THE EFFICIENCY OF INTEGRATED AND SEGREGATED PHYSICAL EDUCATION CLASSES FOR SECONDARY SCHOOL STUDENTS WITH PHYSICAL AND MENTAL DISABILITIES AND POOR FITNESS

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ABSTRACT

Purpose. The aim of our investigation was to establish the efficiency of the integrated physical education classes for schoolchildren with minor deviations in health. Methods. Sociological (questionnaire), biomedical, pedagogical (testing), psycho-diagnostic, and mathematical statistics. Pupils (N = 1417) of secondary school (both sexes, 5th–9th forms, i.e. aged 10–15) were examined. Results. The characteristics of physical and mental development in the process of integrated physical education proved to be significantly better for different sex and age groups. Analysis of physical fitness characteristics shows that integrated physical education classes turned out to be more effective for schoolchildren with minor health deviations than for apparently healthy students. Integrated physical education classes are more effective for students’ dexterity than for their power endurance. Integrated physical education classes are more effective for female students than for male ones; for schoolchildren with minor health deviations in older age groups (7th–9th forms) than for younger schoolchildren. Those schoolchildren who attended integrated physical education classes expressed significantly better attitudes to physical education than their peers who studied in a segregated environment. Conclusions. Integrated physical education classes are a more progressive and effective form of physical education in terms of their beneficial effect upon the physical and mental development of secondary school children with minor health distortions.

Key words: inclusive physical culture, pupils, health groups

Introduction

The concept of integrated education has lofty aims and noble tasks though often counteracted by a whole range of negative tendencies causing an inevitable decrease in education level and developing in healthy students the feeling of being “neglected”, the so called “integration fatigue” (anxiety and aggression of some children against their disabled peers), and the like [1–4]. Major problems occur during physical training lessons (PT), when discrepancy in physical capabilities of schoolchildren manifests itself to its utmost. Integrated education has been gradually introduced in the Ukrainian educational institutions since 2001. Nevertheless physical training teachers often fail to show interest in introducing new educational modes [5–8]. Introduction of common integrated physical training lessons for students whose physical and mental characteristics do notdeviate considerably might create an effect of preconditioning for innovations in those educational institutions that strive for integration.

Since scientists express conflicting views on practical verification of the inclusive physical education model, it seems necessary to check the effect of integrated physical education upon schoolchildren with minor psycho-physical abnormalities and rather poor physical fitness. Thus the aim of our investigation was to determine the efficiency of the integrated physical education classes for schoolchildren with minor deviations in health.

Material and methods

The experimental group (EG) included secondary school students following the integrated program. Physical education classes in such schools were conducted for children with different levels of psycho-physical abilities simultaneously (with individualization of tasks based on the needs and abilities of each child). The control group (CG) was comprised of students of those secondary schools in which physical education classes were conducted separately for healthy students and for those with minor psycho-physical deviations and rather poor physical fitness (differences between groups are presented in the form of table [5]). Nine secondary educational establishments were involved in the investigation. Secondary school students from 5th to 9th forms (aged 10–15 years), N = 1417, took part in the research. The number of EG students amounted to 694 (320 girls and 374 boys). CG numbered 720 students (332 girls and 388 boys). Each age-sex subgroup numbered at least 20 people.

Socio-psychological characteristics of schoolchildren were established by means of a questionnaire developed by Bodnar, Andres and Tymkovych [6]. The survey was conducted to find out the children’s favorite types of locomotor activities during PE classes and out of school, the most enjoyable organizational forms of physical education, their most common harmful habits, their attitudes towards physical education and standardized characteristics of physical fitness. In order to determine the amount of physical activity performed by students, the Framingham method was used. The timekeeping measurements were taken by schoolchildren themselves.


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within one day in the course of one week (on Tuesday, Wednesday or Thursday) from December to February. Individual characteristics of physical activity volume (measured in points) and students’ energy expenditures have been computed. Physical developmental quotients were measured according to accepted standards; integrated parameters, like age-and-weight Quetelet index, were calculated. Physical fitness was determined by means of exercise test pack. Mental development characteristics were studied with the help of traditional psychodiagnostic methods (Spielberg-Khanin’s method of HAM: health, activity, mood; tapping test, Seashore's Group Cohesiveness Index and V.A. Rozanova’s method of group motivation for success) [7]. Parametric and non-parametric methods of mathematical statistics have been applied. To determine the extent of differences among group characteristics, the proportion comparison method was applied (“Statistics” routine).

Results

According to the research, the range of locomotor activity of domestic nature, like helping parents with housework, was significantly higher ($p < 0.01$) in EG schoolchildren in comparison with those of CG. The higher range of EG locomotor activity in EG students confirms higher efficiency of integrated physical education (PE).

Analysis of the students’ social-and-psychological characteristics allowed us to claim that EG children were more active computer users ($p < 0.01$). Whereas CG schoolchildren (healthy students by 7.8%, $p = 0.05$ and secondary school students with minor health problems by 31.8%, $p = 0.07$) more often spent their free time reading educational literature and fiction as well as visiting museums and exhibitions ($p < 0.05$). EG students often seem to use the Internet resources while doing their homework. The use of modern means and sources of information by EG students is clear evidence of their higher mobility, quick readjustment skills, ability to use time more efficiently, progressive thinking qualities and rapid development in terms of integration. EG students eventually show a comparatively stronger need for communication aroused due to mutual task solution during PE classes, whereas their peers from CG behave in a more humble manner, executing teacher’s commands and instructions. It is highly probable that as a result of prevailing need for cooperation EG students express their preference to outdoor games more often ($p < 0.001$) than CG children. EG schoolchildren have chosen more fashionable recreational games among youngsters compared to CG students. Secondary school students with minor health deviations (by 45.5%, $p < 0.05$) prefer playing billiards and bowling, whereas healthy children enjoy rope skipping (by 5.6%, $p = 0.01$), thus confirming the fact that young students who have studied in segregated physical education classes possess more progressive views.

Analysis of socio-psychological characteristics has shown that schoolchildren with different health status in terms of their attitude to physical education classes demonstrate significant differences. The number of EG schoolchildren who fully enjoy all the components of physical education classes was higher (among those with minor deviations by 14.8%, in convalescents by 31.3%, $p < 0.001$, and in healthy students by 18.0%, $p = 0.001$). In the case of EG students with minor health problems these values compared to their CG counterparts were close to significant ($p = 0.06$). EG students exhibited relatively stronger tendency towards a desirable quantity of physical education classes per week (3.75 classes on average) than CG students (3.28 classes). This tendency was proved statistically significant ($p < 0.05$). Such attitude might well be explained by the fact that the students who attended segregated physical education classes expressed less interest, joy and enthusiasm than their peers who practiced physical education on an integrated basis. Healthy students who attended integrated physical education classes accepted the idea of taking physical fitness tests with approval ($p < 0.05$), whereas the attitude of schoolchildren with minor health deviations who attended either integrated or segregated PE classes did not differ. Significant differences in socio-psychological characteristics of schoolchildren from both groups allowed us to claim that those students who attended integrated PE classes showed probably a better attitude to physical training than those attending segregated classes. Moreover, CG students missed PE classes by far more often (by 9.2%, $p < 0.05$) compared to their EG peers, thus demonstrating less enthusiastic attitude to physical education.

Comparison of schoolchildren health complaints in view of their level of health indicated that differences in emotional state were observed in healthy students from both EG and CG groups. CG students were complaining of groundless mood changes, anxiety and irritation more often than EG students (by 17.3%, $p < 0.01$). The very fact of breakup with friends studying in segregated conditions might cause negative changes in neuropsychiatric state of those students. Another reason for negative mood changes might be unfavorable ambience of segregated lessons for healthy students, which might lead to frustration.

Our study found that according to physical development characteristics the integrative model of conducting PE classes proved to be more effective ($p < 0.05$), since the number of significantly higher characteristics in each sex and age EG subgroup was larger than in respective CG subgroups (Table 1).

Our study has shown that in view of physical development the integrative physical education contributes to more positive changes in healthy schoolchildren (43.6%) and in convalescents (50.9%) than in schoolchildren who have minor health problems (21.6%). Hence the apprehensions of experts concerning low efficiency of PE classes
for physical development of students with sound health
proved to be wrong.

Summarizing physical fitness characteristics of school-
children from different health groups it was found that
the total sum of significantly higher results of the students’
physical fitness in the integrative and segregative condi-
tions was virtually identical (32.4% in EG and 36.2%
in CG). Nevertheless, the number of healthy students who
displayed stronger results was larger in CG (13.4% vs.
3.9%, \( p < 0.05 \), see Table 2), besides significant advan-
tages in the number of stronger results of physical de-
development displayed by convalescent schoolchildren
(16.2% vs. 12.4%) and against the students with minor
health problems (12.4% vs. 10.5%) from EG. Thus the
results of the study enable us to claim that judging by
physical fitness characteristics integrated physical edu-
cation is more effective for schoolchildren with minor
health deviations, whereas physical education classes with
separate subgroups are more preferable for healthy stu-
dents. Hence integrated PE classes conducted jointly
with children with minor differences in physical and
mental development confirmed the predictions of ex-
erts who accentuated upon low potential of integrated
physical education classes for physical fitness improve-
ment of healthy schoolchildren. This issue does not con-
flict with the information [2] about ineffectiveness of in-
tegrated PE classes for healthy students in terms of their
physical fitness improvement since the changes intro-
duced by the author applied not only to PE classes but
also to out-of-school activities. To ensure sufficient im-
provement of physical fitness in the integrated PE classes,
healthy schoolchildren should attend extra fitness class-
es or sports groups practicing certain kinds of sport.

It was found that EG students, both males and fe-
male demonstrated significant \( p \leq 0.01–0.001 \) ad-

vantages in the development of agility (“10 eights” exer-
cise and Romberg’s test). Agility is gaining in importance
in the contemporary society, becoming especially signifi-
cant for mastering modern occupations. It also deter-
mines the speed of cognitive operations, helps people
to adjust to variable life circumstances. These factors
enhance the social significance and advantages of the
experimental management of PE classes.

It was found that in performance of certain exercises
students of different sexes reacted to the changed form of
physical education classes in a different way (see Table 2).
This means that integrated physical education led to more
positive changes in female physical fitness, whereas in
males slightly higher growth rate of physical fitness was
observed during segregated physical education classes.

Table 1. The percentage of significantly higher physical fitness characteristics displayed by the experimental (EG)
and control group students (CG)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Apparently healthy students</th>
<th>Convalescents</th>
<th>Students with minor health problems</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>girls</td>
<td>boys</td>
<td>girls</td>
<td>boys</td>
</tr>
<tr>
<td>EG</td>
<td>23.6</td>
<td>20.0</td>
<td>23.6</td>
<td>27.3</td>
</tr>
<tr>
<td>CG</td>
<td>16.3</td>
<td>7.3</td>
<td>18.2</td>
<td>18.2</td>
</tr>
</tbody>
</table>

* differences between EG and CG are significant at \( p < 0.05 \)

Table 2. The percentage of significantly higher results of physical fitness of the experimental (EG)
and control group students (CG)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Apparently healthy students</th>
<th>Convalescents</th>
<th>Students with minor health problems</th>
<th>Total</th>
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<tr>
<td></td>
<td>girls</td>
<td>boys</td>
<td>girls</td>
<td>boys</td>
</tr>
<tr>
<td>EG</td>
<td>2.9</td>
<td>1.0</td>
<td>5.7</td>
<td>10.5</td>
</tr>
<tr>
<td>CG</td>
<td>4.8</td>
<td>8.6</td>
<td>4.8</td>
<td>7.6</td>
</tr>
</tbody>
</table>

* differences in EG and CG are significant at \( p < 0.05 \)
that integrated physical education is more effective for 12–13-year-old schoolchildren with minor health disturbances, whereas segregated physical education is more beneficial for 11–13-year-old apparently healthy schoolchildren.

Summarizing the results of mental development analysis of schoolchildren it should be mentioned that the ambience during integrated physical education classes conduces to more favourable psychological conditions for students. The number of higher mental development characteristics was significantly higher \( (p < 0.01) \) in all sex, age and medical subgroups of EG \((15.0\% \text{ vs. } 5.0\%, \) see Table 3).

In those forms where physical educated classes for students with different health status were carried out jointly, the number of students with a high level of personal anxiety was lower \( (p < 0.05) \) compared with those forms where physical education classes were conducted separately. EG students had an average and high level of personal anxiety. The level of personal anxiety was higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying to the fact that CG students interpreted various situations as precarious for higher in CG students thus testifying 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proved to be significantly better (p < 0.05–0.01) from EG showed much lower physical fitness characteristics of the students with minor health problems still needs further investigation.

Our study has demonstrated advantages of integrated education for physical fitness of the apparently healthy students and students-convalescents (38% and 44% respectively against 19% for the students with minor health distortions). Hence the apprehensions concerning little effectiveness of integrated physical education classes for apparently healthy schoolchildren proved to be wrong.

The results of our study make it possible to assert that integrated education exerts more positive effect upon physical fitness characteristics of the students with minor health disturbances, whereas segregated physical education classes for apparently healthy students are more preferable. Thus integrated PE classes conducted jointly with children who had minor differences in physical and mental development confirmed the predictions of experts who accentuated upon low potential of integrated physical education classes for physical fitness improvement of healthy schoolchildren. This issue does not conflict with the information [2] about ineffectiveness of integrated PE classes for healthy students in terms of their physical fitness improvement since the changes introduced by the authors applied not only to PE classes but also to out-of-school activities. To ensure sufficient improvement of physical fitness in the integrated PE classes healthy schoolchildren should attend extra fitness classes or sports groups practicing certain kinds of sport.

It should be pointed out that the major discrepancies have been observed between the results of personal anxiety of EG and CG students who had minor health discrepancies. The 5th and 9th form girls (p < 0.05) and the 9th form schoolchildren with minor health problems (p ≤ 0.05) as well as the 5th and 6th form students-convalescents (p < 0.05–0.01) from EG showed much lower characteristics of personal anxiety compared with CG students.

Characteristics of personal anxiety in CG students were significantly higher than in EG students. The higher level of anxiety in the students with minor health problems has been also observed by other scientists.

Conclusions

The characteristics of physical and mental development in the process of integrated physical education proved to be significantly better (p < 0.05–0.01) for different sex and age groups. Analysis of physical fitness characteristics permits us to admit that integrated physical education classes turned out to be more effective for schoolchildren with minor health deviations than for apparently healthy students. Integrated physical education classes are more effective for students dexterity than for their power endurance. Integrated physical education classes are more effective for female students than for male ones; and for schoolchildren with minor health deviations in older age groups (7th–9th forms) than for younger schoolchildren.

Those schoolchildren who attended integrated physical education classes have significantly better attitude to physical education than their peers who studied in a segregated environment. Integrated physical education enhances the development of such essential personal qualities as: responsibility, ability to cooperate, sensitiveness, communication, mobility of thinking processes etc. It has special psychological comfort for the students with minor health problems.

Segregated physical education classes caused anxiety and increased excitability, irritability, nervousness and bellicosity. Hence segregated physical education might bear latent threat to students’ mental health.

Therefore integrated physical education classes are a more progressive and effective form of physical education in terms of their positive effect upon physical and mental development of secondary school children with minor health distortions.

References


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