports of schools and their school-based curricula. Self-evaluation should become one of the most efficient instruments for improving the quality and effectiveness of education, and an important foundation for effective communication with parents, school administration and

social partners in the process of enhancing the joint accountability for the school development. Self-evaluation will provide one of the most important inputs for evaluation of schools by the Czech School Inspectorate.

Evaluation at national and international levels. Participation in international projects (PISA) facilitating international comparison of learning outcomes will continue. It is necessary to reinforce the use of the outcomes of international projects in government policies, to raise awareness of the results achieved and to project them into the work of individual schools.

1.3 Other criteria in school evaluation

It is primarily learning outcomes that are considered in the evaluation process. In addition to these, there are other sources of information. Evaluation of the work of school is mainly focused on the ways in which the school can meet the requirements of society and the economy. These concern not only knowledge, but also personal and social skills and attitudes. Direct measuring of these competencies is not much developed at present. Indirectly they can be inferred from the way how various life situations are coped with. (e.g. finding suitable employment or active involvement in social activities).

The situation of school leavers in the labour market therefore constitutes a very important source of information about the work of particular schools and students. Comparison of school success and the effectiveness of education provide a new perspective from which we can see not only how schools prepare students for personal and working lives, but also whether or not the measuring of learning outcomes is too much focused on schooling outputs. This is why the perspective of a successful start in the labour market and the overall career constitutes an important corrective factor when the effectiveness of education and its outcomes are measured.

This perspective may only slightly be modified by *success in entering a more advanced level of education*. This concerns not only admission, but also school performance and completion. At lower levels of education – in basic school in particular – the pupil decides on his/her further educational path. This process is influenced, apart from learning outcomes and school success, by other factors, such as the family status and the education of parents. In the final years of basic school pupils decide whether to opt for a grammar school (*gymnázium*), for secondary technical school or for a vocational programme. Whether and to what extent basic school helps the pupil make an appropriate decision in line with his/her interests, skills and aspirations is a major sign of the school fulfilling or not fulfilling its function.

Similarly, the process of career choice takes place at secondary school as well – this time it is more professional focused. Although the focus of students is much clearer at this age, secondary school may also contribute to a broad reflection on their interests, skills and knowledge, and facilitate an appropriate choice of a tertiary institution or employment.

There are *other characteristic features* of quality education. In the Czech education system there is a large number of various competitions and exhibitions of students' work (mathematics, the Czech language, foreign languages, natural and social sciences, professional skills and competencies). Participation of students in these events suggests the degree to which the school pays attention to gifted students. In many cases it is a particular teacher who identifies these students and works with them. There are also schools which work with these students systematically, and this is reflected in their achievements in the competitions. Successful participation in these events is therefore another important characteristic.

Another set of data complementing measurable results of education concerns the broader context of education, first of all the conditions under which the school operates (in international surveys such as PISA or TIMSS this information is filled in questionnaires which complement the tests).

Satisfaction on the part of pupils and teachers is examined as well as the extent to which the school is viewed as a nice place supporting the development of personal and social competencies (such as communication). This is reflected in the overall school ethos, and in teamwork of pedagogical staff. Co-operation with parents and their involvement in the work on the development of the child's personality is an important factor in overcoming inequalities resulting from family background.

The quality of school also takes the form of reduced occurrence (or elimination) of criminal and pathological behaviour of pupils. This also involves the extent to which the school manages to create a motivating environment for all pupils and to eliminate influences leading to undesirable behaviour in social and personal terms. Another important aspect is the way in which the school is interrelated with the local community and the extent to which the community is conducive to the development of a stimulating environment in this respect.

The value added in education at the level of student, school or the entire system concerns a comprehensive reflection on what is expected from the school and the degree to which this can be measured. Placing the results of some partial measuring of learning outcomes within a broader context can be important in terms of their comparability with other schools and regions. However, the fact that such partial measuring is carried out on the background of a broader evaluation of the value added, it is possible to establish more clearly which part of the value added it is that is actually being measured. These partial results can then be incorporated into the overall picture. It therefore seems to be important to develop a broad concept of value added, where the process of education and learning outcomes are measured only in terms of a successful working and personal life of an individual.

On the one hand the discussion about the need for measuring value added can therefore, in the Czech education context, be viewed from a much broader perspective which can bring new views of the expected and desired function of school. On the other hand, it is possible to see the need for establishing value added as an increase in measurable results in a given period. It is necessary to take account of the positive aspects of this way of identifying value added. At some point along the educational path the education system faces a situation where learning outcomes at student and school level are compared. In some systems the practice of testing and comparing is frequent, in some it is less frequent. It is most often part of completion of a level of education. The introduction of a common national part of "maturita" will facilitate such comparison between Czech secondary schools across-the-board.

In order to avoid schools being disadvantaged or harmed by this comparison at one point of measuring, it is appropriate to use the positive aspects of the measuring of value added, where improvement of performance is measured and not performance at one moment in time. In this way various school-related and other factors may be taken into account which affect student performance and in some cases cannot be influenced by the school (e.g. the socio-economic status of the student). To put this simply - measuring at one moment in time does not cover the starting situation from which the students moved to achieve their performance. This is why measuring of outputs at the end of secondary schooling can be distorted in terms of school comparison, if we do not take account of the level at which student were at the beginning of their schooling. The development of value added models is indispensable in this respect.

There are additional aspects such as the proportion of students with special learning needs. Their inclusion into mainstream classes can, understandably, influence class performance in terms of comparison with other classes. Some aspects, such as the motivation of pupils, can be influenced by the school. The influence of teacher performance is important (its dependence on teaching qualifications is examined) – it is one of those parts of value added which point to the real value added provided by the school. Examination of various factors which affect learning outcomes is therefore important not only in terms of the actual school performance, but also in terms of the corrective comparison.

In the Czech education system there is not yet a systemic approach to the monitoring of value added at the level of school, student and the entire system. However, an evaluation environment is being formed which is gradually bringing into life some elements that will facilitate this monitoring.

The complementing contextual information also concerns the family background of students – particularly its social and cultural standard, which has a large impact on the learning outcomes. Comparison of students' achievements in a given period makes it possible to establish the degree to which the school contributed to these (i.e. the school quality), and to compare schools in this respect. In this way the value added by the school is established. The first attempts to establish this value added used available data. The proposed comprehensive system of evaluation will facilitate its monitoring by means of appropriate measurements. The various alternatives are described and assessed in the following chapter.

CHAPTER 2

Identification of projects obtaining data for measuring the value added

Efforts to identify value added were implicitly or explicitly expressed in several strategic documents. However, the Framework Project of Evaluation (mentioned in the previous chapter) opens a path to its systematic identification. The following text therefore begins with description of the strategic paper *Spektrum*, which is under development and which elaborates on the first topic of the Framework Project of Evaluation – *Student Assessment and Examination*. It introduces specific evaluation instruments which will facilitate identification of value added.

The following parts of this chapter describe two ways of establishing value added based on data identified as part of various surveys. The first one is the project Vektor of the Scio company using the results of external evaluation instruments the company has developed. The second way concerns the work of the Centre for Education Policy (Charles University in Prague) which is based on comparing the results of the OECD study PISA with the results achieved in the process of gradual implementation of “maturita” reform.

2.1 The Spektrum Project

This strategic document proposes a wide variety of instruments for summative and formative evaluation of basic school pupils. It concerns the way in which the proposed evaluation instruments should be used, defines the relevant responsibilities and outlines the procedures for putting the instruments into practices.

Curricular reform, which gives schools a degree of autonomy in the field of pedagogy in addition to their existing autonomy, is linked to the building of an evaluation system. The Spektrum project establishes a framework for the development of instruments for monitoring, evaluation and diagnostics. This is related to the continuing training of teachers in evaluation – teachers must be able to use the instruments (including analyses and data) effectively in their work. One of the main objectives in this area is support for learning that facilitates identification of the pupils' potential. The instruments, which should be used on a continuous basis, should eliminate accidental failures and assist student and parents in the career choice process.

A *student personal portfolio* will be created for the student and the teachers to get an idea of the student's knowledge and skills as well as progress made in achieving them. The portfolio will document the results of various forms of continuous and final assessment. The main aspect on which emphasis will be placed is key competencies as they are set out in the framework curriculum for basic school (learning competencies, problem-solving, communication, social and personal competencies, civic and work competencies).

Assessment in various areas will be carried out using standardised criteria, in some cases using instruments of external evaluation (didactic tests). In other cases the assessment will be done by teachers at the school in line with rules defined by them or recommended to them. The student personal file will also contain student self-evaluation including examples of his/her school work. The file will also include comprehensive assessment of cross-curricular themes, out-of-school activities and school projects. The portfolio will serve as a source of long-term and comparable information facilitating a more responsible choice of applicants in the process of admission to a more advanced level of education. The pupils themselves will use their portfolios to present their knowledge and skills in the career choice process and also during admission proceedings. The portfolio will consist of the following parts:

- National examination
- Final evaluation in the relevant years (school reports)
- Didactic tests on a continuous basis
- Continuous assessment of school work, projects, out-of-school activities
- Identification details

The objective of the *national examination* is to assess, in a uniform and objective manner, specific skills and make a comparison. This will provide feedback to schools which will be able to use the outputs in the self-evaluation process. The national examination should also facilitate evaluation of the education system as a whole (the current state of affairs, the dynamics of development).

This examination will take the form of uniform and standardised tests for pupils in the 5th and 9th year of basic school, possible for pupils of the corresponding age in other types of school. There will probably be three tests: language skills test, mathematical skills tests and a test of general suitability for studies. The tests will be administered and evaluated under uniform conditions by the Centre for Identification of Learning Outcomes. This will increase the validity and reliability of the results.

At present the project is at an experimental stage. Its implementation depends on whether the education law is amended as planned, and also on implementation of curricular reform (in this case mainly the framework curriculum for basic education).

Final evaluation in the relevant years will be included in the student personal portfolio in the form of half-term and final reports for each year. In line with the Education Act the evaluation may either take the form of marking or it may be verbal (combination of the two alternatives is also possible).

Didactic tests, which will be thematic, will be administered on a continuous basis throughout the entire period of compulsory education. Their objective is to test selected knowledge after instruction in a particular thematic area is completed. This diagnostic instrument provides feedback to the teacher and the student as regards the progression along the educational path, and its acceleration or stagnation in terms of acquisition of key competencies or their components.

It is recommended that each student should undergo at least two tests each year covering the following areas: Czech language and literature, mathematics and its application, a foreign language, and other subjects (areas) depending on the school focus or student choice. The objective of the tests is not to compare the results among pupils, but to see the situation in view of a pre-defined set of criteria (comparison in terms of the ideal situation). The test results are expressed in points and the success rate is established as a percentage.

Continuous assessment of school work, projects and out-of-school activities entails a variety of information which contributes to the drawing of the overall picture of student development. This includes traditional methods such as papers, written tests, oral examination, experiments and others, but also modern methods such as evaluation of projects (long-term work on a comprehensive task is assessed – approach to the topic, work organisation, co-operation, results achieved, presentation of project outcomes). The student portfolio will also document student activities which take place partially or entirely out of school (competitions, leisure activities). This will throw more light on the student's aspirations and interests.

Identification details constitute an important part of the personal portfolio as they facilitate a better understanding of the student's results. This data covers prior education, family background and, possibly, health condition.

Although this is not explicitly a project concerned with *identification of value added*, it implicitly contains extensive data and various assessment methods which can be used for this purpose. The national examination – i.e. standardised tests administered centrally to students in 5th and 9th grade of basic school – is a direct instrument for identification of progress in acquisition of key competencies in individual students, classes and schools. There is not yet any methodology developed for using these data to establish value added. However, data thus acquired can be processed in different ways.

A specific way of identifying value added in various pupils is facilitated by verbal assessment on their half-term and final school reports (some schools use it as a complement to or substitute for marking). If verbal assessment is replaced with a mark without sufficient and systematic explanation, parents tend to show dissatisfaction, since marks are far less clear and relevant. Verbal assessment shows all advantages of an individual approach and provides motivation for learning, provided that there is the relevant understanding on the part of parents and, after all, pupils as well. In this is a different type of motivation.

Identification of value added in the learning process may also be facilitated by means of thematic didactic tests focused on key competencies. In this way an increase in skill levels as compared to an ideal situation may be identified in the pupils who sit the tests. It will also be possible to see the progress in learning in various thematic areas – i.e. in terms of subjects. This provides an opportunity for establishing value added depending on the work of individual teachers. As there will be specific conditions set for implementation of the didactic

tests, it should be possible, after the data from test evaluation are collected, to see changes at school, regional and national level.

Another possibility for monitoring of an increase in the level of key competencies in the educational process consists in student self-evaluation. The student portfolio will also contain self-evaluation data. The monitoring of own achievements and progress can provide a major source of motivation for learning. There are some schools (not many) that have experience in student self-evaluation. After some time student self-evaluation does not differ much from assessment done by the teacher. These approaches to monitoring progress in education may, as with verbal assessment, provide teachers with an interesting opportunity for identifying and comparing value added in the learning process.

Although this strategic document does not provide much space to identification of value added, it is clear that this identification will be of key importance if we want to ensure that the school “league tables”, which might come about as a result of testing (although this is not the objective), are not used in an over-simplified manner as an indicator of school quality. Even if such league tables are not formed, education policy-makers need to get information about the success of curricular reform, the functioning of support systems, etc. School directors and school administering bodies need to know whether their schools work well as compared to other schools. Parents, of course, want the same information. If ever schools are to be compared, it is necessary to see school results separately from the initial knowledge and skills and, possibly, other aspects affecting student performance, such as the social status, the education of parents, and others.

This concerns not only schools, but also classes and individual students. An individualised approach which will facilitate “standardised” progress in learning in individual pupils will be much fairer and motivating – as opposed to those approaches using a uniform evaluation scale where it is expected, implicitly or explicitly, that all pupils in the classroom should achieve comparable learning outcomes. These common approaches often only de-motivate those whose performance is below the average. On the other hand, there are gifted students (or high achievers) who could show even better results, but being compared with the average removes their motivation as well.

The possibilities of identifying value added will be expanded by “*maturita*” reform which is under preparation. “Maturita” is a final examination at the end of general, technical and some vocational programmes at upper secondary level and facilitates (not guarantees) access to tertiary education. A national comparable part of “maturita” will be added to the existing school-based (so-called “profile”) part from 2007/2008. The national tests are being developed and their use is voluntary until the official launch. However, a large majority of schools have already used them.

The common part of “maturita” consists of three obligatory examinations – in the Czech language, a foreign language (the choice of *English, French, Italian, German, Russian, Spanish*) – and in a fourth optional subject (the choice of *mathematics, civic education, science&technology, IT*). The “profile” part of “maturita” consists of three examinations in subjects characterising the school profile (the choice is up to the school director). These can be the following: mother tongue and literature, a foreign language, mathematics, civic education and social sciences, biology, physics, chemistry, history and geography.

The implementation of the common part of “maturita” in combination with the national examination mentioned above provides a possibility for identifying value added. The national examination will be taken by all pupils at the end of basic school (at the age of 15). Then all students in “maturita” programmes at secondary school will take a common part of “maturita” (normally at the age of 19). The model for identification of value added via the national

examination and the common part of “maturita” must still be developed, but its strong potential is apparent. The combination of common “maturita” and evaluation at the end of basic school will also expand the possibility for comparing the results of the common part of “maturita” between schools and types of school, since it will be possible to take account of the structure of the student body admitted to the relevant secondary schools, as well as their results at the end of basic education. In this way comparisons will be avoided between schools which, due to the structure of students, do not have equal conditions for achieving the same results. The calculation of value added (and the correction of “maturita” results taking account of the input student characteristics) will therefore be a very important parameter in evaluation of learning outcomes at student and school levels, and a prerequisite for the relevant analyses for education policy purposes.

As regards those secondary programmes which are not completed by “maturita” it is possible to use the so-called portfolio of competencies. Students at secondary vocational schools should prove they have acquired the competencies set out in the relevant evaluation standard. Vocational training has so far only been evaluated by an overall mark, which does not express which competencies the student acquired. The portfolio of competencies will also document, on a continuous basis, acquisition of competencies which cannot be shown during one final examination. This approach makes it possible to monitor value added also in vocational programmes without “maturita” – in this case mainly in individual students. A specific model will have to be developed for school evaluation and the process of increasing value added in students.

2.2 The Vektor Project

The Vektor project has been prepared and launched by the private company Scio. It follows up on the company’s long-term activities in the development and organisation of testing, and employs instruments the company has developed. The project consists in implementation of three modules at secondary schools. One of the outputs of their evaluation will be the possibility of monitoring value added. The project was launched in 2005, and the first outputs concerned with value added will be available in 2008. The objective of the project is to provide schools with the opportunity to compare themselves with other schools and groups of schools with a similar focus in terms of the student intake. Comparison is also possible at class level. The project maps the initial level of knowledge of each student up to the level of mastering partial topics and making use of his/her study potential.

The input module is designed for students at the beginning of secondary schooling, while it is primarily focused on obligatory “maturita” subjects – i.e. Czech language and a foreign language (English and German, French to be added later on). The model also involves a scholastic aptitude test, which provides a necessary framework for interpretation of the results. An expanded version of the input module is also available which makes it possible to see the initial level of knowledge in optional subjects in the national part of “maturita” in order to establish value added generated by the school. This concerns tests in mathematics, civic education (i.e. history, social sciences, partially geography), and science&technology (physics, chemistry, natural science, partially geography, informatics).

The output module is designed for students at the end of 3rd or the beginning of 4th grade of secondary school. Again, there are two versions. The basic version follows on from the basic version of the input module – i.e. tests in Czech and a foreign language, and a scholastic aptitude test. The expanded version follows on from the expanded version of the input module, and, in line with legal requirements related to national “maturita”, it distinguishes between science&technology and information technology.

Another module is a “maturita” module. There is no additional testing. The module consists in schools entering the results of the common part of national “maturita” into the Scio database. These results are correlated with the results of the input and output modules. This facilitates identification of the school’s value added in “maturita” subjects in a four-year programme.

Value added is identified by means of comparing success in the individual tests in the input and output modules. Certain correction is possible using the “maturita” module. Progress of the school in individual subjects is identified and, possibly, also the overall value added. It is also possible to focus on classes and students. The result can be compared to the value added generated by other schools or groups of schools – e.g. by school type or region.

One important component is a student questionnaire which makes it possible to evaluate the broader context and other aspects of education, such as the student’s educational path, his/her school performance, family background, expectations, aspirations, the social environment in which he/she lives, type and location of school, etc. Gradually, questionnaires for schools directors, teachers (and perhaps parents) will be prepared in order to identify various features of school management, school processes, the quality and qualifications of teachers, the school climate, equipment and others, with a view to establishing their impact on value added.

In 2005/2006 over 200 secondary schools and 18 thousand students implemented the input module (some 12.5% of all schools and students). There is quite large interest on the part of *gymnázia* – over 23% took part in the project. In terms of the testing of this approach to identification of value added the number of participating students and schools is favourable – i.e. the school-specific as well as the general findings will be relevant. This project is also interesting for schools which began to be concerned with their quality and became involved in testing still at the time when work on the evaluation system was at its beginnings, and for schools which have not yet implemented any testing.

2.3 Identification of value added according to the Centre for Education Policy

The Czech education system is facing introduction of a common, national part of “maturita”. However, there is a danger that its results will be interpreted regardless of the varying conditions under which schools operate (particularly the structure of students and their social and cultural background). It is therefore necessary to pursue identification of the value added generated by each school, and to provide schools, public administration bodies and the general public with the relevant knowledge and methodological support for correct interpretation of the results.

This approach, which has been developed by the Centre for Education Policy, uses data from the PISA project concerned with identification of learning outcomes, and from the project concerned with the introduction of the national part of “maturita”. Additionally, data are also used that concern the situation of school leavers in the labour market and admission to tertiary institutions.

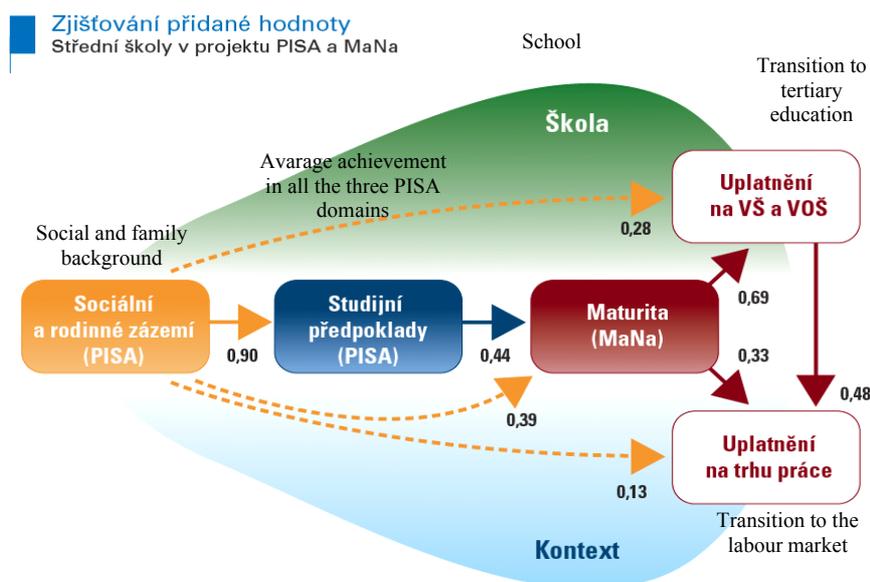


Figure: Education Policy Centre – A Model for Identification of Value Added

Value added is measured as a difference between “maturita” results achieved by students at selected secondary schools and the results at the beginning of secondary schooling identified within the PISA project. It is necessary to bear in mind that although both the PISA project and the project concerned with introduction of the national part of “maturita” measure the results of the same schools, they do not refer to the same subjects. This is why statistical methods are used in order to achieve the highest possible level of correctness in this calculation (for explanation see the following chapter).

The proposed model for calculation of value added does not measure its increase, but compares the position of schools at the beginning of secondary schooling and at its end. It is of primary importance to ensure that the analysis should capture, to the largest possible degree, various factors at student and school level which will make it possible to view the results achieved by various schools in the light of the influence of these factors. This means that the objective is to facilitate a comparison where the different school results will be explained by the relevant factors. One of them is the socio-economic status, which is a contextual factor. It can influence the outcomes considerably and can be the reason for some schools achieving poorer results. The factors which the school can influence include the overall school climate involving the relationship between student and teachers, the sense of belonging, discipline, the approach and motivation of teachers, etc. Other factors may include school management and organisation, the degree of selectiveness, school autonomy, internal differentiation and evaluation of students. Moreover, a factor that can be described as “resources” is also explored. It covers issues such as computer facilities, the qualification of teachers, textbooks, teaching aids, buildings and other equipment.

At student level the socio-economic status is important, as it expresses the influence of family background. Learning strategies are reflected in factors such as competitiveness and identification of contextual links. The factor of self-confidence involves concerns, anxiety and trust in one’s own capacities. The factor of motivation examines internal aspirations and external advantages. A more detailed analysis of various influences and interpretation of results are presented in chapter 4.

CHAPTER 3

More technical information on the projects and data collected

3.1 The Spektrum Project

This chapter provides information about the structure of the Spektrum project in terms of data obtained and ways of their collection. It does not provide any information as to a model for identifying value added based on these data, since this model is not yet available. However, the Spektrum project facilitates generation of information that such a model can use. In the next stage of project implementation a model of this kind will certainly be developed.

The Spektrum project, as we have mentioned in the previous chapter, aims at developing a “Personal Portfolio” for each basic school pupil. The portfolio contains data from the following assessment processes:

- National examination
- Final evaluation in the relevant years (school reports)
- Didactic tests administered on a continuous basis
- Continuous assessment of school work, projects and out-of-school activities
- Identification data

The data from the national examination, school reports and identification data constitute an obligatory part of the portfolio – i.e. they will be collected for all basic school pupils. The didactic tests and continuous assessment are more related to the relevant school (the relevant school-based curriculum). However, inclusion of these data in the personal portfolio will be subject to rules which will facilitate continuous monitoring of learning outcomes.

National examination

In terms of broad comparability of data and their applicability in monitoring value added the national examination is the most efficient instrument, since it will consist of uniform, standardized tests centrally administered by the Centre for Identification of Learning Outcomes in 5th and 9th grades of basic school and the corresponding year of six- and eight-year *gymnázia* and conservatoires. All pupils will be tested. If need be alternative dates will be set.

There will be four tests: in mathematics, Czech language, a foreign language and learning skills. The first three tests aim to verify the mastering of subject matter as prescribed by the relevant educational documents. They are focused not only on knowledge, but also on skills. Application of skills acquired on the basis of knowledge in a particular subject is also tested. The test in learning skills is exclusively skill-focused. It does not test knowledge in any subject and focuses on individual skills related to work with information and the level of key competencies.

The selection and development of the value added model will be a matter of the next stage. Therefore we cannot provide more detailed information as to data operations, the structure of data files, the link between the skills tested and the width of the curricula, the approach to measuring content changes in individual classes, etc. Particular attention will have to be

devoted to curricular issues in view of the Czech curricular reform (each school must prepare a school-based curriculum derived from the relevant framework curriculum).

Final evaluation in the relevant years

This concerns half-term and final school reports which must be written for each pupil. The assessment can take the form of marking or it can be verbal. Combination of the two forms is also possible. This assessment is subjective to a large degree and therefore cannot be used in order to identify and compare value added. However, its verbal form in particular can constitute an important motivation instrument in terms of monitoring progress made by individual pupils. For this purpose it is important that verbal assessment should also be focused on a systematic evaluation of progress in acquisition of key competencies that are relevant to the respective stage of education. The gradual monitoring of the level of key competencies acquired in view of the targeted level in basic education can have very positive effects on each individual. This change in the concept of final evaluation is one of the objectives of ongoing projects focusing on self-evaluation procedures.

Didactic tests administered on a continuous basis

The primary objective of continuous didactic tests is to monitor learning progress in individual pupils – i.e. to monitor their performance in view of the ideal situation. The results are expressed in percentage terms. There will be several sets of tests so that each school can choose depending on its curriculum. Every year each pupil should sit at least one didactic test in the Czech language, mathematics and a foreign language. Tests in additional subjects depend on the choice of the school and the pupil. This instrument is not yet designed to be applicable in terms of measuring and comparing value added. A model for identification of value added could be developed if a decision is taken that the Centre for Identification of Learning Outcomes should collect the results at central level. However, schools would certainly welcome an instrument for systematic identification of value added at pupil, class and school level. The value added could then be compared in terms of years and used during evaluation of the school-based curriculum and the school's self-evaluation.

For *students with special learning needs* a special set of continuous didactic tests and national examinations will be developed. The tasks will be adjusted depending on the level of disability in order to minimise the impact of the disorder on the pupil's results in the examination. Moreover, the results of these pupils should be comparable to those of the mainstream population. The adjusted conditions for pupils with special learning needs include, for example, extended time for test implementation, the use of compensatory aids, modified test format (e.g. size of letters, the Braille, electronic format, sound outputs, modification of some tasks or their replacement with more appropriate ones, work with an assistant, etc.).

3.2 The Vektor project

The private company Scio is implementing a project entitled Vektor. Its aim is to provide schools with comparable data about their value added. This is not an across-the-board project and is only implemented if the school so wishes. However, some 12.5% of schools participated in it in 2005/2006, which is an interesting sample covering over 18 thousand students and over 200 secondary schools. Although this is not a systemic project (it is more a service schools can order), we mention it as it concerns identification of value added which, in the following years, will bring results that can be interesting for

implementation of the value added model within the nationwide project Spektrum. Scio is offering schools this opportunity so that they need not only rely on the results of national “maturita” – i.e. one-off measuring – and have a chance to see how their outcomes change over time.

Value added will, for the first time, be calculated in 2008, since the first test of first-year students at secondary schools were implemented in autumn 2005. Their results will be compared with the results of tests administered in May and June (possibly September) of 2008. Both rounds of tests include tests in learning skills, Czech language, English, German, mathematics, social sciences and science&technology (in the second round of testing S&T is divided into sciences and IT). Not all students must necessarily undergo all tests. The decision is up to the school management.

Identification of value added is based on the assumption that with many indicators it is so far not possible to express what exactly is an excellent or insufficient mastering of a skill. It is only possible to compare the ways in which students in various schools master the skill and how they improve. This means that value added is identified based on comparing the results of various schools and relating the results of a particular school to the results of schools in a particular group of schools (e.g. to the results of all upper secondary technical schools, or all upper secondary schools). In other words the degree of mastering individual tests is measured in terms of comparison with the average level achieved by the relevant group of schools. This is done in both testing years. The difference in the performance of individual schools, classes or pupils constitutes value added. This means that value added is identified in relation to a respective group of schools. Overall value added of a school is also identified and, again, it is expressed in relation to a group of schools.

Since in both years of testing an accompanying questionnaire is used, it will be possible to carry out analyses of various dependencies of value added on selected factors. These include, for example, parental education, social environment, internal school characteristics, aspiration to study further, and the features of basic school education. An analysis of the results of testing and data in the questionnaires will facilitate a more accurate interpretation of the results, and can be put to a better use as regards improvement of the school’s operations. In the future a questionnaire for teachers and school directors will be used, which will enhance the school’s self-evaluation process.

3.3 Identification of value added according to the Education Policy Centre

In its approach, which is predominantly research-focused, the Education Policy Centre focuses on the use of the existing sets of data. The data concern the measuring of learning outcomes and the situation of upper secondary school leavers in tertiary education and in the labour market. The sources of the data are the PISA project and the project concerned with preparation of the common national part of “maturita” (after the preparatory stage complete data related to common “maturita” will be used). Transfer to tertiary education is the subject of the project “Uchazeč” (Applicant), and data about transfer to the labour market are collected by labour offices.

In the previous chapter we have mentioned that the PISA 2000 results were compared with the results of the same schools as part of the project concerned with the preparation of the common national “maturita”. Data from 75 secondary schools where first-year students were tested as part of PISA 2000 were compared with the data obtained in 2003 within the “maturita” project. This approach is facing some data-related and methodological problems resulting from the fact that, although the PISA 2000 results and the results of the “maturita”

project were achieved by the same school, no consideration is given to possible transfers of students to or from other schools, and to possible absence of some students in the two testing exercises. Moreover, the testing was not focused on the same areas of knowledge and skills. This means that this was not a direct measuring of the acquisition of certain competencies and knowledge in line with the respective curriculum. This is why various statistical methods have been employed in order to translate the results of both testing processes into an average outcome. This was done for both processes and then individual schools' differences from the average for all secondary schools were compared. This means that relative results of schools at the beginning and at the end of secondary education were compared. The main purpose of this measuring of value added was to compare the three main streams of Czech secondary education, and to analyse factors affecting the learning outcomes. Another main goal was to facilitate a direct link to the data on the situation of school leavers in the labour market and on their transfer to tertiary education.

Since 1999 the survey "Uchazeč" (Applicant) has been implemented in the Czech Republic. Its objective is to obtain data on the transition from upper secondary to tertiary levels. Tertiary institutions collect data on applicants, admitted students and enrolled students. The data are then collected at central level. Moreover, it is possible to find out whether an individual applies for, or is admitted to, a tertiary institution immediately after "maturita" at a secondary school, or several years later. There are therefore data at the level of an individual. Comparison of these data with those on secondary school leavers makes it possible to obtain information about the success of individual schools in terms of admission of their graduates to tertiary institutions. The relevant sets of data make it possible to discern aspects such as demand for a particular institution or field (in terms of the number of applicants). Evaluation of secondary schools can therefore take account of the number of their graduates who were admitted to programmes or faculties where there is stiffer competition.

Transfer to the labour market can be monitored since labour offices, based on an agreement between the Ministry of Labour and the Ministry of Education concluded in the second half of the 1990s, collect data about the number of unemployed school leavers. The data are collected twice a year (as at 30 April and 30 September). The methodology for the collection was gradually modified and since 2002 it has been deemed appropriate in terms of further processing of the data and their use for further analyses. It is therefore possible to monitor the situation of school leavers in the labour market. The link between the number of unemployed graduates of a particular school and the total number of those who graduated from this school gives an idea how leavers of individual schools are successful in finding employment. By means of examining both the situation of school leavers in terms of employment and transfer to tertiary education it is possible to get comparable data for the purpose of evaluating learning outcomes in secondary schooling.

CHAPTER 4

Some results from the research of the Education Policy Centre

The model of the Centre for Education Policy of Pedagogical Faculty of Charles University has been devised explicitly for identification of value added, using available data from the PISA survey, and from the project preparing the implementation of the common national part of “maturita”. It explores, above all, various factors influencing learning outcomes. Value added is expressed in terms of comparison of the position of schools in the PISA project and their position within the “maturita” project. These data are complemented by data concerned with the situation of secondary school leavers in the labour market and with transfer to tertiary education.

The PISA 2003 findings prove that the differences in the results achieved by various countries, schools and students are, to a large degree, caused by their different economic, social and cultural backgrounds. The family background of each student has an enormous impact on his/her learning outcomes, and the impact of his/her schoolmates' backgrounds is even larger. Moreover, the average results achieved by various OECD countries are influenced by the level of development and educational attainment of their population. The findings identified also make it possible to separate that part of results which is dependent on the characteristics of the external environment, and, based on this, to determine an expected level of results. This level for individual schools is marked blue in the graph below. The actual results of the PISA 2000 project for individual schools are expressed as a sum of the blue and red parts. The size of the red part shows the difference between the actual result of PISA 2000 and the figure expected on the basis of the family and social background of the student. The sum of all three coloured parts, including the blue one, shows the results of schools in the project preparing implementation of the common, national part of “maturita”.

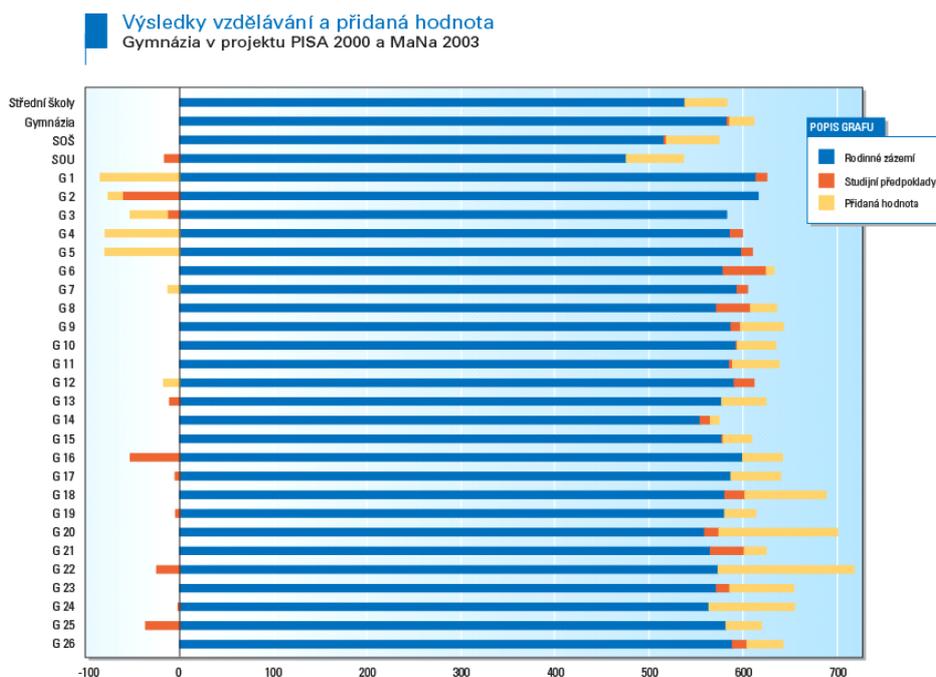


Figure: Learning Outcomes and Value Added, PISA 2000 and “maturita” project 2003

The figure illustrates how different the results achieved by schools are. There are differences not only in terms of the results, but also in terms of value added – all this against the family background. The figure shows details for *gymnázia* – i.e. 26 *gymnázia* out of 75 secondary schools under review – where it was possible to interlink the results of PISA 2000 and those of the “maturita” project of 2003. In terms of the overall system of secondary schooling this is a very interesting outcome. It shows that value added in *gymnázia* is lower than in secondary technical and secondary vocational schools, while the value added in technical and vocational schools is comparable.

The impact of social and family background is a major factor influencing the result of students at the beginning as well as at the end of secondary schooling (although in the latter case this influence is partially weakened). It is known that it is not only school performance and learning skills based on which pupils at the end of basic school divide into three main streams in the Czech system of secondary education (i.e. *gymnázia*, secondary technical schools and secondary vocational schools). An analysis of family background and the overall student performance in the PISA 2003 points to a severe dependence on family background. Lower achievers do study at *gymnázia* or in technical programmes with “maturita” if their family background has motivated them, and students with better results but without this motivation opt for vocational programmes without “maturita”.

The dots in the graph show the value of the economic, social and cultural status index (ESCS) of the student’s family background, and the overall average result. The graph distinguishes between students in secondary vocational programmes without “maturita”, technical programmes with “maturita” and four-year *gymnázia* programmes. The three marked dots show the average values for each of the three types of secondary school. The ellipses define a space for each school type where 90% of its students belong.

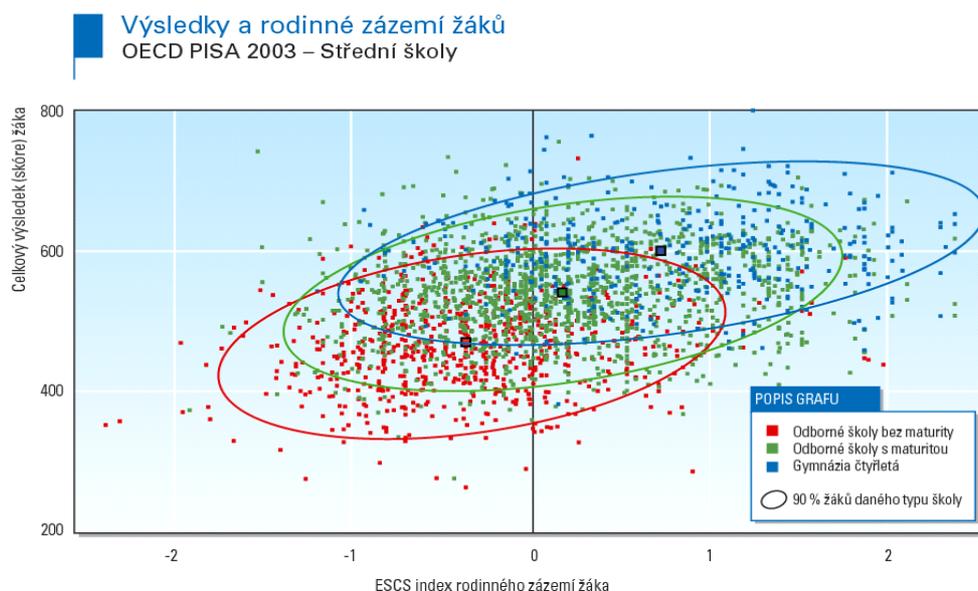


Figure: Results and Family Background, OECD PISA 2003, secondary schools

We can see that both the results and the family background cover an extensive scope of possibilities. We can also see one substantial feature of Czech education: the averages for all three streams of education are relatively close to each other in view of the wide range of figures for individual students in all three types of school – the figures are largely the same both as regards the results and the family background – i.e. they overlap in a major part of the ellipses.

However, this shows that a certain proportion of young people do not receive education in line with their potential. Moreover, the level of motivation for further studies at tertiary level or as part of continuing training decreases significantly in individuals without “maturita”. This means that if a young person happens to follow the stream of initial education which does not lead to “maturita”, he/she has a higher likelihood of not acquiring it later in life either. This is of course related to the person’s professional career and position in the labour market.

The Figure “Results, Family Background and Aspirations” clearly shows that young people with good results in secondary vocational programmes without “maturita” have hardly any aspirations to continue studying at tertiary level. Conversely, almost 100% of *gymnázia* students who achieved similar results show aspirations to study at a university. Surprisingly, their aspirations are even higher than those of their schoolmates with far better results (although statistically the difference is not important). This, again, points to the fact that family background is far more important in terms of aspirations than critical self-reflection of own skills and capacities.

In addition to the average result and aspiration to study at tertiary level the graph also shows distribution of students in quartiles according to the economic, social and cultural background in groups of secondary schools (four-year *gymnázia*, secondary technical schools, secondary vocational schools). There are two columns for each type of school – the first one show 7.5 thousand selected students with the best outcomes, the second show the remaining students in the relevant group of schools (the total number of students in the first year of *gymnázia* was some 15 thousand, therefore there is also 7.5 thousand students in the secondary column, for secondary technical schools it is some 60 thousand students, and some 23 thousand students in secondary vocational schools).

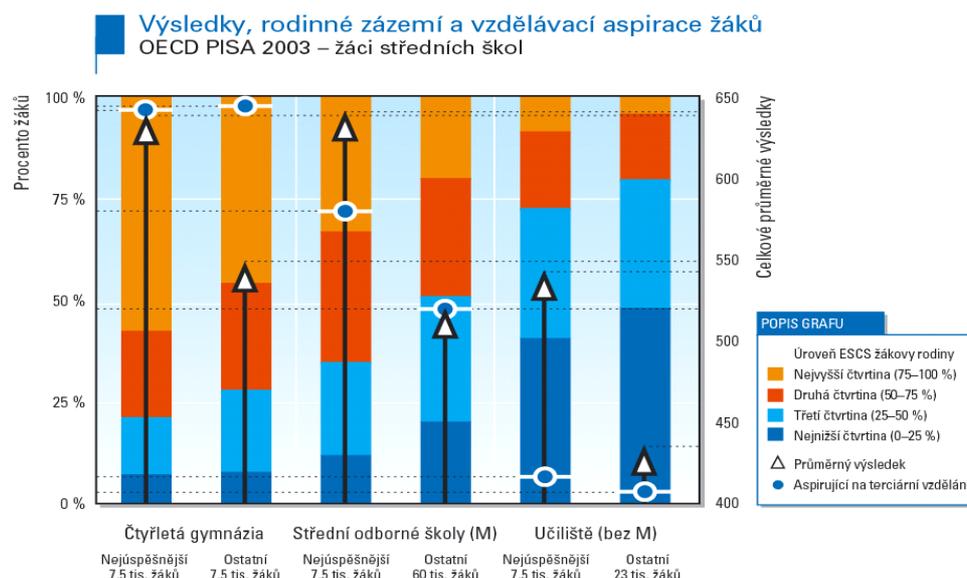


Figure: Results, Family Background and Educational Aspirations of Students, OECD PISA 2003, secondary schools

The distribution of students according to ESCS also points to a large degree of streaming as regards transfer from basic to secondary school, depending on family background. However, the differences between groups in terms of their results are different. The best score is achieved by the successful group of students at secondary technical schools – even better than successful *gymnázia* students. The remaining *gymnázia* students follow, although their score is only slightly better than that of the successful group of students in vocational programmes without “maturita”. Remaining students at secondary technical schools follow with only slightly better results. The most severe problem can be seen in the group of successful students in vocational programmes, whose score is comparable with the second group of *gymnázia* students, but whose educational path is much more jeopardized.

An additional important aspect is the extent to which the differences in results are important within individual schools, or whether they are more important between schools. All countries show considerable differences in terms of school performance within schools. This effect predominates and, in the OECD countries, explains the overall differences in student performance up to 67% on average. However, in most countries differences between schools are also important – up to 33% on average in the OECD countries. In the Czech Republic the differences between schools are double the OECD average, whereas the differences within schools are below the average. This means, again, that the choice of school is very important. However, there are countries where the differences in student performance between schools are very slight, which means that the school show consistent standards.

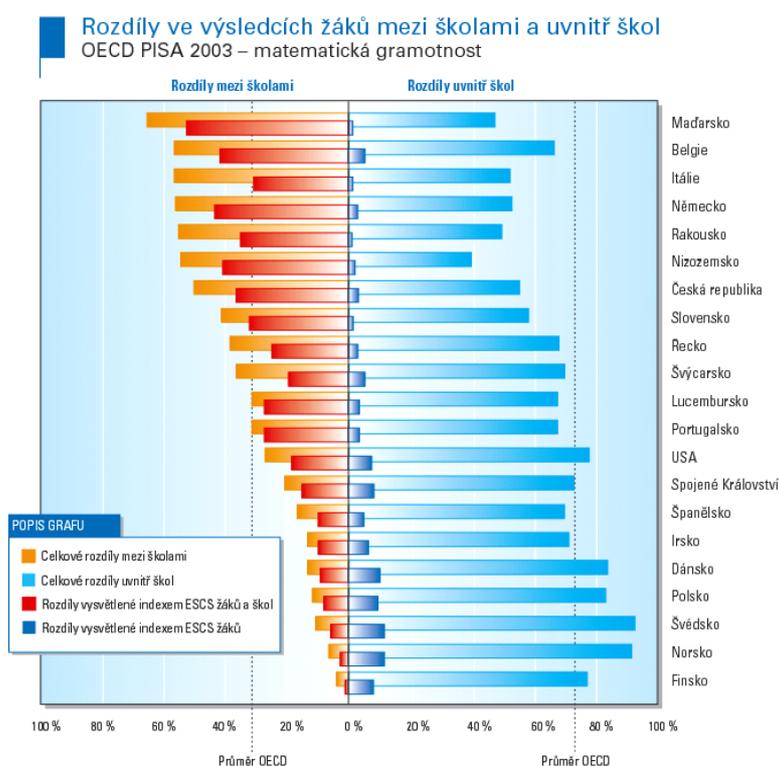


Figure: Differences in Student Performance Between and Within Schools, OECD PISA 2003 – mathematical literacy

The influence of family background is apparent not only in terms of individual differences between students, but also at school level where the social structure of students affects school characteristics. This combined effect of the ESCS index is also tangible (although not in extreme terms) in the Czech Republic. This means that the countries vary not only in terms of the results achieved, but also in terms of the capacity of their education systems to ensure equal educational opportunities.

The international perspective of the inter-dependence of family background and learning outcomes is important for the Czech Republic, since the influence of parental education on the children's choice of education is traditionally high. This is therefore an important aspect to be considered by education policy-makers when pursuing the principle of equal access to education.

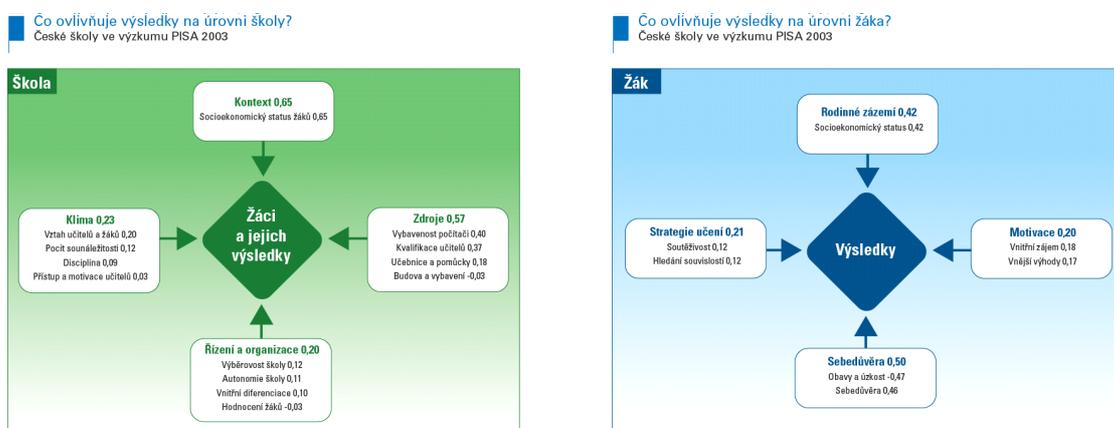


Figure: What Influences Student Performance at School and Student Levels

At school level, learning outcomes are considerably influenced, apart from the socio-economic status of students, by the available resources. The strongest influence in this respect was computer facilities and teacher qualifications. About the same influence can be seen as regards the school climate and its management and organisation, while the most apparent link can be discerned as regards the teacher-student relationship. What is interesting is that no link has been identified between the results and the way in which students are assessed at school.

At student level the performance at school influenced the most by his/her self-confidence, motivation and learning strategies. As regards motivation there is again the same degree of internal interest in the given subject and of the perception of external advantages. As for learning strategies, the strongest link is that between the results and competitiveness in learning, and between the results and own pursuit of logical contexts. These are important dependencies which may assist in the development of well-balanced school curricula in this respect.

One important criterion as to whether secondary school fulfils its function concerning preparation of school leavers for tertiary education or employment. As we have mentioned, this is one component of the broader approach to monitoring value added in schools. It does not concern comparison of results over a period of time, but a mutual comparison of schools as regards one of their functions. The situation in Czech secondary education in this respect is relatively transparent, but it is not satisfactory regarding equal opportunities.

Generally, graduates of *gymnázia* are the most successful as regards transfer to tertiary education (some 80%), while secondary vocational school leavers (in programmes with “maturita” as a condition for entering the tertiary sector) tend not to continue studying at tertiary level (apart from some exceptions). The proportion of secondary school leavers enrolled in tertiary institutions is some 40%. Differences between schools within the same category are large and cannot be corrected by other factors which influence the ambitions and results of young people at various types of school. These differences provide a reason for further analyses and desire attention on the part of school administering bodies and basic school leavers and their parents.

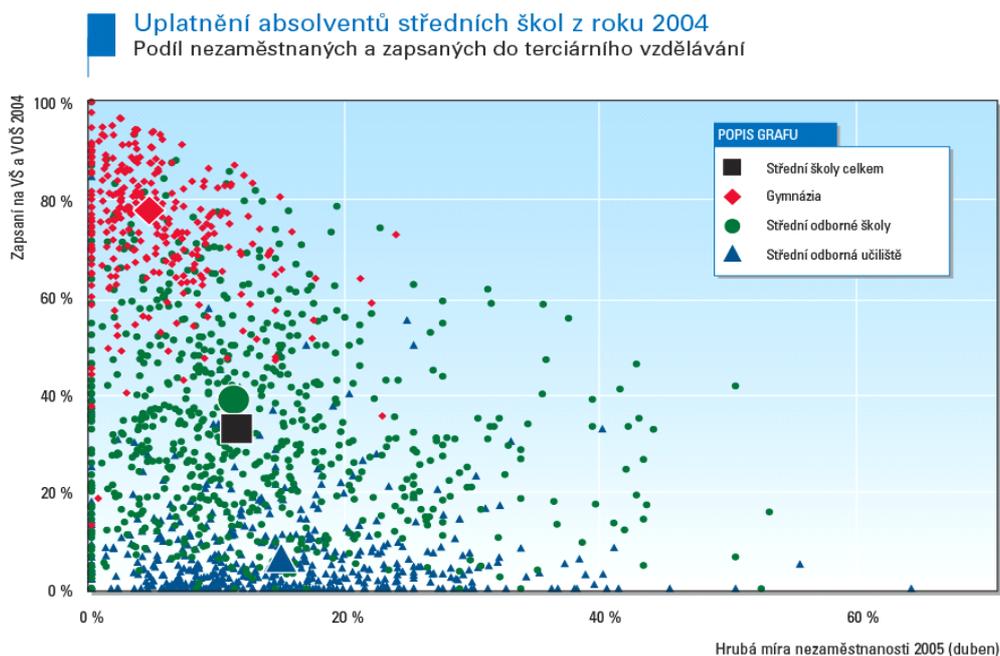


Figure: The Situation of Secondary School Leavers in the Labour Market, 2004

Success in transfer to the labour market must be viewed against the background of the overall situation in the labour market. However, when “maturita” holders leaving various types of school are compared, the differences should not be multiple – as the graph and the overall position of all school types show. It is clear that the performance of secondary vocational schools as compared to the other two types of school is worrying. This does not so much concern individual schools as their systemic position among schools. What is unsatisfactory in view of the earlier analyses of student performance at various types of school is that after four years the differences in school outputs are far larger than at the beginning of secondary schooling. This points to the unfavourable situation where it is very important in which type of school the student is educated.