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# Organisational models of gymnasium in Poland

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In 1999, as a result of reforms of the education system, a new type of lower secondary school, called gymnasium, was introduced in Poland. The main objectives of introducing the gymnasium were to equalize the educational opportunities of rural youth, improve the level of education and extend general education by one year. The reformers envisioned gymnasiums as an autonomous school, located in new, well-equipped buildings, or as schools functioning alongside existing secondary schools. After 16 years of operation, four structural models of gymnasiums evolved: autonomous gymnasium, aggregate gymnasium in a complex with a primary school, gymnasium in a complex with a primary school having the same catchment area, and gymnasium with upper secondary school. The article investigates the differences in the organisational characteristics for each model of gymnasium, educational outcomes from different types of school, and their geographic distribution. Results show that even though gymnasiums in a complex with an upper secondary school attain on average the best results on the gymnasium completion exam, the highest scores in teaching effectiveness are achieved by gymnasiums in complexes with a primary school having the same catchment area.

Keywords: gymnasium; structural model of school; local education policy.

Gymnasiums, or lower secondary schools encompassing grades 7 to 9, were introduced to the Polish education system on September 1, 1999. The intention of the reformers introducing this new type of school was to establish a small network (not more than about four thousand schools, Książek, 2001) of large and well-equipped institutions, employing the best teachers. The reformers insisted on establishing autonomous gymnasiums, since they believed that this was a condition of achieving the main goals of the reform, namely to equalize educational opportunities and improve educational quality. As the programme of the gymnasium was envisioned to be linked to the curriculum of general upper secondary schools, the reformers proposed that, wherever possible, gymnasiums be established in complexes[1] with general upper secondary schools, or that upper secondary school classes be created in large rural gymnasiums (Handke, 2006). In other words, an autonomous gymnasium and a gymnasium in a school complex with a general upper secondary school were the two preferred organisational models.

The most important controversy of gymnasium reform was the issue of establishing complexes of gymnasiums and primary schools (grades 1 to 6). From the very beginning,

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[1] A school complex, clearly defined in Polish education legislation, is a group of schools functioning together, under one director and with a single budget, typically located in one school facility.

the Law on the education system[2] prohibited the establishment of such school complexes. Municipalities[3] warned that they would not be able to open autonomous gymnasiums unless they received sufficient grants for erecting new buildings. On the other hand, the reformers were afraid that locating gymnasiums together with primary schools would defeat the aims of the reform by recreating the inherited network of primary schools.

Sixteen years after gymnasium reform was introduced, half of municipal gymnasiums in Poland operate in school complexes with a primary school. This means that children aged six/seven to sixteen are being taught in the same building. Due to independent decisions of municipalities, the organisational model of the gymnasium, which reformers most wanted to avoid has become the most frequent one. Only 6% of gymnasiums operate in school complexes with upper secondary schools[4], while the number of autonomous gymnasiums has decreased (Herczyński and Sobotka, 2014). The development of various types of gymnasiums means that Polish gymnasium students attend institutions that differ organisationally, e.g. in the age range of the students at school (7–16, 13–16, 13–19), the number of educational thresholds they pass while at school (1 or 2), and the age at which the first educational threshold is crossed (13 or 16).

The purpose of this article is to analyse the functioning of various organisational models of gymnasiums established by municipal authorities. We identify the following four types of gymnasiums: an autonomous gymnasium, a gymnasium in a school complex with a primary school, whose catchment area encompasses catchment areas of several primary schools (*an aggregate gymnasium*), a gymnasium in a school complex with a primary school, where both have the same catchment area and essentially, the same students attend both, creating in effect a nine-year school (a *single district gymnasium*) and a gymnasium in a school complex with an upper secondary school. These models exhibit different organisational features (size of the school, class size), school functioning (homogeneity, repeated grades, outflow of students, after-school club activities and extracurricular activities), results of gymnasium completion exam[5] conducted by the Central Examination Board (Centralna Komisja Egzaminacyjna, CKE), and the educational value added (EVA) indicator.

## The impact of grade configuration on the learning results of students

The impact of the organisation of a school on its operation is often analysed in American studies. These analyses assess the impact of grade configuration on student knowledge, measured by external tests (Rockoff and Lockwood, 2010; Schwerdt and West, 2013). The American education system, like the Polish one, has 12 years of school education and is divided into three types of schools: *elementary schools*, *middle schools* and *high schools*. Unlike Poland, however, the organisation of the grades in individual schools is quite flexible and many grade configurations are allowed[6] – an ele-

[2] *Law of 7 September 1991 on the education system* (as amended).

[3] *Municipality* refers to first tier of local government, called *gmina* in Polish. The second tier of local government is the county, *powiat* in Polish. About 70 large cities are both municipalities and counties, they are referred to as *cities with county rights*.

[4] By *secondary schools* we mean upper secondary schools, encompassing grades from 10 to 12, both general academic and professional.

[5] Polish students take three nationally mandated exams: towards the end of the primary school (6th grade), at the completion of gymnasium (9th grade) and so called *matura* at the completion of secondary schools (12th grade).

[6] School districts can organise schools that have either single grades (for example, only the seventh grade), selected grades (for example 6–8), or all grades from kindergarten (K-12). For example, as many as 64 various configurations of grades have been identified in Louisiana (Franklin and Glascock, 1998).

mentary school may have five grades, but it can also be an eight- or twelve-grade school. A middle school includes "in-between" students, and here too, the limits are not clear cut. Studies of grade configurations are mainly focused on the results achieved by 6th grade students, who can attend various types of schools: elementary schools (K-6, K-8), middle schools (6–8) or comprehensive schools (K-12) covering the entire period of mainstream education. Research on over 700 rural schools in Louisiana carried out by Bobby Franklin and Catherine Glascock (1998) show that 6th grade students who attend schools with a 1–6/7 and 1–12 system achieved significantly better learning results (school size and socio-economic status were controlled) and had better school attendance than their peers at schools with a 6–8 or 6–9 system. David Wihry, Theodore Coladarci and Curtis Meadow (1992) surveyed 8th grade students who achieved significantly better results at schools with configurations: K-8, K-9 and 3–8 than students at middle schools (4–8, 5–8, 6–8) or schools consisting of a middle and high school (6–12, 7–12, 8–12). On the other hand, analyses carried out by Henry Becker (1987) showed that attending an elementary school (K-9) instead of a middle school (7–9) had a significant positive impact on the results of students from backgrounds of a poor socio-economic status.

Difficulties resulting from changing the school environment are the main reason for poorer results at American middle schools. John Alspaugh (1999) proved that in each year following transition from one school to another, students' results significantly fell, while Roberta Simmons and Dale Blyth (1987) showed that students changing schools had not only lower school results, but also a decrease in motivation and self-assessment. American middle schools, as Polish gymnasium, are often criticised for the lack of effective personal development programmes for students who are at the most difficult stage of puberty. Supporters of establishing separate schools for younger teenagers believe that such a school can better meet the needs of this age group. However, because of worsening learning outcomes, students leaving the education system, and other behavioural problems, middle schools are informally referred to as the "Bermuda triangle of education" (see example Ward, 2008). In recent years, some American school districts have started to abandon the K-5 and 6–8 division and are returning to the K-8 school model (Chaker, 2005).

In Poland, the education structure is more rigid, and since 1999 it has been operating in a 6+3+3 model. This seemingly simple structure is somewhat obscured by organising schools into complexes, which enables some diversification of the general education system. Art. 62.1 of the Law on the education system allows school founders to join several different schools into a complex. To establish a school complex, as in opening a new school, a preliminary decision and statutes must be adopted by the founder (for public schools, the municipal council). Schools in a complex share buildings and infrastructure (a gym, a canteen and a library), are managed by one director, and the same staff typically teaches in all the schools belonging to the complex. Students who learn in the same school building, participate together in school events, or spend time together during class breaks form a community, irrespective of their formal enrolment in individual schools. According to the adopted statute, a school complex may also have one teachers' council, one parents' council and one student government. In consequence, schools belonging to one complex function as one organism and, in terms of their organisation and education processes, form one school structure. As in the American system, a Polish gymnasium student may attend an "extended" primary school (SP+G model), a stand-alone gymnasium for students aged 13–16 (SAMG) or a gymnasium operating with an upper secondary school (G+PG).

The number of Polish studies describing the operation of school complexes is small. Artur Bajerski (2011) observed that the municipalities establishing school complexes of a primary school and gymnasium used this as a method of reducing the negative consequences of the periodically changing number of students in individual grades and of lowering the costs of maintaining schools – so this is usually dictated by administrative and financial reasons. When studying 21 municipalities in the Małopolska region, Jerzy Lackowski (2008) stated that there was no relation between the structure of the gymnasium network (understood as the operation of an autonomous gymnasium or one in a school complex) and the results achieved by students in gymnasium completion exam. However, he noted that the worst results were those of students from municipalities with large, autonomous gymnasiums, whereas the best were achieved by students from small gymnasiums attached to primary schools with only one class per grade.

In the case of single district gymnasiums (that is a gymnasium in a complex with a primary school with the same catchment area), the key issue is the smooth transition of students from the 6th grade of the primary school to the first year of gymnasium, and the continuation of education in an unchanged environment (usually in the same class). In this context, the findings of research on students' migration between classes as part of their transition from a primary school to a gymnasium are of interest. The analysis conducted by Grzegorz Humenny, Maciej Koniewski, Przemysław Majkut and Paulina Skórska (2014) indicates that in areas with a smaller population density and less development, unlike in large cities, only a small reshuffling of students takes place between primary school and gymnasium. Only 5.5% of children from rural areas attended a class with no colleagues from their previous primary school class, while in cities of over 100 000 inhabitants, 25% of students experience this. The study shows that there is a positive, though very small impact of maintaining class composition between primary school and gymnasium on the results of the gymnasium completion exam. This effect is particularly noticeable in rural areas. However, these analyses did not include EVA.

## Establishing the network of gymnasiums

Gymnasiums were planned as educational institutions teaching at least 150 students and operating in separate buildings[7]. In 1998, the Ministry of National Education carried out a simulation of the new network of gymnasiums and on this basis planned, according to the so-called efficiency option, the establishment of about 5500 such schools across Poland. In 2001, an average number of 307 students per gymnasium and average class size of 24.9 students were planned. However, the simulations of the Ministry of National Education were not in agreement with the plans of municipalities. A survey carried out in April 1998 on establishing the network of gymnasiums showed that municipalities planned to open 7093 gymnasiums (MEN, 1998).

Dedicated central investment programmes, including the co-financing of school projects[8] and computer labs[9], were introduced to achieve the aims of the reform. At

[7] § 2 of the *Regulation of the Minister of National Education of 15 February 1999 on the manner of and time limits for adapting the operation of existing state schools to the requirements of the new school system and the opening of gymnasiums.* In justified cases the regulation allowed smaller gymnasiums to be opened.

[8] In 1999, specific-purpose provision no. 56 of the state budget for "necessary investments related to the establishment of gymnasiums" and for other purposes totalled PLN 45 million.

[9] The program "Internet lab in each gymnasium" financed the establishment of over 800 labs in gymnasiums in 1999.

the same time, two important organisational limits were introduced. First, unlike in the case of primary schools, the Law on the education system did not provide for affiliated gymnasiums[10] (art. 61 of the Law on the education system allowed to establish only affiliated primary schools). In cases where it was not possible to organise a gymnasium in a separate single building, locating some classes in different buildings was temporarily permitted[11].

Gymnasiums operating in several buildings received the unfortunate name of *virtual gymnasiums*. Off-site gymnasium branches were originally allowed to operate until the end of August 2003, but in June of that year, this time limit was extended to August 2005[12]. Because of the temporary nature of this solution, data about off-site classes were not collected by the Central Statistical Office of Poland. However, the number of such classes must have been large, since in September 2003, the number of gymnasiums reported to the Central Statistical Office of Poland suddenly increased by over 300 in comparison to the previous year (in rural areas, an increase by 8.7% during one year was reported). These organisational changes, consisting of the "disclosure" of off-site branches, the separation from their parent gymnasiums, and the establishment as separate schools led to a constant increase of the number of gymnasiums, despite the decreasing number of their students (Herczyński and Sobotka, 2014).

Another important organisational restriction was the prohibition on establishing a school complex consisting of a primary school and a gymnasium (art. 62 § 1a of the Law on the education system). The purpose of this restriction was to prevent municipalities from recreating, as gymnasium level, of the existing network of primary schools. This prohibition, like the first one, was opposed by many rural municipalities, which stated that to meet the requirement of locating the schools in separate buildings, they would need financial support from the central budget for such investments.

In September 1999, 5403 gymnasiums were established in Poland (of which 4990 were municipal ones, see Konarzewski, 2001a). Although the number of new schools was close to the estimates of the Ministry of National Education and smaller than the number declared by municipalities before the introduction of the reform, the Ministry of National Education deemed the network of gymnasiums as "unsatisfactory" (MEN, 2000). Indeed, as many as 300 gymnasiums were schools with only one class per grade, and over 400 classes had fewer than 20 students enrolled. Nearly 3000 gymnasiums were organised as schools attached to primary schools and about 600 were dispersed in buildings of several schools. The Ministry of National Education (2000, p. 3) admitted that:

> Easing the legal requirements relating to opening gymnasiums resulted in having an exception become the rule. [...] Gymnasiums meant to be a chance for the better education of children living in rural areas remained, in many cases, within the walls of the existing primary school. They became "virtual gymnasiums". In such organized gymnasiums, the child remains in the same school environment, although the intention of reformers was most of all to educate better, not closer.

Thus, from the introduction of the reform in 1999, several models of operating a gymnasium developed. The analysis carried out in 2000 based on a representative sample of 266 gymnasiums (Ignar-Golinowska and Gajewska, 2002) identified 7 location models

[10] An affiliated school in Polish terminology is a separate facility of the given school, operating within the same budget and under the same director as the main school.

[11] § 4 of the *Regulation of the Minister of National Education of 15 February 1999.*

[12] *Law of 27 June 2003 on the amendment to the Law on the education system and amendment to certain other acts.*

Table 1
*Percentage distribution of location models of a gymnasium (1999/2000 school year)*

| Model of a gymnasium | School location: Country | Town | Total |
|---|---|---|---|
| Gymnasium in a separate building | 7.8 | 7.3 | 7.6 |
| Gymnasium in a primary school | 72.2 | 63.6 | 67.8 |
| Gymnasium in a complex of schools | 13.0 | 19.2 | 16.7 |
| Gymnasium in a general upper secondary school | 0.0 | 2.0 | 0.8 |
| "Virtual gymnasium" | 4.3 | 2.6 | 3.4 |
| Other models of a gymnasium | 2.6 | 5.3 | 3.8 |

Source: Ignar-Golinowska and Gajewska (2002).

of a gymnasium based on the school facility (Table 1). "Virtual gymnasiums" are institutions educating students in several buildings located away from each other, while the "other models" include schools located, for example, at a special school and education centre or in a dormitory.

Only 7% of gymnasiums operated in separate buildings, whereas a substantial majority of them were in a primary school[13]. During the initial years after introducing the reform, the number of autonomous gymnasiums increased – municipalities obtained loans for their construction, closed primary schools and reorganised the off-site branches. In addition, the number of gymnasiums in complexes with upper secondary schools grew (see Table 4). Reformers gave municipalities two years to adapt the network of gymnasiums to the principles of the new system and to organisationally separate gymnasiums from primary schools. Thus, the reform stated from the very beginning that combining primary schools with gymnasiums was prohibited as of September 1, 2001, i.e. from the moment of full gymnasiums with three grades[14] appeared. However, as early as August 2001, the deadline for terminating the existing complexes of primary schools and gymnasiums was postponed until August 31, 2003 with the approval of the Curator of Education[15]. School complexes in which the primary school was gradually closed[16] could function until the full liquidation of the primary school, however not longer than August 31, 2005. Unexpectedly, in March 2002, both the prohibition on opening school complexes of primary schools and gymnasiums, as well as the requirement of the written approval of the Curator of Education were removed from the Law[17]. In other words, the Law on the education system ceased to prohibit the establishment of such school complexes.

The legal situation of primary school/gymnasium school complexes was regulated again in June 2003, when a new § 5b was added to art. 62: "Developing a school complex of a pre-school with a primary school or with a gymnasium, a primary school with a gymnasium or a pre-school with a primary

[13] These data do not agree with the assessments presented by Rafał Piwowarski (2006) that in 1999, over 60% of gymnasiums out of 5400 operated in a separate location.

[14] *Law of 25 July 1998 on the amendment to the Law on the education system,* art. 62, §1a.

[15] *Law of 23 August 2001 on the amendment to the Law on the education system, the Law – Regulations introducing the school system's reform, the Law – Teacher's Charter and certain other acts,* article 23. Education Curator is a highest ranking education official in voivodship, nominated by the government and served by a strong office, called *kuratorium.*

[16] Meaning those primary schools which stopped enrolling new students.

[17] *Law of 15 March 2002 on the amendment to the Law on the education system and certain other acts*, art. 3 and art. 1, § 5.

Table 2

*Municipal gymnasiums by type of school complex (2012/2013 school year)*

| Schools in a complex | No. of schools | % of schools | % of students |
|---|---|---|---|
| Autonomous gymnasium | 2 327 | 41.5 | 56.9 |
| Pre-school, primary school, gymnasium | 620 | 11.1 | 6.9 |
| Pre-school, primary school, gymnasium, general upper secondary school | 12 | 0.2 | 0.2 |
| Primary school, gymnasium | 2 184 | 39.0 | 26.5 |
| Primary school, gymnasium, general upper secondary school | 87 | 1.6 | 1.6 |
| Primary school, gymnasium, basic vocational school | 16 | 0.3 | 0.2 |
| Primary school, gymnasium, general upper secondary school, basic vocational school | 11 | 0.2 | 0.2 |
| Gymnasium, general upper secondary school | 230 | 4.1 | 5.5 |
| Gymnasium, general upper secondary school, vocational upper secondary school | 25 | 0.4 | 0.5 |
| Gymnasium, general upper secondary school, basic vocational school | 19 | 0.3 | 0.4 |
| Gymnasium, general upper secondary school, basic vocational school, vocational upper secondary school | 19 | 0.3 | 0.3 |
| Gymnasium, vocational upper secondary school | 11 | 0.2 | 0.2 |
| Gymnasium, vocational upper secondary school, basic vocational school | 10 | 0.2 | 0.1 |
| Gymnasiums in other school complexes | 36 | 0.6 | 0.6 |
| Total | 5 607 | 100.0 | 100.0 |

Based on SIO data.

school and a gymnasium requires the approval of the Curator of Education"[18]. This provision has been in force to this day. Moreover, the following provision was introduced regarding the already functioning school complexes:

> The following school complexes existing on the day this Law enters into force: 1) of a pre-school and a primary school, 2) of a pre-school and a gymnasium, 3) of a primary school and a gymnasium, 4) of a pre-school, a primary school and a gymnasium may function not longer than until 31 August 2005, unless they receive before said date a positive opinion as referred to in art. 62, § 5b of the Law cited in art. 1 of this Law (*Law of 27 June 2003 on the amendment to the Law on the education system and amendment to certain other Acts*, art. 15, § 2, p. 9215).

[18] *Law of 27 June 2003 on the amendment to the Law on the education system and amendment to certain other acts*, art. 1, § 47, p. 9203.

## Methodology of identifying the organisational models of gymnasium

An organisational model of a gymnasium is understood as an organisational combination of a gymnasium with a different type of school or the lack of such a combination, with corresponding impact on the operation of the school. To identify the models of gymnasiums, we used the database of the Education Information System (System Informacji Oświatowej, SIO) from September 2012. We restrict the analysis to public gymnasiums in municipalities, since non-public gymnasiums operate under different conditions and regulations.

The SIO database indicates whether a school is part of a school complex and identifies all other schools belonging to the complex. The distribution of municipal gymnasiums in school complexes of various configurations is presented in Table 2. School complexes with one or more schools of a given type (for example, technical schools) are treated identically. Basic vocational schools and post-secondary schools are treated jointly, as are general upper secondary schools and specialised secondary schools. Municipal gymnasiums in school complexes whose configuration exists in Poland in fewer than ten cases (for example a school complex of a gymnasium and a pre-school) are included in the category "Gymnasiums in other school complexes".

Municipal gymnasiums operate in most cases in school complexes with a primary school (50%), either with (11%) or without a pre-school (39%), autonomously (41%), and much less frequently in a complex with a general upper secondary school (4%). About 2% of gymnasiums operate in school complexes including both a primary school and any of the upper secondary schools, while gymnasiums in other "exotic" complexes are even fewer. This indicates that we can identify three main models of gymnasiums in Poland: an autonomous gymnasium, a gymnasium in a school complex with a primary school (with or without a pre-school) and a gymnasium in a school complex with an upper secondary school (a total of 6% of gymnasiums, with a clear dominance of school complexes only with a general upper secondary school). Gymnasiums in other types of school complexes, a total of 162 schools (2.9%) are not included in the further analysis.

The model of gymnasium operating in a school complex with a primary school, i.e. the one that the reformers wanted to avoid, seems particularly interesting. Combining these types of schools, in which some children attend one school for nine years, is reminiscent of the nine-year primary school operating in some Scandinavian countries (Sweden, for example). However, calling a school complex of a primary school and a gymnasium a nine-year school is justified only if the same children attend both schools. The specific character of operating such a gymnasium, in which teachers know the students – their skills, problems and their family situation – is completely different from a gymnasium that, though functioning in one building with a primary school, also admits children from other neighbouring primary schools. In the second situation, most students change their school environment – the so-called gymnasium shock, observed as a difficult period of mutual adaptation to education in new conditions (see Appelt, 2004; Konarzewski, 2001a; 2004).

In consideration of this difference between the two types of gymnasium/primary school complexes, a fourth organisational model should be defined: the gymnasium in a school complex with a primary school with both sharing the same catchment area. However, the SIO database does not include information about school catchment areas. To overcome this, we estimated the homogeneity of gymnasiums, analogously to the homogeneity of school classes introduced in the study of Humenny and his colleagues (2014). For each 3rd year student taking the gymnasium completion exam, we specified the percentage of students who three years earlier had attended the same primary school, and then calculated the maximum of these values for each school. Homogeneity thus defined is equal to the largest percentage of students who had earlier attended the same primary school among the students of a given gymnasium. For example, if the homogeneity of a gymnasium is close to 100%, then almost all students of a given gymnasium attended the same primary school. Thus, it can be assumed that both these schools de facto share the same catchment area.

Estimation of gymnasium homogeneity requires a combination of SIO data with

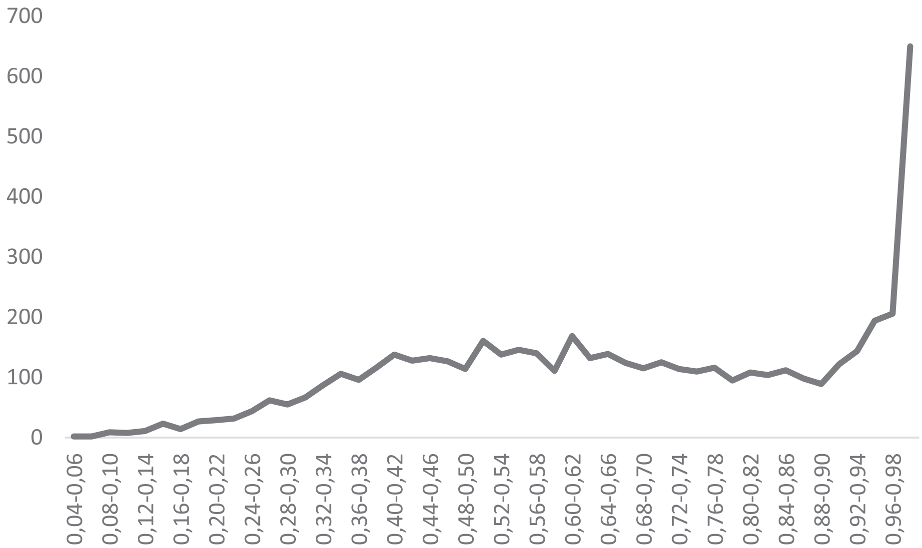



*Figure 1.* The histogram of homogeneity of municipal gymnasiums (2012).

CKE data. This combination was obtained for 5030 municipal gymnasiums (90% of all municipal schools). The average homogeneity of municipal gymnasiums was 66%. The histogram of homogeneity of municipal gymnasiums is presented in Figure 1.

The number of gymnasiums with a homogeneity below 30% is small – these are mainly large and aggregate gymnasiums in cities. A significant increase in the number of students at gymnasiums is observed when homogeneity is equal to 90% and 95%. We take the second value (95%) as the criterion of a common catchment area for a gymnasium and primary school. Gymnasiums with a homogeneity lower than 95% are considered aggregate. In other words, we allowed the possibility that during three years of gymnasium education, one out of 20 students arrived from another primary school district.

We can see that homogeneous gymnasiums include a small number of autonomous schools and several schools in a complex with an upper secondary school (Table 3). This probably is due to the conditions of the facilities, when a primary school and a gymnasium with a common catchment area could

Table 3

*Municipal gymnasiums by structural model and homogeneity*

| Type of gymnasium | Non-homogenous | Homogenous | Total |
|---|---|---|---|
| Autonomous gymnasium | 2 029 | 134 | 2 163 |
| In a school complex with a primary school | 1 829 | 762 | 2 591 |
| In a school complex with an upper secondary school | 267 | 9 | 276 |
| Total | 4 125 | 905 | 5 030 |

Based on SIO and CKE data.

not fit into one school building (or operate in the same building but were not formally combined to form a school complex). We excluded these schools from further analysis. To conclude, the analysis includes 4887 gymnasiums (87.2% of all municipal gymnasiums in Poland).

To summarise this methodological analysis, we identified four organisational models of a gymnasium (the abbreviation denoting a given model used in tables and graphs is provided in brackets):

- Autonomous gymnasium (SAMG),
- Aggregate gymnasium, a gymnasium in a school complex with a primary school attended by graduates of several primary schools (SP+G),
- Single district gymnasium, a gymnasium in a school complex with a primary school, with the same catchment area (SP=G),
- Gymnasium in a school complex with an upper secondary school (G+PG).

Table 4 presents basic information on the number of municipal gymnasiums belonging to various organisational models and their students in the school year 2012/2013. Other, not analysed gymnasiums presented in the penultimate row include institutions in rare school complexes, gymnasiums for which no EVA is calculated and gymnasiums whose data could not be linked in various databases.

## Characteristics of organisational models of a gymnasium

The basic data characterising the structure of gymnasiums belonging to organisational models are presented in Table 5. It is worth emphasising that municipalities operate a certain number of gymnasiums that have no catchment area (these are sports schools, bilingual schools and integration schools).

Table 5 shows that autonomous gymnasiums are the largest, while gymnasiums in a school complex with an upper secondary school are a little smaller. Gymnasiums with a primary school are on average nearly half the size of autonomous ones, while single district gymnasiums are almost three times smaller. However, the variation of school size is very large within each model. Table 5 indicates that autonomous gymnasiums and the ones in school complexes with an upper secondary school are mainly schools with three classes in each grade, aggregate gymnasiums are schools with two classes in each grade, and single district gymnasiums are schools with one class in each grade.

The largest share of students from outside the catchment area (36%) is observed in gymnasiums in school complexes with an upper secondary school (Table 5). These schools are often renowned and students want to attend them, despite the greater

Table 4
*Number of gymnasiums and students by structural model*

| Type of gymnasium | Symbol | No. of schools | No. of students | % of schools | % of students |
|---|---|---|---|---|---|
| Autonomous gymnasium | SAMG | 2 029 | 539 845 | 36.2 | 50.8 |
| Aggregate gymnasium | SP+G | 1 829 | 266 306 | 32.6 | 25.1 |
| Single district gymnasium | SP=G | 762 | 62 401 | 13.6 | 5.9 |
| In a school complex with an upper secondary school | G+PG | 267 | 65 939 | 4.8 | 6.2 |
| Other (not analysed) | | 720 | 128 465 | 12.8 | 12.1 |
| Total | | 5 607 | 1 062 956 | 100.0 | 100.0 |

Based on SIO data.

Table 5

*Characteristics of organisational models of gymnasiums (2012/13 school year)*

| Characteristics | SAMG | SP+G | SP=G | G+PG |
|---|---|---|---|---|
| Average no. of students in the school | 266.1 (136.7) | 145.6 (83.7) | 81.9 (42.6) | 247.0 (128.9) |
| Average no. of students in the class | 23.6 (3.1) | 21.9 (3.7) | 19.4 (3.9) | 24.6 (4.0) |
| Average number of classes in a grade | 3.8 (1.7) | 2.2 (1.1) | 1.4 (0.6) | 3.4 (1.6) |
| Homogeneity of a gymnasium | 54.5% (19.1%) | 67.8% (18.7%) | 99.0% (1.6%) | 44.5% (22.5%) |
| Share of students from outside the catchment area (catchment area gymnasiums only) | 24.4% (26.4%) | 17.3% (26.7%) | 9.5% (26.9%) | 36.0% (35.5%) |
| Share of students entitled to transportation (catchment area gymnasiums) | 26.5% (31.0%) | 35.2% (28.6%) | 23.6% (24.2%) | 14.4% (23.2%) |
| *N* | 2 029 | 1 829 | 762 | 267 |

Based on SIO and CKE data. Standard deviations in parentheses.

distance from home. As non-catchment area students are not entitled to free transportation to school, it is not surprising that these schools have the lowest percentage of students entitled to transportation. The significantly larger share of students entitled to transportion in aggregate gymnasiums than in single district gymnasiums is also easy to understand. Single district gymnasiums, together with their primary schools, are located closer to a student's residence. The relatively large percentage of students from outside the catchment area in single district gymnasiums (9%), even though smaller than in other organisational models, is quite surprising. Perhaps a given primary school is attended by a certain number of non-local students or perhaps this situation results from erroneous data in the SIO (which is also manifested by the large standard deviation).

Gymnasiums belonging to various models are quite different in terms of average homogeneity. The greatest homogeneity is found in single district gymnasiums, which is the effect of the definition of the model adopted. However, aggregate gymnasiums are more homogeneous than autonomous gymnasiums, which in turn are more homogenous than gymnasiums in a school complex with an upper secondary school. This gradation indicates an increasing degree of "inflow" of students to gymnasiums found in various models.

Data on the operation of gymnasiums in various organisational models are provided in Table 6. The effectiveness of a school's operation may be measured by analysing statistics on promotion and dropout. As we cannot use SIO data to determine how many students actually dropped out of the school system and how many left a given school to continue education in another gymnasium (probably a substantial majority), we analysed the number of "student dropouts": we examined, for each gymnasium, by how much the number of graduates in 2012 was smaller than the number of first year students in September 2009. If during these three school years, the number of students increased, we treated it as zero dropout (we did not "compensate" the dropout of students from a given gymnasium with the inflow of students to another gymnasium in the same group of schools). The percentage of participants of extracurricular activities per one hundred students was obtained by dividing the number of participants of these activities by the number of students in a given gymnasium and multiplying by one hundred. As some students participated in more than

Table 6
*Characteristics of structural models of gymnasiums – school operation (2012/2013 school year)*

| Characteristics | SAMG | SP+G | SP=G | G+PG |
|---|---|---|---|---|
| Percentage of students repeating a grade | 3.0% (4.3%) | 2.2% 4.0%) | 1.7% (4.3%) | 3.4% (4.8%) |
| Dropout of students during three years of education | 9.4% (8.8%) | 7.6% (8.3%) | 7.0% (8.1%) | 11.1% (11.4%) |
| Percentage of students using an afterschool club | 21.5% (32.4%) | 23.2% (31.0%) | 22.3% (29.4%) | 12.3% (26.5%) |
| Participants of extracurricular activities per 100 students | 83.8 (58.1) | 79.9 (65.5) | 88.9 (75.6) | 83.3 (64.2) |

Based on SIO and CKE data. Standard deviations in parentheses.

one extracurricular activity, the result is not a percentage of students participating in extracurricular activities.

The information presented in Table 6 confirms that gymnasiums belonging to various organisational models function differently. Grade retention is marginal in municipal gymnasiums. However, there are significant differences between gymnasium models. The fewest students repeat a grade in single district gymnasiums, while the largest number of them – more than twice as often – are from gymnasiums in a school complex with an upper secondary school. The distribution of student dropout is similar. The largest number of student dropouts (over 11%) are from gymnasiums in a school complex with an upper secondary school. This may result from the strict requirements imposed on students, but may also reflect the difficulties of travelling to a distant school. The smallest number of dropouts is characteristic of single district gymnasiums (7%).

The share of students using an afterschool club is very similar in autonomous gymnasiums and gymnasiums in a school complex with a primary school. It is significantly smaller in gymnasiums in a school complex with an upper secondary school and these schools organise such facilities least often (less than every third gymnasium). The percentage of students participating in extracurricular activities is very similar for the different models and equals about 80%, except for single district gymnasiums, where it is higher by 9%. All four variables are quite dispersed within each model.

The data presented in Table 6 seem to indicate that the percentage of students repeating a grade is correlated with the percentage of students dropping out of school. However, at the school level, this correlation is strong only for municipal gymnasiums in a school complex with an upper secondary school ($R = 0.61$) and for autonomous gymnasiums ($R = 0.57$), while it is significantly weaker for the other models ($R = 0.28$ for SP+G; $R = 0.19$ for SP=G). Explaining this variation requires more in-depth analysis.

Because of the large standard deviations, in addition to a review of average values given in Tables 5 and 6, it is also useful to analyse the distribution of relevant variables. In Figure 2, the distribution of the sizes of gymnasiums belonging to various models is presented.

The number of students in two-thirds of the single district gymnasiums does not exceed 90 (potentially schools with one class per grade), while aggregate gymnasiums often consist of 90–180 students (potentially schools with two classes per grade). Among autonomous gymnasiums and gymnasiums in a school complex with an upper secondary school, there are virtually no small schools,

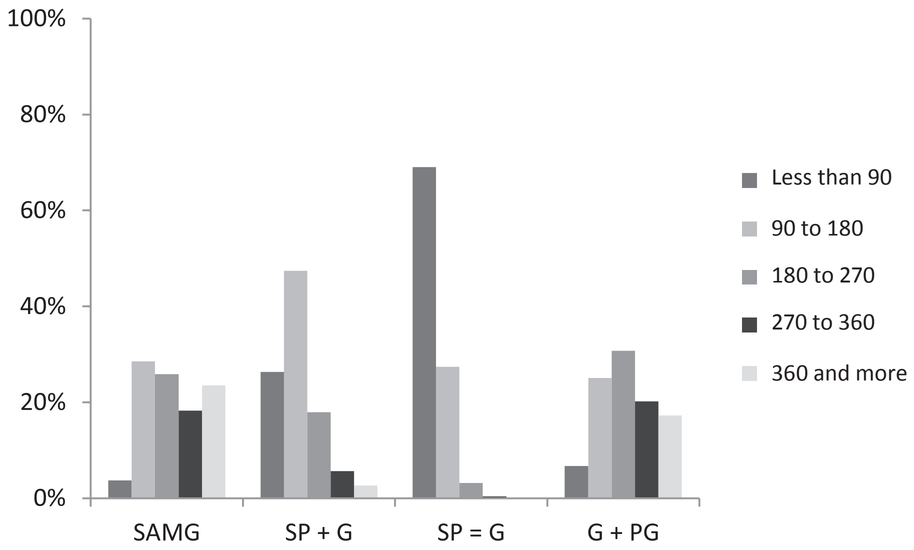



*Figure 2*. Percentage distribution of sizes of gymnasiums by structural model in the 2012/2013 school year.

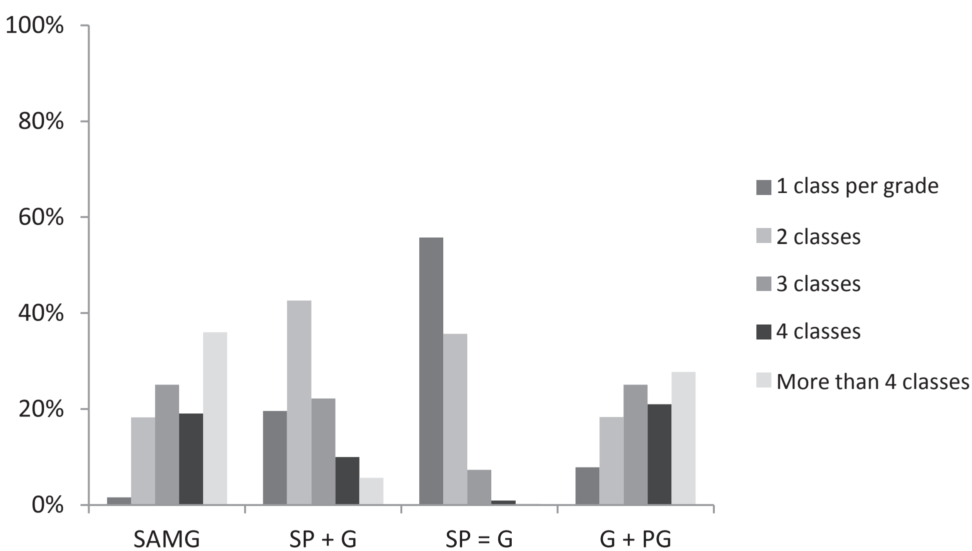



*Figure 3.* Percentage distribution of the number of classes per grade by structural model in the 2012/2013 school year.

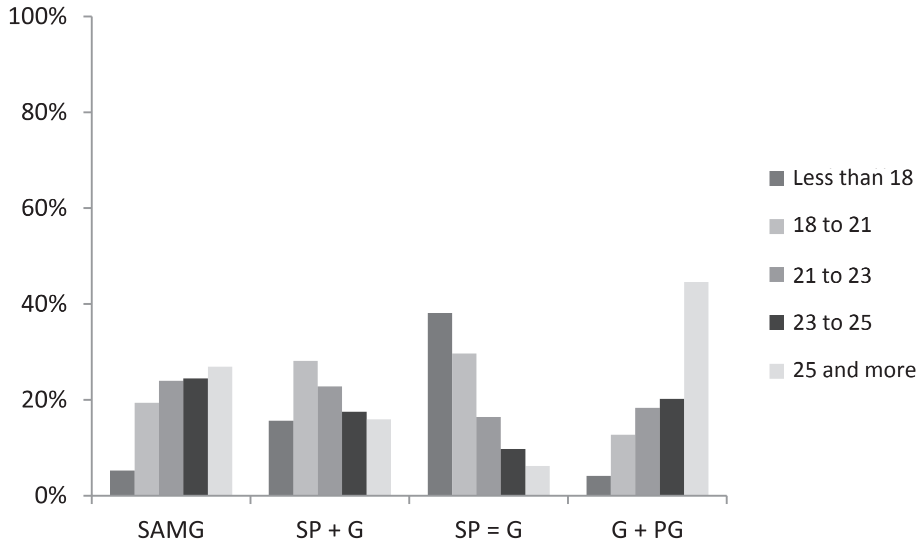



*Figure 4.* Percentage distribution of class size by structural models in the school year 2012/13.

while other schools are present in similar proportions.

The actual number of classes per grade may be estimated based on the number of classes in a school. We assumed that a gymnasium with one class per grade has one to three classes, a gymnasium with two classes per grade has from four to six classes, etc. The distribution of the number of classes per grade of gymnasiums by structural model is illustrated in Figure 3. It shows that among single district gymnasiums, schools with one class per grade dominate, while among aggregate gymnasiums – schools with two classes per grade. Among autonomous gymnasiums, the highest number of schools are those with over four classes per grade.

The variation of class size (number of students per class) among gymnasiums in various models is much smaller than the variation of the size of school (see Table 5).

The smallest classes are observed in single district gymnasiums, the largest ones – in gymnasiums in a school complex with an uppersecondary school. However, the distributions of class size in various models are quite different, as shown in Figure 4.

The distribution of class size in autonomous gymnasiums is even (except for gymnasiums in which the average class size is less than 18 students), while this distribution in single district gymnasiums is opposite to the distribution in gymnasiums school complexes with an upper secondary school.

We complete the comparative analysis of gymnasium models with a review of average results of schools and their EVA[19]. We used the results of the gymnasium completion exam from 2012 and three years of gymnasium EVA averages for 2010–2012. National average values and standard deviations are provided in Table 7.

In the sample of gymnasiums under review (which constitutes almost 89% of the entire population), standard deviations of the

[19] According to the convention adopted by the EVA Team (Dolata et al., 2013; Pokropek, 2009), the results of primary school completion exam and of gymnasium completion exam are normalised with M = 100 and SD = 15. EVA is normalised with M = 0 and SD = 15.

Table 7

*Averages and standard deviations of gymnasium completion exam results and EVA of schools*

| | Humanities | | Mathematics and natural sciences | |
|---|---|---|---|---|
| Value | Result | EVA | Result | EVA |
| *M* | 98.9 | -0.04 | 98.9 | 0.04 |
| *SD* | 4.54 | 2.38 | 4.63 | 2.22 |

Based on CKE data (school year 2012/2013).

average result of the gymnasium completion exam among gymnasiums totalled about 4.5. The average EVA for the humanities and mathematics and natural sciences are very close to zero, while their standard deviations are slightly over 2. These low standard deviation values result from the fact that school data, namely data averaged over large groups of students, are less dispersed than individual data. Average results and average EVA by structural model of gymnasiums were presented in Table 8.

Schools' average gymnasium exam results do not differentiate the models, except for gymnasiums in a school complex with an upper secondary school, whose graduates have slightly better results (this may be due to the selectivity of these schools). This model also has the largest variation of results. However, the average EVA for various structural models of gymnasiums is quite different. Autonomous gymnasiums have the lowest, negative EVA. Aggregate gymnasiums and those in a complex with upper secondary school have a positive EVA, somewhat higher for mathematics and natural sciences. The highest EVA is achieved by single district gymnasiums. This is an unexpected and very important result of our analyses, confirming the earlier findings of Lackowski (2008) resulting from a review of a small sample of municipalities. The teaching effectiveness of gymnasiums in school complexes with an upper secondary school is lower, though still higher than for autonomous gymnasiums.

It should be stressed that differences of the average EVA between an autonomous gymnasium and a single district gymnasium are over 1 for the humanities and nearly 1.5 for mathematics and natural sciences, which is about half of the standard deviation at the

Table 8

*Average results and EVA of gymnasiums by structural model*

| Characteristics | SAMG | SP+G | SP=G | G+PG |
|---|---|---|---|---|
| Humanities | | | | |
| Mean of gymnasium completion exam result | 98.76 (4.51) | 98.75 (3.78) | 98.69 (3.58) | 101.92* (9.25) |
| Mean of EVA | -0.47 (2.38) | 0.13* (2.22) | 0.64* (2.28) | 0.18* (3.20) |
| Mathematics and natural sciences | | | | |
| Mean of gymnasium completion exam result | 98.69 (4.41) | 98.68 (3.71) | 98.88 (3.52) | 102.13* (10.52) |
| Mean of EVA | -0.47 (2.09) | 0.19* (2.00) | 0.99* (2.00) | 0.12* (3.78) |
| *N* | 2 029 | 1 829 | 762 | 267 |

* Significant differences at the level of 0.05. Autonomous gymnasiums constitute the reference group.
Based on SIO and CKE data. Standard deviations in parentheses.

Table 9

*Average results and EVA of gymnasiums by structural model in typically rural municipalities*

| Characteristics | SAMG | SP+G | SP=G |
|---|---|---|---|
| Humanities | | | |
| Mean of gymnasium exam result | 98.33 (2.85) | 98.38 (3.02) | 98.90* (3.23) |
| Mean of EVA | -0.24 (2.19) | 0.21* (2.21) | 0.89* (2.26) |
| Mathematics and natural sciences | | | |
| Mean of gymnasium exam result | 98.21 (2.65) | 98.36 (2.95) | 99.03* (3.23) |
| Mean of EVA | -0.24 (1.89) | 0.36* (1.98) | 1.17* (2.10) |
| *N* | 548 | 764 | 371 |
| Mean of students in schools | 175.5 | 123.6 | 72.4 |

* Significant differences at the level of 0.05. Autonomous gymnasiums constitute the reference group.
Based on SIO and CKE data. Standard deviations in parentheses.

level of schools. This difference is statistically significant, but not very large. In addition, standard deviations of EVA within the models are high.

The data presented in Table 8 are so surprising that the same analysis should be repeated for typical rural municipalities[20] and for towns with county rights. Because the number of gymnasiums in rural municipalities operating in complexes with upper secondary schools is typically very small (14), we excluded them from the analysis. Examination data for the remaining models are presented in Table 9.

After limiting the analyses to typical rural municipalities, the variation among models of gymnasiums remains unchanged. In these municipalities, the average EVA of single district gymnasiums is even higher than the national average. The distribution is different for data for towns with county rights (Table 10). This time we excluded the SP=G model, since towns with county rights operate only nine such gymnasiums.

[20] These are rural municipalities located away from urban agglomerations, in which no significant industrial production was present and agricultural activity was not dominated by state agricultural farms (Herczyński, 2012).

Table 10

*Average results and EVA of gymnasiums by structural model in towns with county rights*

| Characteristics | SAMG | SP+G | G+PG |
|---|---|---|---|
| Humanities | | | |
| Mean of gymnasium exam result | 100.51 (6.45) | 101.31* (5.08) | 103.33* (10.45) |
| Mean of EVA | 0.17 (2.56) | 0.61* (2.17) | 0.66* (3.43) |
| Mathematics and natural sciences | | | |
| Mean of gymnasium exam result | 100.09 (6.68) | 100.89* (5.44) | 103.70* (11.98) |
| Mean of EVA | -0.32 (2.40) | 0.12* (2.12) | 0.58* (4.19) |
| *N* | 458 | 197 | 182 |
| Mean of students in schools | 329.7 | 205.7 | 240.9 |

* Significant differences at the level of 0.05. Autonomous gymnasiums constitute the reference group.
Based on SIO and CKE data. Standard deviations in parentheses.

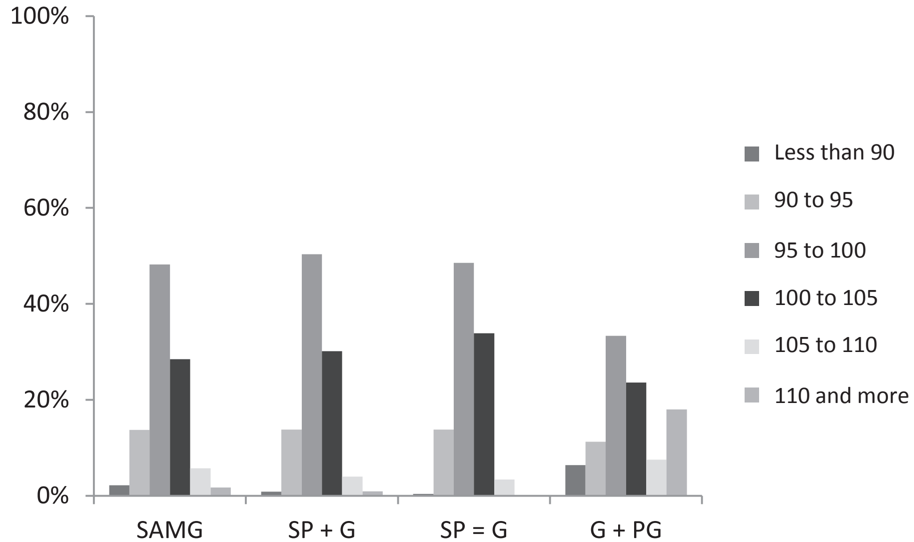



*Figure 5*. Percentage distribution of a gymnasium exam results by structural model (humanities).

In towns with county rights, both the results of a gymnasium completion exam and EVA are higher than the domestic averages. This mainly relates to gymnasiums in school complexes with a primary school. However, the EVA in these schools is quite dispersed. Autonomous gymnasiums have the lowest EVA.

As in our earlier analyses of the average size of the school and class size, in addition to calculating the average results of the gymnasium completion exam and EVA, we should also analyse the variation of these values within each model. Figure 5 shows the distribution of the humanities component of gymnasium completion exam results.

As we can see, the distribution of average exam results for autonomous gymnasiums and gymnasiums in a school complex with a primary school are very similar. The largest number of schools had an average result of between 95 and 105 points (on a scale with an average of 100), while for autonomous schools, the share of schools with an average result between 100 and 105 was slightly lower, and among single district gymnasiums – slightly higher. However, the distribution of average results of gymnasiums in a school complex with an upper secondary school is completely different. For this model, the number of schools with average results is lower, while the number of schools with very good results is higher. Also, the share of schools with poor results (below 90) is higher in the G+PG model. This means that this model is particularly differentiated: it includes both schools with students achieving very good results and many schools with students attaining poor results. Probably the group of gymnasiums with particularly good exam results includes those affiliated with renowned, autonomous general upper secondary schools, while those with poor results are observed at gymnasiums operating in complexes with vocational schools. The distribution of the average results of the mathematics and natural sciences exam is very similar to the distribution shown in Figure 5.

The distribution of teaching effectiveness of subjects in the humanities for individual gymnasium models is very differentiated (Figure 6). Gymnasiums in a school complex

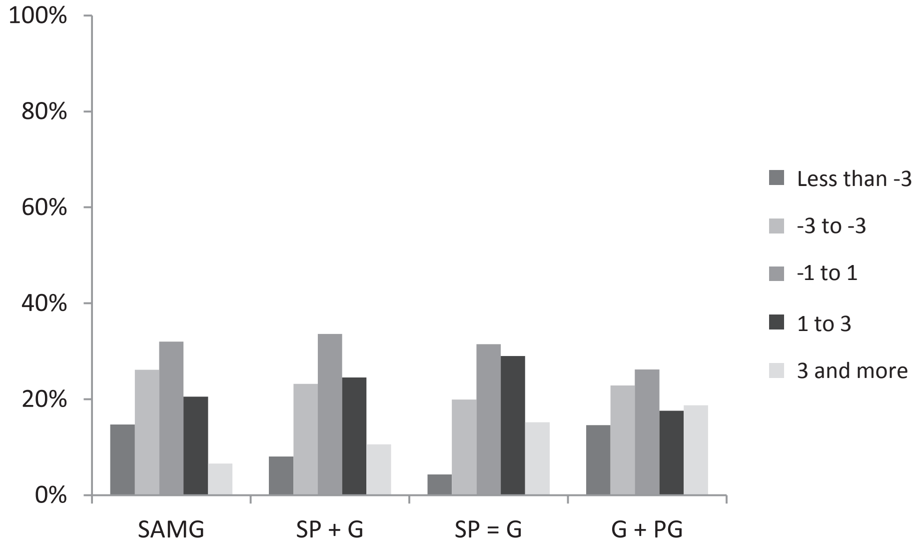



*Figure 6*. Percentage distribution of EVA of gymnasiums by structural model (maths and natural sciences).

with an upper secondary school are equally divided into groups of schools in individual EVA ranges. Among autonomous gymnasiums, the share of schools with high effectiveness is slightly lower, while the share with an effectiveness below -1 is higher. On the other hand, gymnasiums in a school complex with a primary school are dominated by schools with average effectiveness. They also have a very small share of schools with low effectiveness (especially in the case of single district gymnasiums). This means that the relatively high average EVA for these gymnasiums results mainly from the fact that these gymnasiums include only a small number of schools with low effectiveness. The distribution of teaching effectiveness for mathematics and natural sciences is similar.

An initial attempt at an explanation is proposed for the differences illustrated in Table 8 and in Figures 5 and 6. Autonomous gymnasiums encounter significant transition problems of all their students to a new school, new classes and new teachers (see Appelt, 2004). Both the ability of teachers to recognise the potential and problems of their students, as well as students' adaptation to new requirements take some time. Gymnasiums in school complexes with an upper secondary school also experience this problem, but perhaps the initial selection of candidates to this type of gymnasium eliminates some of those students who are poorly motivated or have behavioural issues. The problem of transition to a new school is significantly smaller in gymnasiums in school complexes with a primary school and virtually non-existent when the primary school and gymnasium have the same catchment area. In this case, this is a de facto nine-year school and presumably – with respect to configuration – many members of the 1st year gymnasium classes are from the 6th grade classes.

The differences in gymnasium completion exam results and in EVA of gymnasiums from different structural models may also have other reasons, not directly linked to the model itself. These issues, though very interesting, are outside of the scope of this article.

Table 11
*Distribution of municipal gymnasiums among functional types of municipalities by structural model*

| Functional type of municipality | SAMG | SP+G | SP=G | G+PG | Other | Total |
|---|---|---|---|---|---|---|
| Towns with county rights | 22.6 | 10.8 | 1.2 | 68.2 | 26.3 | 18.5 |
| Towns outside metropolitan areas | 11.8 | 5.6 | 5.1 | 5.2 | 10.8 | 8.4 |
| Municipalities in metropolitan areas | 11.1 | 13.1 | 6.2 | 7.5 | 9.0 | 10.6 |
| Industrial municipalities | 3.2 | 2.5 | 3.5 | 0.7 | 2.1 | 2.7 |
| Post-state farm municipalities | 13.9 | 14.3 | 17.8 | 7.9 | 13.3 | 14.2 |
| Mixed agricultural municipalities | 10.4 | 12.0 | 17.5 | 5.2 | 11.1 | 11.7 |
| Typical rural municipalities | 27.0 | 41.8 | 48.7 | 5.2 | 27.4 | 33.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

## Social and territorial distribution of gymnasiums belonging to various models

The social distribution of gymnasiums belonging to various structural models is illustrated with the use of a classification of municipalities. The functional typology of municipalities introduced by Paweł Swianiewicz (2012) and modified by Jan Herczyński (2012) is used. One-third of municipal gymnasiums are in typical rural municipalities, and 18% of them in towns with county rights (see the "Total" column in Table 4, which includes municipal gymnasiums not representing any of the four types). The number of industrial municipalities is small. Typical rural municipalities, mixed agricultural and post-state farm municipalities operate 60% of all gymnasiums.

Table 11 provides the distribution of gymnasiums among various types of municipalities by structural model. The column "Other" includes data on gymnasiums excluded from the analysis, as in the penultimate row of Table 4.

The distribution of gymnasiums in different structural models is very different. Gymnasiums in school complexes with upper secondary schools are most often found in towns with county rights (68%). In other types of municipalities, this model appears rarely, which is simply the effect of the statutory responsibilities of the different tiers of local government: primary schools are the responsibility of municipalities, secondary schools of counties. Thus, the only municipalities that may operate both gymnasiums and upper secondary schools are towns with county rights. Municipalities may delegate tasks among each other based on an agreement – a municipality may assume the operations of a secondary school from a county, while a county may operate a gymnasium and together they can form a gymnasium and post-lower secondary school complex (G+PG). However, this happens rarely. As a result, this model is found most frequently in towns with county rights. Gymnasiums in school complexes with a primary school can be found primarily in typical rural municipalities, mixed agricultural municipalities and post-state farm municipalities (68% of SP+G; 84% of SP=G respectively). The concentration of single district gymnasiums in typical rural municipalities is particularly striking (49%). Autonomous gymnasiums are more evenly distributed among types of municipalities, their number in typical rural areas is relatively lower. Gymnasiums not belonging to any model are distinctly overrepresented in towns with county rights and underrepresented in typical rural municipalities.

The domination of types of structural models by type of municipality is also worth analysing; this is presented in Table 12. The

Table 12
*Percentage distribution of structural models of municipal gymnasiums in functional types of municipalities*

| Functional type of municipality | SAMG | SP+G | SP=G | G+PG | Other | Total |
|---|---|---|---|---|---|---|
| Towns with county rights | 44.3 | 19.0 | 0.9 | 17.6 | 18.3 | 100.0 |
| Towns outside metropolitan areas | 50.5 | 21.8 | 8.2 | 3.0 | 16.5 | 100.0 |
| Municipalities in metropolitan areas | 37.9 | 40.0 | 7.9 | 3.4 | 10.9 | 100.0 |
| Industrial municipalities | 41.6 | 29.9 | 17.5 | 1.3 | 9.7 | 100.0 |
| Post-state farm municipalities | 35.4 | 32.8 | 17.1 | 2.6 | 12.1 | 100.0 |
| Mixed agricultural municipalities | 32.2 | 33.3 | 20.2 | 2.1 | 12.2 | 100.0 |
| Typical rural municipalities | 28.9 | 40.3 | 19.6 | 0.7 | 10.4 | 100.0 |
| Total | 36.2 | 32.6 | 13.6 | 4.8 | 12.8 | 100.0 |

row "Total" repeats data already provided in Table 4. In accordance with earlier findings, only towns with county rights have a significant percentage (18%) of gymnasiums in school complexes with upper secondary schools. Towns outside of urban agglomerations have the highest percentage of autonomous gymnasiums (50%), while typical rural municipalities – the lowest (29%). On the other hand, 60% of all gymnasiums operated by rural municipalities are those in a school complex with a primary school.

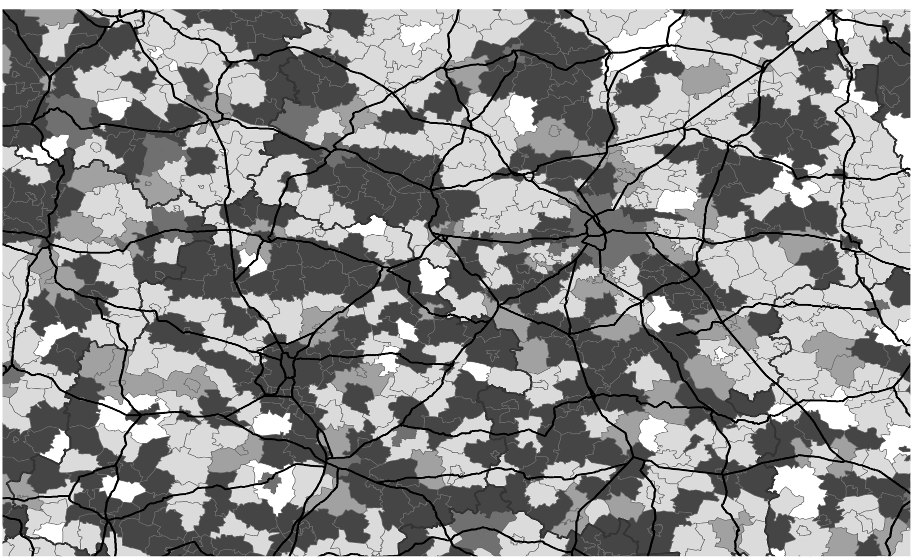
## Territorial differentiation of gymnasium models

The appearance of four structural models of gymnasiums is geographically differentiated, but this variation is not clear or easy to interpret. This is due to many overlapping factors that led to the development of some models in different regions of Poland. For this reason, comments to the maps presented below are mostly hypothetical. We start with the model of the autonomous gymnasium (Map 1), recognised by education reformers as their basic target model.

### Autonomous gymnasium

The autonomous gymnasium can be found throughout Poland, both in cities and rural areas. The largest number of such schools are in the Łódzkie Voivodship (55.7%), Dolnośląskie Voivodship (53.4%) and Opolskie Voivodship (49.6%). This model was probably established primarily in areas where it was relatively easy to open autonomous gymnasiums, due to the number of gymnasium-aged children living in the given area and the numerous school buildings that could house the gymnasium. However, the settlement network is obviously not the only factor that contributed to the dominance of this structural model in individual municipalities. The degree of urbanisation of the Pomorskie Voivodship is comparable to that of the Zachodniopomorskie Voivodship. However, significant differences in the occurrence of autonomous gymnasiums are noticeable between these two voivodships, which suggests the impact of other factors. One of them may be the decisions of Curators of Education. We have no data on the number of rejected requests to open a gymnasium and primary school complex. However, we can assume that education curators do not always approve the establishment of this type of school complex. In voivodships where education curators are less inclined to approve such complexes, more autonomous gymnasiums may operate. The analysis of changes in the network of gymnasiums (Herczyński and Sobotka, 2014) shows that in 2007–2012,


*Map 1*. Territorial variation of the SAMG model in municipalities.
Based on SIO and CKE data.



*Map 2.* SAMG model and a network of main roads near Warsaw and Łódź.
Based on SIO and CKE data.

out of all schools existing in 2007, only 2.8% of gymnasiums in the Zachodniopomorskie Voivodship were in a school complex with a primary school, while, for example, in the Podlaskie Voivodship, nearly every seventh gymnasium was included in such a school complex. These differences may certainly result from the number of requests submitted by municipalities in individual voivodships. However, they show that not only relatively constant factors (such as, for example, urbanisation or population density) but also factors changing over time, such as the terms of successive Education Curators, who may or may not approve a gymnasium and primary school complex, may impact the development of individual models.

Establishing an autonomous gymnasium in a municipality with a small concentration of students requires organising a system of transporting children to school. However, the efficient provision of transportation largely depends on the local network of roads, their density and quality. In some parts of Poland, municipalities with autonomous gymnasiums sometimes form elongated special strips, which suggests that the road network may influence the location of autonomous gymnasiums.

The elongated spatial strips are particularly clearly visible near Warsaw and Łódź (Map 2), where municipalities with a large share of autonomous gymnasiums reflect the radial system of the main exit roads from both cities. A hypothesis may be proposed that the establishment of autonomous gymnasiums was motivated in part by the developed road network, which allowed students to be more easily transported to school.

**Aggregate gymnasiums**

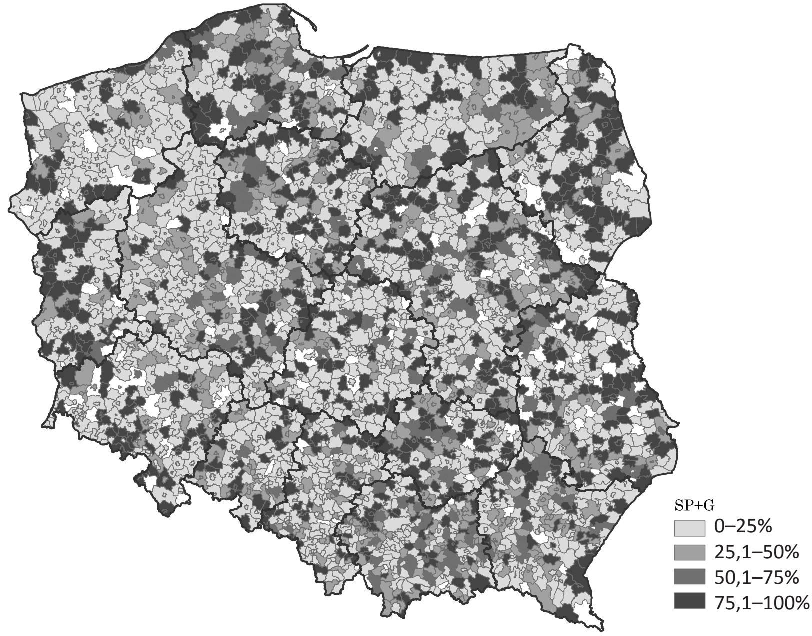
The second identified structural model is the aggregate gymnasium, that is, a gymnasium in a complex with a primary school, enrolling graduates of several primary schools (SP+G, see Map 3).

The municipalities where this model dominates sometimes form compact areas, for example, in the central part of the Pomorskie Voivodship or in the eastern part of the Podlaskie Voivodship. This model developed mainly in rural areas, dominating in the poorly urbanised Świętokrzyskie Voivodship (47.2%) and the eastern part of the Podlaskie Voivodship. The popularity of this model in the urbanised Pomorskie Voivodship is puzzling. The development of this model primarily in rural areas (40.3% in typical rural municipalities) confirms the difficulties reported by such municipalities at the start of the reform in establishing autonomous gymnasiums. Many rural municipalities at that time had no funds to construct new school buildings, so they located gymnasiums in the facilities of primary schools. The analysis of changes in the network of gymnasiums taking place in 2007–2012 (Herczyński and Sobotka, 2014) shows that the number of schools operating in this model is still growing. The declining number of children in primary schools and gymnasiums and, in consequence, the reduced education subvention received by municipalities force them to look for savings. Organising schools into school complexes makes such savings possible: a school complex has only one director and one office, and the staff is better managed.

**Single district gymnasiums**

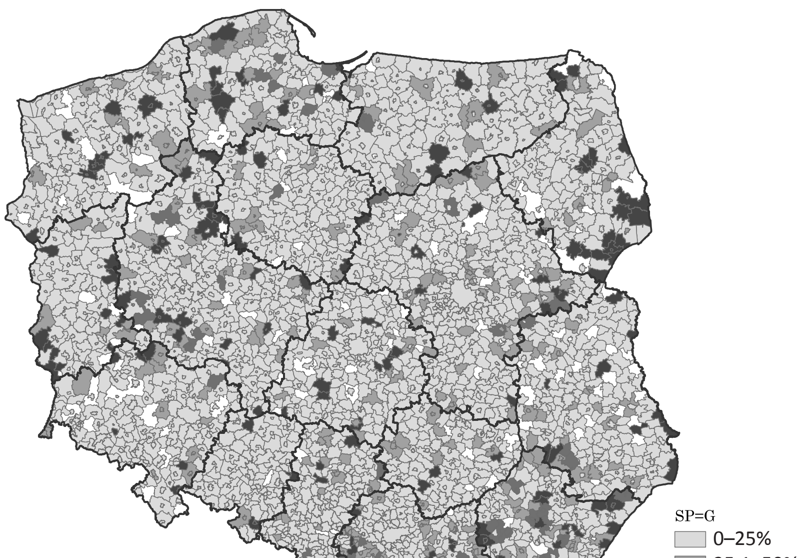
The third identified model is the single district gymnasium, that is, a gymnasium in a school complex with a primary school having the same catchment area (SP=G, Map 4).

Single district gymnasiums can be mainly found in Podkarpackie Voivodship – this model is found for every third municipal gymnasium there (34.1%). Many schools of this type also operate in the Małopolskie Voivodship (23.3%) and in the south-eastern part of the Podlaskie Voivodship (19.3%). At least three reasons for establishing this




*Map 3.* Territorial variation of the SP+G model in municipalities.

Based on SIO and CKE data.




*Map 4.* Territorial variation of the SP=G model in municipalities.

Based on SIO and CKE data.

type of school may be formulated. First, such a model may be result of the functioning of remote gymnasium classes during the first years of the reform. Statistics on the number of remote classes in individual voivodships are not available, however, the establishment of new gymnasiums between 2002 and 2003[21] indicates that remote classes were most common in the Podkarpackie Voivodship – the number of gymnasiums there increased in 2003 by as much as 11%. The number of gymnasiums also increased in the Małopolskie (8%) and Lubelskie Voivodships (7.6%), while in other voivodships (e.g. Warmińsko-Mazurskie, Dolnośląskie and Kujawsko-Pomorskie) the increase was only about 1%. In certain municipalities of the Podkarpackie Voivodship, we notice sudden increase in new gymnasiums from one year to the next. For example, in Ropczyce, only three gymnasiums operated in 2002 and a year later their number grew to as many as 12. The situation was similar in neighbouring Dębica (the number of gymnasiums increased there from 5 to 13) or in Przeworsk (Herczyński and Sobotka, 2014).

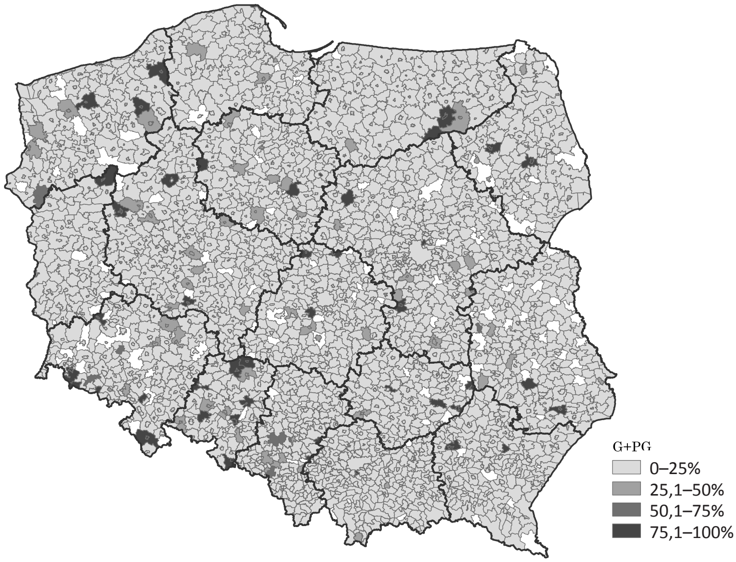
In the case of the Podlaskie Voivodship, another hypothesis on the establishment of single district gymnasiums may be proposed. In 1999–2009, the yearly increase in the number of municipal gymnasiums was very insignificant there, which suggests that the process of transforming remote classes into autonomous gymnasiums had not taken place in this region. Thus, the reasons for the development of this model in the Podlaskie Voivodship must be different. Podlaskie has the smallest average population density in Poland (59 persons/km$^2$ in 2014), which makes organising a network of schools challenging. Gymnasiums operating with a primary school (SP+G and SP=G models) constitute nearly 60% of the models there. Over 37% of primary schools (2012) are small schools, enrolling fewer than 70 students, and often threatened with liquidation. Organising such small primary schools into school complexes with gymnasiums increases the efficiency of the institution, enhances the effective use of school staff, and reduces administration costs. The intention to save small primary schools in this region may have led to establishment of single district gymnasiums. Another factor, not connected with spatial distribution but influencing the development of this model in certain municipalities, relates to the education policy adopted by a municipality. There are cases of municipalities where this type of gymnasium model was developed (Herczyński and Sobotka, 2014) mainly to reduce the adaptation difficulties experienced when changing schools and the environment.

**Gymnasium in a school complex with a secondary school**

The last identified structural type of a gymnasium is the gymnasium in a school complex with an upper secondary school (G+PG model, Map 5).

Municipalities which have a significant proportion of this structural model are scattered throughout Poland and their number is small. As we have already observed, over two-thirds of gymnasiums in school complexes with upper secondary schools are in towns with county rights (Table 11). Thus, the territorial distribution of this model is related to the occurrence of towns with county rights in Poland, although this not a popular model in the largest cities. The largest number of gymnasiums in this model is present in the strongly urbanised Śląskie (12%) and Zachodniopomorskie Voivodships (10.6%).

[21] Recall that from September 2003 and with the approval of the Education Curator, gymnasiums could operate in a school complex with a primary school, which encouraged many municipalities to transform remote classes of gymnasiums, invisible for the public statistics system, into autonomous schools. The increase in the number of gymnasiums between 2002 and 2003 is thus a reporting artefact.




*Map 5.* Territorial variation of the G+PG model in municipalities.
Based on SIO and CKE data.


**Summary**

The autonomous decisions of municipalities over the last 16 years have led to the development of four structural models of the gymnasium. Autonomous gymnasiums, gymnasiums in a school complex with a primary school (aggregate or single district) and gymnasiums in a school complex with an upper secondary school are different types of schools, operate in different school environments and have different structural and organisational characteristics. A particularly surprising feature of these models is the relatively low teaching effectiveness (EVA) of autonomous gymnasiums and the high teaching effectiveness of single district gymnasiums, which the reformers wanted to avoid.

The distribution of the four structural models of municipal gymnasiums is also contrary to the expectations of the reformers of 1998: gymnasiums in a school complex with a primary school dominate, while the number of gymnasiums in a school complex with an upper secondary school is small and not increasing. Although the decisions of municipalities about the network of gymnasiums largely depend on financial issues (need to curb expenses) and the availability of school facilities (high cost of new investments), the analysis presented here indicates that, contrary to the intentions of the reform, gymnasiums in school complexes with primary schools have higher teaching effectiveness as measured by EVA.

Based on our analysis, two open research problems can be formulated. The first relates to the determinants of the decision to establish a gymnasium of a given type. The following factors undoubtedly impact the decisions of municipalities: fragmentation of the settlement network and the network of roads, the small or large distance from large urban centres, as well as the attitude of the Education Curators. However, how much these factors are significant in the functioning of municipalities, which of them are important, and how the different factors

interact with one another – these are questions requiring empirical analysis. Of particular urgency is the question of whether, given the conditions in Poland, it was inevitable that few gymnasiums would be opened in complexes with upper secondary schools, or, as Professor Mirosław Handke believes, this was the result of political decisions taken by his successors.

The second significant research problem is understanding what determines the differences in the operation of gymnasiums representing the various models. This certainly relates to such issues as the higher indicators of grade retention and student dropout at gymnasiums in school complexes with upper secondary schools. However, the most urgent fact requiring clarification is the variation of EVA results among gymnasiums of different types. Small rural single district gymnasiums have statistically higher teaching effectiveness than large autonomous urban schools. Understanding the institutional and educational mechanisms that underlie these differences is necessary for the better management of local school networks.

## Literature


Alspaugh, J. W. (1999). *The interaction effect of transition grade to high school with gender and grade level upon dropout rates*. ERIC Document No. ED431066. Montreal: American Educational Research Association.

Appelt, K. (2004). Gimnazjum. Trudności wychowawcze w okresie dorastania. *Psychologia w Szkole*, *4*(4), 19–25.

Bajerski, A. (2011). Organizacja przestrzenna i funkcjonowanie usług edukacyjnych w aglomeracji poznańskiej. *Biblioteka Aglomeracji Poznańskiej*, 14, Poznań: Bogucki Wydawnictwo Naukowe.

Becker, H. J. (1987). *Addressing the needs of different groups of early adolescents: effects of varying school and classroom organizational practices on students from different social backgrounds and abilities*. Report No. 16. Baltimore: Center for Research on Elementary and Middle Schools, The Johns Hopkins University.

Chaker, A. M. (2005). Middle school goes out of fashion, districts shift to K-8 model. *The Wall Street Journal*, April 6. Retrieved from http://www.wsj.com/articles/SB111274377335098942

Dolata, R., Hawrot, A., Humenny, G., Jasińska, A., Koniewski, M., Majkut, P. and Żółtak, T. (2013). *Trafność metody edukacyjnej wartości dodanej dla gimnazjów.* Warszawa: Instytut Badań Edukacyjnych.

Franklin, B. J. and Glascock, C. H. (1998). The relationship between grade configuration and student performance in rural schools. *Journal of Research in Rural Education*, *14*(3), 149–153.

Handke, M. (2006). *Reformę szkoły zepsuto później.* [Radio interview.] Retrieved from http://www.rmf24.pl/ tylko-w-rmf24/wywiady/news-handke-reforme-szkoly-zepsuto-pozniej,nId,210846

Herczyński, J. (2012). Wskaźniki oświatowe. *Biblioteczka Oświaty Samorządowej*, 6. Warszawa: Wydawnictwo ICM.

Herczyński, J. and Sobotka, A. (2014). *Diagnoza zmian w sieci szkół podstawowych i gimnazjów 2007–2012*. Warszawa: Instytut Badań Edukacyjnych.

Humenny, G., Koniewski, M., Majkut, P. and Skórska, P. (2014). Migracje uczniów między zespołami klasowymi przy przejściu ze szkoły podstawowej do gimnazjum. In B. Niemierko and M. K. Szmigel (eds.), *Diagnozy edukacyjne – dorobek i nowe zadania* (pp. 128–141). Kraków: Polskie Towarzystwo Diagnostyki Edukacyjnej.

Ignar-Golinowska, B. and Gajewska, M. (2002). Warunki nauczania w gimnazjach miejskich i wiejskich w pierwszym roku reformy systemu edukacji. *Rocznik Państwowego Zakładu Higieny*, *53*(1), 89–96.

Konarzewski, K. (2001a). Sieć szkolna. In K. Konarzewski (ed.), *Szkolnictwo w pierwszym roku reformy oświaty*. Warszawa: Instytut Spraw Publicznych.

Konarzewski, K. (2001b). Reforma strukturalna: gimnazjum. In K. Konarzewski (ed.), *Szkolnictwo w pierwszym roku reformy oświaty*. Warszawa: Instytut Spraw Publicznych.

Konarzewski, K. (2004). *Reforma oświaty. Podstawa programowa i warunki kształcenia*. Warszawa: Instytut Spraw Publicznych.

Książek, W. (2001). *Rzecz o reformie edukacji 1997–2001*. Warszawa: Oficyna Wydawniczo-Poligraficzna „Adam".

Lackowski, J. (2008). *Decentralizacja zarządzania polskim systemem oświatowym a społeczne nierówności edukacyjne*. Kraków: Wydawnictwo Uniwersytetu Jagiellońskiego.

Ministerstwo Edukacji Narodowej (1998). Ministerstwo Edukacji Narodowej o sieci szkół (Biblioteczka Reformy, vol. 2). Warszawa: Ministerstwo Edukacji Narodowej.
Ministerstwo Edukacji Narodowej (2000). *Ministerstwo Edukacji Narodowej o reorganizacji sieci szkół* (Biblioteczka Reformy, vol. 19). Warszawa: Ministerstwo Edukacji Narodowej.
Piwowarski, R. (2006). *Modele edukacji dla potrzeb koncepcji przestrzennego zagospodarowania kraju*. Warszawa: Ministerstwo Rozwoju Regionalnego.
Pokropek, A. (2009). Metody statystyczne wykorzystywane w szacowaniu trzyletnich wskaźników egzaminacyjnych. In B. Niemierko and M. K. Szmigel (eds.), *Badania międzynarodowe i wzory zagraniczne w diagnostyce edukacyjnej* (pp. 137–153). Kraków: Polskie Towarzystwo Diagnostyki Edukacyjnej.
Rockoff, J. E. and Lockwood, B. B. (2010). Stuck in the middle: impacts of grade configuration in public schools. *Journal of Public Economics*, *94*(11–12), 1051–1061.
*Rozporządzenie Ministra Edukacji Narodowej z dnia 15 lutego 1999 roku w sprawie sposobu i terminów dostosowania działalności dotychczasowych szkół państwowych do wymogów nowego systemu szkolnego oraz tworzenia gimnazjów* (1999). [Dz.U. Nr 14, poz. 124]. Retrieved from http://isap.sejm.gov. pl/DetailsServlet?id=WDU19990140124
Schwerdt, G. and West, M. R. (2013). The impact of alternative grade configurations on student outcomes through middle and high school. *Journal of Public Economics*, 97, 308–326.
Simmons, R. G. and Blyth, D. A. (1987). *Moving into adolescence: the impact of pubertal change and school context*. New York: Aldine De Gruyter.
Swianiewicz, P. (ed.). (2012). Edukacja przedszkolna. *Biblioteczka Oświaty Samorządowej*, 4. Warszawa: Wydawnictwo ICM.
*Ustawa z dnia 7 września 1991 r. o systemie oświaty* (1991). [Dz.U. Nr 95 poz. 425]. Retrieved from http://isap.sejm.gov.pl/DetailsServlet?id=WDU19910950425
*Ustawa z dnia 25 lipca 1998 r. o zmianie ustawy o systemie oświaty* (1998). [Dz.U. Nr 117, poz. 759]. Retrieved from http://isap.sejm.gov.pl/DetailsServlet?i d=WDU19981170759
*Ustawa z dnia 8 stycznia 1999 r. Przepisy wprowadzające reformę ustroju szkolnego* (1999). [Dz.U. Nr. 12, poz. 96]. Retrieved from http://isap.sejm.gov.pl/ DetailsServlet?id=WDU19990120096
*Ustawa z dnia 21 stycznia 2000 r. o zmianie niektórych ustaw związanych z funkcjonowaniem administracji publicznej* (2000). [Dz.U. Nr. 12, poz. 136]. Retrieved from http://isap.sejm.gov.pl/DetailsServlet?i d=WDU20000120136
*Ustawa z dnia 23 sierpnia 2001 r. o zmianie ustawy o systemie oświaty, ustawy – Przepisy wprowadzające reformę ustroju szkolnego, ustawy – Karta Nauczyciela oraz niektórych innych ustaw* (2001). [Dz.U. Nr 111, poz. 1194]. Retrieved from http://isap.sejm.gov.pl/DetailsServlet?id=WDU20011111194
*Ustawa z dnia 15 marca 2002 r. o zmianie ustawy o systemie oświaty oraz niektórych innych ustaw* (2002). [Dz.U. Nr 41, poz. 362]. Retrieved from http:// isap.sejm.gov.pl/DetailsServlet?id=WDU20020410362+2002%2405%2404&min=1
*Ustawa z dnia 27 czerwca 2003 r. o zmianie ustawy o systemie oświaty oraz o zmianie niektórych innych ustaw* (2003). [Dz.U. Nr 137, poz. 1304]. Retrieved from http://isap.sejm.gov.pl/DetailsServlet?id=WDU20031371304
*Uzasadnienie projektu ustawy o zmianie ustawy o systemie oświaty* (1998). Retrieved from http://orka. sejm.gov.pl/Rejestrd.nsf/wgdruku/389/$file/389.pdf
Ward, D. S. (2008). Middle school: the "Bermuda triangle" of education? [Website of New York State School Boards Association.] Retrieved from http://www.nyssba.org/news/2008/11/24/on-board-online-nov-24-2008/middle-school-the-bermuda-triangle-of-education/
Wihry, D. F., Coladarci, T. and Meadow, C. (1992). Grade span and eighth-grade academic achievement: evidence from a predominantly rural state. *Journal of Research in Rural Education*, *8*(2), 58–70.

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