Summary of PhD Thesis

A Complex Programme of Everyday Physical Education
in Hodmezovasarhely from 2005 to 2009:
Realization, study of effectiveness, software development

by

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INTRODUCTION

During the last two decades, the main questions of the Hungarian school system have been formed around the central theme of the new, 21st Century school environment, including the new economic and social requirements schools have to face. Proposed answers and reform initiatives have touched upon several areas, including the interpretation of the new school as an organization, the introduction of quality assurance into the school system, the role of tenders and the legal background in the reform of the practice of pedagogy, the definition of school literacy and promoting competency-based education as well.

In this process of 'school-update', sports pedagogy has usually been treated as marginal (*Elbert*, 2008), also causing the pedagogical possibilities based on extra-PE physical activity, a developmental psychological and anthropological need of children, to virtually disappear, which, at the same time, means missing several important chances to promote learning motivation, conflict management, attention, self-perception, etc.

Successful school health promotion might be regarded as a complex, consciously controlled, quality-based process, determined by children's needs, related scientific results and the personality shaping resources of the community (*Meleg*, 2001; *Ratalics*, 2002; *Barabas*, 2006; *Somhegyi*, 2006; *Recla*, 2004). A way to realize this complexity is to widen schools' repertoire beyond the mere passing on of information, like by centering the whole pedagogical programme around health promotion. World Health Organization considers schools as the most optimal places for programmes focusing on children, emphasizing that shaping health-related behavior is an elementary interest of schools themselves, as their primary function, teaching, is only possible with healthy, balanced children who are satisfied with themselves (*WHO* 1984, 1986, 1991, 1997).

Evidence corroborates that students' health status is an important factor of how efficiently they are able to participate in learning (*St. Leger es Nubeam*, 2001). Children's health status correlates significantly with health behavior and indices of study progress (e.g. grades and lesson performance), school behavior (attendance and discipline), and also with students' attitudes (*Schadle-Schardt*, 2000; *Eggert es Schuck*, 1979; *Zimmer*, 1981; *Weineck* 1997).

A remarkable problem today is the often mentioned lack of exercise among children, not only concerning free time spent dominantly on consuming media and playing computer games, but in the school as well (*Zinnecker*, 1990; *Wilck es Bacher*, 1994; *Laging*, 2000; *Nemeth*, 2007). Children do not play in neighborhood streets anymore, they have no strong ties to the particular urban environment they live in, they mostly live to their parents' schedule, and in the school they just sit and listen, without any chance to gain real experience on their environment or themselves. This lack PE lessons and extracurricular exercise (if any) cannot compensate for.

Freetime exercise-programmes offer an institutionalized framework as well, marginalizing community sport programmes, and among the well-off there is a definite tendency of preferring individualized extreme sports. That is, a social inequality often presenting as health inequality also crops up as a factor, which appears in the school environment as well. These, of course, require a novel approach of exercise from schools.

In an attempt to gain a deeper understanding of the outlined phenomena, this thesis offers the elaboration of the results yielded by and the experience gained during the realization of an exercise-based school health promotion programme. After a review of the literature on the definition of health and theories of general health promotion follows a review of the theories related specifically to exercise-based school health promotion together with an

elaboration of the relation of regular exercise to health, and finally, a real-life example, the Everyday Exercise Programme of Hodmezovasarhely is analyzed and evaluated.

The programme started in September 2005, involving more than 5500 students from both elementary and secondary levels. Its uniqueness lies in the fact that by offering two extra PE lessons a week, it can provide an age-optimal amount of exercise to all council school students of Hodmezovasarhely. The complexity of the programme and the number of involved students makes it remarkable in itself, but the results of its integrated system of evaluation provide one more reason to analyze the programme in detail, including the effects it had on both the school and the community.

RESEARCH HYPOTHESES

I. Our hypotheses regarding Everyday Exercise Programme as a model of health promotion:

1. EEP is a suitable model to find the success criteria of exercise-based school health promotion.
2. EEP, as an exercise-based model of school health promotion, is suitable for the enhancement of the main output indices of health development: it enhances students' quality of life and it promotes equity as well.
3. The hidden curriculum of the programme brings along results beyond the enhancement of the output indices as well.
4. Planning and implementation of large-population school health promotion programmes imply carefully designed data handling mechanisms.

II. Our hypotheses regarding the measurement:

Our expectations regarding our newly developed system of measurement were:

1. We have developed a test of low instrumental needs, capable of measuring both condition and coordination, suitable for the measurement of the beneficial effects of regular exercise.
2. Regular, daily, optimized physical activity will enhance students' health and fittness indices, as in:
    - a significant enhancement will be seen in physical fitness when comparing the beginning and the end of the academic year.
    - this enhancement will be significantly related to gender, build, age and extracurricular physical activity.
    - children's anthropometric data (except for body height) will not differ significantly from national reference data.
    - cardiovascular data will show significant enhancement in a two-year term, especially in terms of the optimal working pulse rate.
    - pulse restitution will be significantly related to gender, build, age and extracurricular physical activity.
    - the prevalence of obesity and hypertension will decrease among the involved students.
3. We also hypothesized that in schools where socially disadvantaged students are in the majority, the percentage of those participating in regular extracurricular physical activity will be lower.

III. Hypotheses regarding the questionnaire-based survey

1. Providing a chance for regular exercise, and thereby promoting a healthy lifestyle is suitable for making daily physical activity a natural part and need of students' lives.
2. We expected that most children would support the programme, and they would participate in planning the daily PE lessons actively, as part of the implementation of a 'PE for joy' approach.
3. Among the secondary benefits we expected such things as a rise in the prestige of PE teachers and lessons or an increase in swimming pool use.
4. We also expected that the programme would have a positive effect on the local sport life in general.

METHODS

Our research programme followed the logic of public health research programmes, as in:

1. New knowledge and experience gained in the process of planning and introduction allowed us to identify the basic needs, requirements and indispensable elements of an exercise-based health promotion programme. With the help of the result model we elaborated the basic characteristics of the pilot programme in Hodmezovasarhely, and we also outlined the indispensable conditions of its adaptation.
2. - After the evaluation of the system of measurement and recording, we processed the data from the academic years 2007/2008 and 2008/2009 for the purposes of the study of programme effectiveness.
   - To measure subjective effectiveness a questionnaire-based survey was carried out on a representative sample of students in the spring of 2008. The survey was aimed at getting information on the reputation of the programme and the attitude of students toward exercise in general.
3. Furthermore, we identified the vulnerable points and outlined the requirements of a software related to the programme, by which we widened the traditional scope of public health programmes.

The System of Measurement

The methodology, worked out in cooperation by PE teachers and pediatricians, based on sports sciences, pedagogy and sports medicine, was gradually elaborated from the first measurements in the academic year 2005/2006. Measurements take place at the beginning and at the end of each academic year, covering the whole population (n= 5500), according to a standard protocol. Five different anthropometric parameters and the results of five conditional tests are recorded. Stamina is tested by a running test, 1, 5 and 10 minutes before and after which pulse and blood pressure values are taken. Both testing periods last six weeks, with the help of PE teachers and health visitors experienced in taking blood pressure.

Our instrument is suitable for defining individual courses of development, that is, to determine how the individual child's body reacts to a given amount of physical workload and how this changes over time. National anthropometric reference values are available, therefore, special local characteristics (if any) may be identified as well.

Survey Questionnaire

The survey was administered in the involved schools in June 2008. The sample (n=396) included students from the 5th to the 8th grades of elementary education, and it was generated with a multi-stage, layered sampling method. The resulting sample is representative in terms of school, grade and gender as well. Data collection was carried out exactly at the same time during the same day in all participating schools, with the help of home teachers, following standard procedures.

The questionnaire was designed observing the 45-minute class time of elementary schools. It contains 23 questions (56 items), 9 question groups and 6 open ended questions. Question groups covered the following: (1) opinion about EEP, (2) exercise motivation, (3) extracurricular training, (4) opinion about PE classes, (5) opinion about those who avoid PE classes, (6) swimming pool experiences, (7) experiences with PE teachers, (8) pastime activities, (9) statistical background variables.

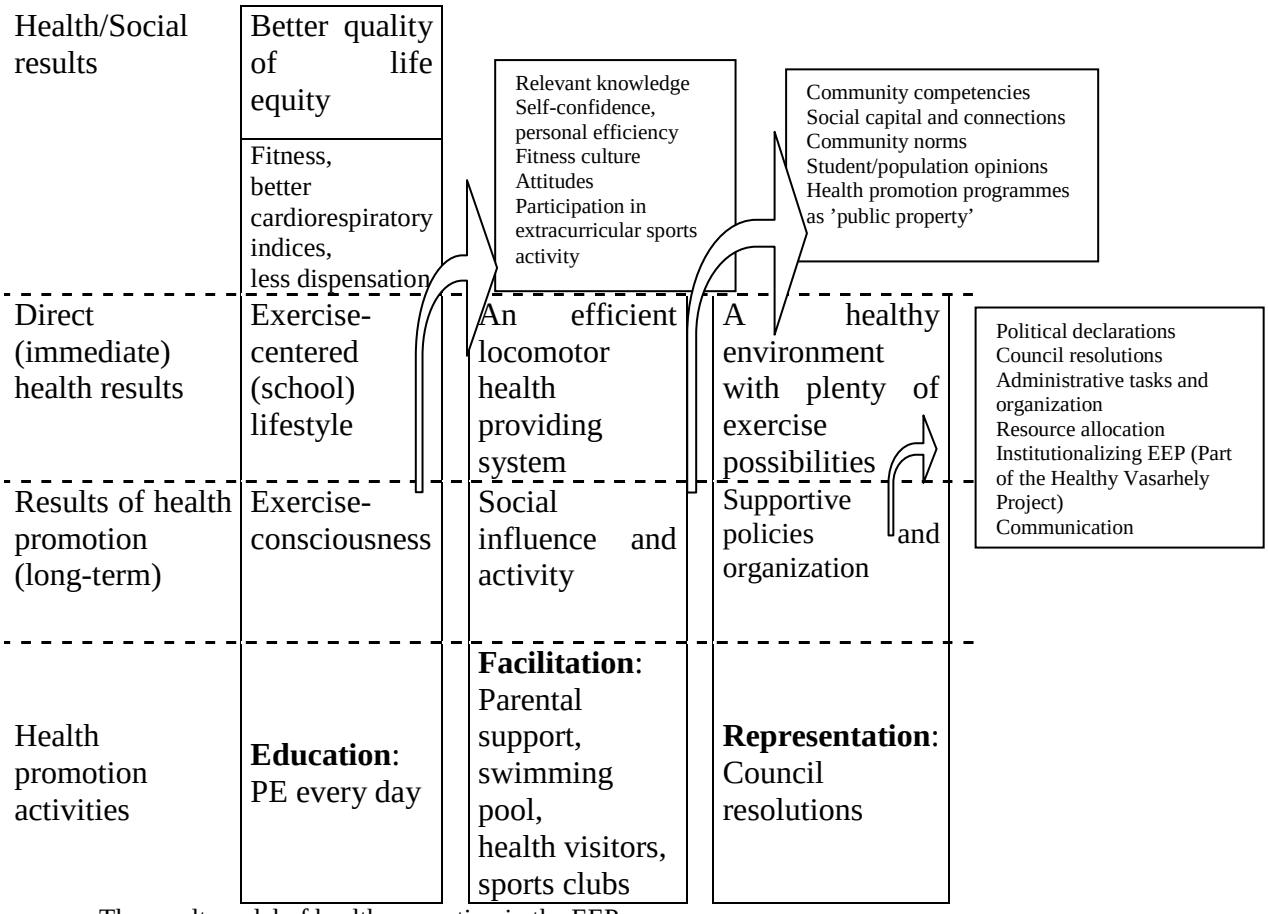
RESULTS

Implementation

The first four years of EEP have shown that based on local resources it is possible to meet children's daily exercise needs in a cost-effective manner. Although Hodmezovasarhely is a township of county rights, its population is relatively small (50000 people). The city council runs mostly averagely equipped schools both at the elementary and secondary levels (each with a gymnasium), a sports swimming pool and a skating rink in the winter. However, by cooperation with local sports clubs, the capacity has increased considerably, and so it is possible to provide the two extra lessons per week.

Observing especially the three main dimensions of the result model of health promotion (education, facilitation and representation), it has been established that EEP meets all the requirements of an optimal programme of exercise-based school health promotion programme. Analyzing the results along the mentioned three dimensions, it is to be seen that educational institutions are optimal for health promotion, as they have representation (the city council), they educate, and they are present within the community, which helps the facilitative dimension.

As for the dimension of education, we consider it a remarkable result that the reputation of PE classes has improved. Furthermore, by today, EEP functions as a programme involving the whole faculty. Beyond school managements, PE teachers with their professional knowledge, dedication and creativity are a sine qua non of successful implementation.



The result model of health promotion in the EEP

Concerning the community (facilitative) dimension : as a result of the programme, it became possible for students to spend more time together, which provided them a chance for a better understanding of their peers and themselves. Community organization started among parents as well; taking their junior grade children to the swimming pool every day, their relationships have intensified. School community norms went through a reshaping process, as programme elements of EEP were gradually integrated into the everyday life of schools.

At the level of representation the positive attitude and support of the city council is of invaluable importance. It is to be pointed out that EEP has now become part of a larger health promotion initiative, Egeszseges Vasarhely Program (Healthy Vasarhely Project) which is an interdisciplinarily controlled, wide-range, well organized project. This way the programme can reach its health promotion goals.

Measurement Results

The methodology, worked out in cooperation by PE teachers and pediatricians, based on sports sciences, pedagogy and sports medicine, was gradually elaborated from the first measurements in the academic year 2005/2006. In this work we have elaborated on data of the elementary school population from the academic years 2007/2008 and 2008/2009.

Anthropometric data corroborate the success of EEP but partially. Body height, of course, is not influenced, however, and in spite of regular exercise, 18.3% of students are overweight. In terms of BMI, there is no vast difference from national reference data,

however, some improvement has been observed over a two-year period, which we put down to the beneficial effect of regular exercise.

Cardiovascular data - due to differences in data acquisition - were not suitable for a national comparison. During the analysis of the pre-run baseline blood pressure values, though, we found high normal or high values in 10-11% of the students. We propose that in these students further medical examination should be necessary.

Applying the Karrasch-Muller Index, we found that at the end of the academic year 2007/2008 students' cardiovascular condition was better than at the beginning of the same year, that is, the same workload caused apparently less cardiovascular stress. An enhancement of stamina is signified by the fact in 80% of students the 1 minute post-run pulse rate fell within the 55-80% rage of the maximal values.

An important result of our study is the percentile tables about the involved children's height, weight, BMI, waist-, hip- and wrist circumference and baseline blood pressure, which serves not only as a screen to find present morbidity, but these tables also contain the baseline values for the longitudinal study.

Motor abilities have also exhibited significant enhancement, however, in lack of a control group, it cannot be definitely argued that this is anything more than spontaneous development. Outliers and extremes were also analyzed, but the main tendency was a decrease in weak performance, not an increase in good performance. The programme, therefore, does not seem to be fit for the purposes of talent management.

Gender-related differences are also significant, both in terms of actual performance and development. These differences are identical to those described in the literature. It is to be pointed out, though, that the percantage of those who can not swim is higher among girls. As this test was not designed to measure stamina in connection with swimming but the technique of swimming, we explain the observed difference with differences in attendance: girls' monthly one dispensation means a loss of a quarter of the swimming classes. Build as determined by BMI is an important background variable; all our tests, except for medicine ball put, show that overweight or obese children exhibit a decreased output. It was also observed that these children develop slower in performance, as compared with their average built peers. For instance, in serial jump, they achieve only 70% of their average built peers' performance development in an academic year (for both girls and boys). Furthermore, in the Alden test, overweight girls' performance after one academic year of development is identical to that of their average peers at the beginning of the same year. As for our hypothesis regarding the decrease in the percentage of overweight or obese students, we have found a positive tendency, however, the blood pressure hypothesis could not be tested, mainly due to measurement problems.

We could not manage to generate an exact subsample of students doing sports regularly (i.e. athletes), therefore we could not test our hypotheses about athletes.

Questionnaire results

This survey of reputation was aimed at the identification of programme elements influencing outcomes positively or negatively. Getting information on children's attitudes toward daily physical exercise in general.

The questionnaires have shown that EEP makes students more exercise-conscious. Our results suggest that in health promotion among school-age children promoting fitness culture may have a major role. More than 70% of elementary school students can be motivated with the help of their natural love of physical activity. 64% of the involved students said that they found physical education positive, even if exercises are difficult. Only 11% of

the students judged physical education as (relatively) negative (5.8 % among athletes). The need for daily exercise has formed only in two fifths of the students; these students said they definitely missed cancelled PE classes (this tendency is a bit more significant among those attending some kind of regular training).

Extracurricular physical activity was surveyed through the number and legth of weekly training sessions, by the type of sport. In concert with national data, boys do more sport than girls. At the time of data acquisition boys have attended training sessions for an average of two and a half years, in an average of 3.14 hours a week.Time spent on training shows a slight decrease after one year, but from the fourth year on this decrease is drastic. Doing sports seems to have a positive effect on studies as well: those who do sports regularly do significantly better at school.

In institutions with a lower number of multiply disadvantaged students[1], that is, in schools chosen by the socially better-off, more children do sports regularly, therefore, EEP has a distinguished role in promoting equity, as it offers various exercise possibilities (like swimming) even to those students whose family background otherwise would not make it possible for them to do sports/exercise regularly.

It is notable that almost one third of the children do not feel talented, not even in PE classes. 16.6% are completely dissatisfied with their build, and they also want to lose weight. At the beginning we hypothesized that there would be a measurable difference between the self- images of children who do sports and who do not. This hypothesis has not been corroborated.

As far as free time is concerned, about a third of the asked children said that they usually hang around with friends after school, without any definite aim. Computer and television are indeed dominant as pastimes. Television series and cartoons/animation films are the most popular genres, however, it often means that children watch late night films intended primarily for adults. Gender difference in computer use is not robust, but still, boys are in the majority.

Data management

During the two whole-population measurements per year a considerable amount of data is gained. For the storage and handling of such an amount of data integrating (even electronic) files into separate data bases by research question is unsatisfactory. An extra problem is the relative large number of persons involved in data acquisition (60 persons), which makes the process, even following standardized procedures, rather vulnerable to individual mistakes. This realization led us to the planning of an internet-based software with public access functions. This softwer will make it possible to follow individual progress on a ’health map’, including information on the actual health status.

[1] The dispersion of multiply disadvantaged students is becoming rather homogenous, inequalities are on the decrease ever since the introduction of integrated education. At the beginning of our study representation of MDSs was homogenous only in the first grade.

SUMMARY

Although EEP was developed for Hodmezovasarhely, its complexity and the characteristics of the city make it suitable for adaptation. We are positive that the present study can serve the educational political purpose of being a starting point for the national implementation of EEP.

We have also identified elements to be corrected, like the need for longer changing time before swimming classes.

Measurement and evaluation we do find vulnerable points of the programme:

- Population size and the number of interwievers necessitates the refinement of the protocol and pre- education.
- Screening for hypertonia is possible only if baseline blood pressure is taken right when anthropometric data are recorded.
- Data recording must be safer, as the present practice is not fit for scientific purposes (due to frequent misrecording, data loss, etc.). The proposed software is bound to eliminate this problem.
- Control groups should be applied.

In the described programme about half a million items of data are recorded per year. This amount of data makes it possible to carry out further analyses to gain a finer, more detailed picture, especially after the introduction of the proposed software. The longitudinal quality of the study offers an invaluable chance to diagnose the secular trend, that is, the changes in children's health status over time. The first two whole-population studies indicate several beneficial trends, which is in favor of the continuation of the programme.[2]

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