

Effectiveness of an innovative athletic program at the 1st stage of primary school

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ABSTRACT

The aim of the experiment was to test the effectiveness of an innovative program in grade 3 of elementary school and to compare the results with a traditional teaching program for lower stage of elementary school. The experiment took place at the Ďumbierska primry School in Banská Bystrica. One class was randomly assigned as an experimental group, in which teaching in the form of an innovative programme took place, and the other as a control group, in which teaching in the traditional way took place. Subsequently, the application of the innovative programme was carried out in the scope of 9 lessons. A 5-point scoring scale was developed to assess athletic skills. SPSS Statistic statistical program was used to detect statistical significance and the results were evaluated at $\alpha \leq 0.05$ level. The pupils of the experimental group achieved a significant improvement in sports skills compared to the control group, which was confirmed by calculating the statistical significance. The most significant improvement was recorded in short distance running, where pupils of the experimental group improved by 32%. In short distance running, the most significant differences between the experimental and control group were also recorded, by 20%. In the standing long jump, an improvement of 23.5% was recorded, with a more significant improvement of 19% compared to the control group. The least significant differences were recorded in cricket ball throwing, where the experimental group improved by 16.75%, 13% more than the control group. Based on the results, we recommend incorporating more innovative exercises, exercises in pairs and movement games, following the methodological procedures, incorporating more teaching aids to make the lesson more varied and fun for the pupils.

KEY WORDS: Athletics, teaching effectiveness, innovative program, physical and sport education, elementary school

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INTRODUCTON

At a younger school age, children are exposed to a lot of changes brought about by a new environment and regular school attendance, while their lives are no longer dominated by

play [1]. Del Giudice [2] argues that it is the period of younger school age that is suitable for the acquisition of various movement skills, which are the basis for everyday activities and for further movement improvement [3]. The

athletic disciplines themselves are based on basic locomotor movements such as running, jumping, or throwing. They are also dependent on whole-body movement and have a positive impact on healthy physiological development. This is why schools should take care to properly execute athletic disciplines and focus primarily on their technical execution [4]. In primary schools, athletics should form a major component in the physical and sport education curriculum with a structure that is optimal for the development of movement skills [5]. The preparation of teachers also has a significant impact on the implementation of athletics and therefore it is important to encourage them to attend training courses or follow new trends to increase the effectiveness of athletics teaching in schools [6].

Porubský et al. [7] point to the fact that it is during this period that the child acquires skills that will influence him or her throughout life, and therefore efficiency is essential in the process of learning new things. In order to make teaching more effective, a curriculum reform was carried out in Slovakia in 2008, but it was met with a great wave of criticism, mainly due to the lack of emphasis on teaching effectiveness. Currently, an updated ISCED 1 national curriculum is in force for the first level of primary schools, which also includes physical and sport education, which

can be found under the educational area of health and movement [8]. Problems with the effectiveness of teaching physical and sport education are also pointed out, for example, by Antala (9), who also identifies the low number of physical and sport education lessons as a problem.

Game-based models have been shown to be effective at younger school ages and significantly improve speed in short-distance running [10]. For children at this age, regular sporting activity is appropriate, whether it is a different form of running or, for example, skipping rope, or other spontaneous physical activity [11]. However, performance in short distance running can vary between children and this is based on different biological ages. In the same way, children need to be treated in the same way in the development of motor skills, where the developmental and growth processes of children need to be taken into account [12].

Sari et al. [13] point out that games are a more effective form also for improving the long jump skills of primary school pupils than the form of traditional methodological practices. Another factor that contributes to the positive impact of establishing good long jump habits is visualization. Visual demonstration is proven to be more beneficial for younger school-aged children than verbal instructions that point to a target [14].

In throwing, we observe only slight differences between boys and girls in their ability to improve during the younger school-age period [15]. According to Tillaar & Marques [16], performance and technique in ball throwing is positively influenced by changes in ball weight. Throwing technique is

OBJECTIVE

The aim of the work was to verify the effectiveness of an innovative program included in the teaching process of physical and sport education in the 3rd grade at primary school. The effectiveness of the

METHODS

The experiment was carried out at the Spojeová 14 primary school in Banská Bystrica. The experiment involved pupils of two 3rd grade classes aged 8 - 9 years. The classes were randomly assigned as an experimental group (20 pupils) and a control group (21 pupils).

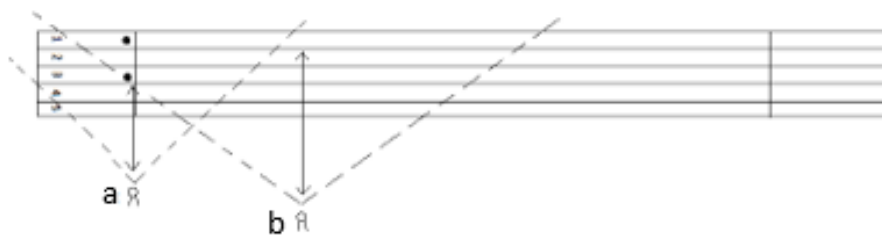
Initial assessment of technique was made by assessing athletic skills: running a distance of 20 m from a semi-high start, standing long jump start and throwing a cricket ball from a standing start. The assessment was carried out on the basis of the video recordings that we made in the physical education and sports education classes. This was followed by the teaching of the athletics block, where we applied the innovated programme in the

also significantly affected by the age of the child. In 6-year-old children, throwing technique is still primitive, but usually begins to improve between the ages of 10 and 14 years depending on the improvement of motor skills [17].

program was evaluated by assessing the running, jumping and throwing techniques of the students before and after the completion of the experimental program in physical and sport education classes.

experimental group, while the control group was taught in the traditional way. In the framework of the project "Athletics with joy in primary schools", sample preparations consisting of two different warm-ups and sample preparations for 9 lessons with athletics content were developed. After the completion of the innovative program, an exit evaluation was conducted based on the same implemented video recordings.

We used a GoPro HERO 10 outdoor camera with a tripod, 240 frames per second and 23 megapixels resolution to film the athletic skills. During filming, the camera was 15 to 20 m away from the pupils in a lateral view, midway between the initial and final phases of the recorded movement (Figure 1).



Legend: a - long jump from place / cricket ball throw, b - short distance running,
Figure 1 Drawing of camera placement during filming of individual athletic disciplines

In both the entry and exit shooting, we assessed athletic skills in the experimental and control groups, using a 5-point scoring scale (1 - best rating, 5 - worst rating, according to predetermined criteria: in the short distance running, the following were assessed: half high start, striding run, and swing run. In the standing long jump, the preparatory movements with a bounce and the flight phase with a rebound were evaluated. In the cricket throw, the throw as a whole was assessed. The demonstrations of athletic skill

RESULTS

In short distance running, we observed improvements in technique in all parts of the run in both the experimental and control group (Figure 2). The experimental group improved by 34.25% ($t = 9.5$; $p < 0.05$) and the control group improved by 12.5% ($t = 5.2$; $p < 0.05$) in the medium start position. Thus, the experimental group improved by 21.75% ($t = 5.38$; $p < 0.05$). This trend was true in all other running skills assessed. In drive phase, the

technique were independently assessed by 3 assessors (2 athletic coaches and one primary school PE teacher). The results were processed using mathematical and statistical methods and then compared between the experimental and control groups. The significance of differences was determined using a two-sample paired t-test, using the IBM SPSS Statistical data editor for calculations. The significance of the results was tested at a significance level of $\alpha \leq 0.05$.

students of the experimental group improved by 31.75% ($t = 11.15$; $p < 0.05$) which is significantly better by 18.75% ($t = 3.34$; $p < 0.05$) compared to 13% ($t = 4.53$; $p < 0.05$) of the control group. For the swing run, the difference between the groups was 19.5% ($t = 4.62$; $p < 0.05$), with the experimental group improving by 29.5% ($t = 7.87$; $p < 0.05$) and the control group improving by 10% ($t = 1.88$; $p > 0.05$). In the overall assessment, the experimental group students improved from

an initial score of 3.66 to 2.39, an improvement of 32% ($t = 15.8$; $p < 0.05$), and the control group students improved from 3.77 to 3.29, an average improvement of 12 %

($t = 6.19$; $p < 0.05$). Thus, we can conclude that the pupils in the experimental group showed a significant improvement of 20% ($t = 8.76$; $p < 0.05$) compared to the control group.

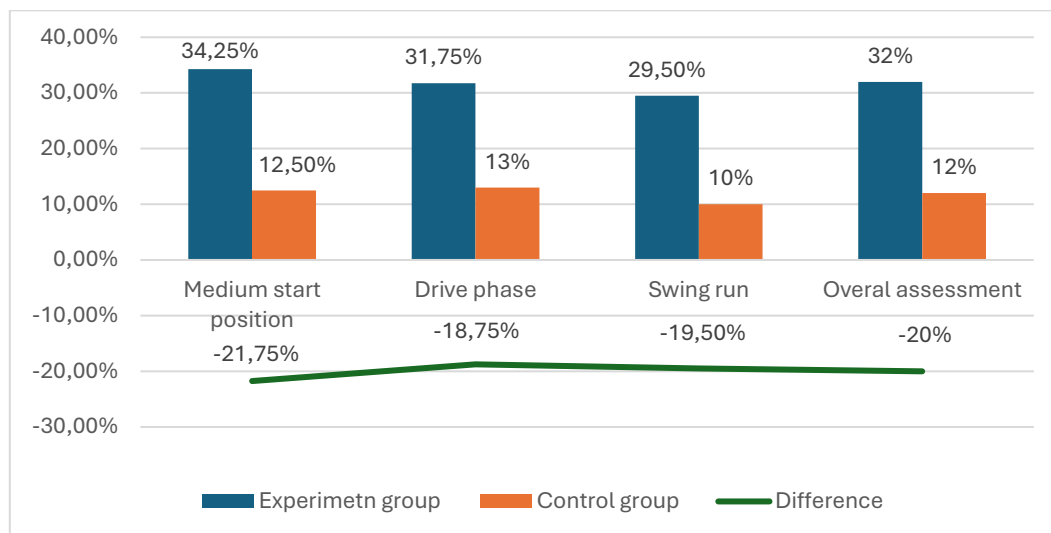


Figure 2 Percentage improvement in short distance running technique in experimental and control groups

In the standing long jump, we observed an improvement in preparatory movements and takeoff by 23% in the experimental group ($t = 16.6$; $p < 0.05$) and by 5% in the control group ($t = 2.5$; $p < 0.05$). The difference in improvement was 18% ($t = 4.6$; $p < 0.05$) in favour of the experimental group. Similar results were observed in the flight phase and landing, when the pupils of the experimental group improved by 24 % ($t = 17.7$; $p < 0.05$) and the pupils of the control group by 4 % ($t = 1.9$; $p > 0.05$). Thus, the difference represents

a more significant improvement in the experimental group, namely by 20% ($t = 9.59$; $p < 0.05$). In the overall assessment, the experimental group improved from an average of 3.44 points to 2.51 points, representing an improvement of 23.5% ($t = 7.57$; $p < 0.05$). Thus, the experimental group improved by 19% ($t = 12.92$; $p < 0.05$) more significantly compared to the control group, which improved from 3.56 points to 3.38 points and thus improved by 4.5% ($t = 3.13$; $p < 0.05$).

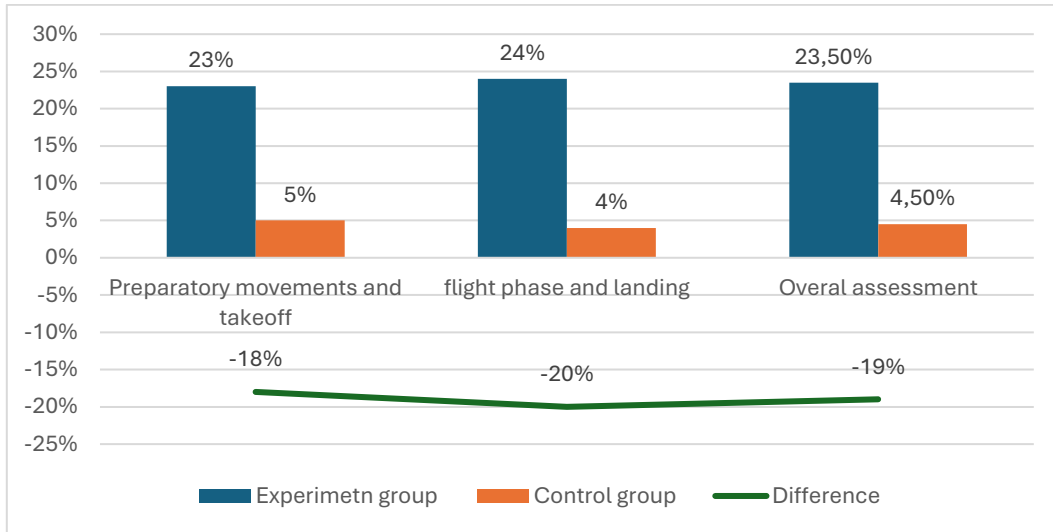


Figure 3 Percentage improvement in standing long jump technique in the experimental and control groups

In the technique of throwing the cricket ball from the spot, only the total throw was evaluated. In this case, we observed an improvement of 16.75% ($t = 9.07$; $p < 0.05$) for the pupils in the experimental group and thus from 3.94 points to 3.27 points, while in the control group we observed an

improvement of 3.75% ($t = 2.08$; $p > 0.05$) from 4.02 points to 3.87 points for the pupils in the experimental group. The difference in improvement between the experimental and control group is 13% ($t = 6.29$; $p < 0.05$) in favor of the experimental group.

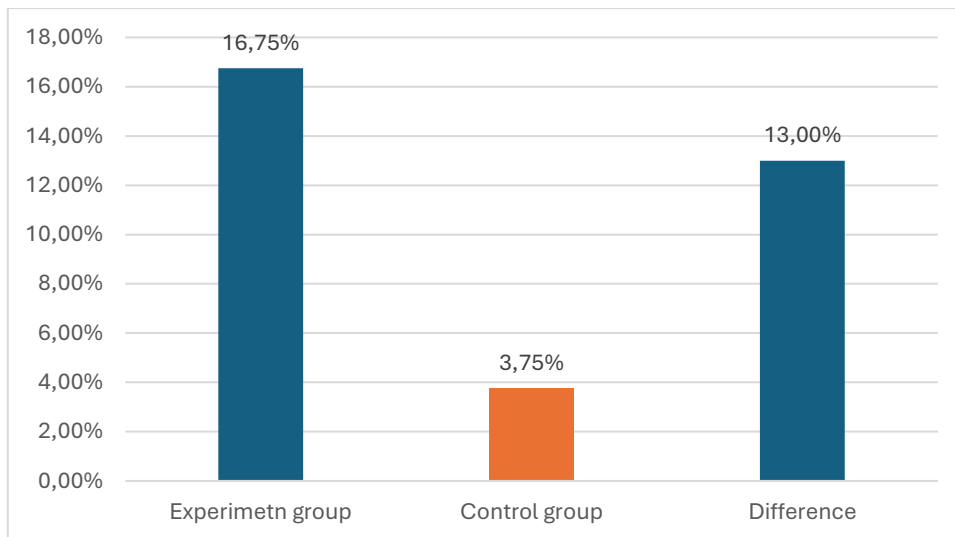


Figure 4 Percentage improvement in the technique of throwing a cricket ball in the experimental and control groups

DISCUSSION

Rata et al. [18] created a 12-week program for children aged 7-8 years, where the aim was to

improve coordination skills in order to allow children to perform movements at a higher speed and therefore become more efficient at

short distance running. In order to achieve the objectives, mainly game-based exercises were used, which aimed at mastering the basic technical elements that are part of the primary school curriculum and were based on the elements of running, jumping and throwing, and were implemented in the form of movement and relay games or by creating sports obstacle courses. The results indicated that the impact of this programme improved coordination and a positive effect on the increase in speed in the 20 m race was confirmed by correlation calculations. In our case, the programme did not focus on coordination, but on running technique, but the two are related. We observed positive results due to the impact of the innovative program while, like Rata et al. [18], we based the concept on teaching basic movement skills such as running, jumping and throwing and also games and obstacle courses were incorporated into the teaching. As a result of this program, we were able to record an overall improvement of 32% in short distance running technique.

The project of Doležajová et al. [19] also included the development of an innovative programme for long jump. However, even in this case, she was not able to confirm the positive outcome of the developed program. The reason given by the author was that 12 lessons were not sufficient to achieve positive

results. The author further states as recommendations to rather implement running for a shorter distance, the inclusion of movement games aimed at the development of jumping activity, or rebounding exercises incorporated into movement games. In our program, we can observe a considerable similarity with the recommendations of Dolezaj et al. [19], whereby we implemented both the teaching and assessment in the long jump from and just the movement games focused on rebounding were included in the teaching. In our program, we observed a 23.50% improvement in the standing long jump.

Doláková [19] developed a plan for teaching cricket ball throwing that was designed for Year 4 pupils and lasted for 3 months. The teaching block was implemented 1 time per week with a teaching unit length of 90 minutes. However, when evaluating the programme, the author found the programme to be ineffective and justified this by stating that the discipline is complicated for younger school-aged children and this is due to the fact that younger school-aged children are not able to remember and subsequently connect a larger number of phases and link them together correctly into a single unit. This statement is also agreed by Dolezajova et al. [19] who also identified the discipline of throwing a cricket ball as challenging despite

the fact that their programme was aimed at Year 6 pupils. According to Doležajová et al. [19], more time needs to be dedicated to teaching cricket ball throwing, mainly due to the complexity of the run-up and jump before the throw. However, in our programme we have seen significant improvement in the pupils. This is explained by the fact that in our programme we concentrated on cricket ball technique from the spot and not from the run-up. The second difference is that the teaching was split into two shorter sessions so that we covered the throwing of the cricket ball in 6 lessons but only half of the main part of the lesson. In the case of our program, we were able to record an average improvement of 16.75% in the experimental group.

The programme developed by Yan et al. [21] confirmed the positive impact of incorporating movement games into the teaching of physical and sport education in primary schools in several areas. The first area

CONCLUSIONS

Based on the results obtained, we evaluate the innovative program we have developed as more effective compared to the traditional way of teaching in physical and sport education classes. The results show a positive impact in all three movement skills targeted by the experiment. In short distance running, we observed a 32% improvement in skill level

is the impact on physical performance, where movement games have been shown to contribute significantly to improved movement skills and better physical health outcomes. However, movement games also have a positive impact on the psychological side, positively influencing mental health, helping to improve physical self-perception or, for example, intrinsic motivation or overall sense of well-being. The program we developed for teaching the athletics block in sport and physical education classes also included a number of movement games or competitions, and like Yan et al. (21), we also observed positive results in the area of movement skills. Therefore, we can conclude that the inclusion of movement games in the teaching of the athletics block has a positive effect on the level of movement skills and thus their inclusion in the teaching process is beneficial for the students.

in the experimental group which is a significant improvement of 20% compared to the traditional way. We were also able to record a more significant improvement in the experimental group in the standing long jump. The pupils included in the experimental group improved their movement skills by an average of 23.50% due to the innovative program, which is 19% more than the pupils in the

control group. In the cricket ball throwing, we observed the smallest differences between the experimental and control groups, but also in this case the innovative program proved to be more effective compared to the traditional program, namely by 13%.

The results showed that the innovative programme was most effective in improving the skills of short distance running and, conversely, was least effective for cricket ball throwing. In the cricket ball throw, we already observed the worst scores at the initial assessment, with pupils on average performing the worst. It was confirmed that throwing is becoming less and less of a natural locomotion activity for primary 1 pupils.

In teaching athletic skills we recommend:

- Include more innovative exercises, exercises in pairs, movement games or competitions,
- Follow methodological procedures and do not include more complex exercises unless the pupil has sufficiently mastered the simpler ones,
- Vary the exercises to make the lessons varied and interesting for the pupils,
- Incorporate more aids to athletics training into the classroom.

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