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THE CONDITIONS FOR EDUCATIONAL ACHIEVEMENT OF LOWER SECONDARY SCHOOL GRADUATES

(a research report)

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INTRODUCTION

The education of children, adolescents and adults has been growing in importance with formal school instruction becoming longer and an increasing number of adults receiving continuous education. As education is becoming more widespread, a growing percentage of particular age groups can benefit from ever higher levels of the educational system. Yet more advanced levels of education are available only to those who perform better. In this context, increasingly measurable and objectively verifiable school achievements can either promote or be a hindrance to further educational, professional and personal careers.

The Polish educational system has been undergoing reform since the mid-1990s. The highlights of the educational reform were the establishment of lower secondary schools (*gimnazjum*) and the introduction of an external system for the assessment of student progress. Since 1999, the educational system has consisted of compulsory uniform six-grade primary schools, compulsory uniform three-grade lower secondary schools (representing the first level of secondary education) and various types of upper secondary school (offering two to three years of instruction). Unlike the former educational system featuring eight years of primary education and only one level of secondary education, the new one more closely resembles systems operating elsewhere in Europe.

In 2002, for the first time, all the students graduating from lower secondary schools were submitted to two assessment procedures, of which one was conducted by the teachers of the subjects concerned while the other consisted of a standard external test. The test was designed to assess both knowledge and skills acquired by students throughout their school instruction. The introduction of this new system for the assessment of student achievement provided a unique opportunity to carry out an external evaluation (i.e. one not conducted by a teacher familiar with the student) of student progress using standard measures and tools.

Education has a role in creating and strengthening social divisions. The classic literature on this subject appears, at least to a certain point, not

to have lost its validity (see, for instance, C. Bernstein, P. Bourdieu, J.C. Passeron)[1]. Correlations among education, culture, social divisions, communication and cultural codes are still very much alive (as exemplified by a theory of the relationship between cultural capital, determined by father's occupation, and acquired capital, i.e. school, professional and personal achievements) and certainly worth researching, notably in view of social and educational changes that are becoming increasingly pronounced in Poland (as outlined below). Still, the knowledge arising from classic literature is not always sufficient to explain how and to what extent student achievement is affected.

The institution that should be given the full credit for its role in researching student achievement in the 1970s and 1980s is the International Association for the Evaluation of Educational Achievement (IEA). The IEA focuses on two types of studies: 1) those concerned with identifying differences among countries and schools or academic institutions within particular countries, and 2) those intended to determine whether the factors underlying such differences[2] or the factors determining student achievement are identical or different in particular countries[3]. However, IEA reports are the most useful in constructing tools for measuring educational achievement, which is neither the subject nor the goal of this study.

Few studies exist that demonstrate what factors affect student achievement in particular countries and to what extent this occurs. A study commissioned in the United States in 1997 by the Rochester Teacher Association into the results of a maths test found out that 49% of the variation in these results was explained by home and family factors, 43% by teachers' skills, and 8% by the school's size[4]. Yet many educators and

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[1] B.Bernstein: Odtwarzanie kultury [*Reconstructing culture*]. Warsaw 1990, P.Bourdieu, J.C.Passeron: La reproduction: Elements pour une théorie du système d'enseignement. Paris 1970.
[2] R.Pachociński: Zarys pedagogiki porównawczej [*An outline of comparative pedagogy*]. Warsaw, IBE 1998
[3] T.N. Postlethwaite: The aims, style and methodology of IEA studies. Frascati, 1988
[4] A.Urbanski (President of Rochester Teacher Association) – a paper delivered at the conference in the Ministry of Education in Warsaw on 16 June 1999.

educational politicians recognise other factors while often rejecting those recognised by other researchers.

It could, therefore, be stated that the educational system and student achievement conditions represent a complex fragment of reality which is influenced by a collection of many variables. While being fairly well able to register these variables, we have a considerable difficulty in organising them into a hierarchy.

A new approach to studying student achievement has been emerging over recent years. Namely, the studying of the results of performance in specific school subjects is being given up in favour of studying skills, or both knowledge and skills, representing an overview of several school subjects. At an international level, such new studies are conducted by the OECD under the Programme for International Student Assessment (PISA), in which the thirty-two OECD member states and four non-member states participate (a total of over 120,000 students). The skills tested among fifteen-year old students within the PISA 2000 framework concerned reading literacy, mathematical literacy and scientific literacy[1]. Polish students (4,037) performed poorly in these tests, providing a strong argument for research into the conditions underlying school achievement. Considering that the PISA test results are at present the most recognised and influential measure of school performance of 15-year old students, let us take a look at some of the findings of this huge project, particularly those relating to Poland, as well as those attempting to explain the factors and conditions underlying student achievement.

Measured through reading literacy rather than mathematical literacy in 2000, student achievement was demonstrated to differ greatly from country to country. However, variations within the countries were even more pronounced. The project's findings demonstrate that a country's high average performance can be correlated with its low internal variation (Finland, Japan, Korea) and that the highest internal variation is associated

[1] Programme for International Student Assessment – PISA 2000. (www.pisa.oecd.org).

with an average performance that is lower than the OECD country average (Germany).

Internal variation in some of PISA results can be explained by factors such as, for instance, gender, family conditions or type of school attended. The last mentioned factor played a particularly important role in the case of Polish students, who at the time of the test attended upper secondary schools (better performance) or vocational secondary schools or basic vocational schools (worse performance). This age group now attends uniform lower secondary schools. As regards gender differences, female students performed better in reading comprehension in all of the countries participating in the test while male students demonstrated a higher mathematical literacy in half of the countries researched (no material differences were noted in the other half of the countries).

A relationship between student performance and family background was studied with regard to the following factors: parental education, occupation and resources in the home. PISA tests looked at international variations both regarding the strength of this relationship and its importance in explaining overall differences in student performance. The association between family background and student performance differs greatly from one country to another. In Korea, there was a difference in score of 33 points between the top and bottom quarters of the student performance index according to parental occupation while in Belgium, Luxembourg, Germany and Switzerland this difference in score was over 100 points (Germany 113 and Switzerland 115). Not all students from disadvantaged family backgrounds perform poorly. For instance, in Canada, Finland and Korea, students whose parents had lower ranking jobs performed above the OECD average, thus demonstrating that family background does not have an universal impact or may be offset by other factors underlying student performance.

Students from wealthier families (better equipped) tend to do better, but this relationship was not very strong. What mattered more was the possession of items associated with "classical culture", such as literature or

works of art. In a majority of countries, students living with one parent only underperformed by an average of 12 score points compared with the OECD average score of 500 points.

The PISA project posed a number of important questions regarding each country's educational policy: To what extent is school performance determined by family background? How can the school address inequalities resulting from parental socio-economic status?

There was a group of five countries (Belgium, Germany, Hungary, Austria and Poland) where variations between schools were very high (ca. 70 score points compared with an average variation in score of 100 points in the OECD countries). Conversely, there was a group of four Scandinavian countries where this variation in score was as low as 10 points on average. The first group of countries was characterised by a diversified schooling system at the secondary level (lower secondary schools had just been launched in Poland at that time).

Some PISA findings refer to school equipment and teacher indices, but these tend to be less pronounced than the factors associated with family background.

The introduction of a uniform system of final tests supervised by the external examination boards in May 2002 allows for a more accurate analysis of school achievement in Poland (in lower secondary schools).

Furthermore, the studies conducted for thirty years now on a sample of upper secondary school students in one of the regions of central Poland demonstrate, sadly, that 20% to 22% of those students are illiterate and semi-illiterate (according to a silent reading comprehension test[1]). These alarming data are indicative of the existence of a number of factors that typically extend beyond the period of secondary schooling.

Many countries of the former Soviet bloc are undergoing a turbulent and often painful process of political, social and economic transformation that affects a child's social and educational environment. On the one hand, there are fairly profound demographical changes that are typically

[1] Z.Kwieciński: Wykluczanie [*Exclusion*]. Toruń, 2002.

manifested by the aging of societies and the decline in births, and thus in the number of pupils. On the other hand, the divestment of power from central to local authorities has made it difficult for the municipalities (*gminas*) to allocate proper funds for education. Since local authorities in Poland are free to adopt independent decisions on how to spend money, central authorities (the regional curator or Ministry of Education) cannot force them to maintain schools if the costs of doing so are higher than those stated in the budget. As certain schools, notably those in rural areas, are being closed down by municipalities, an increasing number of children and adolescents have to commute to school.

Changes are also affecting the family environment of students and the furnishing of their homes (e.g. computer and internet access, own room). There has been a systematic, if slow, improvement in the level of parents' education while at the same time the number of impoverished families and unemployed (and frequently marginalised) individuals has been on the increase. These phenomena contribute to a widening of existing social and community divisions.

The schools make ever greater efforts to upgrade work and study conditions: the number of computers is increasing fast, internet access is becoming widely available and foreign language laboratories and facilities for teaching other school subjects are increasingly better equipped. Gradual improvement can also be seen in the level of education and qualifications of the teaching staff. Nevertheless, there are still many schools that do not keep pace with the changes.

Educational achievement carries a different meaning for individuals, the regions and the state. The last two can use knowledge on student performance to better implement their educational policies.

Differences in student achievements can only partly be explained by differences within the educational system (the school and how it is equipped, teachers' qualifications, etc.). How the students perform at school is to a large extent determined by cultural, civilisational and economic factors that are not related to the school context. By identifying areas that

urgently require the government's attention (such as, for instance, a need to better equip schools or increase the number of teaching hours or undertake the tedious effort of re-educating parents), research into the conditions underlying educational achievement may have a considerable influence on the change of the state's educational policies.

The main objective of the research project underlying this paper was to establish which of the factors in the family and home environment and, to a lesser extent, school and teacher-related factors are the most important from the point of view of educational achievement. The research was not concerned with students' biopsychological traits, which in certain cases may have a decisive, or at least material, influence on school performance. These limitations were mainly caused by time and financial constraints.

For this reason, the present research features the following key research problems:

1. Which of the conditions researched has the greatest influence on student achievement?
2. How is student achievement influenced by family environment?
3. What role does the school location have in differentiating the results of the lower secondary school leaving exam?
4. Are these the same conditions that have an impact on performance in humanities and sciences?

These constraints also had an impact on the adoption of research methods (mainly the survey method and postal questionnaires) that were used to obtain information about students and their parents, schools, teachers and the results of the lower secondary school leaving exam.

The information thus collected represents a set of several tens of variables. Only twenty seven of the independent variables (achievement conditions) were selected for statistical analysis. This number was further reduced after the initial analysis had demonstrated that only around ten of these variables were relevant.

The dependent variables in the research project were measures of students' achievements – but this did not cover all of them and nor the

achievement of students in general. It was determined that the most objective and comparable information currently available in Poland with regard to student performance were the results of lower secondary school leaving exams (which can be broken down into eight detailed variables – compare Chapter II). Therefore, whenever reference is made to exam results further in this paper, this will mean results of the lower secondary school leaving exam (i.e. taken upon completion of the third and final grade).

Research material was described and subjected to statistical analysis. The most important parts of the statistical analysis included Pearson's correlation coefficient analysis and multiple regression analysis (with regard to variables and factors of the factor analysis).

It should be emphasised again that the author is aware of the fact that his study should be treated as an important introduction to other research projects that will be primarily concerned with analysing biopsychological factors. While not being easy to carry out, such projects are certainly viable. The fact that it was impossible to cover such topics in this study has been compensated for, at least partially, by a more in-depth treatment of what are called "classic conditions". While some of these have been found in the course of research to have no significant impact on student achievement, they may often add to our understanding of the teachers' community and the school environment.

It appears, further, that the family, the school and the church are losing their influence to peer group and the mass media[1]. Together with broadly defined popular culture, the mass media are sometimes perceived as a key factor underlying young people's socialisation, dubbed "permanent pedagogy"[2]. Such an approach to the study of student achievement conditions leads to the conclusion that not everything is understandable and researchable (even if covered by a broader research project) since there are

[1] Z.Kwieciński: Edukacja wobec nadziei i zagrożeń współczesności [*Education versus the hopes and threats of modernity*]. In: Z.Kwieciński (ed.) Tropy – ślady – próby [*Trails – traces - attempts*]. Poznań-Olsztyn, 2000.
[2] T.Szkudlarek: Radykalna krytyka, pragmatyczna zmiana [*A radical cricicism, a radical change*]. In: Z.Kwieciński (ed.) Alternatywy myślenia o/dla edukacji [*Alternative thinking about education*]. Warsaw, 2000.

many conditions that are elusive or unknown. This refers mainly to questionnaire studies containing a limited set of variables, the relevance and accuracy of which can be assessed only after completion of the study.

I. Selection of research sample and organisation of research

An assumption was made at the design phase of the research project (at the end of 2002) that a total of 600 students from 31 to 35 lower secondary schools would be researched. In the end as many as 54 lower secondary schools were identified for participation in the project.

Before proceeding to the discussion of the selection criteria, the location and a brief outline of the characteristics of the schools researched, it is worth outlining a certain dilemma that arose during the research concerning the period from which information was to be collected.

It was assumed that vital information on student achievement would be provided by the results of the lower secondary school leaving exam. Two options were available in this respect: 1) to use the results of the first exam in 2002, or 2) to wait for the results of exams held in May 2003.

1. The fact that the results of the 2002 exams were already known and processed provided an argument for adoption of the first approach. Furthermore, by ensuring that the research would cover students from schools characterised by highly diversified results (i.e. those with both poor and good results), these results were also an important criterion in the school selection process.

Another argument for adoption of the first approach was the certainty of information on the careers of school graduates, provided that all of them could be traced. Yet although many schools keep track of their graduates, in many cases it would have been impossible to establish what careers were chosen by the students of lower secondary schools after graduation.

A difficulty in tracking these graduates could also mean that some information that had to be obtained directly from students (concerning home environment) would have been impossible to collect. Nor could it be excluded that information concerning certain teachers would have been difficult to obtain (because there were no longer employed in the school year 2002/03). For the same reason, it could have been difficult to obtain information about students from their tutors.

2. A decision was eventually made to adopt the other approach (based on the exam results of May 2003) in view of the following advantages this presented: the students, teachers and tutors were still attending or employed at school and it was relatively easy to establish what were the further educational plans of students upon graduating from the lower secondary school. The educational careers of graduates would have been more difficult to establish (due to research schedule and budget)[1]. A challenge during the initial phase of research was the proper co-ordination of various information sources and the matching of exam results to students (exam results were expected in June 2003 while school results were obtained in July).

A certain disadvantage of the other approach was that the research would be based on how the schools performed in 2002. As the 2003 results could be different from the results from (and selection in) 2002, there was a risk that a research sample could be different from intended. However, although some schools indeed performed differently than during the previous exams, it was still possible to distinguish between the better and worse performing schools, except that the differences between them were slightly less pronounced than in 2002.

The basic criteria for selection of the research sample were the following:

1) location (community) criterion,
2) performance criterion (better and worse performing schools).

Out of the fifty four schools (their students, teachers and students' parents) identified for research, information was obtained, and selected for further research, from forty six schools located in eight provinces (voivodeships). The selection process was conducted as follows:

1) two groups of districts (poviats), were identified in various parts of the country where average results from both parts of the 2002 test were either high or low (5 "better" poviats and 9 "worse" poviats),

[1] The research grant required that the preliminary results be presented by the end of July 2003.

2) better and worse performing schools were selected within these poviats (31 schools in rural areas and in small towns),
3) an attempt was made to select "better" and "worse" schools in big cities, but there were difficulties in identifying "worse" schools (i.e. below the national average), hence a substantial majority of better performing schools (unlike in rural areas, where it was difficult to find "better" schools).

Of the schools selected for research:
- 19 were located in rural areas,
- 12 were located in 12 small towns (with a population of less than 10,000),
- 15 were located in three big cities (with a population of more than 200,000).

The spatial distribution (by voivodeship) of schools in rural areas and small towns was the following: eight schools were located in the Mazowieckie Voivodeship, five in the Podlaskie Voivodeship, four each in the Lubuskie Voivodeship and the Warmińsko-Mazurskie Voivodeship, three each in the Pomorskie Voivodeship and the Zachodniopomorskie Voivodeship, and two each in the Małopolskie Voivodeship and the Łódzkie Voivodeship. The research covered a total of thirty one schools in rural areas and small towns.

It has already been mentioned that fifteen schools were located in three big cities, of which seven were located in Warsaw, four in Krakow and four in Białystok.

Just as the students are assessed by means of scores obtained during the exam, so the schools can be assessed using averaged results. Out of the schools researched, twenty one performed above the national average, which was a score of 57.05 in 2003 (31.5 for humanities and 25.55 for sciences) while twenty five performed below the average. The schools researched are presented in Table 1.

Table 1. Schools researched according to location and 2003 performance

Location	Schools			
	Above average ("better")	Below average ("worse")	Total	
			Number	%
Big cities	11	4	15	32.6
Small towns	4	8	12	26.1
Rural areas	6	13	19	41.3
Total	21	25	46	100

Source: the author's research

A question arises whether or not the schools selected on the basis of 2002 results performed similarly in 2003.

A comparison demonstrates that the position of better and worse performing schools in small towns has not changed.

In rural areas, two schools had performed worse and were demoted from the better category to the worse category. In big cities, two schools improved their performance and were promoted to the category of schools performing better than average. All in all, there were no significant changes with regard to the selection based on the 2002 results.

When distributions of the students and lower secondary schools researched were compared with those of overall students and lower secondary schools in Poland, they turned out to be similar in terms of school location while differing considerably in terms of students attending these schools.

School location

	researched	Poland*
rural areas	41.3%	43.3%
cities	58.7%	56.4%

* inclusive of special schools

Students at schools

	researched	Poland
rural areas	50.7%	32.4%
cities	49.3%	67.6%

These variations between rural and urban areas result from the fact that lower secondary schools are substantially smaller in rural areas. Classes are also smaller in these schools and it should be borne in mind that the research covered only one class in each school.

Nevertheless, there was an overrepresentation of rural school students. This is due to the fact that more answers were missing in the case of urban schools (which suggests that rural school students adopted a more serious approach to the survey).

The selection procedure was clearly selective rather than representative. Nevertheless, the author believes that school selection based on the choice of extreme cases as well as the way variables were characterised and the school performance data used (exam results) guarantee a fairly good representation of the entire population.

The organisation of research

While being subordinate to the purpose of the research, the organisation of the research depended also on two principal sources and methods of collecting information. These were:

1) Students' results in the lower secondary school leaving exam which were obtained from the head masters of the schools concerned (these results were submitted to schools by the district examination boards); while the school results were obtained from the Central Examination Board in Warsaw;
2) Student achievement conditions (exam results) broken down into:
   - school conditions,
   - teacher-related conditions,
   - family home conditions.

This information was collected by means of a postal survey and several questionnaires addressed to:

- the head master of the school concerned (general information about the school and teachers),

- the student (family and home situation, place of residence, educational plans),
- the tutor of the class concerned (information on the parents of the students concerned, such as education, occupation, unemployment, pathologies).

It should be noted that where there was more than one class of students, the head masters were requested to choose class B or No. 2 for the purpose of research. This was motivated by the fact that many schools have an informal practice of dividing students into better and worse classes. As the class A tends to consist of better students, this measure was intended to improve the credibility of research material.

Likewise, in order to obtain as accurate information as possible on the parents of the students concerned, some of it was requested not from students but from their tutors (students can sometimes overstate the educational level and professional status of their parents and conceal, for natural reasons, family problems such as alcoholism, drug addiction, etc.).

As well as co-ordinating and supervising research within the schools, the head masters also provided information on teachers of the following seven subjects: Polish, mathematics, history, geography, biology, physics and chemistry, i.e. the subjects that were tested in the lower secondary school leaving exam. They were also requested to evaluate the performance of these teachers on a scale from 0 to 10.

The students filled out the questionnaires under the supervision of their tutors, marking them with their classroom register number and date of birth. The questionnaires filled out by tutors concerning the family environment of students were identified by the same means (in order to facilitate potential verification and comparison with the exam results).

The research covered a total of 1,098 students (directly and with the assistance of tutors) and 300 teachers (through the head masters).

II. Lower secondary school leaving exam[1]

The lower secondary school leaving exam was conducted for the second time in Poland on 8 and 9 May 2003, covering approximately 550,000 students of the third, and final, year of lower secondary schools.

The exam is general and compulsory and is conducted in accordance with rules and procedures published in March 2001. "The main goal of the lower secondary school leaving exam is to:

- test skills and knowledge in humanities and sciences as set out in the examination requirement standards,
- exert an influence on the teaching (learning) process by providing a feedback on the quality of education,
- provide objective and comparable information on the performance of lower secondary school students that may also be used in recruitment to upper secondary schools."[2]

It should be emphasised that there has been a worldwide tendency for some time now to first of all test certain skills and only then knowledge.

The exam is written and consists of two sections.

The first section is concerned with skills and knowledge in humanities while the other section tests skills and knowledge in the area of sciences. Standard examination sheets are distributed to the examinees, who are allowed 120 minutes to complete the exam (this time limit can be prolonged only in the case of students with disorders or developmental disabilities).

A student can obtain a maximum score of 100 if he successfully completes all the tasks (scoring 50 each respectively for humanities and sciences).

In 2003, **the humanities section** consisted of 31 tasks, of which 20 were of multiple-choice type while 11 were open tasks (i.e. the tasks that require the

[1] All information concerning the objectives, procedures, scope, grades and results of the 2003 exam comes from the publication of the Central Examination Board (CKE) "Presentation of the results of the lower secondardy school leaving exam". Warsaw, CKE, 3 July 2003

[2] Presentation.... op.cit., p.1.

students to construct the answer themselves). The following two areas were tested in the humanities section:

1) Reading and reception of cultural texts, where the following was tested:
   - reading facts at a literal level,
   - reading the intentions of a sender,
   - discriminating between facts and opinions,
   - interpreting various types of cultural texts,
   - searching for information in various types of cultural texts,
   - identifying the means of expression in a text,
   - defining the stylistic function of forms of grammar,
   - recognising the correlation between cultural phenomena and the relations between culture and politics,
   - recognising the contexts necessary for interpreting cultural texts.

2) Writing own text, where the following was tested:
   - the use of poetic terms,
   - comparing, arranging and generalising information,
   - text transformation,
   - writing a business text (an application),
   - writing a longer text (a description),
   - writing a text coherent logically and syntactically,
   - formulating arguments,
   - adapting the style to a communication situation and form of expression,
   - writing texts that are characterised by the correct use of vocabulary, phraseology, syntax, spelling and punctuation.

The sciences section consisted of 34 tasks, of which 25 were of multiple-choice type while 9 required that the students construct the answer themselves. The following areas were tested:

1) Competent use of terms, concepts and procedures (related to sciences) that are necessary in everyday situations and in further education, where the following were tested:

- the choice of proper terms to describe natural phenomena and organisms and the behaviour of organisms,
- the performance of calculations in practical situations, including the practical application of properties of operations and the use of percentages and units of measure,
- the use of properties of figures, including calculating the area of plane figures and the use of properties of measures.

2) Searching for and use of information:

- reading information from texts, maps, tables, graphs and drawings,
- the use of information, including selecting, analysing, comparing, processing and interpreting information.

3) Identification and description of facts, relationships and correlations (cause-effect, functional, temporal and spatial):

- the use of principles to explain phenomena,
- the use of the language of symbols and algebraic expressions,
- the use of functions (analysis and interpretation of functions presented as formulas or graphs),
- the use of integrated knowledge to explain natural phenomena.

4) Application of integrated knowledge and skills for problem solving:

- the creation of the problem situation model,
- the use of a creative approach to problem solving (by associating various facts, observations and test results and drawing conclusions),
- forecasting the results of tests.

RESULTS OF THE LOWER SECONDARY SCHOOL LEAVING EXAM – POLAND IN GENERAL, 2003

The analysis of the humanities section of the exam demonstrates that the skills acquired by students are lowest in the second of the areas evaluated (writing own text). These skills included:

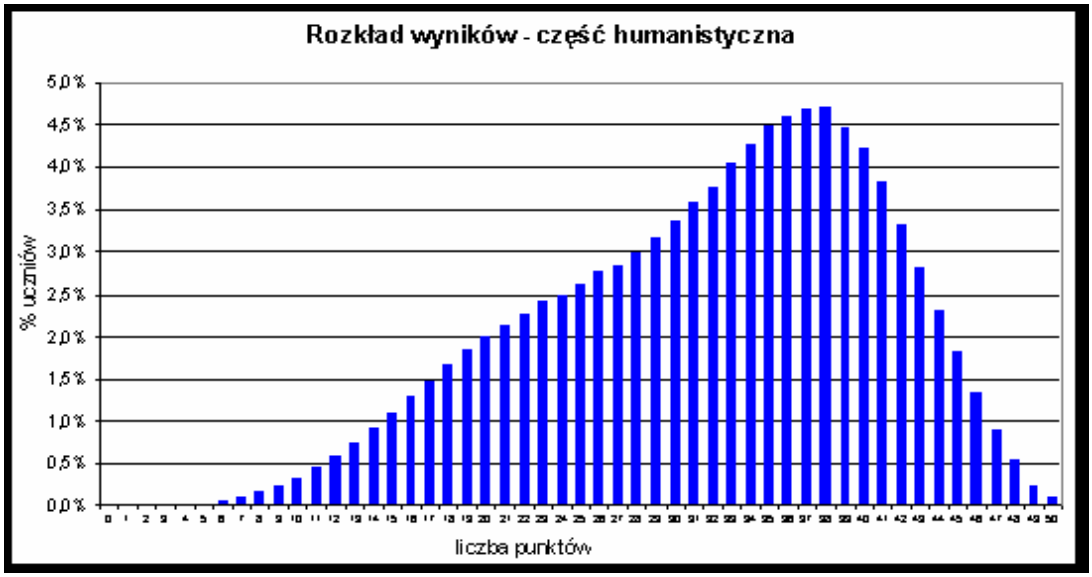
- writing a text characterised by the correct use of vocabulary, spelling and punctuation,
- preserving the formal features of an application,
- the use of poetic terms.

The following skills were the lowest in the sciences section:

- the use of creative thinking in solving a problem that combined mathematics and physics (area 4),
- the interpretation of the properties of a function and the conversion of its formula (area 3),
- the use of properties of similar figures.

In both sections of the exam, students had difficulty solving complex tasks that were more highly scored.

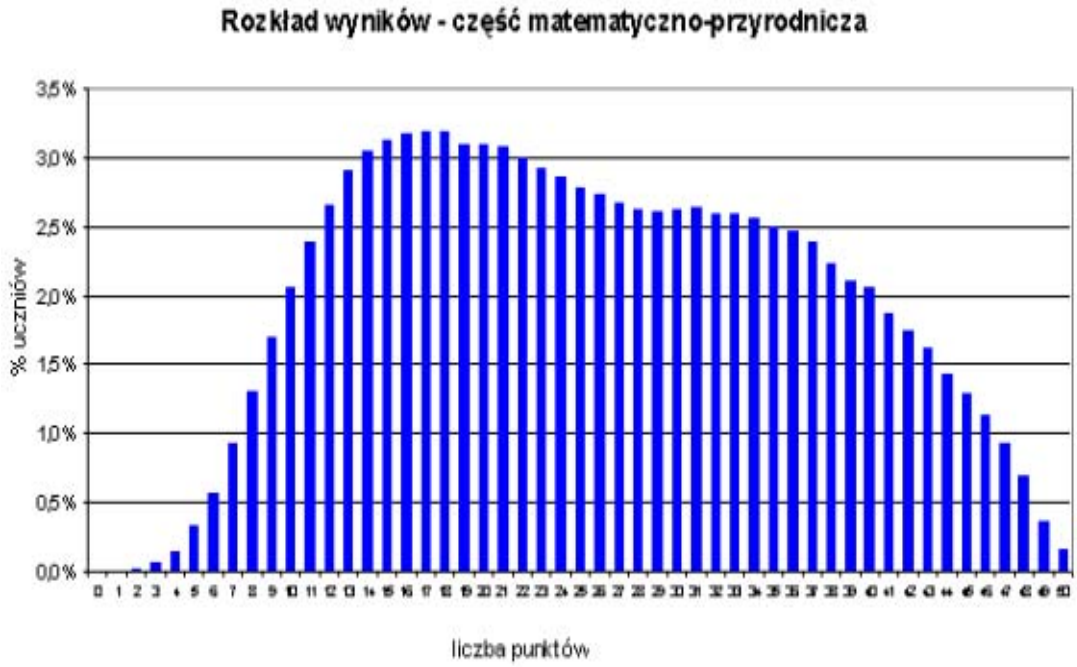
Graph 1. Distribution of results – humanities



Source: Central Examination Board, Warsaw 2003

[% students, Distribution of results – humanities, scores]

Graph 2. Distribution of results – sciences



Source: Central Examination Board, Warsaw 2003

[% students, Distribution of results – sciences, scores]

An analysis of the first and second graphs (providing a graphic representation of the results obtained by approximately 550,000 graduates of lower secondary schools) demonstrates that sciences caused more problems than humanities. This finding is supported by statistics. Namely, although the same score could have been obtained for each section of the exam (50 each), the average score is much higher in the humanities section. Furthermore, the modal value is higher than the arithmetic mean (38 > 31.83) in the first section of the exam. Conversely, in the second section the modal value is 17 while the arithmetic mean is 25.75 scores. The results are presented in more detail in Table 2.

Table 2. Characteristics of the results of the lower secondary school leaving exam in 2003 (scores)

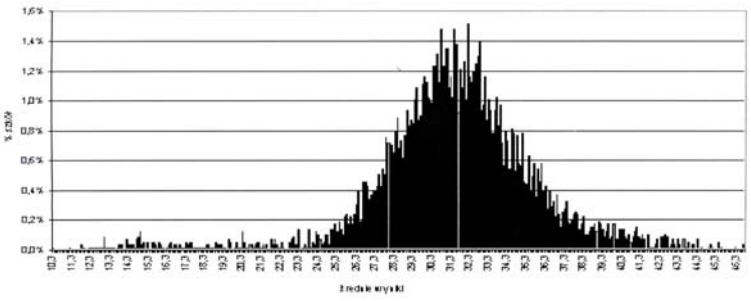
	Max. result	Arithmetic mean	arith.mean[1)] / max. result
Total humanities (N=551.150 students)	50	31.83	63.66%
1) reading	25	19.43	77.72%
2) writing	25	12.40	49.6%
Total sciences (N=548.716)	50	25.75	51.5%
1) use of terms	15	7.56	50.4%
2) search for information	12	8.48	70.67%
3) relations, correlations	15	7.35	49%
4) use of integrated knowledge	8	2.36	29.5%

1) This index demonstrates how easy or difficult are particular parts of the areas concerned: the higher the percentage the better was the task solved by students.

Source: Data of the Central Examination Board, Warsaw 2003

As regards the arithmetic means, the exam results of schools display nearly the same characteristics as those of students (31.5 for humanities and 25.55 for sciences), showing a close resemblance to the characteristics of schools and students researched by the author (see below). Where they differ is in their distribution with the average schools' results having almost normal distribution and the students' results having skewed distribution.

Graph 3. Distribution of the average schools' results - humanities

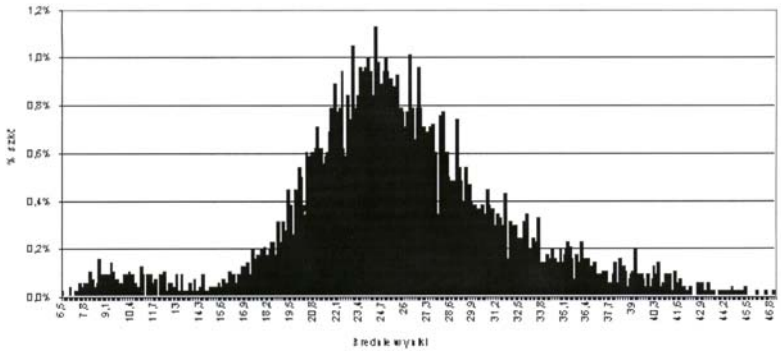


$\bar{x} = 31{,}5$

$med = 31{,}56$

Source: Central Examination Board, Warsaw 2003

Graph 4. Distribution of the average schools' results – science



$\bar{x} = 25{,}55$

$med = 25{,}11$

Source: Central Examination Board, Warsaw 2003

While having no impact on promotion, the students' results are taken into account in recruitment to upper secondary schools (notably those where the number of candidates exceeds the number of places available).

"As the exam is based on the examination requirement standards that were published two years previously and are uniform countrywide, it is possible to conduct a more objective evaluation of the educational impact of teachers, and thus to improve the quality of education. The performance of students is evaluated according to clearly defined and uniform scoring rules, using the principle that the evaluation must be performed by dedicated and registered examiners who are not the employees of the school attended by the examinee…(underlined by R.P.). This system enables one to compare results obtained by particular students, which is all the more important considering that the schools have adopted different curricula, handbooks and evaluation systems".[1]

We do not entirely concur with the above statement that directly correlates performance to "the impact of teachers". The teacher and the school account for only some of the conditions underlying student performance. This should not, however, be understood to mean that the author (R.P.) does not take these conditions seriously. The teacher and the school are the easiest to be controlled by formal means. Their impact and effectiveness are less so.

[1] Presentation ....., op.cit., p. 3.

To conclude this part of the paper – dedicated to presenting the rules governing a lower secondary school leaving exam in Poland (the results of which are treated here as a key dependent variable) – let us emphasise considerable territorial differences in the distribution of exam results.

The maps Nos. 1 and 2 present the average results of poviats: the darker the colour, the higher the average. Explaining these differences represents a fascinating challenge that calls for separate research. The maps demonstrate that there is no simple correlation between economic development and urbanisation and the results of a lower secondary school leaving exam. The author favours a hypothesis that the original cause of these differences can be attributed to the partition borders lasting from the late 18th century until the end of the First World War, i.e. the period when Poland did not formally exist and was divided among Austria, Prussia and Russia[1].

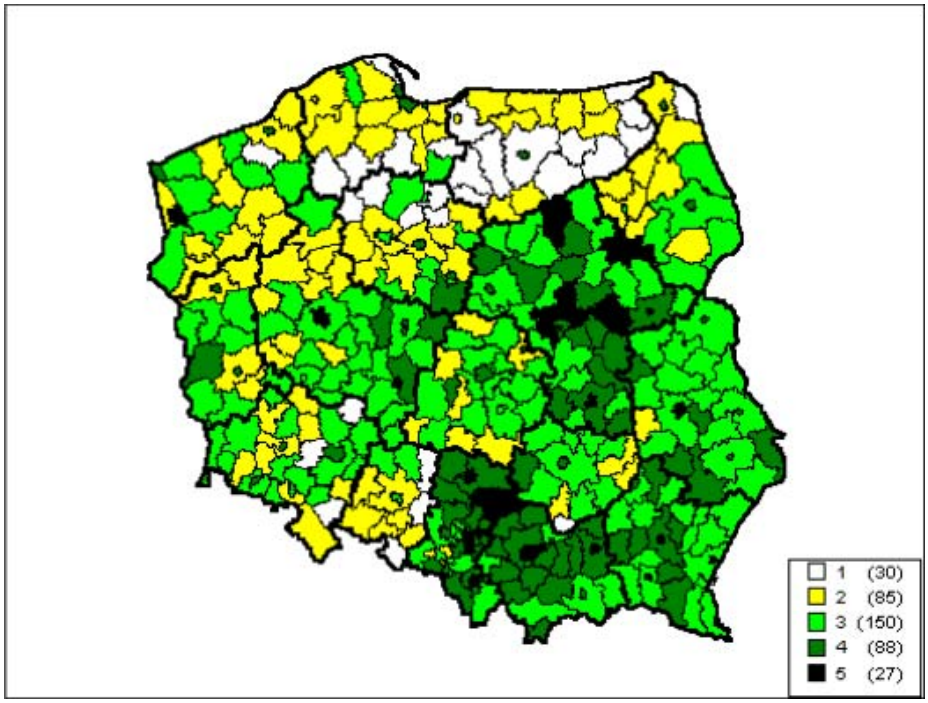
These divisions continue to be also visible with regard to other non-educational points of reference (e.g. religion, entrepreneurship, crime incidence). Offering more questions than answers, this problem represents a huge research challenge and as such merits a separate report.

What is certain is that education is one of the exponents of those spatial differences and that the differences between poviats (with regard to the results of the lower secondary school leaving exam) can probably be attributed to, *inter alia*, social, cultural and economic remains of the economically unviable state-owned farms that were dissolved over ten years ago. The model of social and economic relations that was prevalent at those farms is at least partly responsible for development of a passive and expectant personality type which did not stand the test of the new and often difficult Polish reality after 1989, resulting in the rise of unemployment and other social pathologies in impoverished, non-industrial regions where employment opportunities are scarce. The big socialist state-owned farms

[1] For more information see R.Piwowarski, Udział oświaty w utrwalaniu różnic przestrzennych [*The role of education in strengthening spatial differences*]. "Edukacja" 2000/4, p. 20-28.

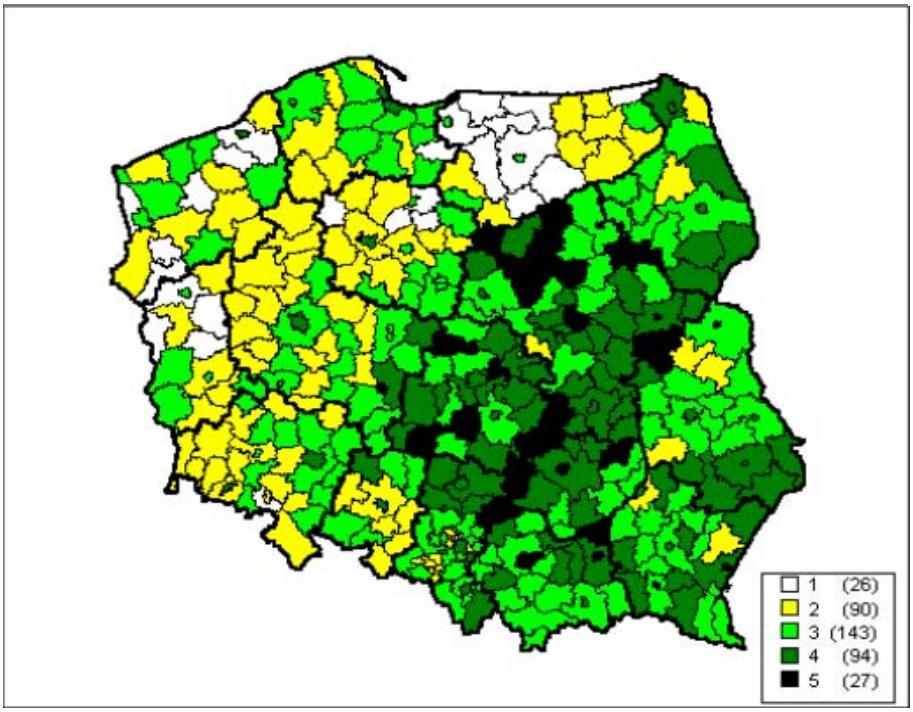
were prevalent in north and north-eastern Poland. i.e. the areas roughly corresponding to the Prussian partition zone.

Map 1. Poviat results – humanities



Source: Central Examination Board, Warsaw 2003

Map 2. Poviat results – sciences



Source: Central Examination Board, Warsaw 2003

III. Characteristics of the research sample

It is worthwhile to discuss some of the information collected during the research before presenting a statistical and qualitative analysis of the main research objective, i.e. to demonstrate the existence of key conditions underlying educational achievement. While not all of it proved relevant (in a statistical sense) to the exam results, such information has a cognitive value in view of the fact that it is often missing from the studies conducted by ministries and the Central Statistical Office.

How should we treat the characteristics presented below? Are they representative and can they be generalised? As it is not always possible to make comparisons with national characteristics, it may only be presumed that the information presented below is not accidental and is representative of parameters calculated for the whole country. Yet all we can be entirely certain of are the results of the lower secondary school leaving exam that were nearly identical for 550,000 graduates of lower secondary schools across Poland and for approximately 1,100 of graduates covered by the research[1].

1. Schools

Information concerning the location of lower secondary schools has been presented in the earlier part of this report. Here we would like to present in the main data on how schools are organised and equipped. Of the 46 schools researched, 22 are independent schools and 24 operate as part of school complexes (which usually means that they share the same building with a primary school or, less typically, with an upper secondary school or both a primary school and an upper secondary school).

Each school had on average around 304 students, divided into 12.5 classes, and more than 29 teachers (both full and part time), and hence typically there were four classes in each year of study. Yet it is only the extreme values that can give us a full view of the number of students in a

[1] Compare sub-chapter 1, part IV

school. The smallest of the schools researched counted as few as 35 students while the biggest one had 1,120 students. Seven schools had fewer than 100 students and six schools had more than 500 students.

Table 3. Organisation, equipment and teachers in the schools researched

	Arithmetic mean ($\overline{X}$)	Minimum (min.)	Maximum (max.)	Standard deviation (δ)	Coefficient of variation $\frac{\delta}{\overline{X}} \bullet 100\ \%$
Number of students at school	303.7	35	1120	218	71.8
Number of classes at school	12.5	2	44	8.29	66.3
Students per class	23.2	11.7	29.8	3.66	15.8
Students per classroom	22	5	49.7	9.45	43
Students per computer	20.5	3.7	66.3	14.12	60.9
Students per internet access	80.7	4	509	122.17	151.4
Total teachers at school	29.2	5	72	17.39	59.6
Full time teachers	18	0	68	15.34	85.2
Full time teachers to teachers in general	57.8%	0%	100%	29.73	51.4

The data in Table 3 demonstrate that the schools differ most significantly in the availability of internet access to students (the standard deviation is much higher than the arithmetic mean as demonstrated by the coefficient of variation)[1]. The schools are also fairly varied with regard to the number of students, classes and teachers and the number of students per computer.

It should also be noted that, on average, full time teachers accounted for approximately 58% of all the teachers in each school (but there were also two schools that did not employ any full time teachers and two schools where all teachers were employed full time).

The general school information, which is not verifiable (and thus the least reliable), concerns the estimated social structure of schools, i.e. the family background of students. According to information provided by

[1] The author believes that school and teacher-related variations are better presented using the coefficient of variation (expressed in %) rather than the coefficient of variance.

headmasters, the following five social and occupational groups are predominant in their schools:

Table 4. Students' family background

Background	Number of schools
Workers and peasant farmers	15
Peasant farmers	12
Workers	11
Workers and intelligentsia	5
Intelligentsia	3
Total	46

The data in Table 4 are for reference only. The family background of students is a very inaccurate variable and, when compared with the school results, is demonstrated to have no relevance to student achievement.

One of the questions asked in a questionnaire addressed to headmasters was of an open, or qualitative, character. Namely, the headmasters were requested to provide additional information on teaching conditions in their schools (other than that given in reply to other questions). While the information thus obtained was not accounted for in the statistical analysis, it nevertheless reflected working conditions and atmosphere in the lower secondary schools.

In general, the headmasters' responses fell into the following three categories: 1) satisfaction or pride, 2) complaints, 3) neutral statements.

The third category concerned information on the school's history, detailed staff records and the number of school workshops or information that the school runs a day-room for "difficult" students or has integration classes or offers a non-Polish curriculum (in case of the school attended by national minority students).

2. Teachers

The information concerning teachers was used in analysing the results achieved by schools (the arithmetic mean of scores achieved by

students of the given school participating in the exam). Considering that 23 to 24 students on average were researched in each school, it does not seem advisable to characterise students using the same teacher-related parameters. This would make sense (in the study of students) if one student from each school was randomly selected to be subjected to the influence of a team of teachers whose subjects were tested at the exam. Teacher-related information was taken into account in the study of schools.

The teachers of seven subjects tested at the lower secondary school leaving exam were covered by the research. Since some teachers teach more than one subject, the total number of teachers does not result from the following multiplication: 46 schools x 7 subjects = 322 teachers (in reality there were 300 teachers).

Table 5. Qualified and non-qualified teachers by subject

Subject	Teachers			Notes
	Total	Including non-qualified		
			Qualifications	
History	46	0		One teaches geography
Mathematics	46	2	- history - transport engineer	Eight teach physics (of which one also teaches chemistry)
Polish	46	4	- elementary teaching - history - library studies	
Biology	46	9	- agriculture - food technology - zootechnics	Nine teach chemistry, one teaches geography
Geography	45	5	- theology - history - chemistry - secondary education	
Physics	37	16	- typically mathematicians - engineers - biology - food technology - chemistry - geography - secondary education	One teaches chemistry

Chemistry	34	11	- typically biologists - mathematics - agriculture - food technology	
Total	300	47		

The data in Table 5 give a good idea of which school subjects are difficult to staff with properly qualified teachers (even though the lack of formal qualifications does not necessarily translate into improper quality of teaching). In this respect, the most difficult subject is physics, which in 43% of cases is taught by unqualified teachers (many of whom are, however, mathematicians). The situation is much better in the case of history which is taught exclusively by qualified historians, and mathematics (where only two teachers are not qualified mathematicians).

A decisive majority of teachers employed in the schools researched are graduates of higher education institutions (of university type). A majority of these teachers hold master's degrees and have completed teaching courses.

Table 6. Percentage of teachers holding a master's degree and having teacher training (by subject, in relation to the teachers in general)

Subject	%
Biology	97.8
History	95.6
Chemistry	95.6
Polish	93.5
Mathematics	86.8
Geography	86.8
Physics	80.4

In a few cases, teachers had only secondary education or were graduates of a Teaching College (a school for the holders of the secondary school graduation diploma) while two teachers were holders of the Doctor of Sciences degree.

It was found that the teachers researched rarely upgrade their qualifications by undertaking postgraduate courses (maybe there is no need to do so). This finding is supported by the following data: on average more

than half the teachers (50.9%) had never taken any postgraduate courses (ranging from 37% for biology teachers to 63% for Polish teachers), nearly 39% have completed only one postgraduate course and fewer than 10% have completed two postgraduate courses.

As well as being correlated with education and length of service, the salaries of Polish teachers depend on what is called "a level of professional advancement". Thus, in order to increase their salaries (which nevertheless remain far from impressive), a growing number of teachers are intent on achieving ever higher levels of professional advancement.

Table 7. Teachers in the schools researched according to the level of professional advancement and subject taught (in %).

Subject	Level of professional advancement			
	Contract teacher	Nominated teacher	Licensed teacher	Interns and others
Polish	28.3	63	6.5	2.2
Mathematics	10.9	86.9	2.2	-
Biology	15.2	69.6	10.9	4.3
History	17.4	67.4	13	2.2
Physics	15.2	71.7	4.3	8.8
Chemistry	18.2	59.1	18.2	4.5
Geography	11.4	75	13.6	-
Average (all subjects)	16.6	70.4	9.8	3.2

On average more than 70% of the teachers researched are nominated teachers (for an unspecified period), fewer than 17% are contract teachers (for a specific period), and nearly 10% are licensed teachers, i.e. those who have achieved the highest level of professional advancement.

The research provided an opportunity to carry out a study of teachers not only in professional but also sociological terms. It is a well-known fact that in many countries the teaching profession is dominated by women. Certain subjects have been found to deviate from this rule (but this finding is not necessarily representative).

Table 8. Gender, marital status and children of the teachers researched

Subject	Gender		Marital status		% of teachers with children			
	% women	% men	% married	% non-married	child-less	1 child	2 children	3 + children
Polish	93,5	6,5	76,1	23,9	28,9	28,9	33,3	8,9
Mathematics	84,8	15,2	71,7	28,3	30,4	8,7	41,4	19,5
Biology	95,7	4,3	68,9	31,1	26,7	13,3	42,2	17,7
History	63	37	73,9	26,1	27,3	27,3	38,6	6,8
Physics	67,4	32,6	80,0	20	22,7	18,	43,2	15,9
Chemistry	89,1	10,9	84,4	15,6	15,6	22,2	40	22,2
Geography	68,9	31,1	75	25	27,3	18,2	40,9	13,6

The data in the table above demonstrate that the percentage of women teaching biology and Polish is around 94% while of those teaching history, physics and geography is in the range from 63% to 69%. Overall, this index (80.3%) is slightly lower than generally for lower secondary schools in Poland.

Finally, the last piece of information that will give us a full overview of the teachers researched (and not only of them) concerns their family background. Approximately three-quarters of the teachers researched are married and 24% are unmarried. Nearly 40% of teachers (who are presumably married) have two children, but the group of childless teachers is also significant (nearly 26%).

The education level of teachers' spouses was grouped into the following seven categories: 1) primary, 2) basic vocational, 3) secondary, 4) post-secondary, 5) higher vocational, 6) master's degree, 7) other (e.g. incomplete education). Of these, the two categories predominant among teachers' spouses were secondary education (over 29%) and master's degree (nearly 45%).

And thus the misconception has been proven wrong that teachers (or, more specifically, women teachers in rural areas) often marry poorly educated persons, thereby degrading themselves, or so some claim, in the social hierarchy. It should be noted that the primary education category remained empty and only 5.6% of spouses had basic vocational education.

The characteristics of the teachers employed in the rural lower secondary schools surveyed as part of the research differ only slightly from indices calculated for teachers in general (300). There were fewer women (75.4%) among the 114 rural school teachers.

In general, the spouses of rural school teachers tended to be slightly less educated, with 36.5% having secondary education and 35.3% having a master's degree. Spouses with basic vocational education accounted for 9.4%. The husbands of female teachers were poorer educated than the wives of male teachers. Considering that 88% of the teachers' husbands had, at the minimum, secondary education accompanied by the higher level exam (*matura*), one can hardly speak of any sort of social degradation.

Likewise, when analysed in terms of occupation, teachers' spouses are found to represent medium or high levels of the occupational hierarchy. Nearly 33% belong to group 02, i.e. are highly educated professionals, academic personnel, lecturers, medical practitioners, legal professionals, etc., and 28% belong to group 03 consisting of medium-level white collar workers (technicians and administrative and office specialists). Again, it should be noted that there was not a single report of the teacher's spouse belonging to group 08 (unskilled workers) and in several instances the spouses were reported to belong to the highest occupational category (01) comprising directors, CEOs, members of parliament and senior state officials[1].

Evaluation of teacher performance

Of the many teacher-related variables, only the evaluation of teacher performance (carried out by headmasters) showed significant correlation with the schools' results. While not being objective or comprehensive (teachers were graded solely on the scale from 1 to 10), this evaluation may probably be considered significant for diagnosis and, at least partly, prognosis.

To sum up, the evaluation of teacher performance provides evidence that the headmasters are fairly well aware of the professional qualifications

[1] Social and occupational groups according to the Polish Social Classification of Occupations (1995)

of their staff. It cannot be excluded, of course, that better performing schools (with better students) attract better teachers.

It is also possible, as suggested by the reviewer, that the assessments given by headmasters to teachers reflect results of exam performance. This possibility cannot be entirely excluded but it would be a difficult task (for headmasters) to isolate exam sections corresponding to the seven subjects and compare them with students' answers (scores).

Table 9. Evaluation of teacher performance by subject and grade

Subject	% of teachers who obtained the following grades:					Minimum grade*
	10	9	8	7	....	
Polish	39.1	26.1	21.7	8.7		5
Mathematics	39.1	15.2	26.1	15.2		5
Chemistry	39.1	26.1	13.0	2.2		4
History	34.8	19.6	19.6	19.6		4
Biology	30.4	15.2	28.2	10.9		3
Geography	30.4	15.2	19.6	8.7		5
Physics	21.7	26.1	15.2	15.2		2

* typically 1 to 2 teachers (except for geography – 8 teachers)

On average, the headmasters gave the maximum number of grades (10) to one-third of teachers, 9 and 8 grades to 20% of teachers and 7 grades to 11.5% of teachers (the teachers who obtained at least 7 grades accounted for 74.5% of all the teachers researched).

It is worthwhile noting that the maximum grades were not always granted to licensed teachers, i.e. those who have achieved the highest level of professional advancement. The performance of teachers teaching more than one subject was usually evaluated identically with regard to all those subjects. In some cases, however, the teacher was better evaluated with regard to the subject in which he or she was qualified.

3. Students

The research covered a total of 1,098 students. However, since answers to nearly all questions were incomplete (from several to several

hundred answers missing), a reference point (100%) for percentage breakdowns is the number of answers actually given.

Table 10. Students by place of residence and school location (in %)

School location	Place of residence				Total
	Rural areas	Towns with population of less than 10,000	Towns with population 10,000 to 200,000	Towns with population of more than 200,000	
Rural areas	98.5	1.0	0.5	-	100
Small towns (population of less than 10,000)	37.6	55.6	6.8	-	100
Big cities (population of more than 200,000)	3.3	1.2	3.0	92.5	100
All areas	50.7	15.6	3.0	30.7	100

The data in Table 10 demonstrate that the schools in rural areas and in big cities cater mainly to students from these environments (which does not always mean that students live near to the school). Conversely, schools in small towns also cater for students living in rural areas, who represent nearly 38% of their total intake (on top of the 55% students coming from small towns). It should be added that, due to highly dispersed patterns of rural settlement, students living in villages of fewer than 200 inhabitants are predominant in rural schools (over 59% of all rural school students).

Table 11. Students by distance between school and home (in %)

School location	Distance in km					Total
	0	0-1	2-5	6-10	over 10	
Rural	1.4	25.7	38.4	20.7	13.8	100
Small town	1.5	48.5	25	11.2	13.8	100
Big cities	2.4	46.5	30.8	12.7	7.6	100
All areas	1.8	38.4	32.4	15.6	11.8	100

The data in Table 11 demonstrate differences in the territorial accessibility of schools. In total 34.5% of rural school students live at least 6 km away from the school and have no opportunity to attend a school located nearer their home. Over 20% of students in big cities also attend schools that are located more than 6 km away from their homes. In this case, however, it was their own choice, or that of their parents, not to attend a school located nearer.

The distance between school and home determines the means of transport used (see Table 12).

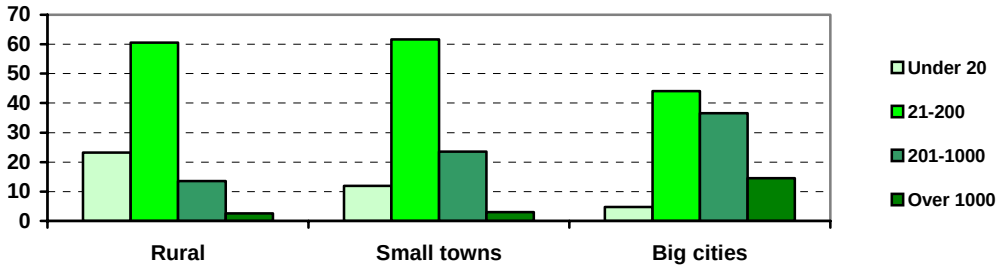
Table 12. Students classified according to means used to travel from home to school (in %)

School location	How is the distance between home and school covered:			Total
	On foot	By transport	On foot and by transport	
Rural	32.6	26.7	40.7	100
Small towns	57.9	19	23.1	100
Big cities	50	14.2	35.8	100
All areas	44.9	20.6	34.5	100

In towns, a majority of students walk to school while in rural areas they typically combine walking with commuting (together with the students who only commute they represent more than two-thirds of all students). The social environment is also a determining factor in differentiating between students with regard to the number of books (except for handbooks), computers and internet access. These factors are taken into account in the studies of educational achievement.

Table 13. Students by the size of home library (in %)

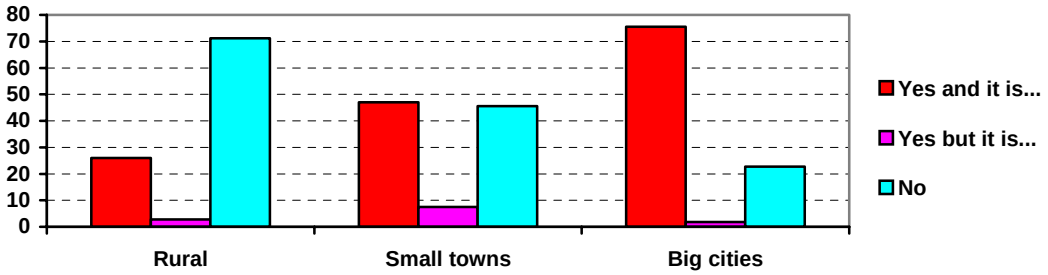
School location	Number of books at home:				total
	Under 20	21-200	201-1000	Over 1000	
Rural	23.2	60.6	13.6	2.6	100
Small towns	11.9	61.6	23.5	3	100
Big cities	4.8	44.1	36.6	14.5	100
All areas	14.2	55.5	27.7	6.6	100



There are typically no more than 200 books in the homes of rural students (nearly 84%), of which a large number have fewer than 20 books (23.2%). In the case of students from big cities, over 50% of homes have more than 200 books while 14.5% have more than 1,000 books.

Table 14. Students with computer access at home (in %)

School location	Computer access at home			Total
	Yes and it is used by student	Yes but it is not used by student	No	
Rural	26	2.8	71.2	100
Small towns	47	7.5	45.5	100
Big cities	75.5	1.8	22.7	100
All areas	47.5	3.7	48.8	100

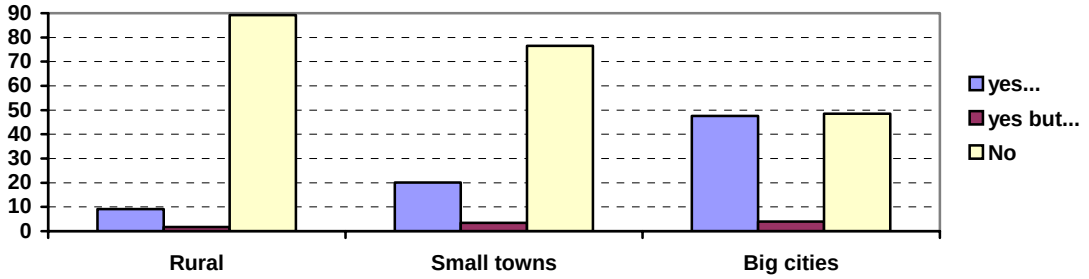


Differences are even more pronounced with regard to the ratio of computer possession (Table 14). As few as one-fourth of rural students declared having and using a computer at home while in big cities this figure exceeded 75%. Computer possession by small town students is nearly the same as for the average of all the students researched.

As a result of these differences (in computer possession), students have limited access to the internet at home.

Table 15. Students with internet access at home (in %)

School location	Internet at home			Total
	Yes and it is used by student	Yes but it is not used by student	No	
Rural	9.1	1.7	89.2	100
Small towns	20.1	3.4	76.5	100
Big cities	47.6	3.9	48.5	100
All areas	24.5	2.8	72.7	100



Only some of the students who own a computer at home have access to the internet as well. Of the 26% of rural students owning a computer, only slightly more than one-third have internet access. In case of students from big cities, nearly two-thirds of those who own a computer have internet access.[1]

Purely subjective, or qualitative, answers always give rise to most doubts when researching any group of people (in this particular case – over a thousand 16-year-old lower secondary school leavers). In the research under discussion, such a question concerned how the students perceived the financial situation of their immediate families.

[1] In July, August and September 2003, the OBOP (Public Opinion Survey Centre) conducted a survey on the availability of internet access among Poles (over 15 years old) that found out that only 27% of respondents had internet access (16% in rural areas and 42% in the cities of over 500,000 inhabitants).

Table 16. Students according to the financial situation of immediate family (in %)

School location	Self-assessed financial situation					Total
	Very bad	Bad	Satisfactory	Good	Very good	
Rural	3.1	8.6	34.8	49.7	3.8	100
Small towns	1.1	4.9	26.2	57.7	10.1	100
Big cities	2.4	4.2	21.4	56.9	15.1	100
All areas	2.4	6.2	28.1	54.1	9.2	100

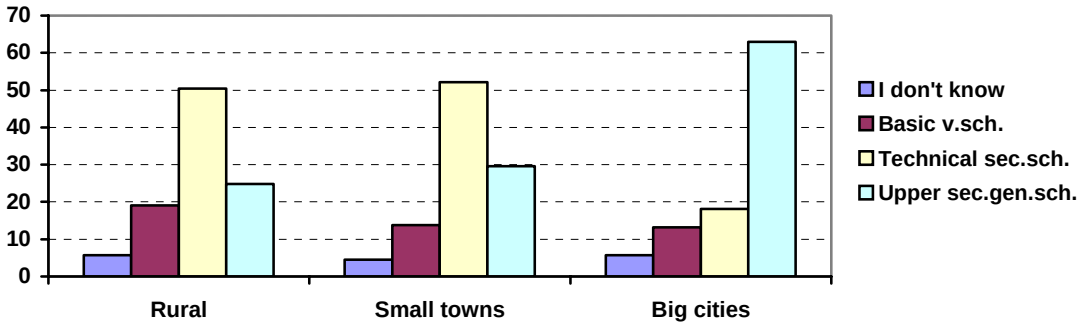
Students differ in their feelings about the financial situation of their immediate families; 53.3% of students from rural areas said that it was good or very good while the same opinion was expressed by as many as 72% of students from big cities. There are relatively few differences in assessing the situation as bad or very bad.

Although a majority of self-assessments in Table 16 can be positively verified using other data (such as, for instance, the number of rooms in a family house, the social and occupational status of parents), it is difficult to estimate their comparative value. The information given by one of the students provides evidence of the relativity of these self-assessments. Namely, she said her family's financial situation was "good" while we have learned that her parents are out of work, she has eight siblings and the family of eleven lives in a three-room house.

Another difficult in verifying information concerns the educational plans of the students researched. While it is certain that not all of these plans have been realised, they nevertheless provide important information on students' approach to further educational and life careers. Rather than reflecting dreams and wishes, these plans seem to stem from realistic calculations based on the students' assessment of their chances, performance and the financial status of their families. It will also be demonstrated that in certain cases educational plans are strongly correlated with performance (i.e. lower secondary school leaving exam).

Table 17. Students according to declared further education (type of post-lower secondary school) – in %

School location	I intend to continue education in:				Total
	I don't know, I have no intention to continue education	Basic vocational school	Technical secondary school, vocational secondary school	Upper secondary general school	
Rural	5.7	19.1	50.4	24.8	100
Small towns	4.5	13.8	52.1	29.6	100
Big cities	5.7	13.2	18.1	63	100
All areas	5.4	15.8	40.3	38.5	100



Only in a few cases did the students declare a lack of interest in continuing education. Since the law requires that they attend school until 18 years of age, this question was rather provocative. Of the few such answers, the one drawing particular attention was: "I would like to continue going to school, but we have no money". In one case the answer was: "I don't intend to continue school because I don't care".

When all the opinions of students are analysed, it is easy to notice that 79% declare an intention to continue education in upper secondary schools leading to the higher level exam (*matura*) that gives access to higher education (the differences between rural areas, small towns and big cities are not significant in this respect). The differences are much more pronounced in the choice among particular types of upper secondary school. While a majority of students from rural areas showed a preference for vocational schools (over 50%), only 18% of their peers in big cities declared

these to be their schools of choice. As many as 63% of students from big cities chose general upper secondary schools (*liceum ogólnokształcące*) as a springboard for further academic education. In rural areas, fewer than 25% of students were willing to undertake education in these schools. While reflecting lower educational aspirations in rural areas, these differences also stem from the lack of choice; nearly all general upper secondary schools are located in urban areas and thus require commuting (which not all students are willing or able to undertake).

All the information discussed above was obtained directly from the students. The student information you will find presented below comes from tutors.

School absences (classes, days) are caused by a variety of reasons, ranging from illness and truancy to accidents, and are typically perceived as a factor contributing to worse student performance.

Table 18. Students by absences (classroom hours) in the school year 2002/03 (in %)

School location	Number of absences (classroom hours)					Total	Maximum number of absent hours
	0	1-10	11-20	21-50	over 50		
Rural	5.8	10.6	12.8	32.7	38.1	100	308
Small towns	7.3	15.6	14.5	31.3	31.3	100	316
Big cities	1.2	11.6	11.3	29.4	46.5	100	519
Big cities without two schools	1,3	13,2	12,9	32,7	39,9	100	519
All areas	4.6	12.4	12.8	31	39.2	100	519

The data in Table 18 again demonstrate a difference between rural areas and big cities. The high number of absences (at least 50 classroom hours) in big cities should be attributed to two schools functioning de facto as centres for delinquent adolescents. Had it not been for these two schools, the differences among particular environments (rural, urban) would have been negligible.

Table 19. Students by absences (days) in the school year 2002/03 (in %)

School location	Number of absences (days)					Total	Maximum number of absent days
	0	1-5	6-10	11-20	over 20		
Rural	6,9	39,	25,8	21,1	7,2	100	48
Small towns	12,3	43,2	21,8	15,5	7,2	100	57
Big cities	6,1	27,3	27,6	21,2	17,7	100	98
Big cities without two schools	7,1	31,7	31,2	21,3	8,7	100	98
All areas	8,2	36,3	25,3	19,6	10,6	100	98

The situation is similar with regard to absences in days: the differences would have been small had it not been for the two untypical schools in big cities. What, however, merits attention is a relatively high percentage of students in rural areas and small towns who were absent from school for not more than five days.

Table 20. Percentage of repeat students (in %)

School location	% of repeat students
Rural	2.6
Small towns	6.5
Big cities	14.0
All areas	7.4

Even if the data in the last three tables (18, 19 and 20) are interpreted assuming that truant students are overrepresented in the schools researched in big cities, it nevertheless may be presumed that rural students tend to be more disciplined compared with their big-city peers. While the repeat ratio can be similarly interpreted, some may claim that the difference is attributable to the fact that, for a variety of reasons (ranging from the shortage of special schools for handicapped students to an increased pressure on the part of parents and the closely knit community), student promotion requirements are slightly lower in rural areas.

4. Family home and parents

Table 21. Family size and house/apartment size by school location

Location	Number of family members (living together)			Number of rooms		
	average	min.	max.	average	min.	max.
Rural	5.7	2	11	3.4	1	11
Small towns	5.2	2	14	3.8	1	9
Big cities	4.2	2	11	3.3	1	13
In general	5.1	2	14	3.5	1	13

The families of the students researched are more diversified in the number of family members living together than in the size of a family house or apartment. Since extended families are much more prevalent in rural areas and hence there is a higher number of children in the family, the families of rural students are typically larger than those of their big-city peers. The differences in the number of rooms occupied by the families of students are insignificant.

Table 22. Orphaned students by school location (in %)

Location	% of students without:	
	mother	father
Rural	2.4	10.8
Small towns	2.5	12.5
Big cities	5.8	21.5
In general	3.6	14.7

The data in Table 22 demonstrate that semi-orphaned students are typically those without the father. In big cities, as many as 21.5% of the students researched do not live with the father, who is either dead (but this is rare) or, in a majority of cases, has left the family.

The family factors that are believed to play a role in influencing student performance include first of all the education of parents and, to a lesser degree, their occupation.

Table 23. Students' parents by education and school location (in %)

School location / Education		Rural areas	Small town	Big city	In general
Primary	M	25.1	15	8.8	17
	F	24	14.6	9.6	16.9
Basic vocational	M	35.8	34.3	15.2	28.6
	F	51.8	48.5	21.6	41.2
Secondary	M	36.3	38.3	41.1	38.4
	F	23.2	31.5	36.1	29.6
Higher vocational	M	0.7	4.4	10.8	5
	F	-	2.7	15.7	5.8
Master's degree	M	2.1	4.4	24.1	10
	F	1	2.3	17	6.5
Other	M	-	3.6	-	1
	F	-	0.4	-	-

M – mother

F – father

Poorly educated parents are prevalent in rural areas, with nearly 62% of the mothers of rural students having only primary education (25.1%) or basic vocational education (35.8%) and nearly 76% of fathers having only primary or basic education. In big cities, 24% of mothers and 31.2% of fathers have primary or basic education.

Big cities offer and have a demand for more jobs requiring higher education. For this reason, nearly 35% and 33% respectively of the mothers and fathers of students attending lower secondary schools in big cities have diplomas of higher education (these indices are around ten times lower for rural areas).

Table 24. Students' parents by occupation and school location (in %)

Occupational group	School location							
	Rural areas		Small town		Big city		In general	
	F	M	F	M	F	M	F	M
01	-	0.3	0.4	0.5	3.3	2.6	1.2	1.2
02	0.3	2.5	4.1	7.6	16.3	25	6.7	12
03	1.9	4.4	5.9	9.6	10	23.7	5.7	12.8

04	2.2	6.3	3.2	11.5	3.7	8.6	3	0.8
05	3.9	1.9	11.8	6.2	18.1	3.6	10.7	3.6
06	5.6	11	6.8	14.3	18.1	16.8	10.1	14
07	26.7	11.6	31.4	12.9	17.7	8.6	24.8	10.8
08	7.2	8.5	10.9	12	9.4	9.2	12.2	9.6
09	50	51.9	25	24.4	1.7	0.6	27.3	26.2
10	2.2	1.6	0.4	1.0	1.7	1.3	1.6	1.3

F – father

M – mother

Considering the difficulty in accounting for all the occupations of parents covered by research, we have adopted the nine social and occupational groups that are generally accepted in social studies. These groups originated from the ISCO classification (International Standard Classification of Occupations), published in the 1960s in Geneva by the International Labour Office[1], and are based on the Polish Social Classification of Occupations (PSKZ – 1995). These are:

01 – directors, presidents of enterprises and large companies, senior state officials, members of parliament;

02 – professionals with higher education, liberal professions (academic staff, higher education teaching professionals, teachers, medical practitioners, legal professionals, writers);

03 – technicians and office and administrative specialists (medium white collar workers);

04 – lower white collar workers (secretaries, cash tellers, clerks, phone operators);

05 – private firm owners;

06 – trade and service workers;

07 – skilled workers;

08 – unskilled workers;

09 – farmers (owners of individual agricultural holdings and assistant family members).

[1] See e.g.: Z.Sawiński, Klasyfikacja zawodów w badaniach społecznych [*Classification of occupations in social studies*]. "ASK. Społeczeństwo, Badania, Metody" 1995 nº 2, and other articles published in that issue.

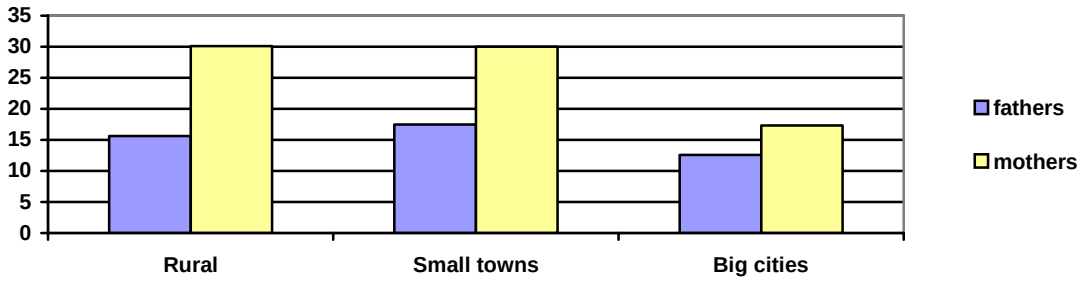
The author has added the tenth group that includes retired people and pensioners.

As in the case of parents' education, the data above demonstrate a difference between rural areas and big cities. In rural areas, at least 50% of parents were farmers and there were few who qualified for the highest occupational groups (01, 02, 03). Conversely, in big cities more than 51% of mothers and nearly 30% of fathers were eligible for inclusion in these three groups.

The data in Table 25 demonstrate that a high percentage of parents are out of work.

Table 25. Unemployed parents by school location (in %)

School location	Percentage of unemployed	
	fathers	mothers
Rural	15.6	30.1
Small towns	17.5	30
Big cities	12.6	17.3
In general	15	25.8



In rural areas and small towns, mothers of the students researched were much more likely than fathers to be out of work (as many as 30% of mothers were unemployed).

Another piece of information collected from the tutors of the students researched concerned the occurrence of social pathologies (alcoholism and drug addiction) in students' families.

Table 26. Alcoholism and drug addiction in students' families by school location (% of families).

School location	Alcoholism	Drug addiction
Rural	7.8	0.2
Small towns	13.8	0.7
Big cities	12.9	5.3
In general	11.1	2

The data in Table 26 demonstrate that alcoholism poses a serious threat to the normal functioning of the families researched. What is more, drug addiction is becoming an increasingly visible problem in big cities.

IV. Factors Conditioning School Achievement

This section of the report attempts to answer the question:

- What factors influence students' achievement and to what degree?

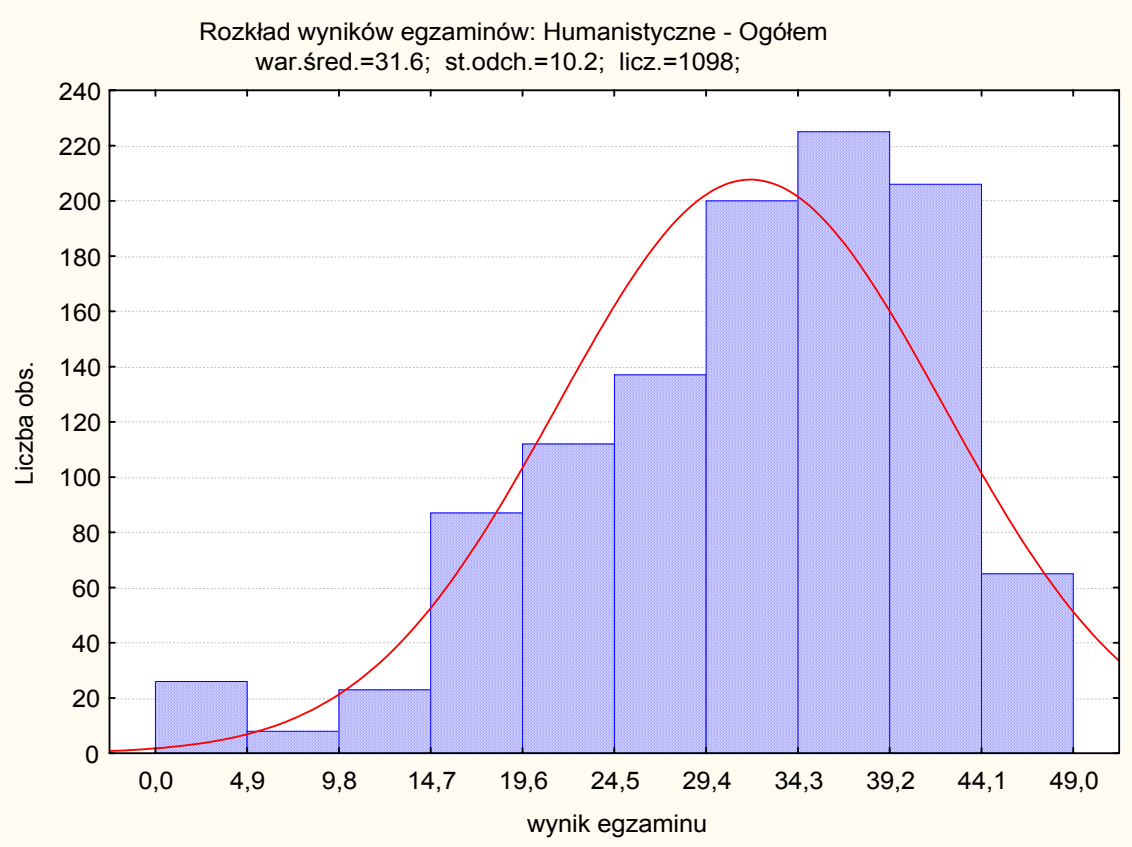
The following methods were of primary importance when answering this question:

- analysis of correlation coefficients between exam results and the conditioning factors (independent variables presented in section III),
- multiple regression analysis whereby the result of the lower secondary school leaving exam is the dependent variable and the above-mentioned conditioning factors (characteristics of the sample examined) are independent variables.

1. Characteristics of Exam Results

Around 1100 students were included in the study; their results were very similar to those recorded for the entire population of 550,000 Polish lower secondary school students in 2003 (both with regard to the distributions of individual results and simple characteristics such as the arithmetic mean). This similarity is reflected by the graphs 3 and 4, which are worth comparing to graphs 1 and 2.

Graph 5.

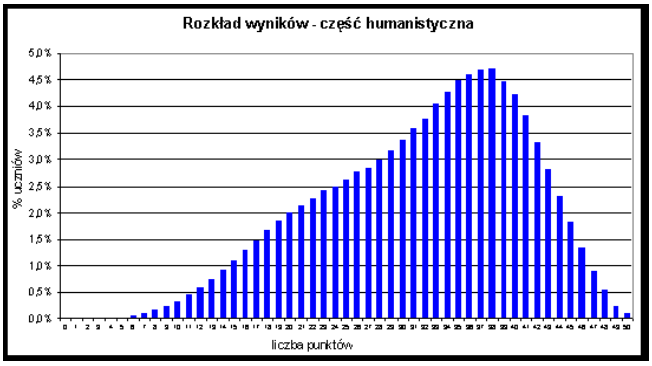


Exam results distribution: humanities – total

mean value = 31.6, st. dev.=10.2, sample size=1098

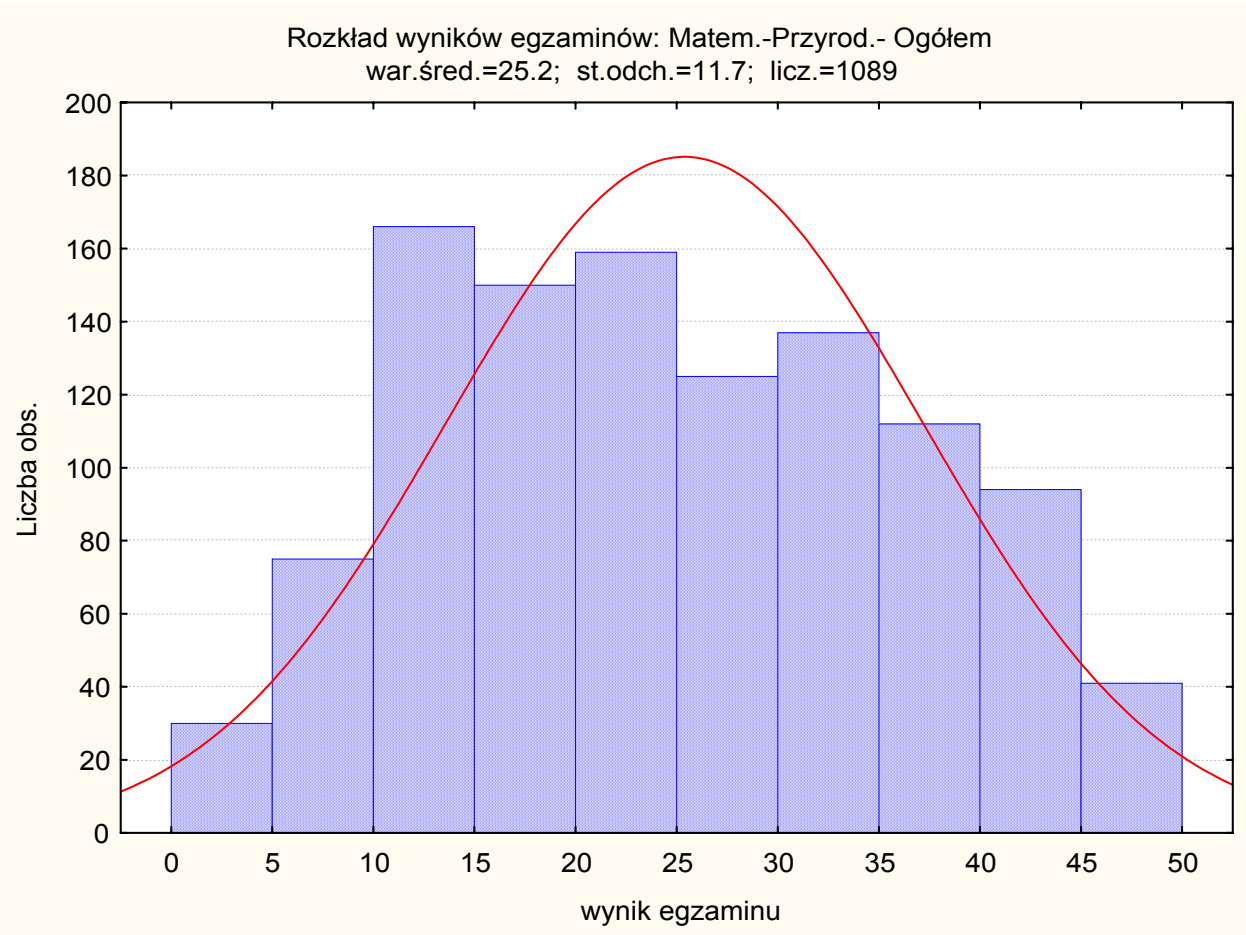
Liczba obs. – No. of observations

wynik egzaminu – score



(graph 1, p.10)

Graph 6.

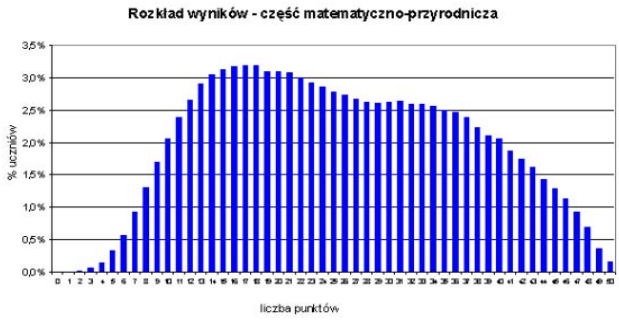


Exam results distribution: sciences – total

mean value = 25.2, st. dev.=11.7, sample size=1089

Liczba obs. – No. of observations

wynik egzaminu – score



(graph 2, p.21)

Table 27. Comparison of average national results and research sample results (in 2003) – number of points

	Humanities	Sciences	Total (sums)
Poland	31.8	25.8	57.6
Own research	31.6	25.2	56.8

The analysis of the results presented clearly shows that the sciences section of the exam was much more difficult for students. Apart from the significant difference between the average results for the two sections of the exam (the maximum score was 50 points for each section), the variation in "sciences" results is much larger than in the case of "humanities" results. The wider dispersion of the former is reflected by the coefficient of variation, which amounts to 46.6 percent[1] for the sciences section (32.3 percent for the humanities section). Similarly the results for those areas of both sections of the exam which were considered more difficult were much more dispersed: in the case of the humanities section, the area "writing own text" exhibited a coefficient of variation amounting to less than 50 percent, and in the case of the mathematics section, the area that posed the most problems (area 4 – "application of integrated knowledge and skills…") scored almost 88 percent with regard to this value.

This characteristic is complemented by the numbers of extreme results. In the humanities section as many as 26 students scored 0 points, nobody scored 50 points and 4 students scored 49 points. In the mathematics section, 26 students also failed to score a single point, 2 students scored 50 points and 6 students scored 49 points.

2. Correlation Analysis

Numerous correlation relationships were found in the material examined, but only those that exceeded the ± 0.25, and especially the ± 0.50 threshold were analysed in more detail[2]. All values analysed are significant at the level of at least .05 ($p<0.05$). The vast quantities of data imposed

[1] The ratio of standard deviation to arithmetic mean.
[2] Cf. Annex – tables containing all values of correlation coefficients.

certain constraints on interpretation: on the one hand, correlation coefficients have been calculated by school location:

- rural areas,
- small towns,
- large cities,
- total,

on the other hand, they have been calculated by sections of the exam :

- humanities section,
- sciences section,
- overall results.

Moreover, correlation coefficients have been calculated for individual areas of both sections of the lower secondary school leaving exam, which additionally complicates the choice of significant results (mutual correlations).

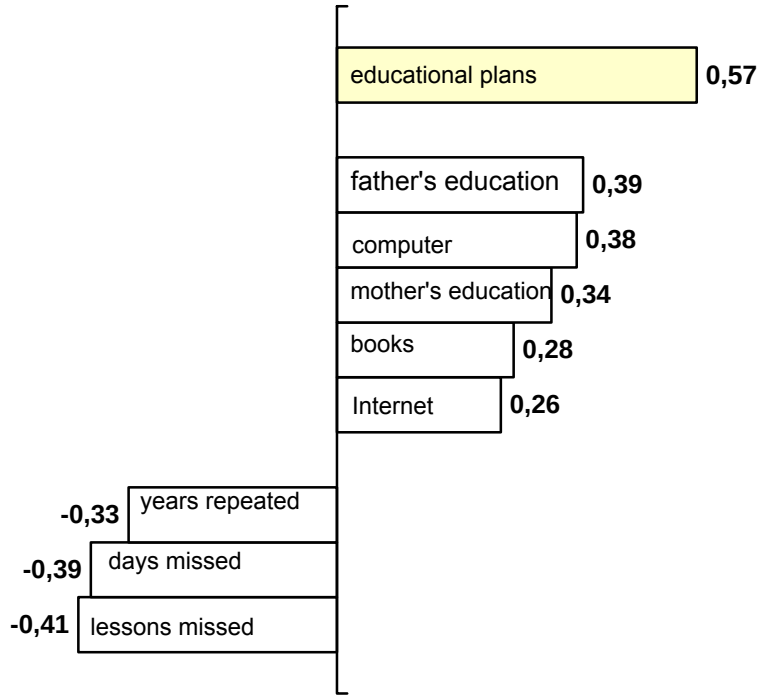
It appears that in many cases it is worthwhile presenting correlations in various frames of reference because only this approach allows us to indicate relationships of a more universal nature (e.g. occurring in both urban and rural areas) as well as specific relationships (occurring or becoming significant only in certain environments). Similarly, not all parts of the exam are correlated with conditioning factors in the same way and sometimes the analysis for the "total" or "overall" level looks different (both with regard to exam results and to undifferentiated school locations).

It should also be noted that we deal with positive and negative correlations. The former obtain for example between the number of books at the student's home and exam results; the latter – between the number of missed days or lessons and exam results. All correlation relationships are primarily statistical, we cannot always be sure that they are causal relationships (and it is usually the researchers' main objective to point out causal relationships: 'this influences that,' 'increase in one variable causes an increase in another variable,' etc.). In some situations, this leeway for interpretation and uncertainty may be significant. These introductory remarks concerning the interpretation of the correlation coefficients calculated (presented below) can be concluded with a suggestion to treat

positive (+) coefficients as opportunities and factors conducive to school achievement and negative (–) ones as threats, obstacles or factors leading to poor performance.

2.1. Correlations – Students

Graph 7. Correlation coefficients: Total – Exam overall*



* Total = students from large cities + students from small towns + students from rural areas
Exam overall = humanities + sciences

The correlation values presented on the graph are a resultant, mean value for three different environments and so they point to universal relationships. The highest value here is the correlation between the educational plans of the students examined and exam results and this is the only relationship (among the ones presented here) that cannot be treated as a causal one (the plans are not treated as a condition or an independent variable – they are presented because of the interest they may have from a cognitive perspective). We can state, however, that those who plan to attend "better" upper secondary schools are usually better students. A self-selection mechanism is at work here and not a relationship of the type: "if I plan to attend a comprehensive upper secondary school after leaving the lower secondary school, I will achieve good results in the lower

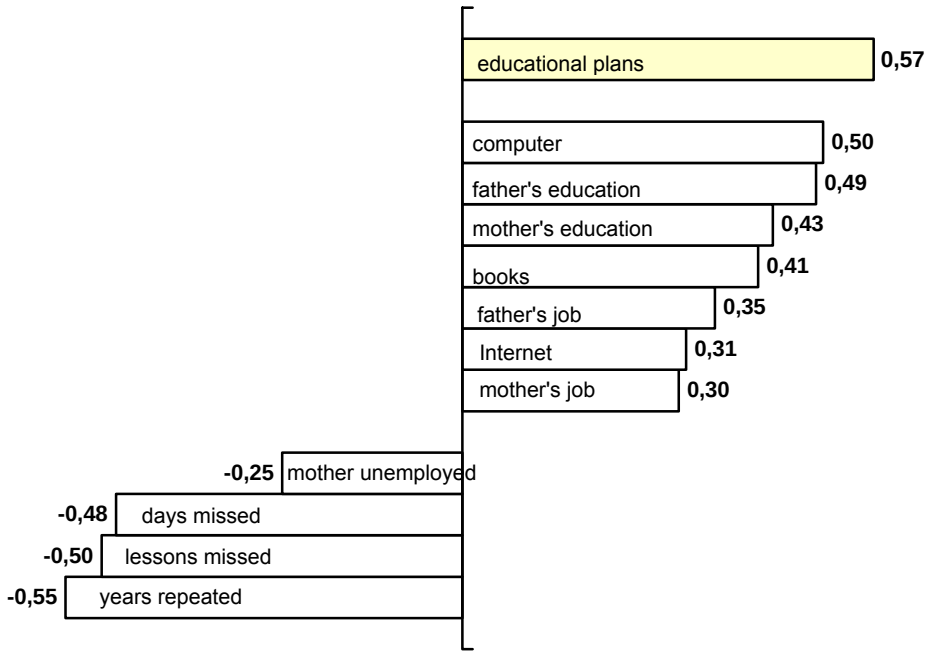
secondary school leaving exam." It should also be noted that, in view of the fact that the questionnaires were completed a few weeks before the exam and thus exam results could not have influenced the students' intentions, the plans should not be treated as outcomes.

The remaining variables that exhibit positive correlation with exam results can be treated as variables that have a certain positive influence on these results: these are the parents' education as well as a computer, books and access to the Internet at the student's home. The results are negatively correlated with school absences and repeating years (which is often the effect of absences).

If they were the main subject of the research, the conditions such as school absenteeism and class repetition would have to be treated as dependent variables.

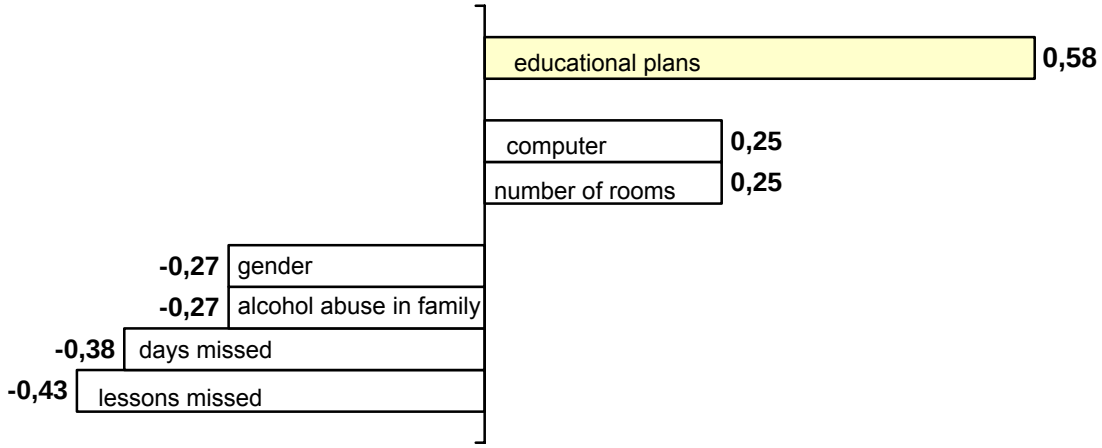
The highest number of strongest relationships was found among students attending schools in large cities. The relationship between the parents' qualities and exam results is stronger in these cases, both in the positive (education, occupation) and negative (mother's unemployment) senses. Poorer exam results may also be caused by the students' incomplete families (the absence of father or mother).

Graph 8. Correlation coefficients: Large cities – Exam overall



Correlation relationships for students attending lower secondary school in rural areas are somewhat different. First of all, such relationships are significantly fewer than in large city environments and some of those that occur are specific ones. Most significantly, there are no clear relationships between the parents' education or occupations and exam results, which may be caused by the generally lower levels of education in rural areas (and thus smaller differences with regard to the parents' education).

Graph 9. Correlation coefficients: Rural areas – Exam overall



Correlations (albeit not the strongest ones) occur here that were not present in large cities. These are gender (boys demonstrate worse results than girls) and the number of rooms in the student's house or flat (the more rooms the better the results).

The correlations determined within the "small town" set are the closest to the average, similar to the "total" set. A significant difference in comparison to rural or large city environments is a much lower correlation between educational plans and results, amounting to 0.50 (large cities: 0.57, rural areas: 0.58). The values of the remaining coefficients are as follows: father's education: 0.40, mother's education: 0.36, computer: 0.34, number of rooms: 0.26 and mother's occupation: 0.25. The following negative correlations were found: days missed (-0.40) and lessons missed (-0.38).

The correlation coefficients discussed above referred to relationships between the dependent variable (exam results) and multiple independent variables.

- Two types of important relationships can be distinguished with regard to independent variables: one is related to the parents' education and professions and another to family pathologies. However, the nature of these relationships varies between different environments.

Among the entire student population there is a significant correlation between mother's and father's professions (0.65) and their education levels (0.60); there is also a correlation between mother's absence and drug abuse in the family (0.57). In large cities the correlation between mother's and father's educational levels is 0.63. The correlation between educational plans and repeating a year is -0.61, the correlation between mother's absence and drug abuse in the family is 0.40 and the correlation between mother's absence and alcohol abuse in the family amounts to 0.44.

In rural areas the strongest correlation is between mother's and father's joblessness (0.55) and mother's and father's professions (0.50). "Pathological" relationships are weaker but the father's role is more important: the correlation between father's absence and alcohol abuse in the family is 0.34., father's absence – drug addicts in the family (0.37). In small towns there are also significant correlations between the parents' professions (0.62) and their educational levels (0.51).

- Among dependent variables, of which there are up to 9[1], correlations of various strength can be found. The strongest correlation between results for an individual section of the exam and the overall result occurs in the case of the sciences section of the exam: 0.95 in large cities, 0.93 in total and in small towns, 0.91 in rural areas.

The correlation of the humanities section results with the overall result is slightly weaker (from 0.86 in rural environments to 0.91 in large cities). This justifies the statement that a good "maths" result more often guarantees a good overall exam result.

[1] Results: 1) overall, 2) overall humanities, 3) overall sciences, 4) humanities 1, 5) humanities 2, 6) mathematics 1, 7) mathematics 2, 8) mathematics 3, 9) mathematics 4.

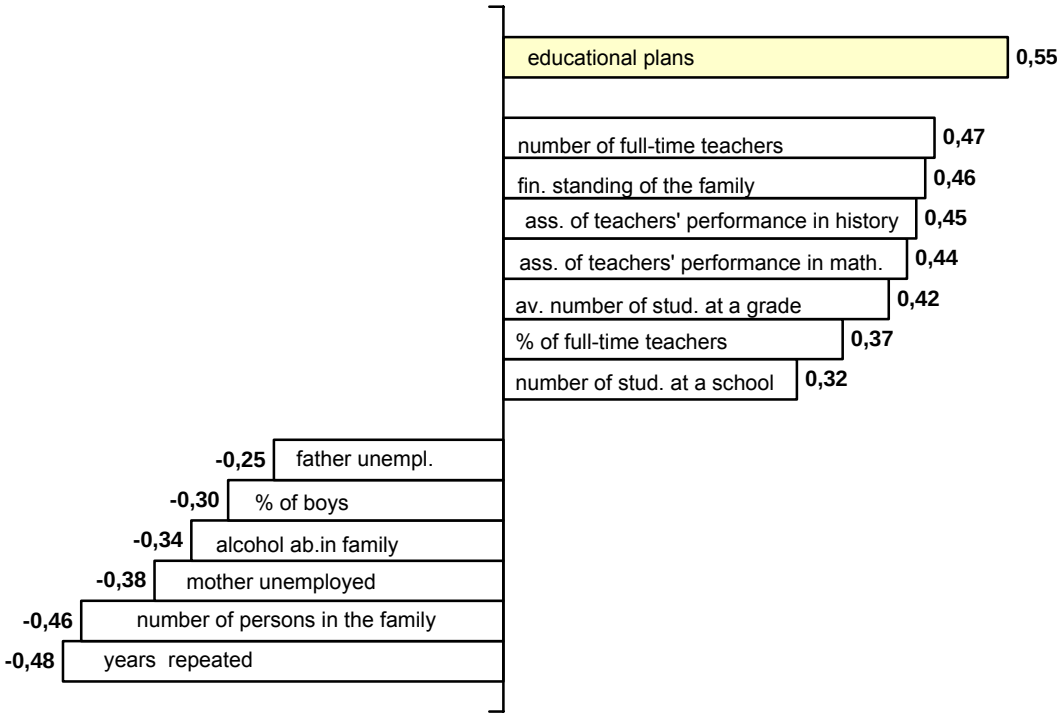
Correlations exist between the two major sections of the exam (humanities and sciences), although they are slightly weaker: 0.58 (rural areas), 0.69 (small towns), 0.68 (total) and 0.75 in large cities.

The weakest correlation with regard to exam results obtains between area IV of the mathematics section and the total result (from 0.56 in rural areas to 0.74 in large cities). It should be recalled here that area IV of the mathematics section posed the most problems for students and its results exhibited the largest dispersion.

2.2. Correlations – Schools

The research material collected has made it possible to expand the independent variable spectrum by including school and teacher characteristics. This makes the school and not the student (as in the previous subsection) the point of reference for individual data. However, the interpretation of the 46 discrete items (schools) examined in terms of rural and urban environments could be risky and thus the discussion will refer to all schools only.

Graph 10. Correlation coefficients: Schools – Exam overall



However, these results are worth presenting because many of them are similar to the ones discussed above (educational plans, pathologies, repeating a year) and therefore the correlation relationships are confirmed to a certain degree. Some of them are stronger and some weaker in comparison with the ones already discussed and there are also some entirely new ones due to the introduction of new variables.

The strongest correlations (as before) have been found between (school) results and educational plans (0.55). Some relationships that had not been mentioned earlier due to low correlation values became much more pronounced.

These relationships are primarily: the financial standing of the family as assessed by the student and the results (0.46), the number of persons in the family and the results (-0.46), mother's joblessness and the results (-0.38).

There is also a clear statistical relationship between the family (financial) situation of the students and their educational plans after leaving the lower secondary school (0.57).

Among the "school" variables, the one that correlates best with the results of lower secondary schools is the number of full-time teachers (0.47), which is partially confirmed by a similar variable, i. e. the ratio of full-time teachers to the total number of teachers (0.37). These values may be interpreted in the following way – the more full-time teachers and the larger percentage of the total number of teachers they constitute, the better are the students' results. A large number of full-time teachers may also mean that we deal with a large school and thus a large city, a specific social composition of the student population etc. However, it may be assumed that a teacher who has stronger links to the school (and does not just "drop in" for 3 hours a week while working at another school) performs his duties better.

Another relationship, which is perhaps not the strongest one but which can be clearly observed, may be interpreted in a similar way. The value of the correlation coefficient between overall exam results and the average number of students at a grade is 0.42. This may be linked to the

size of schools that function in large cities coupled with the social structure of their students being more favourable (the value of the correlation coefficient between a school's results and its size is, however, lower and amounts to 0.32).

There are interesting correlations (visible but not very strong) between school results and the assessment of teachers performed by school managers. These correlations do not apply to all teachers (subjects). The strongest correlations obtain between school results and the assessment of teachers' performance in history (0.45) and mathematics (0.44). Perhaps such high values are conditioned by the fact that only the teachers of these subjects did not include (in the case of history) or included only small numbers (mathematics) of persons without the qualifications to teach them. Correlations between teacher performance assessments and school results with regard to other subjects were weaker: 0.23 in the case of Polish language and literature, 0.22 – biology, 0.16 – physics, 0.11 – geography, 0.10 – chemistry.

It should also be stated that the relationships between teacher performance assessments and the results of individual sections of the exam are almost the same as in the case of the overall result (which is surprising – it was to be expected that the assessment of a mathematics teacher's performance would be more strongly correlated with the results of the science section).

When calculating correlations for schools it can be observed that the correlations between the results of the humanities section and those of the sciences section are much stronger for schools (0.81) than in the case of student results (0.68). This is primarily a result of the fact that we deal with averaged, less dispersed values. In practice this difference (higher correlation in the case of schools) may be interpreted in the following way: the fact that a school achieves good (poor) results in both sections of the exam is a more frequent occurrence than a convergence in results for individual students.

3. Multiple Regression Analysis

The analysis of correlation relationships allows us to find possible causal relationships between many, often purely statistical, values. The values of correlation coefficients discussed in the previous subsection referred solely to relationships between pairs of variables (usually exam results and some independent variable).

Multiple regression (taking correlation into account) makes it possible to simultaneously examine the influence of a larger number of independent variables on one variable (in this study – the result of the lower secondary school leaving exam).

This represents a considerable progress when compared to just analysing pairs of relationships, but the results are not always obvious as well.

The analysis of multiple regression results with a large number of variables is usually based on comparisons of the so-called β (beta) term expressed as a decimal fraction. Such fractions are constant factors and therefore the weights of individual independent variables[1]. β values show by how many units the exam result increases per each unit increase of a given independent variable, assuming that the influence of other variables is constant (determining the impact of a single variable while eliminating the others).

Only those β values that fulfil the requirements concerning statistical significance are taken into account. It is assumed that the probability of getting a random result must not exceed 5 percent and thus $p \leq 0.05$. Multiple regression analysis should also be understood in terms of the auxiliary information provided by individual β values and not in terms of real relationships between the variables and the "results" variable.

The values analysed below cannot be considered final or absolute because we cannot be certain that we have taken the most important variables into account (indeed, no biopsychological variables have been included). However, regression analysis is more valuable for comparison

[1] Cf. Annex – tables containing all β and p values for variables (there are also presented t values, important in some research)

purposes than correlation analysis and thus it is more reliable when we try to determine the impact of individual variables on school.

However, the point of reference for the β value is the value of the multiple determination coefficient (R^2), which, when multiplied by 100%, informs us what percentage of the difference in the dependent variable (the result of the lower secondary school leaving exam) can be attributed to the total differences in the independent variables (predictors) that have been taken into account[1]. The higher the value of R^2, the larger the significance of the independent variable set with regard to explaining the changes of the dependent variable.

3.1. Students – Variables

Just as in the case of interpretation of the correlation coefficients, the results have been broken down: 1) with regard to environment (urban areas, rural areas, total) and 2) with regard to sections of the exam (humanities, sciences, overall). Specific features of environments and individual exams are discernible.

Large cities

Table 28. R^2 and β values for conditioning factors with $p \leq 0.05$ (values rounded to 3 decimal places)

Conditions	For exam results:					
	Overall		Humanities		Sciences	
	β	p	β	p	β	p
Number of books at home	0.202	0.013	0.180	0.032	0.200	0.018
Educational plans	0.418	0.000	0.435	0.000	0.363	0.000
Father's job	0.196	0.047				
Father's education					0,239	0,042
Size of town or village in which the student lives	0.188	0.019	0.223	0.006		
R^2	0,518		0,491		0,483	

[1] To be more precise: it is the percentage of the variance in the dependent variable caused by all independent variables together; cf.: J.P. Guilford, Podstawowe metody statystyczne w psychologii i pedagogice [*Basic statistical methods in psychology and pedagogy*]. Warsaw PWN 1960; J.Brzeziński, Metodologia badań psychologicznych [*Methodology of psychological research*]. Warsaw, PWN 1996; K.Konarzewski, Jak uprawiać badania oświatowe. Metodologia praktyczna [*How to conduct educational research. Practical methodology*]. Warsaw WSiP 2000

In large cities, the factors conditioning exam results are not quite uniform.

The following factor may have a favourable influence on both sections of the exam:, having a large number of books at home. However, the highest β value corresponds to the "educational plans" variable, which may be interpreted similarly as in the correlation analysis – this is not an influence but a strong interexistence between two variables (results and plans).

The father's education has a visible impact on performance in the sciences section of the exam while the father's occupation influences the overall exam result.

Rural areas

Table 29. R^2 and β values for conditioning factors with $p \leq 0.05$ (values rounded to 3 decimal places)

Conditions	For exam results:					
	Overall		Humanities		Sciences	
	β	p	β	p	β	p
School journey time (transport, walking)	0.306	0.006	0.316	0.003	0.246	0.042
School journey time (walking)	-0.224	0.009	-0.246	0.003		
Gender			-0.150	0.043		
Educational plans	0.403	0.000	0.401	0.000	0.336	0.000
Home-school distance	-0.277	0.030	-0.369	0.002		
Alcohol abuse in the family			-0.161	0.20		
R^2	0,436		0,489		0,316	

The factors conditioning school achievements of students attending lower secondary schools in rural areas differ markedly from those in the large city environment already discussed.

The time factor appears (school journeys), which is difficult and troublesome to interpret. Most people would agree that if a student has to walk a long way to school, this may negatively influence his or her achievements (tiredness, various distracting "attractions" on the way). This

type of variable is similar to the distance between the student's home and his or her school (the farther the worse) – here the relationship between results and distance is much stronger.

However, it is difficult to explain the favourable influence of the school journey time (transport and walking together) on exam results. There are many ways to interpret this phenomenon: students learn or read when riding to school, they are better psychologically "prepared" for school, they are already fully awake (but this would refer to their first lessons only). If the relation between journey time and school performance had a causal character, this could also be interpreted as follows: the students who spend more time travelling to school have chosen (often together with parents) a "better" school which is not the closest located school.

Another notable feature of the rural environment is the significant impact of alcohol abuse on exam results – with regard to the humanities section. To a certain degree, the impact of gender is visible with regard to the humanities section – boys have worse results. Again, there is a strong interexistence between results and educational plans.

We have to be very cautious when interpreting the factors conditioning the results of the sciences section of the exam with regard to students who attend lower secondary school in rural areas. The fact that only two variables are present here, of which only one can be treated as a favourable influence (transport and walking time to school) and the other may as well be treated as a dependent variable (just as exam results) – shows that the results of the sciences section may also be influenced by other factors, which have not been taken into account.

Small towns

The small town environment is also a specific one. Only one variable (father's occupation) can be seen to have an explanatory value.

Table 30. R^2 and β values for conditioning factors with $p \leq 0.05$ (values rounded to 3 decimal places)

Conditions	For exam results:					
	Overall		Humanities		Sciences	
	β	p	β	p	β	p
Educational plans	0.310	0.000	0.298	0.000	0.272	0.000
Father's education	0.222	0.034	0.264	0.005	0.217	0.043
Gender			-0.160	0.028		
Absent mother					0.196	0.040
R^2	0,491		0,593		0,354	

A positive influence of the absence of the mother on performance in the sciences section should probably be interpreted as accidental.

It may also be added that during the separate analysis of the three environments, certain conditioning factors appeared (with low β values) that were excluded from interpretation due to the fact that they did not attain the 5 percent threshold of statistical significance. For the rural environment they were walking time/sciences results (-0.168 and p=0.07). For small towns such a factor was computer/overall results (-0.174 and p=0.097). For big cities: father's occupation/overall score (0.194 and p=0.086), father's occupation/score in humanities (0.190 and p=0.06), father's occupation/score in sciences (0.181 and p=0.075).

Total (all students)

Table 31. R^2 and β values for conditioning factors with $p \leq 0.05$ (values rounded to 3 decimal places)

Conditions	For exam results:					
	Overall		Humanities		Sciences	
	β	p	β	p	β	p
Number of rooms			0.086	0.042		
Number of books at home					0.100	0.042
School journey time (transport, walking)	0.198	0.005	0.187	0.008	0.179	0.016
Educational plans			0.116	0.005		
Father's education	0.190	0.002	0.154	0.014	0.193	0.003
Repeating a year	-0.130	0.006			-0.143	0.004
Lessons missed			-0.498	0.030		
Home-school distance			-0.166	0.019		
Alcohol in the family			-0.113	0.012		
R^2	0.340		0.341		0.268	

The multiple regression β values look different when students are not divided into three environments. It must be admitted that results in this frame of reference are less clear and significant than in the case of more uniform environments (lower R^2 values and β).

The factors conditioning overall exam results are relatively weak: there are only three factors and β values do not exceed ±0.2 (transport and walking time, father's education and repeating a year). It should also be added that a number of factors were not considered in the table above due to the fact that they exceeded the level of statistical significance (albeit often slightly). As regards the overall results of the exam, these were: the number of rooms at the student's home (β=0.079 and p=0.063), the number of books at the student's home (β=0.076 and p=0.104), alcohol consumption in the student's family (β=-0.080 and p=0.077). As regards the humanities section of the exam, the factor that exceeded the level of statistical significance was year repetition (β=-0.092 and p=0.053), whereas in the sciences section it was the father's occupation (β=0.114 and p=0.080). Secondly, we may

suspect that many more factors (among those included in the study) influence the result of the humanities section of the exam. Thirdly, the interpretation of "school journey time (transport and walking)" still poses many problems.

Finally, the variable "father's education" (just as "time") appears with regard to both sections of the exam, but both variables do not exhibit high β values. The highest β value is the detrimental impact of missed lessons on the result of the humanities section (-0.498) – all other β values are below ±0.2.

Summing up the multiple regression analysis of exam results with regard to students and variables (conditioning factors), it may be said that calculations performed for uniform environments, especially environments such as "large cities" and "rural areas," yield much more significant results and thus are more valuable for forecasting and diagnosis purposes (as demonstrated by significantly higher R^2 values). Differences are also visible in the strength of influence of certain independent variables (performance conditions). For instance, gender has a more pronounced influence in rural areas (boys perform worse) while in big cities the number of books has a visibly higher influence (the more books the better). It may also be stated that the variables referring to the humanities section fulfil such expectations much better than the ones referring to the sciences section. It is clear that detrimental conditioning factors dominate (repeating a year, lessons missed) among those variables included which have a potential for both positive and negative impact.

3.2. Students – Factor Analysis

An attempt has also been made to obtain even better research results. This attempt was based on applying regression not to variables (subsection 3.1.) but to factors.

Factor analysis consists of replacing a larger number of variables (the elimination of less significant variables) with a much smaller number of factors. In the case of this study, 27 variables "describing" the student and his or her home, but excluding exam results, have been replaced by five

factors. Because the elimination of certain variables causes some loss of input information, a question is justified as to how large this loss is and whether further analysis is possible. These five factors together carry over 67 percent of covariation (percentage of total variance), so this is a sufficient value to treat factor analysis seriously in this case. Each factor "contains" from 15.08 percent (factor 1) to 12.5 percent (factor 5) of covariation. It must also be remembered that a factor often represents several very different variables. In this study, the individual factors represented the following variables first of all:

factor 1 – this is primarily the number of rooms and number of books at home, the student's assessment of the financial standing of his or her family as well as lessons and days missed;

factor 2 – this is the number of family members living in a common household as well as the number of siblings and (to a smaller extent) the education and occupations of parents;

factor 3 – this is primarily transport to school as well as distance between home and school and (to a smaller extent) father's joblessness, mother's absence, drugs;

factor 4 – this is gender and, to a smaller extent, educational plans;

factor 5 – this is the total time of transport and walking to school and the time of walking to school[1].

The analysis of multiple regression β values calculated for those factors exhibits significant differences in comparison to the calculations regarding variables. First of all, the detrimental effect of certain conditioning factors on school achievement is even more marked.

Table 32. β values for <u>overall exam results</u> (β and p rounded to 3 decimal places); $R^2 = 0.041$

Conditions	β	p
Factor I primarily	-0.081	0.040

[1] Cf. Annex – tables No. 22 and 23

• lessons missed • days missed		
Factor III Primarily • commuting to school and distance between home and school • father's joblessness • mother's absence • drugs	-0.156	0.000

Table 33. β values for the results of the humanities section (β and p rounded to 3 decimal places); $R^2 = 0{,}061$

Conditions	β	p
Factor I primarily • lessons missed • days missed	-0.078	0.045
Factor III primarily • commuting to school and distance between home and school • father's joblessness • mother's absence • drugs	-0.187	0.000
Factor II • number of family members • number of siblings	0.085	0.030

Tab.34. β values for the results of the mathematics section (β and p rounded to 3 decimal places); $R^2 = 0.020$

Conditions	β	p
Factor III primarily • commuting to school and distance between home and school • father's joblessness • mother's absence • drugs	-0.103	0.010

If we consider these results to be more correct because accidental variables have been eliminated, then they are only similar to regression analysis performed for variables in certain respects: there are more conditioning factors in the humanities section than in the mathematics section and we can see the recurring impact of missed lessons and days. All β values are low, which reduces the reliability of these results. The only condition represented by factor II and present only in regression analysis for the humanities section – a condition that has a potentially favourable (and controversial) influence on exam results – is the size of family (living together).

It should also be noted that this method of calculating regression – and thus an attempt at determining what has the most influence on exam results – omits such variables as the troublesome school transport or walking time or educational plans (often present in previous frames of reference). These assertions would be significant if R^2 values were higher. As they are not, multiple regression results should be considered disqualifying with regard to the factors. This part of the report should, therefore, be considered just an interesting attempt at applying a certain methodology, which produced poor results in the case under consideration.

3.3. Schools – Variables

Finally, R^2 and β values yielded by multiple regression analysis will be presented for 46 schools (and not for students as in subsection 3.1). The attempt to introduce data concerning "teacher performance assessment" into the database on schools has failed (the regressions calculated did not point to any variables that might have any impact on exam results). The "strongest" teacher variables such as the headmasters' assessments of teacher performance did not have a pronounced influence in the light of regression indices presented in table 35. After the exclusion of teacher performance assessment, which seemed to be correlated with some results (cf. correlation analysis), the resultant multiple regression β values cannot be disregarded (see annex: tables 19-21).

Table 35. R^2 and β values for lower secondary school leaving exam for schools (values rounded to 3 decimal places)

Conditions	For exam results:					
	Overall		Humanities		Sciences	
	β	p	β	p	β	p
Number of family members	-0.436	0.006	-0.442	0.005	-0.393	0.023
Transport and walking time (total)	0.425	0.009			0.508	0.006
Financial standing of family (student's assessment)					0.437	0.031
Repeating a year	-0.645	0.001	-0.527	0.005	-0.683	0.001
R^2	0.678		0.680		0.602	

The number of variables influencing school achievement (average school performance in the case considered) in this frame of reference is relatively low but their influence is very pronounced. With respect to scores in humanities, there are only two factors and both of these have a negative influence (large family and class repetition are important predicators of underperformance). The influence of these factors is also visible in the sciences section (with class repetition having an even stronger influence). In this section, the factors that had a positive impact on school achievement included the family's financial situation and transport and walking time to school.

It should be remembered, however, that the figures in the table above, which invite various interpretations due to their high values, should be treated very cautiously. Information about students from only one grade has been taken into account while exam results refer to entire schools. If school results had been compared with the characteristics of all students, the analysis would have been more reliable. A significant negative influence of two conditioning factors can be discerned in the last frame of reference analysed: repeating a year and family size (the larger the family the worse the results).

On the other hand it should be noted that, despite these objections, of all analysed results of multiple regression R^2 values were the highest. This is probably due to the fact that all individual information was eliminated (in

relation to students) and replaced by averaged values (arithmetic means or percentage of prevalence). In this way, the risk that accidental or extreme values could distort the outcome of the research was eliminated.

CONCLUSIONS

Is around 1100 students and their families, 300 teachers and 46 schools a large enough sample to point out the factors conditioning student achievement? With regard to the scope of this study (the conditioning factors taken into account) – certainly yes. The correct choice of sample is reflected by the almost identical (with regard to distributions and mean values) results of the students included in the study and results of all lower secondary school students in Poland. Although the sample was selective and not random, it seems that it is highly representative due to the fact that the schools included in the study were chosen from various environments, which together exhibit great similarity to the entire population. Therefore it does not seem necessary to increase the number of students or schools in future studies (this would be a purely technical question and would necessitate a larger research budget). Doubts may only be raised with regard to the information collected using survey questionnaires – this is a problem of all such surveys. Even if some surveys were conducted improperly to some extent, the results are confirmed by the analyses presented in the report referring to various environments and sections of the lower secondary school leaving exam.

The study has shown that the number of independent variables taken into account should be reduced because the influence of some on student achievement turned out to be insignificant. If, as part of further research, the number of factors (independent variables) was restricted to only those factors whose importance has been determined by means of multiple regression analysis, the results would be even more satisfying (R^2 values, which are already significant, would be even higher). This is partially demonstrated by regressions calculated for schools, in which the number of variables has been reduced considerably. However, this knowledge has only been gained from the results of this study. In this sense, the study has also been a very good pilot undertaking, preceding a proper one that would take the students' biopsychological traits into account (which, however, would demand a significant expansion in the scope of the study and altering its organisation).

The study indicates certain crucial conditioning factors but only among those that were taken into account: information available in a relatively short time and using specific research procedures determined by the limited project budget.

The awareness that the students' biopsychological traits have been disregarded caused some fears at the beginning that good or bad exam results might be attributed to teachers or schools. These problems have not materialised – on the other hand, the results show that the variables related to teachers and schools did not fulfil their function very well. The negative influence of quite trivial conditions and pedagogical problems such as repeating a year or missed lessons and days has been shown clearly. The influence of parents has been visible but in a different way than could be expected. Pathological elements (alcohol and drug abuse) and information concerning unemployed or absent parents were much more pronounced than the parents' higher education level or occupational status. A weak, positive relationship between school performance and the student having a computer has also been observed (but the impact of having access to the Internet was much weaker) as well as between performance and the number of books at home (except for big cities). The influence of school journey time (transport, walking) is equivocal – the results differ depending on the environment and the method of statistical analysis applied. It should be added here that a recent study by I. Białecki concerning the factors conditioning upper secondary school graduation shows a positive correlation between the number of books at the student's home and reaching the upper secondary school graduation exam and the lack of such a correlation with regard to school journeys.[1]

A large number of statistical studies also exist which attempt to determine a relationship between school quality and educational attainment (referred to as "education production functions"[2]).

These functions are essentially multiple regression equations, where some measure of attainment is related to a set of school quality variables

[1] I. Białecki, Drogi kariery szkolnej. Wyniki badań ankietowych [*Roads of School Career. Results of Questionnaire Tests*], Warsaw 2002.
[2] Inter alia: M.Fertig, R.E.Wright, School Quality, Educational Attainment and Aggregation Bias." IZA Discussion Paper" No. 994, January 2004.

(e.g. class size, teacher education/experience) and a set of variables such as family background and other factors thought to affect attainment. It is interesting to note attempts to find an optimal level of data aggregation (e.g. at the level of students, schools, regions or countries). M. Fertig and R.E. Wright embarked on an attempt to contest a statement made by Eric Hanushek that there is no systematic relationship between school quality and educational attainment ("higher levels of school quality do not appear to go hand-in-hand with higher levels of attainment")[1]. M. Fertig and R.E. Wright refuted Hanushek's finding that "more aggregated data... overestimate systematically the influence of school expenditure related characteristics on student attainment"[2].

The data they used came from the PISA 2000 studies[3] (109,873 students from 31 countries). The dependent variable in their research was the reading literacy score. Three class size variables were considered and, at the same time, three levels of data aggregation were distinguished: the individual student's class size, average class size in the school that the student attends, and average class size in the country where the student lives. Family background was measured by variables such as the student's gender, whether the student lives with parents, home language and national language, siblings and whether the student's parents completed education. The findings demonstrate that, while being positive and statistically significant at the student level, the class size effect is less certain at school and country levels (exceeding an admissible level of statistical significance: $p>0.05$). The authors suggest that it does matter at what level of aggregation school quality variables are measured in the estimation of educational production functions. Their estimates are in agreement with those of Hanushek – as the level of aggregation increases, the probability of finding statistically significant and correctly signed school quality effects also increases. However, Fertig's and Wright's analysis does

[1] Ibidem, p. 3 and e.g. E.Hanushek, S.G.Rivkin and L.L.Taylor, Aggregation and the Estimated Effects of School Resources „Review of Economics and Statistics" 78(4), Nov. 1996.
[2] E.Hanushek, op. cit. in: M.Fertig and R.E.Wright op. cit.
[3] OECD, 2001, Knowledge and skills for life: First results from PISA 2000. Paris, OECD 2001

not answer "a key policy question of whether decreasing class size will lead to higher, educational attainment".[1]

All family background variables considered by Fertig and Wright are statistically significant. For instance, there is a positive relationship between attainment and mother's and father's schooling (measured in years of schooling completed) and whether the student resides with both parents (this concerns female students), whereas attainment is lower the higher the number of siblings (in my research this is confirmed by means of the factor concerning the number of family members). It should also be added that R^2 values do not exceed 30% at the level of student and school aggregation assessed in the research discussed above.

A large impact of family factors has also been demonstrated using other economic models[2]. The study of Ch.Belzil and J.Hansen, based on a sample of 1,708 students, is interesting in a methodological sense. Namely, it demonstrates that results may differ depending on what configuration of variables is used.

"Using a structural dynamic programming model, we investigate the relative importance of family background variables and individual specific abilities in explaining cross-sectional differences in schooling attainment and wages. For a given scholastic ability, household background variables (especially parents' education) account for 68% of the explained cross-sectional variation in schooling attainment. When the effects of household background variables on ability are also taken into account, the percentage raises to 85%"[3].

The analysis of research results shows that much clearer, "better" results were obtained in uniform environments – especially large city and rural ones. The calculations performed with regard to all students often caused the results to become "flattened," averaged. The division into urban and rural environments helped to discover certain specific conditioning factors. The situation was similar with regard to the utilisation of the results of the two basic sections of the lower secondary school leaving exam

[1] M.Fertig, R.E.Wright, op. cit. p.6.
[2] Ch.Belzil, J.Hansen, Structural Estimates of the Intergenerational Education Correlation. "IZA Discussion Paper" No. 973, December 2003.
[3] Ibidem, p. 1

(humanities and sciences) in our calculations. The factors conditioning the results of the humanities and sciences sections as well as overall exam results were often not identical – this shows that different factors influence achievement in humanities and sciences. The study conducted shows that the independent variables used were much better suited to the humanities section than to the sciences one.

Statistical analysis methods yield various results. These may be treated as complementary, especially with regard to correlation analysis and multiple regression (regarding variables). When applied to factors (resulting from the factor analysis), multiple regression results are unsatisfactory. The problem of result reliability (briefly discussed in the report) should also be considered due to the case of two large city schools. Perhaps the exclusion of these results and their conditioning factors, which exhibit extremely negative values, would give a more uniform set of data for analysis.

Further research should not only take into account the factors conditioning school achievement (a much wider range of these) but also attempt to measure the so-called educational value added more accurately.[1] This would involve measuring the difference between the student's competence and intellectual skills at the beginning of his or her education at a given school and at the end of this education. Such a measurement would bring us much closer to the assessment of individual schools, although the permanent pedagogical impact of mass media, popular culture and peers discussed at the beginning also influences this added value.

There are many indications that at the age of sixteen it is already too late to ensure equal educational and occupational opportunities, which are often the function of measurable school achievement. The compensation of an imperfect family environment and slower intellectual development of some children should start with a much earlier diagnosis of the child's school aptitude (the test after the sixth form of primary school is necessary but occurs too late for such purposes). In the Polish educational system, the right moment for such a diagnosis would be the third form of primary school, which ends the period of initial, integrated education and starts the stage of systematic education, divided into subjects.

The compensatory effort should refer first of all to kindergarten education. In Poland only every sixth child living in rural areas attends kindergarten and every third child receives kindergarten care and education

[1] This is discussed in, *inter alia*, J. Herczyński, I. Białecki, Dostęp do wykształcenia średniego (problemy selekcji w polskim systemie szkolnym), Warsaw, June 2002.

in kindergartens and kindergarten branches of primary schools. Many research results indicate that kindergarten care and education are important for a child's successful start at school (this relationship does not hold with regard to achievement at the age of 16 or 19 – upper secondary school graduation exam). It also seems that in certain environments local educational policies should be directed at parents with lower education levels who are often affected by such problems as unemployment or alcohol abuse. Those parents and the environment in which they live are important factors determining the school achievement and life opportunities of their children.

ANNEXES

1. Correlations (students) – overall
2. Correlations (students) – big cities
3. Correlations (students) – small towns
4. Correlations (students) – rural areas
5. Correlations (schools) – overall
6. Correlations (schools) – overall
7. Multiple regression (students overall) of the dependent variable: overall exam score
8. Multiple regression (students overall) of the dependent variable: humanities
9. Multiple regression (students overall) of the dependent variable: sciences
10. Multiple regression (students – big cities) of the dependent variable: overall exam score
11. Multiple regression (students – big cities) of the dependent variable: humanities
12. Multiple regression (students – big cities) of the dependent variable: sciences
13. Multiple regression (students – small towns) of the dependent variable: overall exam score
14. Multiple regression (students – small towns) of the dependent variable: humanities
15. Multiple regression (students – small towns) of the dependent variable: sciences
16. Multiple regression (students – rural areas) of the dependent variable: overall exam score
17. Multiple regression (students – rural areas) of the dependent variable: humanities
18. Multiple regression (students – rural areas) of the dependent variable: sciences
19. Multiple regression (schools overall) of the dependent variable: average humanities score
20. Multiple regression (schools overall) of the dependent variable: average sciences score
21. Multiple regression (schools overall) of the dependent variable: average overall exam score

Tab. 22. Factor loadings (Varimax) principal components

Tab. 23. Eigenvalues – factors

Table 1. Correlations (students) - overall (all values p<0,05)

	Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1.	gender	1.00																
2.	number of family members	0.03	1.00															
3.	number of siblings	0.01	0.85	1.00														
4.	number of rooms	-0.06	0.12	0.09	1.00													
5.	computer	-0.05	0.25	0.27	0.20	1.00												
6.	internet	0.03	0.22	0.22	0.23	0.56	1.00											
7.	books	0.03	-0.15	-0.12	0.18	0.37	-0.29	1.00										
8.	commuting to school	-0.02	0.25	0.17	0.08	0.16	0.09	-0.12	1.00									
9.	distance school-home	0.01	0.22	0.16	0.04	0.21	0.12	-0.12	0.75	1.00								
10.	journey time home-school	-0.04	0.19	0.13	0.10	0.12	0.07	-0.10	0.57	0.70	1.00							
11.	including walking time	-0.11	0.02	0.02	0.16	-0.05	0.01	-0.01	-0.19	-0.05	0.37	1.00						
12.	location	0.11	-0.40	-0.30	-0.12	-0.42	-0.37	0.38	-0.20	-0.31	-0.21	-0.07	1.00					
13.	material situation	-0.03	-0.22	-0.16	0.27	0.24	0.32	0.22	-0.12	-0.11	-0.12	0.03	0.17	1.00				
14.	educational plans	-0.21	-0.21	-0.21	0.14	0.37	0.27	0.23	-0.07	-0.09	-0.03	0.06	0.19	0.12	1.00			
15.	no mother	0.03	-0.05	-0.04	-0.10	0.04	-0.01	-0.11	-0.02	0.01	0.12	-0.02	0.02	-0.09	-0.19	1.00		
16.	no father	0.11	-0.12	-0.01	-0.17	0.07	0.08	-0.05	0.06	0.03	0.06	-0.04	0.15	-0.10	-0.07	0.21	1.00	
17.	mother education	0.06	-0.22	-0.20	0.21	0.42	0.42	0.45	-0.15	-0.15	-0.10	0.02	0.40	0.21	0.31	-0.07	-0.03	1.00
18.	father education	-0.02	-0.22	-0.19	0.17	0.41	0.43	0.46	-0.09	-0.11	-0.06	0.04	0.45	0.23	0.33	-0.02	-0.04	0.60
19.	mother occupation	-0.03	-0.39	-0.32	0.03	0.44	0.42	0.39	-0.23	-0.27	0.21	0.04	0.58	0.23	0.31	0.04	-0.05	0.64
20.	father occupation	0.03	-0.39	-0.29	0.08	0.41	0.43	0.39	-0.23	0.22	0.21	0.03	0.55	0.27	0.23	-0.04	-0.02	0.47
21.	unemployed mother	0.11	0.03	0.08	-0.17	-0.16	-0.10	-0.14	-0.06	-0.05	-0.05	-0.09	0.01	-0.21	-0.13	0.06	0.07	-0.17
22.	unemployed father	0.04	-0.02	-0.01	-0.12	-0.08	-0.13	-0.14	0.01	0.00	0.06	0.04	0.01	-0.15	-0.08	0.10	0.10	-0.11
23.	alcohol in family	0.14	0.05	0.10	-0.12	-0.18	-0.18	-0.11	0.10	0.10	0.05	-0.07	-0.04	-0.23	-0.15	0.17	0.31	-0.11
24.	drugs in family	0.05	-0.05	0.00	-0.09	-0.07	-0.01	-0.13	0.01	-0.06	-0.05	-0.05	0.08	-0.03	-0.20	0.57	0.07	-0.05
25.	absent classes	0.16	0.01	0.05	-0.13	-0.20	-0.13	-0.04	0.16	0.19	0.17	-0.09	0.15	-0.14	-0.37	0.26	0.29	-0.08
26.	absent days	0.15	-0.01	0.03	-0.14	-0.19	-0.13	-0.02	0.16	0.19	0.17	-0.08	0.15	-0.13	-0.36	0.27	0.29	-0.07
27.	year repeating	0.22	-0.02	0.04	-0.14	-0.13	-0.10	-0.03	0.08	0.12	0.12	-0.11	0.19	-0.05	-0.32	0.23	0.24	-0.11
28.	overall score humanities	-0.29	-0.19	-0.23	0.20	0.35	0.29	0.27	-0.14	-0.16	-0.04	0.09	0.18	0.13	0.57	-0.09	-0.15	0.34
29.	score humanities p. 1	-0.14	-0.14	-0.18	0.17	0.32	0.24	0.23	-0.13	-0.14	0.01	0.10	0.16	0.06	0.45	-0.04	-0.11	0.28
30.	score humanities p.2	-0.34	-0.19	-0.22	0.19	0.32	0.27	0.26	-0.13	-0.15	-0.07	0.07	0.17	0.15	0.57	-0.10	-0.15	0.32
31.	overall score sciences	-0.06	-0.13	-0.16	0.16	0.34	0.20	0.25	-0.10	-0.08	0.01	0.10	0.12	0.11	0.48	-0.09	-0.13	0.29
32.	score sciences p.1	-0.06	-0.14	-0.17	0.16	0.34	0.17	0.23	-0.10	-0.10	-0.02	0.10	0.11	0.10	0.46	-0.09	-0.13	0.28
33.	score sciences p.2	-0.09	-0.10	-0.14	0.18	0.27	0.20	0.21	-0.07	-0.06	0.01	0.09	0.10	0.13	0.36	-0.09	-0.18	0.25
34.	score sciences p.3	-0.07	-0.09	-0.13	0.16	0.30	0.18	0.23	-0.11	-0.06	0.03	0.11	0.07	0.12	0.46	-0.10	-0.13	0.24
35.	score sciences p.4	-0.03	-0.13	-0.12	0.03	0.23	0.14	0.20	-0.05	-0.02	0.04	0.03	0.17	0.02	0.31	-0.03	-0.01	0.23
36.	overall exam score (h + s)	-0.18	-0.17	-0.21	0.19	0.38	0.26	0.28	-0.13	-0.12	-0.01	0.11	0.16	0.13	0.57	-0.10	-0.15	0.34

	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
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18.	1.00																		
19.	0.50	1.00																	
20.	0.63	0.65	1.00																
21.	-0.17	0.06	0.06	1.00															
22.	-0.19	0.01	0.12	0.37	1.00														
23.	-0.22	0.07	0.13	0.13	0.26	1.00													
24.	-0.03	0.02	-0.03	0.05	0.18	0.22	1.00												
25.	-0.09	-0.02	-0.03	0.15	0.09	0.22	0.18	1.00											
26.	-0.08	-0.02	-0.05	0.13	0.08	0.22	0.18	0.98	1.00										
27.	-0.17	0.01	0.03	0.20	0.12	0.22	0.20	0.54	0.53	1.00									
28.	0.40	-0.25	-0.24	-0.16	-0.10	-0.27	-0.10	-0.40	-0.38	-0.32	1.00								
29.	0.32	-0.24	-0.19	-0.12	-0.10	-0.21	-0.05	-0.34	-0.32	-0.27	0.84	1.00							
30.	0.39	-0.22	-0.24	-0.15	-0.09	-0.26	-0.12	-0.38	-0.36	-0.31	0.95	0.64	1.00						
31.	0.33	-0.20	-0.15	-0.09	-0.05	-0.16	-0.10	-0.35	-0.34	-0.28	0.68	0.64	0.60	1.00					
32.	0.30	-0.19	-0.14	-0.09	-0.03	-0.14	-0.07	-0.34	-0.33	-0.27	0.64	0.61	0.56	0.93	1.00				
33.	0.24	-0.19	-0.14	-0.11	-0.05	-0.14	-0.09	-0.29	-0.30	-0.26	0.59	0.57	0.52	0.81	0.69	1.00			
34.	0.33	-0.15	-0.11	-0.06	-0.06	-0.18	-0.12	-0.35	-0.34	-0.28	0.65	0.60	0.59	0.92	0.81	0.67	1.00		
35.	0.26	-0.19	-0.14	-0.07	-0.07	-0.08	-0.05	-0.16	-0.16	-0.14	0.40	0.39	0.35	0.73	0.58	0.52	0.58	1.00	
36.	0.39	-0.24	-0.21	-0.13	-0.08	-0.23	-0.11	-0.41	-0.39	-0.33	0.89	0.80	0.83	0.93	0.87	0.78	0.87	0.64	1.00

Table 2. Correlations (students) - big cities (all values p<0,05)

Variable		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1.	gender	1.00																
2.	number of family members	0.12	1.00															
3.	number of siblings	0.13	0.81	1.00														
4.	number of rooms	-0.05	0.29	0.21	1.00													
5.	computer	0.14	0.17	0.22	-0.21	1.00												
6.	internet	0.11	0.16	0.21	-0.32	0.46	1.00											
7.	books	0.06	0.04	-0.01	0.09	0.26	-0.12	1.00										
8.	commuting to school	-0.11	0.14	0.10	0.30	0.11	-0.07	-0.02	1.00									
9.	distance school-home	-0.09	0.04	0.03	0.16	0.11	-0.04	0.03	0.71	1.00								
10.	journey time home-school	-0.07	0.07	0.08	0.13	0.18	-0.05	-0.01	0.63	0.78	1.00							
11.	including walking time	-0.11	-0.01	0.02	0.09	-0.03	-0.06	0.14	-0.01	0.16	0.43	1.00						
12.	location	-0.01	0.05	0.13	-0.21	-0.06	-0.11	0.17	-0.19	-0.24	-0.32	-0.12	1.00					
13.	material situation	-0.02	-0.02	0.00	0.27	0.19	0.39	0.15	0.04	0.02	0.01	0.06	0.06	1.00				
14.	educational plans	-0.29	-0.17	-0.18	0.06	0.49	0.28	0.17	-0.15	-0.21	-0.22	-0.01	0.06	0.13	1.00			
15.	no mother	-0.01	-0.06	-0.07	-0.09	0.10	0.00	-0.17	0.00	0.10	0.30	0.05	-0.20	-0.06	-0.26	1.00		
16.	no father	0.16	-0.19	-0.02	-0.25	0.26	0.20	-0.09	0.06	0.03	0.19	0.07	0.00	-0.22	-0.14	0.14	1.00	
17.	mother education	-0.09	-0.11	-0.15	0.16	0.40	0.42	0.41	-0.06	0.00	-0.09	0.03	0.18	0.19	0.40	-0.21	-0.14	1.00
18.	father education	-0.06	-0.12	-0.11	0.19	0.43	0.41	0.50	-0.01	0.03	-0.04	0.13	0.12	0.28	0.34	-0.12	-0.18	0.63
19.	mother occupation	-0.07	-0.16	-0.18	0.10	0.42	0.37	0.27	-0.07	0.12	-0.01	0.00	0.01	-0.16	0.39	0.18	0.05	0.64
20.	father occupation	0.13	-0.14	-0.13	0.19	0.41	0.41	0.33	-0.04	0.15	-0.01	-0.08	0.10	-0.27	0.38	0.09	0.21	0.46
21.	unemployed mother	0.10	0.06	0.09	-0.15	-0.19	-0.14	-0.18	0.00	0.01	0.01	-0.15	0.00	-0.29	-0.26	0.15	0.14	-0.37
22.	unemployed father	-0.02	0.04	0.06	-0.14	-0.21	-0.19	-0.24	0.06	0.04	0.16	-0.02	-0.06	-0.24	-0.09	0.23	0.10	-0.25
23.	alcohol in family	0.17	0.01	0.11	-0.13	-0.30	-0.26	-0.17	0.02	0.00	0.11	-0.05	-0.15	-0.27	-0.18	0.15	0.44	-0.16
24.	drugs in family	0.03	-0.03	0.08	-0.09	-0.19	-0.05	-0.24	0.05	-0.06	-0.03	-0.04	0.03	0.03	-0.30	0.40	-0.05	-0.19
25.	absent classes	0.13	0.20	0.17	-0.06	-0.47	-0.27	-0.05	0.27	0.43	0.42	0.05	-0.05	-0.20	-0.50	0.21	0.28	-0.25
26.	absent days	0.11	0.18	0.14	-0.07	-0.45	-0.27	-0.05	0.27	0.44	0.43	0.05	-0.06	-0.21	-0.49	0.23	0.29	-0.25
27.	year repeating	0.29	0.17	0.24	-0.12	-0.46	-0.27	-0.20	0.15	0.31	0.29	-0.07	0.00	-0.10	-0.61	0.32	0.33	-0.35
28.	overall score humanities	-0.32	-0.17	-0.19	0.17	0.48	0.33	0.37	-0.11	-0.17	-0.19	0.05	0.23	0.16	0.57	-0.15	-0.26	0.42
29.	score humanities p. 1	-0.18	-0.18	-0.20	0.14	0.43	0.28	0.31	-0.13	-0.18	-0.17	0.04	0.09	0.08	0.51	-0.12	-0.23	0.30
30.	score humanities p.2	-0.37	-0.14	-0.16	0.17	0.46	0.33	0.37	-0.08	-0.14	-0.18	0.05	0.28	0.18	0.54	-0.15	-0.25	0.45
31.	overall score sciences	-0.09	-0.20	-0.21	0.06	0.46	0.25	0.39	-0.20	-0.19	-0.16	0.10	0.13	0.16	0.51	-0.12	-0.16	0.39
32.	score sciences p.1	-0.10	-0.21	-0.21	0.05	0.45	0.26	0.35	-0.20	-0.20	-0.19	0.07	0.15	0.18	0.50	-0.11	-0.17	0.37
33.	score sciences p.2	-0.11	-0.13	-0.17	0.07	0.42	0.30	0.34	-0.09	-0.12	-0.12	0.12	0.13	0.14	0.46	-0.10	-0.23	0.38
34.	score sciences p.3	-0.06	-0.19	-0.20	0.06	0.44	0.24	0.37	-0.19	-0.15	-0.12	0.11	0.11	0.15	0.48	-0.13	-0.14	0.36
35.	score sciences p.4	-0.04	-0.16	-0.13	0.00	0.28	0.10	0.33	-0.20	-0.17	-0.13	0.08	0.07	0.06	0.36	-0.04	0.02	0.28
36.	overall exam score (h + s)	-0.20	-0.20	-0.21	0.11	0.50	0.31	0.41	-0.17	-0.19	-0.19	0.08	0.18	0.17	0.57	-0.14	-0.21	0.43

	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
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18.	1.00																		
19.	0.49	1.00																	
20.	0.70	0.46	1.00																
21.	-0.32	0.34	0.19	1.00															
22.	-0.36	0.17	0.32	0.30	1.00														
23.	-0.23	0.05	0.20	0.17	0.31	1.00													
24.	-0.15	0.15	0.12	0.10	0.39	0.27	1.00												
25.	-0.27	0.17	0.21	0.18	0.12	0.22	0.11	1.00											
26.	-0.26	0.16	0.18	0.17	0.13	0.25	0.10	0.99	1.00										
27.	-0.37	0.30	0.28	0.35	0.19	0.23	0.25	0.67	0.64	0.01									
28.	0.44	-0.27	-0.35	-0.25	-0.17	-0.23	-0.18	-0.45	-0.44	-0.53	1.00								
29.	0.32	-0.23	-0.24	-0.22	-0.14	-0.15	-0.13	-0.41	-0.40	-0.48	0.88	1.00							
30.	0.46	-0.26	-0.37	-0.24	-0.17	-0.24	-0.19	-0.43	-0.42	-0.50	0.96	0.72	1.00						
31.	0.47	-0.30	-0.31	-0.22	-0.12	-0.15	-0.14	-0.47	-0.46	-0.49	0.75	0.69	0.70	1.00					
32.	0.44	-0.29	-0.32	-0.18	-0.07	-0.17	-0.09	-0.50	-0.49	-0.47	0.72	0.68	0.66	0.94	1.00				
33.	0.41	-0.25	-0.26	-0.27	-0.14	-0.16	-0.12	-0.43	-0.42	-0.51	0.69	0.65	0.64	0.82	0.70	1.00			
34.	0.48	-0.29	-0.31	-0.18	-0.11	-0.14	-0.18	-0.43	-0.42	-0.46	0.69	0.63	0.65	0.95	0.85	0.70	1.00		
35.	0.31	-0.18	-0.16	-0.17	-0.15	-0.07	-0.10	-0.28	-0.27	-0.30	0.53	0.47	0.50	0.81	0.67	0.59	0.72	1.00	
36.	0.49	-0.30	-0.35	-0.25	-0.15	-0.20	-0.17	-0.50	-0.48	-0.54	0.91	0.82	0.87	0.95	0.90	0.82	0.90	0.74	1.00

Table 3. Correlations (students) - small towns (all values p<0,05)

Variable		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1.	gender	1.00																
2.	number of family members	-0.08	1.00															
3.	number of siblings	-0.13	0.91	1.00														
4.	number of rooms	0.04	0.10	0.08	1.00													
5.	computer	-0.18	0.27	0.22	-0.25	1.00												
6.	internet	-0.04	0.12	0.07	-0.26	0.52	1.00											
7.	books	0.01	-0.10	-0.04	0.28	-0.28	-0.20	1.00										
8.	commuting to school	-0.01	0.30	0.18	0.00	0.32	0.25	-0.10	1.00									
9.	distance school-home	0.04	0.29	0.19	-0.01	0.28	0.10	-0.04	0.79	1.00								
10.	journey time home-school	-0.11	0.21	0.07	-0.07	0.10	0.12	-0.16	0.56	0.61	1.00							
11.	including walking time	-0.06	0.05	0.00	0.10	-0.27	-0.06	-0.06	-0.20	-0.21	0.48	1.00						
12.	location	0.12	-0.29	-0.23	0.01	-0.39	-0.24	0.07	-0.71	-0.67	-0.34	0.33	1.00					
13.	material situation	-0.06	-0.15	-0.08	0.19	0.20	0.23	0.10	-0.15	-0.10	-0.17	-0.03	0.07	1.00				
14.	educational plans	-0.07	-0.21	-0.23	0.21	0.22	0.10	0.15	0.00	0.01	0.15	0.16	0.05	0.09	1.00			
15.	no mother															1.00		
16.	no father	-0.04	-0.01	0.12	0.01	0.08	0.10	0.01	0.01	0.05	0.00	-0.06	0.01	0.03	0.09		1.00	
17.	mother education	0.05	-0.13	-0.10	0.38	0.34	0.29	0.35	-0.18	-0.12	-0.03	0.18	0.19	0.11	0.20		0.06	1.00
18.	father education	-0.10	-0.09	-0.06	0.34	0.21	0.29	0.34	-0.28	-0.24	-0.09	0.13	0.29	0.13	0.24		0.10	0.51
19.	mother occupation	-0.02	-0.29	-0.20	0.17	0.42	0.27	0.26	-0.43	-0.43	0.27	-0.09	0.44	-0.18	0.19		0.00	0.58
20.	father occupation	-0.06	-0.26	-0.15	0.31	0.32	0.38	0.33	-0.44	-0.34	0.37	0.02	0.41	-0.26	0.08		-0.09	0.40
21.	unemployed mother	0.15	0.17	0.22	-0.03	-0.12	-0.02	-0.07	-0.10	-0.11	-0.17	-0.12	0.08	-0.11	-0.20		-0.04	-0.15
22.	unemployed father	0.02	-0.10	-0.07	-0.07	-0.04	-0.14	-0.16	0.02	-0.08	0.03	0.07	0.06	-0.02	-0.16		-0.03	-0.01
23.	alcohol in family	0.12	0.06	0.08	0.02	-0.15	-0.17	0.02	0.36	0.28	0.14	-0.10	-0.19	-0.19	-0.08		-0.04	-0.08
24.	drugs in family																	
25.	absent classes	0.15	-0.02	0.07	-0.15	-0.12	-0.14	-0.24	-0.05	-0.15	-0.16	-0.16	0.08	-0.11	-0.32		0.13	-0.15
26.	absent days	0.15	-0.02	0.06	-0.17	-0.16	-0.15	-0.24	-0.01	-0.13	-0.15	-0.18	0.02	-0.11	-0.33		0.08	-0.16
27.	year repeating	0.14	-0.10	-0.08	-0.17	-0.02	-0.08	-0.06	0.06	-0.02	-0.12	-0.12	-0.07	-0.08	-0.12		-0.02	-0.10
28.	overall score humanities	-0.25	-0.19	-0.21	0.26	0.28	0.18	0.17	-0.14	-0.09	0.13	0.23	0.10	0.11	0.53		0.03	0.36
29.	score humanities p. 1	-0.10	-0.21	-0.21	0.22	0.28	0.18	0.19	-0.13	-0.07	0.13	0.24	0.14	0.04	0.50		0.04	0.32
30.	score humanities p.2	-0.29	-0.15	-0.19	0.24	0.25	0.16	0.14	-0.13	-0.09	0.11	0.20	0.07	0.13	0.48		0.02	0.34
31.	overall score sciences	0.05	-0.16	-0.19	0.22	-0.34	-0.11	0.16	-0.11	-0.09	0.08	0.21	0.14	0.11	0.40		-0.06	0.30
32.	score sciences p.1	0.06	-0.14	-0.17	0.22	-0.35	-0.04	0.18	-0.06	-0.09	0.09	0.20	0.12	0.02	0.35		-0.05	0.33
33.	score sciences p.2	-0.02	-0.18	-0.21	0.23	-0.30	-0.15	0.18	-0.13	-0.11	0.01	0.14	0.16	0.16	0.31		-0.06	0.29
34.	score sciences p.3	-0.01	-0.09	-0.14	0.20	-0.25	-0.12	0.09	-0.10	-0.05	0.10	0.19	0.08	0.13	0.42		-0.06	0.21
35.	score sciences p.4	0.17	-0.16	-0.15	0.08	-0.26	-0.09	0.10	-0.11	-0.10	0.05	0.16	0.18	0.13	0.24		-0.04	0.17
36.	overall exam score (h + s)	-0.09	-0.18	-0.22	0.26	-0.34	-0.15	0.18	-0.14	-0.10	0.11	0.24	0.13	0.12	0.50		-0.02	0.35

	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
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18.	1.00																		
19.	0.43	1.00																	
20.	0.55	0.62	1.00																
21.	-0.15	-0.02	0.03	1.00															
22.	-0.09	-0.12	0.05	0.10	1.00														
23.	-0.27	0.11	0.21	-0.07	0.23	1.00													
24.							1.00												
25.	-0.09	-0.04	-0.10	0.35	0.14	0.00		1.00											
26.	-0.13	-0.01	-0.08	0.32	0.14	0.04		0.98	1.00										
27.	-0.15	0.03	-0.03	-0.03	-0.03	0.21		0.35	0.40	1.00									
28.	0.45	-0.23	-0.16	-0.19	-0.05	-0.23		-0.47	-0.49	-0.23	1.00								
29.	0.41	-0.24	-0.14	-0.13	-0.07	-0.18		-0.38	-0.43	-0.15	0.84	1.00							
30.	0.42	-0.20	-0.16	-0.19	-0.04	-0.23		-0.45	-0.46	-0.24	0.96	0.66	1.00						
31.	0.29	-0.22	-0.09	0.04	0.04	-0.19		-0.24	-0.27	-0.13	0.69	0.65	0.62	1.00					
32.	0.26	-0.25	-0.08	0.06	0.09	-0.14		-0.19	-0.22	-0.05	0.61	0.60	0.54	0.93	1.00				
33.	0.26	-0.24	-0.17	0.03	0.07	-0.24		-0.18	-0.21	-0.16	0.65	0.62	0.59	0.82	0.72	1.00			
34.	0.28	-0.12	-0.04	0.03	-0.02	-0.20		-0.29	-0.32	-0.16	0.67	0.61	0.62	0.92	0.80	0.67	1.00		
35.	0.17	-0.18	-0.08	0.02	-0.01	-0.05		-0.13	-0.14	-0.06	0.35	0.34	0.31	0.67	0.53	0.45	0.51	1.00	
36.	0.40	-0.25	-0.14	-0.07	0.00	-0.23		-0.38	-0.40	-0.19	0.90	0.81	0.85	0.93	0.86	0.81	0.88	0.57	1.00

Table 4. Correlations (students) - rural areas (all values p<0,05)

	Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1.	gender	1.00																
2.	number of family members	0.13	1.00															
3.	number of siblings	0.11	0.81	1.00														
4.	number of rooms	-0.12	0.03	0.02	1.00													
5.	computer	0.00	-0.01	0.13	-0.27	1.00												
6.	internet	0.11	0.07	0.16	-0.26	0.54	1.00											
7.	books	-0.06	0.00	-0.01	0.31	-0.29	-0.29	1.00										
8.	commuting to school	0.05	0.28	0.19	0.07	0.05	0.12	-0.21	1.00									
9.	distance school-home	0.10	0.17	0.14	0.04	0.13	0.22	-0.22	0.76	1.00								
10.	journey time home-school	0.06	0.22	0.17	0.21	0.03	0.12	-0.11	0.55	0.69	1.00							
11.	including walking time	-0.14	-0.03	0.01	0.15	0.05	0.05	-0.01	-0.21	-0.01	0.32	1.00						
12.	location	0.15	-0.24	-0.21	0.00	-0.08	-0.05	0.18	-0.60	-0.59	-0.45	0.00	1.00					
13.	material situation	-0.05	-0.27	-0.22	0.32	0.19	0.24	0.25	-0.16	-0.15	-0.18	0.01	0.17	1.00				
14.	educational plans	-0.30	-0.10	-0.12	0.24	0.28	0.25	0.18	-0.02	0.02	0.11	0.09	-0.03	0.06	1.00			
15.	no mother	0.09	-0.05	-0.02	-0.12	0.06	0.03	-0.12	-0.09	-0.09	-0.09	-0.05	0.07	-0.17	-0.20	1.00		
16.	no father	0.11	-0.05	0.03	-0.11	0.04	0.04	-0.22	0.06	0.05	-0.09	-0.04	0.12	-0.04	-0.17	0.37	1.00	
17.	mother education	0.13	-0.04	-0.11	0.23	0.26	0.30	0.32	-0.21	-0.18	-0.12	-0.10	0.21	0.17	0.14	0.05	-0.09	1.00
18.	father education	-0.02	-0.05	-0.11	0.23	0.26	0.23	0.17	-0.04	-0.03	0.03	0.05	0.15	0.12	0.21	0.09	-0.08	0.43
19.	mother occupation	0.11	-0.26	-0.25	0.00	0.11	0.26	0.25	-0.37	-0.36	0.33	0.07	0.37	0.19	0.15	-0.01	0.03	0.51
20.	father occupation	0.15	-0.36	-0.25	0.06	0.11	0.09	0.13	-0.37	-0.36	0.33	-0.02	0.34	0.13	0.02	-0.20	-0.09	0.17
21.	unemployed mother	0.09	-0.09	-0.01	-0.25	-0.17	-0.16	-0.14	-0.16	-0.09	-0.07	0.00	0.08	-0.17	0.02	-0.03	0.01	0.00
22.	unemployed father	0.10	-0.04	-0.02	-0.13	-0.06	-0.08	-0.04	-0.07	0.00	-0.02	0.08	0.19	-0.14	-0.02	-0.02	0.18	-0.06
23.	alcohol in family	0.12	0.09	-0.13	-0.20	-0.16	-0.14	-0.15	-0.01	0.06	-0.06	-0.05	-0.07	-0.20	-0.18	0.24	0.34	-0.10
24.	drugs in family	0.09	-0.05	-0.02	-0.12	-0.06	-0.03	-0.12	-0.09	-0.09	-0.09	-0.05	0.07	-0.17	-0.20	1.00	0.37	0.05
25.	absent classes	0.21	-0.03	0.04	-0.13	-0.26	-0.14	-0.11	0.09	0.17	-0.01	-0.04	-0.12	-0.11	-0.41	0.42	0.30	0.07
26.	absent days	0.20	-0.03	0.03	-0.12	-0.23	-0.11	-0.07	0.05	0.12	-0.03	-0.03	-0.12	-0.08	-0.37	0.44	0.31	0.07
27.	year repeating	0.15	0.03	0.10	-0.10	-0.11	-0.06	0.07	-0.07	-0.01	-0.03	-0.07	0.07	-0.04	-0.12	-0.01	-0.03	0.04
28.	overall score humanities	-0.35	-0.09	-0.19	0.18	0.23	0.24	0.14	-0.12	-0.14	0.03	-0.01	0.08	0.04	0.58	-0.06	-0.16	0.12
29.	score humanities p. 1	-0.16	0.03	-0.08	0.16	0.21	0.17	0.09	-0.10	-0.10	0.13	0.05	0.09	-0.01	0.32	0.02	-0.11	0.14
30.	score humanities p.2	-0.40	-0.16	-0.22	0.16	0.20	0.24	0.14	-0.12	-0.14	-0.04	-0.04	0.05	0.06	0.64	-0.10	-0.16	0.08
31.	overall score sciences	-0.16	0.00	-0.06	0.25	0.22	0.11	0.08	0.02	0.08	0.20	0.05	-0.10	0.01	0.47	-0.12	-0.21	0.09
32.	score sciences p.1	-0.15	-0.04	-0.11	0.25	0.24	0.09	0.07	-0.01	0.01	0.13	0.08	-0.06	0.03	0.48	-0.11	-0.16	0.08
33.	score sciences p.2	-0.15	0.04	-0.01	0.23	0.11	0.07	0.05	0.01	0.08	0.17	0.01	-0.09	0.04	0.27	-0.12	-0.23	0.04
34.	score sciences p.3	-0.16	0.02	-0.03	0.24	0.24	0.14	0.14	-0.02	0.04	0.16	0.06	-0.08	0.06	0.48	-0.10	-0.20	0.10
35.	score sciences p.4	-0.06	0.02	0.00	0.09	0.05	0.06	-0.02	0.14	0.23	0.27	-0.04	-0.15	-0.15	0.24	-0.05	-0.13	0.08
36.	overall exam score (h + s)	-0.27	-0.05	-0.13	0.25	0.25	0.19	0.12	-0.05	-0.02	0.14	0.02	-0.02	0.03	0.58	-0.11	-0.21	0.12

	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.
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18.	1.00																		
19.	0.15	1.00																	
20.	0.30	0.50	1.00																
21.	-0.03	-0.11	-0.05	1.00															
22.	-0.12	-0.05	0.01	0.55	1.00														
23.	-0.26	0.10	0.06	0.18	0.24	1.00													
24.	0.09	-0.01	-0.20	-0.03	-0.02	0.24	1.00												
25.	-0.04	0.06	-0.10	0.00	0.03	0.39	0.42	1.00											
26.	0.01	0.05	-0.12	-0.04	-0.03	0.33	0.44	0.97	1.00										
27.	-0.15	0.01	0.00	0.08	0.14	0.26	-0.01	0.10	0.02	1.00									
28.	0.23	-0.13	-0.06	-0.04	-0.07	-0.34	-0.06	-0.44	-0.37	-0.21	1.00								
29.	0.17	-0.14	-0.04	-0.04	-0.07	-0.29	0.02	-0.37	-0.29	-0.16	0.81	1.00							
30.	0.23	-0.10	-0.07	-0.03	-0.06	-0.31	-0.10	-0.41	-0.35	-0.20	0.93	0.54	1.00						
31.	0.10	0.00	0.11	-0.04	-0.05	-0.17	-0.12	-0.34	-0.32	-0.10	0.58	0.59	0.47	1.00					
32.	0.10	0.02	0.10	-0.08	-0.06	-0.12	-0.11	-0.31	-0.28	-0.14	0.57	0.56	0.47	0.91	1.00				
33.	-0.04	-0.03	0.09	-0.03	-0.04	-0.06	-0.12	-0.25	-0.25	0.03	0.42	0.45	0.33	0.81	0.65	1.00			
34.	0.16	0.00	0.12	0.00	-0.03	-0.22	-0.10	-0.36	-0.33	-0.13	0.58	0.56	0.49	0.90	0.77	0.64	1.00		
35.	0.08	-0.03	0.05	-0.03	-0.02	-0.13	-0.05	-0.15	-0.15	-0.05	0.27	0.32	0.19	0.68	0.51	0.51	0.48	1.00	
36.	0.18	-0.07	0.04	-0.05	-0.06	-0.27	-0.11	-0.43	-0.38	-0.17	0.86	0.77	0.76	0.91	0.85	0.71	0.85	0.56	1.00

Table 5. Correlations (schools) - overall (all values p<0,05)

Variable		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	
1.	gender (% boys)	1.00													1.
2.	no. of family members (average)	0.27	1.00												2.
3.	no. of rooms (average)	0.04	0.16	1.00											3.
4.	journey time to school (average)	-0.14	0.15	-0.08	1.00										4.
5.	material situation (average)	0.18	-0.42	0.26	-0.39	1.00									5.
6.	educational plans (average)	-0.19	-0.26	0.05	-0.25	0.57	1.00								6.
7.	humanities score (average)	-0.29	-0.49	0.15	-0.21	0.47	0.57	1.00							7.
8.	sciences score (average)	-0.29	-0.40	0.08	-0.03	0.41	0.49	0.81	1.00						8.
9.	overall exam score (average)	-0.30	-0.46	0.12	-0.12	0.46	0.55	0.94	0.96	1.00					9.
10.	no mother (% of students)	-0.46	-0.24	-0.23	0.36	-0.38	-0.21	-0.20	-0.13	-0.17	1.00				10.
11.	no father (% of students)	-0.11	-0.22	-0.45	0.20	-0.21	-0.10	-0.19	-0.18	-0.20	0.55	0.01			11.
12.	unempl. mother (% of students)	0.04	0.19	-0.27	-0.06	-0.38	-0.36	-0.42	-0.32	-0.38	0.30	0.14	0.01		12.
13.	unempl. father (% of students)	-0.19	-0.13	-0.40	0.08	-0.38	-0.40	-0.26	-0.21	-0.25	0.55	0.31	0.62	1.00	13.
14.	alcohol in family (% of students)	-0.01	0.08	-0.26	0.37	-0.30	-0.26	-0.41	-0.26	-0.34	0.63	0.68	0.40	0.54	14.
15.	year repeating (% of students)	0.15	-0.16	-0.37	0.47	-0.21	-0.43	-0.49	-0.44	-0.49	0.44	0.55	0.21	0.33	15.
16.	assessment of Polish teacher	-0.05	-0.10	0.20	0.13	0.04	0.14	0.23	-0.22	0.23	0.20	0.06	-0.22	-0.15	16.
17.	assessment of maths teacher	-0.37	-0.46	-0.21	-0.12	0.14	0.30	0.43	0.41	0.44	0.11	0.12	-0.25	0.08	17.
18.	assessment of history teacher	-0.11	-0.10	0.02	-0.11	0.16	0.40	0.43	0.43	0.45	-0.22	-0.16	-0.56	-0.37	18.
19.	assessment of biology teacher	-0.08	0.07	0.13	-0.08	-0.02	0.35	0.15	0.26	0.22	0.11	0.07	-0.04	-0.19	19.
20.	assessment of geography teach.	-0.14	-0.25	-0.01	-0.03	-0.03	0.26	0.11	0.10	0.11	0.01	-0.16	-0.16	-0.06	20.
21.	assessment of physics teacher	-0.04	-0.36	0.05	0.00	0.33	0.15	0.26	0.06	0.16	-0.21	0.09	-0.51	-0.29	21.
22.	assessment of chemistry teach.	-0.04	-0.05	-0.26	0.24	-0.03	0.10	0.05	0.13	0.10	-0.09	0.19	-0.17	-0.13	22.

14.	15.	16.	17.	18.	19.	20.	21.	22.
1.00								
0.49	1.00							
-0.01	-0.07	1.00						
-0.17	-0.22	0.20	1.00					
-0.45	-0.42	0.43	0.39	1.00				
0.05	-0.38	0.43	0.09	0.32	1.00			
-0.25	-0.04	0.24	0.15	0.33	0.19	1.00		
-0.23	0.07	0.17	0.11	0.23	-0.02	0.13	1.00	
-0.09	0.12	0.20	0.12	0.19	0.29	0.27	0.38	1.00

Table 6. Correlations (schools) - overall (all values p<0,05)

Variable		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.	number of students	1.00												
2.	number of grades	0.99	1.00											
3.	number of students per grade	0.48	0.39	1.00										
4.	overall number of teachers	0.90	0.90	0.34	1.00									
5.	number of full time teachers	0.79	0.79	0.38	0.78	1.00								
6.	no. of full time teach. / overall teach. %	0.30	0.28	0.39	0.16	0.65	1.00							
7.	no. of students per room	0.58	0.55	0.49	0.41	0.46	0.34	1.00						
8.	no. of students per computer	0.64	0.66	0.30	0.59	0.56	0.26	0.55	1.00					
9.	no. of students per internet access	0.15	0.17	0.05	0.09	0.04	- 0.02	0.11	0.45	1.00				
10.	number of students per class	0.46	0.39	0.71	0.33	0.43	0.30	0.47	0.24	- 0.11	1.00			
11.	humanities exam (average)	0.30	0.26	0.43	0.32	0.46	0.40	0.15	0.01	- 0.16	0.39	1.00		
12.	sciences exam (average)	0.30	0.26	0.37	0.38	0.43	0.30	0.19	0.01	- 0.15	0.30	0.80	1.00	
13.	exam overall (average)	0.32	0.27	0.42	0.37	0.47	0.37	0.18	0.01	- 0.16	0.36	0.93	0.96	1.00

Table 7. Multiple regression (students overall) of the dependent variable: overall exam score R2 = 0,340

	BETA	p level	t
number of rooms	0.079	0.063	1.862
computer	0.027	0.540	0.614
internet	0.045	0.342	0.952
books	0.076	0.104	1.627
commuting to school	-0.034	0.587	-0.544
distance	-0.099	0.159	-1.410
time 1	**0.198**	**0.005**	2.815
time 2	-0.038	0.454	-0.749
location	0.083	0.133	1.504
material situation	-0.026	0.540	-0.613
plans	0.068	0.098	1.659
no mother	0.041	0.434	0.782
no father	-0.005	0.898	-0.128
mother education	0.043	0.463	0.734
father education	**0.190**	**0.002**	3.048
mother occupation	0.094	0.130	1.515
father occupation	0.099	0.109	1.607
unemployed mother	-0.002	0.953	-0.059
unemployed father	0.036	0.410	0.825
alcohol	-0.080	0.077	-1.774
drugs	0.004	0.940	0.075
absent classes	-0.280	0.223	-1.220
absent days	0.010	0.967	0.041
year repeating	**-0.130**	**0.006**	-2.735

Table 8. Multiple regression (students overall) of the dependent variable: humanities R2 = 0.341

	BETA	p level	t
number of rooms	**0.086**	**0.042**	2.034
computer	0.043	0.321	0.992
internet	0.067	0.153	1.430
books	0.034	0.462	0.736
commuting to school	0.010	0.867	0.167
distance	**-0.166**	**0.019**	-2.360
time 1	**0.187**	**0.008**	2.663
time 2	-0.051	0.315	-1.005
location	0.067	0.227	1.210
material situation	-0.039	0.368	-0.901
plans	**0.116**	**0.005**	2.816
no mother	0.024	0.653	0.449
no father	0.001	0.974	0.032
mother education	0.034	0.569	0.570
father education	**0.154**	**0.014**	2.476
mother occupation	0.094	0.131	1.513
father occupation	0.065	0.294	1.050
unemployed mother	-0.024	0.565	-0.575
unemployed father	0.030	0.484	0.700
alcohol	**-0.113**	**0.012**	-2.521
drugs	0.016	0.757	0.309
absent classes	**-0.498**	**0.030**	-2.172
absent days	0.253	0.268	1.108
year repeating	-0.092	0.053	-1.941

Table 9. Multiple regression (students overall) of the dependent variable: sciences R2 = 0,268

	BETA	p level	t
number of rooms	0.062	0.166	1.388
computer	-0.009	0.839	-0.204
internet	-0.020	0.689	-0.400
books	**0.100**	**0.042**	2.035
commuting to school	-0.067	0.314	-1.007
distance	-0.030	0.687	-0.403
time 1	**0.179**	**0.016**	2.424
time 2	-0.022	0.681	-0.411
location	0.085	0.144	1.463
material situation	-0.012	0.784	-0.273
plans	0.019	0.657	0.444
no mother	0.050	0.367	0.903
no father	-0.010	0.818	-0.230
mother education	0.046	0.465	0.731
father education	**0.193**	**0.003**	2.946
mother occupation	-0.081	0.215	-1.241
father occupation	0.114	0.080	1.754
unemployed mother	0.016	0.720	0.359
unemployed father	0.035	0.439	0.774
alcohol	-0.041	0.389	-0.862
drugs	-0.007	0.901	-0.124
absent classes	-0.060	0.805	-0.247
absent days	-0.194	0.420	-0.807
year repeating	**-0.143**	**0.004**	-2.865

Table 10. Multiple regression (students - big cities) of the dependent variable: overall exam score R2 = 0,518

	BETA	p level	t
gender	-0.002	0.983	-0.022
no. of family members	-0.018	0.887	-0.142
no. of siblings	-0.098	0.430	-0.791
no. of rooms	0.107	0.202	1.282
computer	0.094	0.308	1.025
internet	0.028	0.753	0.315
books	**0.202**	**0.013**	2.512
commuting to school	-0.050	0.670	-0.426
distance	0.084	0.538	0.618
time 1	0.117	0.458	0.744
time 2	0.017	0.850	0.189
location	**0.188**	**0.019**	2.378
material situation	-0.046	0.563	-0.580
plans	**0.418**	**0.000**	4.451
no mother	0.092	0.303	1.034
no father	-0.073	0.432	-0.788
mother education	-0.036	0.729	-0.348
father education	0.194	0.086	1.729
mother occupation	0.009	0.927	0.092
father occupation	**0.196**	**0.047**	2.011
unemployed mother	0.012	0.872	0.162
unemployed father	-0.090	0.277	-1.092
alcohol	0.068	0.429	0.794
drugs	0.077	0.410	0.827
absent classes	0.238	0.611	0.510
absent days	-0.438	0.332	-0.975
year repeating	-0.091	0.442	-0.772

Table 11. Multiple regression (students - big cities) of the dependent variable: humanities R2 = 0,491

	BETA	p level	t
gender	-0.093	0.228	-1.211
no. of family members	-0.056	0.669	-0.428
no. of siblings	-0.058	0.645	-0.462
no. of rooms	0.146	0.091	1.704
computer	0.069	0.464	0.734
internet	0.006	0.951	0.061
books	**0.180**	**0.032**	2.172
commuting to school	0.067	0.583	0.550
distance	0.040	0.778	0.283
time 1	0.049	0.763	0.302
time 2	0.025	0.786	0.273
location	**0.228**	**0.006**	2.815
material situation	-0.078	0.337	-0.964
plans	**0.435**	**0.000**	4.504
no mother	0.117	0.204	1.278
no father	-0.138	0.148	-1.457
mother education	-0.025	0.817	-0.232
father education	0.114	0.324	0.991
mother occupation	0.009	0.930	0.088
father occupation	0.190	0.060	1.899
unemployed mother	-0.011	0.887	-0.143
unemployed father	-0.129	0.127	-1.535
alcohol	0.075	0.396	0.851
drugs	0.038	0.692	0.398
absent classes	0.103	0.831	0.214
absent days	-0.245	0.596	-0.531
year repeating	-0.032	0.790	-0.267

Table 12. Multiple regression (students - big cities) of the dependent variable: sciences R2 = 0,483

	BETA	p level	t
gender	0.073	0.350	0.937
no. of family members	0.014	0.913	0.109
no. of siblings	-0.119	0.351	-0.935
no. of rooms	0.064	0.456	0.747
computer	0.105	0.272	1.102
internet	0.053	0.570	0.568
books	**0.200**	**0.018**	2.401
commuting to school	-0.140	0.254	-1.146
distance	0.112	0.430	0.792
time 1	0.161	0.327	0.985
time 2	0.009	0.925	0.094
location	0.136	0.098	1.665
material situation	-0.015	0.854	-0.184
plans	**0.363**	**0.000**	3.730
no mother	0.063	0.498	0.680
no father	-0.012	0.896	-0.130
mother education	-0.041	0.699	-0.387
father education	**0.239**	**0.042**	2.059
mother occupation	0.008	0.936	0.080
father occupation	0.181	0.075	1.794
unemployed mother	0.030	0.703	0.382
unemployed father	-0.048	0.570	-0.569
alcohol	0.056	0.532	0.627
drugs	0.100	0.297	1.046
absent classes	0.324	0.505	0.669
absent days	-0.550	0.239	-1.182
year repeating	-0.129	0.291	-1.060

Table 13. Multiple regression (students - small towns) of the dependent variable: overall exam score
R2 = 0,491

	BETA	p level	t
gender	-0.026	0.744	-0.327
no. of family members	-0.053	0.812	-0.238
no. of siblings	-0.024	0.912	-0.111
no. of rooms	0.082	0.386	0.871
computer	0.174	0.097	1.674
internet	0.096	0.299	1.044
books	-0.030	0.727	-0.350
commuting to school	-0.082	0.565	-0.577
distance	-0.063	0.711	-0.372
time 1	0.152	0.384	0.874
time 2	-0.056	0.684	-0.408
location	-0.063	0.608	-0.515
material situation	0.004	0.956	0.056
plans	**0.310**	**0.000**	3.613
no mother	0.103	0.221	1.231
no father	-0.073	0.382	-0.877
mother education	0.135	0.202	1.284
father education	**0.222**	**0.034**	2.146
mother occupation	0.038	0.752	0.316
father occupation	0.074	0.533	0.626
unemployed father	0.104	0.191	1.317
alcohol	-0.146	0.126	-1.543
absent classes	0.445	0.370	0.901
absent days	-0.684	0.171	-1.378
year repeating	0.060	0.487	0.697

Table 14. Multiple regression (students - small towns) of the dependent variable: humanities R2 = 0,593

	BETA	p level	t
gender	**-0.160**	**0.028**	-2.226
no. of family members	-0.049	0.809	-0.242
no. of siblings	-0.054	0.780	-0.280
no. of rooms	0.064	0.447	0.764
computer	0.139	0.138	1.493
internet	0.055	0.503	0.672
books	-0.088	0.263	-1.125
commuting to school	-0.125	0.329	-0.981
distance	-0.080	0.597	-0.530
time 1	0.161	0.305	1.031
time 2	-0.068	0.581	-0.554
location	-0.110	0.322	-0.996
material situation	-0.036	0.614	-0.505
plans	**0.298**	**0.000**	3.879
no mother	-0.025	0.740	-0.333
no father	-0.008	0.913	-0.109
mother education	0.137	0.150	1.451
father education	**0.264**	**0.005**	2.848
mother occupation	0.076	0.478	0.712
father occupation	0.000	0.998	0.002
unemployed father	0.067	0.346	0.945
alcohol	-0.095	0.265	-1.120
absent classes	0.146	0.741	0.331
absent days	-0.468	0.294	-1.055
year repeating	0.038	0.622	0.494

Table 15. Multiple regression (students - small towns) of the dependent variable: sciences R2 = 0,354

	BETA	p level	t
gender	0.092	0.314	1.012
no. of family members	-0.049	0.846	-0.194
no. of siblings	0.006	0.982	0.023
no. of rooms	0.084	0.429	0.793
computer	0.177	0.134	1.509
internet	0.116	0.267	1.116
books	0.023	0.816	0.233
commuting to school	-0.033	0.838	-0.205
distance	-0.038	0.841	-0.201
time 1	0.121	0.538	0.618
time 2	-0.037	0.811	-0.240
location	-0.014	0.919	-0.101
material situation	0.038	0.672	0.425
plans	**0.272**	**0.006**	2.811
no mother	**0.196**	**0.040**	2.074
no father	-0.117	0.216	-1.244
mother education	0.113	0.344	0.951
father education	0.152	0.195	1.303
mother occupation	-0.001	0.996	-0.005
father occupation	0.126	0.348	0.942
unemployed father	0.120	0.183	1.341
alcohol	-0.166	0.121	-1.563
absent classes	0.630	0.260	1.132
absent days	-0.760	0.177	-1.359
year repeating	0.069	0.477	0.714

Table 16. Multiple regression (students - rural areas) of the dependent variable: overall exam score R2 = 0,436

	BETA	p level	t
gender	-0.087	0.258	-1.135
no. of family members	0.016	0.900	0.126
no. of siblings	-0.058	0.625	-0.490
no. of rooms	0.091	0.264	1.121
computer	-0.102	0.235	-1.192
internet	0.061	0.475	0.716
books	-0.110	0.158	-1.420
commuting to school	-0.170	0.166	-1.391
distance	**-0.273**	**0.030**	-2.194
time 1	**0.306**	**0.006**	2.814
time 2	**-0.224**	**0.009**	-2.661
location	-0.069	0.502	-0.673
material situation	-0.020	0.800	-0.253
plans	**0.403**	**0.000**	5.053
no mother	0.078	0.332	0.973
no father	-0.016	0.844	-0.197
mother education	-0.027	0.771	-0.291
father education	0.072	0.403	0.838
mother occupation	-0.052	0.590	-0.540
father occupation	0.113	0.213	1.251
unemployed mother	-0.038	0.662	-0.438
unemployed father	0.067	0.447	0.762
alcohol	-0.139	0.083	-1.745
absent days	-0.093	0.286	-1.070
year repeating	-0.026	0.720	-0.359

Table 17. Multiple regression (students - rural areas) of the dependent variable: humanities R2 = 0,489

	BETA	p level	t
gender	**-0.150**	**0.043**	-2.042
no. of family members	0.069	0.563	0.579
no. of siblings	-0.113	0.312	-1.014
no. of rooms	0.022	0.774	0.287
computer	-0.040	0.621	-0.496
internet	0.002	0.982	0.022
books	-0.097	0.189	-1.320
commuting to school	-0.129	0.271	-1.105
distance	**-0.369**	**0.002**	-3.106
time 1	**0.316**	**0.003**	3.046
time 2	**-0.246**	**0.003**	-3.064
location	-0.004	0.964	-0.046
material situation	-0.022	0.770	-0.292
plans	**0.401**	**0.000**	5.284
no mother	0.074	0.333	0.972
no father	0.044	0.570	0.570
mother education	-0.056	0.527	-0.634
father education	0.104	0.205	1.274
mother occupation	-0.039	0.671	-0.425
father occupation	0.082	0.343	0.951
unemployed mother	-0.023	0.783	-0.276
unemployed father	0.054	0.514	0.654
alcohol	**-0.203**	**0.008**	-2.672
absent days	-0.059	0.476	-0.714
year repeating	-0.034	0.614	-0.506

Table 18. Multiple regression (students - rural areas) of the dependent variable: sciences R2 = 0,319

	BETA	p level	t
gender	-0.018	0.832	-0.212
no. of family members	-0.033	0.808	-0.243
no. of siblings	0.001	0.993	0.009
no. of rooms	0.136	0.131	1.521
computer	-0.139	0.143	-1.473
internet	0.102	0.276	1.064
books	-0.103	0.231	-1.202
commuting to school	-0.178	0.189	-1.320
distance	-0.144	0.296	-1.048
time 1	**0.246**	**0.042**	2.056
time 2	-0.168	0.073	-1.805
location	-0.113	0.315	-1.009
material situation	-0.014	0.864	-0.171
plans	**0.336**	**0.000**	3.830
no mother	0.068	0.441	0.772
no father	-0.066	0.462	-0.734
mother education	0.003	0.977	0.029
father education	0.032	0.739	0.034
mother occupation	-0.054	0.608	-0.514
father occupation	0.121	0.225	1.218
unemployed mother	-0.045	0.640	-0.469
unemployed father	0.065	0.494	0.686
alcohol	-0.060	0.497	-0.681
absent days	-0.107	0.266	-1.118
year repeating	-0.014	0.862	-0.174

Table 19. Multiple regression (schools overall) of the dependent variable: average humanities score R2 = 0,680

	BETA	p level	t
gender %	-0.065	0.645	-0.466
family members (average)	**-0.442**	**0.005**	-2.980
rooms (average)	0.03	0.834	0.211
time overall (average)	0.274	0.084	1.783
material situation (average)	0.206	0.246	1.182
plans (average)	0.138	0.355	0.937
no mother %	-0.093	0.615	-0.507
no father %	0.148	0.442	0.778
unemployed mother %	-0.069	0.648	-0.461
unemployed father %	0.092	0.618	0.502
alcohol %	-0.177	0.409	-0.837
year repeating %	**-0.527**	**0.005**	-3.014

Table 20. Multiple regression (schools overall) of the dependent variable: average sciences score R2 = 0,602

	BETA	p level	t
gender %	-0.095	0.547	-0.608
family members (average)	**-0.393**	**0.023**	-2.381
rooms (average)	-0.154	0.333	-0.982
time overall (average)	**0.508**	**0.006**	2.967
material situation (average)	**0.437**	**0.031**	2.256
plans (average)	-0.011	0.948	-0.066
no mother %	-0.049	0.811	-0.241
no father %	0.030	0.888	0.142
unemployed mother %	0.060	0.720	0.362
unemployed father %	-0.048	0.818	-0.231
alcohol %	0.010	0.967	0.041
year repeating %	**-0.683**	**0.001**	-3.505

Table 21. Multiple regression (schools overall) of the dependable variable: average overall exam score R2 = 0,678

	BETA	p level	t
gender %	-0.086	0.544	-0.613
family members (average)	**-0.436**	**0.006**	-2.932
rooms (average)	-0.077	0.589	-0.545
time overall (average)	**0.425**	**0.009**	2.763
material situation (average)	0.352	0.051	2.021
plans (average)	0.058	0.700	0.389
no mother %	-0.072	0.698	-0.392
no father %	0.086	0.654	0.452
unemployed mother %	0.004	0.981	0.024
unemployed father %	0.015	0.936	0.081
alcohol %	-0.076	0.722	-0.359
year repeating %	**-0.645**	**0.001**	-3.682

Tab. 22. Factor loadings (Varimax) principal components

Variable groups	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
A	0.638	-0.208	-0.156	-0.198	-0.073
B	0.118	0.651	0.306	-0.324	-0.183
C	0.331	-0.144	0.567	0.133	0.174
D	**0.766**	0.124	0.021	0.154	0.036
E	0.161	0.002	**-0.775**	-0.003	0.025
F	-0.06	**0.788**	-0.2	0.168	0.135
G	-0.004	-0.021	-0.015	0.054	**-0.957**
H	0.0038	0.016	0.034	**0.897**	-0.072

A – absent classes, absent days
B – parental education and occupation
C – unemployment (mainly father's), absence of mother, drugs
D – number of rooms, books, self-assessment of material situation
E – commuting and distance from home to school
F – number of family members, siblings, size of city/town/village
G – combined transport and walking time and walking time to school
H – gender, educational plans