The Impact of Level Education (Ability Grouping) on Pupils’ Learning Results

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Abstract

In the article we are presenting the findings of the research study on the organisation of ability grouping in mathematics and Slovenian language in the ninth year of primary schools, on the role of socio-cultural environment in ranking pupils into ability groups and on the success of pupils in differentiated level and heterogeneous groups. We are outlining the characteristics of ability grouping and its impact on pupils’ learning outcomes, and the significance of teaching differentiation and individualisation as well as its advantages and limitations. In the research work we applied the descriptive and causal – non-experimental method of empirical research work. The sample covered 1454 pupils of the ninth grade Slovenian primary schools. We implemented the following instruments: basic descriptive statistics, Pearson’s correlation coefficient, reliability analysis according to the classical examination theory (Guttman-Cronbach coefficient α). The study has shown that approximately three-quarters of schools implement ability education. And among the forms of ability grouping the three-level difficulty prevails, whereas the two-level ability grouping is less common. The scores and social-cultural background play the most decisive role in ranking pupils into ability groups. We have registered from medium to high grade statistical correlation between ranking pupils into ability groups in the 7th, 8th and 9th grade on the other hand. We can normally find in the first level difficulty group pupils who reached lower achievements and at the same time come from less privileged socio-cultural environment. In ability groups the strongest factor, dividing pupils according to their success, is their social background. The results have also highlighted the fact that the first level of difficulty involves pupils who are less motivated for their learning and their motivation mostly depends on external encouragements. The results have also shown that ability grouping may be effective only if teachers adjust both teaching methods and teaching materials to pupils of different ability groups.

Key words: differentiation of instruction, mathematics, primary school, Slovenian language, socio-cultural environment, external assessment of knowledge

1 Introduction

One of the general principles of education is the principle of fairness. As it is enshrined in the White Paper on Education in the Republic of Slovenia (2011), fairness in education is the core element of social justice and is closely linked with equality. Justice in education is quite often understood as equality of educational opportunities which is an urgent condition that all people have in modern societies, founded on liberal and democratic principles, equal opportunities to be successful in their lives. And, since the equality of opportunities that one has in the society strongly depends on their abilities for education, the state is obliged to ensure, when striving for a society of justice,
through various measures (for example by implementing positive discrimination policies for children from socially and culturally underprivileged environments, by providing the possibility of individualisation of school system and instruction…) first of all equal educational opportunities to everyone (White Paper on Education in the Republic of Slovenia (2011, p. 14-15)).

Family economic, cultural and social capital has a strong impact on pupils’ performance. As long as the class structure of society exists there will always be educational inequality, however, adequate wider and school policies can diminish the influence of different capitals on unequal school efficiency of young people (Cankar, et. all., 2011). Despite that, at the school level it is important to take into account differences among pupils, their invested efforts, and also the risk resulting from their conduct, in order to provide equal opportunities to all pupils in attaining the standards of knowledge.

In this context learning differentiation and individualisation deserves in school domain a large interest both from the part of educational expertise and from school policies. When speaking of learning differentiation and individualisation it is worth mentioning at least two dimensions: learning individualisation and differentiation which is mostly an organisational measure and differentiation of learning contents.

By the educational differentiation which is mostly an organizational measure pupil are democratically oriented according to their specific differences into sporadic, permanent homogenous and heterogeneous learning groups, in order to enable schools to better put in place social and individual educational objectives by applying more adjusted learning objectives, contents and didactic-methodological styles (Strmčnik, 1987). It is therefore a question of taking into account one’s characteristics, abilities, gifts to such an extent that his/her development in any area is ensured. Strmčnik (1999) furthermore emphasises that at the upper- subject level of primary schools, in particular in the final years, it is not sufficient to apply only the didactic-methodological differentiation, and it is thus necessary to differentiate and individualise also the educational aims and contents. In addition, he believes that partial external differentiation (ability grouping) is far more simple and cheaper compared to internal differentiation and individualisation and thus also much easier to be put in place and more reliable.

The basic assumption in ability grouping is that education is more adjusted for pupils and that they will be able to optimize learning. As an argument for the introduction of this didactic form of education Brophy and Good (1986) indicate the need for more rational use of time in organizations and balancing the learning process and more time for direct (more effective) teaching which includes: answering to pupils’ questions with a clear explanation, listening to pupils and reacting to their replies, an outline of learning objectives in the function of motivating, monitoring advancement of each individual within a group and responding to the needs of each individual. Such approach demands more interaction between teachers and pupils, and that is only possible if teachers communicate more with the homogeneous group rather than individual pupils. Too extensive heterogeneity is supposed to reduce the time available for assignments which entails worse performance of pupils (Ibid).

As certain experts and authors of researches argument learning differentiation, others call attention to the weaknesses and pit holes of pupils’ ability grouping.

L. Plut-Pregelj (1999, p. 28–50) is critical to differentiation at the level of primary schools and to the objectives and contents within curricula. According to her, "curriculum differentiation in a comprehensive school shows itself as an unsuccessful approach to address learning failure and to the provision of more qualitative education ". The education quality is supposed to be a result of what is going on in a classroom where the key role is played by the teacher. Thus, it is of utmost importance to educate teachers and to provide them with basic conditions for the professional and independent performance of their work.

The same applies for Biehler and Snowman (1993), who following the results of different researches dealing with ability grouping, suggest abandoning grouping into homogeneous classes according to abilities (streaming). Pupils ranked in homogeneous classes in all the subjects for all school day do not learn better or think more positively about themselves and the school as pupils from heterogeneous classes.

Biehler and Snowman (1993) also consider that grouping within classes or the so called internal differentiation is more effective, since it increases the opportunities for more adequate and more effective forms of instruction (e.g., greater flexibility in pupils’ moving into or out of certain groups, gives more opportunities for application of highly successful learning models, larger teachers’ effort in encouraging pupils in lower learning groups in order to
promote to higher groups). The best way to create homogeneous groups is grouping of pupils according to their class performance or on the basis of standardized tests and knowledge assessments, or both. These measures apply first of all for pupils whose intellectual, social, emotional and physical features or abilities are within the range considered to be "normal", and less for pupils with special needs (mentally, emotionally or physically underprivileged).

The authors Askew and Wiliam (1995) emphasize that grouping of pupils is effective only if also teaching methods and learning materials are adjusted to pupils. Askew and Wiliam (1995) for example found, when examining different studies, positive impacts of grouping in mathematics in the higher group of pupils, if learning materials had been written for them, although they remind, that it is not entirely clear what contributes to pupils’ advancement, either learning materials or teachers’ attention.

The concept of ability grouping in the 8th and 9th grade of Slovenian primary schools

In Slovenian primary schools the most established type of grouping is the ability grouping (in Slovenian nivojski pouk). The main features of ability grouping in the Slovenian primary schools are as follows: it is performed in three subjects (mother tongue, foreign language and mathematics), in other subjects pupils are in mixed original classes; pupils are mostly regrouped into three difficulty levels; pupils decide on their own to be included in a certain difficulty level and to possible change later on in the course of the year; schools only give them advice. We thus speak of soft type of “setting” (ability grouping) in certain subjects that is not grounded on testing abilities and knowledge.

External differentiation in the last two years of primary schools was frequently criticized. Several criticisms of external differentiation in 2006 were followed by appropriate legislation. The Act on Amendments to the Act on Primary School (Official Gazette of the RS, No. 60/2006) and the Regulations on the implementation of differentiation in the primary school education (Official Gazette of the RS, No. 63/2006), were adopted, replacing the Regulations on detailed conditions for the organization of ability grouping in the 9-year primary schools. Thus, nowadays it applies that in case of Slovenian language as well as the Hungarian and Italian languages in the 8th and 9th grade on nationally mixed territories, and in case of mathematics and foreign language the education may be organized by setting pupils into ability groups with simultaneous teaching of two teachers, as ability grouping, as a combination of differentiation forms as mentioned above in the same passage (Official Gazette of the RS, No. 63/2006), providing that the law passed on the decision on the organization type to the individual school. In case of a small number of pupils the school performs only the internal differentiation.

2 Methods

Studying the impact of ability grouping on pupils’ success is relatively complicated and delicate. When speaking of ability grouping in Slovenian primary schools we refer to homogeneous education groups which are established on the basis of agreed criteria (for example pupils’ school scores, teachers’ opinions, pupil wishes, parents’ desires,...).

In our research we were interested in:
1. the organisation of ability grouping in mathematics and Slovenian language in the ninth grades of primary schools that had been included into the research;
2. the role of socio-cultural environment in ranking pupils into ability groups;
3. pupils’ success in ability grouping and heterogeneous groups.

For the research work we applied the descriptive and causal-non-experimental method of empirical educational researching. The sample covered 1454 pupils of the ninth grade of 41 Slovenian primary schools. Both, urban as well as rural schools were included in the sample, four schools from each of 12 statistical regions of the Republic of Slovenia. As regards gender the sample was fairly balanced as 54% of girls and 46% of boys participated in the research.

For the purposes of the study we acquired the data on final scores for Slovenian language and mathematics of the 7th, 8th, and 9th grade as well as on the results of pupils at the National Assessment of Knowledge in
mathematics and Slovenian language from the National Examination Centre of the Republic of Slovenia. We obtained the information on the organization of ability grouping for individual schools and on the socio-cultural environment indicator through a questionnaire for pupils. The socio-cultural environment indicator includes, besides parents’ education, also home property, i.e., whether pupils have at home their own desk, their own room, a calm place for learning, a computer to use for school, access to internet, books and magazines which help them with school work, dictionaries, literature works, works of art (e.g., pictures), DVDs or video players, digital cameras or video cameras, their own MP3 player, and if they attend out of school activities: foreign language courses in Slovenia, language courses abroad, music schools, dancing schools, computer courses, fine arts activities, chess clubs, scouts, etc. (Žakelj, Ivanuš Grmek, 2010).

The results are presented in tables and graphs. We applied the basic descriptive statistics, the Pearson’s correlation coefficient and the reliability analysis according to the classical testing theory (Guttman-Cronbach’s coefficient α).

3 Results and discussion

Organisation of ability grouping along the schools

We asked the pupils if they had ability grouping in mathematics and Slovenian language and if they did in what ability groups they were ranked. Decisions an organizational aspect of education is taken by each school separately. In case instruction is organized in the form of ability grouping pupils are, according to their success and according to pupil wishes), in mathematics in Slovenian language divided into two or three ability groups. The most successful pupils are ranked into the third group, less successful in the second and/or into the first group. If a certain school does not implement ability grouping, instruction takes place in the original class or in heterogeneous groups consisting of pupils regardless their success in those subjects. The form of instruction may be in mathematics and Slovenian language at the same school different.

The results indicate that the majority of schools which participated in the study, implement ability grouping, i.e., 76,66% pupils in Slovenian language and 81,58 % of pupils in mathematics are included in the educational differentiation. As regards the type, the ability grouping of three levels of difficulty prevails, since up to 73,9 6 % of pupils in Slovenian language and up to 78,25 % in mathematics are included into three ability groups. Ability grouping of two difficulty levels is less common; up to 2.70% of pupils of Slovenian language and 3.33% of pupils in mathematics are involved in it. Furthermore, the results remind us that in schools which participated in the research the ability groupings are more common in mathematics.

From pupils answering that they are included into ability groups we have found that:

- 13,01 % participate in the first ability group of Slovenian language, 50,82 % in the second ability group and 36,16 % in the third group;
- 18,15 % are included in the first ability group for mathematics, 48,86 % in the second group and 32,99 % of pupils in the third ability group.

The role of social-cultural environment in ranking pupils into ability groups

In our research we were interested in the role of social-cultural environment for ranking pupils into the ability groups. The indicator of socio-cultural environment that we implemented in our research units, besides parents’ education also property at home and active participation of pupils in the out of school activities (Žakelj, Ivanuš Grmek, 2011, p. 13).

The results have shown that both in Slovenian language and in mathematics pupils with higher indicator of socio-cultural environment were included in higher (more demanding) ability group (ibid).

Table 1: Statistical significance levels (p) and correlation coefficients (r_{xy}) between pupils’ levels in Mathematics and Slovenian language and the variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Slovenian r_{xy}</th>
<th>p</th>
<th>Mathematics r_{xy}</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother’s education</td>
<td>0,259533</td>
<td>0,00</td>
<td>0,257321</td>
<td>0,00</td>
</tr>
</tbody>
</table>
A correlation between pupils’ levels in Mathematics and Slovenian and the variables in the table above indicates the following:
- The statistical correlation between the pupil’s level in Slovenian and Mathematics, on the one hand, and parents’ education, the number of books, dictionaries and literary works in the family, on the other, is low because correlation coefficients range from 0.20 to 0.29.
- Pupil’s level in Slovenian and Mathematics and pupils’ average grade in the 7th, 8th, and 9th grades show a medium positive correlation that occasionally borders on high positive statistical correlation. Correlation coefficients range from 0.54 to 0.69.
- Pupil’s level in Slovenian and Mathematics and the desired secondary school enrollment shows a medium positive statistical correlation. The correlation coefficient for both Slovenian and Mathematics is 0.56.

Also other authors (e.g., Boaler, 1997; Aylett, 2000) have found out that pupils’ social background (lower social status) has an impact on the ranking of pupils into particular (lower) ability group. Also the results of evaluation study (Žagar et. all., 2003) have shown that the strongest factor in ability groups, which separated pupils in performance, is their social origin. It even seemed more important than their abilities verified before school entry. However, social background was not connected with the learning performance in heterogeneous groups.

**Pupils’ performance in ability groups**

In order to ensure and monitor the efficiency and quality of educational system schools benefit also from National Assessment of Knowledge (below NAK) which is a type of external testing of knowledge.

**Table 2: Pupils’ results at the NAK from Slovenian language and mathematics in reference to the ability ranking.**

<table>
<thead>
<tr>
<th>Ability group</th>
<th>Subject</th>
<th>n</th>
<th>x 9. r</th>
<th>p</th>
<th>s</th>
<th>x NAK</th>
<th>s</th>
</tr>
</thead>
<tbody>
<tr>
<td>First ability group</td>
<td>SLO</td>
<td>153</td>
<td>2.32</td>
<td>0.61</td>
<td>42.52</td>
<td>13.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAT</td>
<td>231</td>
<td>2.22</td>
<td>0.48</td>
<td>28.51</td>
<td>14.12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SLO</td>
<td>599</td>
<td>3.24</td>
<td>0.79</td>
<td>58.06</td>
<td>13.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAT</td>
<td>622</td>
<td>3.12</td>
<td>0.83</td>
<td>48.25</td>
<td>17.24</td>
<td></td>
</tr>
<tr>
<td>Second ability group</td>
<td>SLO</td>
<td>423</td>
<td>4.37</td>
<td>0.68</td>
<td>74.67</td>
<td>12.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAT</td>
<td>420</td>
<td>4.37</td>
<td>0.73</td>
<td>74.09</td>
<td>16.37</td>
<td></td>
</tr>
<tr>
<td>Third ability group</td>
<td>SLO</td>
<td>230</td>
<td>3.68</td>
<td>1.17</td>
<td>64.94</td>
<td>19.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAT</td>
<td>194</td>
<td>3.60</td>
<td>1.12</td>
<td>55.9</td>
<td>28.28</td>
<td></td>
</tr>
</tbody>
</table>

Legend: x 9. r – average pupils’ results in the 9th grade in Slovenian language and mathematics, x NAK - average pupils’ results at the NAK in Slovenian language and mathematics.

The best results at NAK in Slovenian language were achieved by pupils in the third ability group and the lowest results in the first ability group. Average pupils’ results at NAK in Slovenian language who attended heterogeneous groups were lower than average results of pupils attending the third ability group and higher than the results of the second level. The average final scores of the pupils of the ninth grade in Slovenian language who attended the...
heterogeneous groups were slightly lower than average final scores of pupils who attended the third ability group and higher than the average scores of second ability group pupils (table 2).

In Slovenian language the differences in average performances at NAK between the ability groups were slightly less distinctive than in mathematics. The best performance in mathematics in the ninth grade was achieved by pupils of the third ability group and the lowest performance was achieved in the first ability group. The average pupils’ performance at NAK in mathematics who attended heterogeneous groups was lower than average performance of pupils attending the third ability group and higher than results of the second ability group. The average final scores of pupils of the ninth grade in mathematics who attended heterogeneous groups were slightly lower than average final scores of pupils who attended the third ability group and higher than the average scores of second ability group pupils (table 2).

The impact of the model of successive combining of basic and ability group education in mathematics has in Slovenia over the past period been empirically studied by Adamič (1996). His experiment included pupils of the 4th and 8th grade, who were according to their performance in the knowledge assessment divided into two comparative groups. In the first group the pupils of the three heterogeneous grades were divided into three homogeneous grades (weaker in learning, average, more capable), and in the second group pupils were divided into three learning groups within individual classes. At the end of the experiment the first comparative group, i.e., those pupils who were after the basic education divided into homogeneous groups, was in the 4th grade in learning mathematical contents slightly more successful, whereas the pupils of the eight year primary schools from both comparative groups were in their performance quite equal.

Linchevski (1995) also considers that less capable pupils in heterogeneous classes better tackle the tests, because both their teachers as well as they themselves have higher expectations. Despite that, the results of the presented research as well as several other authors (Slavin, 1987; Linchevski, 1995, Biehler and Snowman, 1993) point out that ability education may be more effective only if teachers adjust their teaching methods and learning materials for the pupils of ability groups, and that it is necessary to abandon grouping in homogeneous classes according to abilities (streaming).

Pupils of highly capable classes have a more positive attitude to schools and higher educational aspirations than pupils of lower capability classes. Teachers of highly capable classes set various aims and apply more effective learning practice than teachers of lower capability classes. In highly capable classes teachers emphasize critical thinking, self-direction, creativity and cooperation. And in lower capability classes the stress quiet work (silence), respect of rules and parallel learning with all other pupils (Biehler in Snowman, 1993).

Besides the recorded results it is necessary to mention also the motivational and emotion-personal aspect of education. Linchevski (1995) also considers that less capable pupils in heterogeneous classes better tackle the tests, because both their teachers as well as they themselves have higher expectations. Despite that, the results of the presented research as well as several other authors (Slavin, 1987; Linchevski, 1995, Biehler and Snowman, 1993) point out that ability education may be more effective only if teachers adjust their teaching methods and learning materials for the pupils of ability groups, and that it is necessary to abandon grouping in homogeneous classes according to abilities (streaming).

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Besides the recorded results it is necessary to mention also the motivational and emotion-personal aspect of learning, as the accomplished research (Štemberger, Ivanuš Grmek, Čagran, 2009; Čagran, Ivanuš Grmek, Štemberger, 2009) gives us a warning that external differentiation is linked with motivation and emotion-personality aspects of education.

The results of the above said research (Štemberger, Ivanuš Grmek, Čagran 2009) give us a warning that educationally less motivated pupils are ranked into the first difficulty level and their motivation mostly depends on external incentives. In addition, we have to bear in mind that teachers are, in reference to the level they provide teaching, and from the point of view of pupils’ motivation in quite diversified working situations. The differences among pupils have to be taken into account during their teaching preparations, as well as during the teaching performance. In case of pupils of the 1st ability group they primarily have to develop their interest for school and school work, and in case of pupils of the 3rd ability group they have to develop, encourage and maintain previously gained motivation. They have to take care that the work represents to pupils a challenge, and they have to strengthen their inner motivation.

Similar results were obtained by evaluation study (Žagar et.all, 2003), i.e., that more inner motivated pupils are at a higher level of difficulty, whereas medium and lower ability groups in this regard do not differ from each other. Learning motivation significantly decreases in the last two years of primary schools (ibid).

We can make a conclusion that we may not expect positive effects of pupils’ ability grouping according to their achievements unless teachers apply adequate learning materials. One of more remarkable studies is the meta-analytical study of Slavin from 1987, pointing at the efficiency of ability groups in certain subjects only when the
teaching methods and the learning materials are adapted to the pupils’ needs. Solely ranking of pupils into ability groups without adequate adjustments is not effective regardless the teaching subject (Slavin, 1990).

4 Conclusions

On the basis of the obtained results from the presented study and also from the results of other researches (Slavin, 1987, Linchevski, 1995) we could make a conclusion that there are no consistent and reliable results about positive or negative impact of pupils’ grouping into ability groups. Given the results of the described research and the achievements of pupils in individual ability groups we could draw a conclusion that ability grouping is a more convenient form for more successful pupils, and less for pupils with lower results. If we combine this with the finding that we recorded from medium to high positive statistical connection between ranking pupils into ability groups in mathematics and Slovenian language on one hand and the education of their mothers and fathers as well as with average scores in mathematics and Slovenian language in the 7th, 8th and 9th grade, our thesis is even more substantiated. The first level difficulty group usually consists of pupils who have lower achievements and at the same time come from families with less encouraging socio-cultural environment. In addition, the results of other studies (Štemberger, Ivanuš-Grmek, Čagran 2009) warn us that the first difficulty level consists of pupils who are less motivated for educational work, and their motivation mostly depends on external incentives.

References