

Assessing physical activity in sports lessons – distance learning in secondary school

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Abstract

During the distance learning process, the biggest problem is an even more inactive daily routine. The objective of the study - the application of assessment parameters and criteria in distance learning in sport lessons, to promote daily physical activity and to improve the assessment of the subject Sport. The study used a deterministic experiment; initially pupils were surveyed about the distance learning approach and transcripts of records were collected. The pupils then worked for a month according to a “distance plan” and were assessed by set of parameters. After two months, the pupils were surveyed again. Two questionnaires were used - for pupils in grade 10, to find out attitudes towards sport in distance learning and its impact on physical activity. 96 questionnaires were received. Questionnaire 2 – for sport teachers, to find out the opinion on the effectiveness of sport lessons during distance learning. 19 questionnaires were received. The questionnaires were processed using MS Excel and “Student's t-test, “Pearson's rank correlation coefficient”. The information obtained was used to design the programme to be carried out during the sports lesson and the assessment parameters and criteria to be applied over a one-month period. The programme included all-round strength-building exercises, theoretical exercises. The results obtained show that the example of assessment parameters and criteria developed for pupils in the distance learning process is motivating for pupils to engage in independent physical activity. Not everyone achieved good or very good marks, but every pupil benefitted, even if it was a minimal increase.

Keywords: secondary school; sport lessons; distance learning; assessing physical activity; assessment parameters

Introduction

The problem and relevance of the study derive from the theoretically argued and empirically confirmed fact that people are becoming passive and physically inactive as a result of rising welfare and new scientific advances in everyday life that reduce the need for physical effort. The development of new technologies and their application in educational institutions and everyday life, reduce physical effort and a deeper understanding of sport (Bennett, 2011). The physical condition and development of young people, including pupils, is declining.

The World Health Organisation has developed recommendations on health-promoting physical activity, as insufficient physical activity is one of the causes of increased risks of serious health problems, reduced life expectancy and poorer overall quality of life. These recommendations are based on the scientifically proven correlation between the frequency, duration, intensity and certain types of physical activity to avoid non-communicable diseases such as cardiovascular disease, lung disease and cancer (Aarts et al., 1997).

One of the institutions that primarily provides basic knowledge about sport and its necessity in everyday life is school. The development and evaluation of sport content in schools is still a very topical issue. However, the importance of sport in the everyday lives of pupils is highly ambiguous among pupils, parents and national authorities (Bailey, 2009). When distance learning in sport became a daily practice in Latvia, sports teachers had to adapt and motivate pupils to be physically active, not forgetting that “Assessment in sport has been identified as a powerful method for monitoring students' accountability to learning tasks” (Baltušīte, 2006; Barker et al., 1989); however, it can be observed that during the distance learning process, great emphasis is placed on the acquisition of theoretical knowledge, as well as on the assessment criteria and their positive acquisition, without fully taking advantage of the desire of teachers to really get students physically moving, thus forgetting the most important thing that sport can provide – physical and active movement and positive health effects. Health safety and physical activity in the field of education (hereinafter referred to as – the subject *Sport*) can achieve the most positive results in distance learning right now by focusing not only on learning the content, but also on meeting the recommendations of the World Health Organisation, integrating such correctly, effectively and organically into the learning process.

The World Health Organisation (WHO) defines physical activity as any movement of the body that is generated by the skeletal muscles and uses energy. Physical activity includes both exercise and other activities that involve body movement, such as playing sports, walking, cycling, cleaning the house or gardening, swimming,

recreational activities, etc. Scientific evidence shows that physical activity has important health benefits for children and young people. Adequate levels of physical activity contribute to a healthy musculoskeletal system, a healthy cardiovascular and respiratory system, have a positive effect on coordination and motor coordination, and help maintain normal body weight. In addition, for young people, physical activity is associated with psychological benefits, such as social development, self-expression, self-esteem, social interaction and integration. At least 60 minutes of moderate to vigorous intensity physical activity daily is recommended for children and young people (WHO, 2019; 2020).

As distance learning lessons can provide this type of content, the next step is to ensure that assessment is an integral part of the learning process.

Guidelines for Assessment in General Education

Latvian schools have been using a 10-mark scale for assessing pupils' learning achievements since the 1992/1993 school year, with the well-known 'pass'/fail' grading system, but ongoing debates among educators and society at large show that there is a need for a more comprehensive explanation of how to use formative and summative assessment in a more targeted way in the learning process. Assessment issues are topical both among educational researchers and in public debates not only in Latvia but all over the world. Analysing the study of international assessment experts, for example, Peter Black (2003), concludes that there is increasing focus on the aims of assessment - "...the first priority of assessment is to promote pupils' learning".

Canadian expert Faye Brownlie (2004), calls for any assessment to be preceded by an answer to the question of what the information from the assessment is for. She recommends that teachers make greater use of assessment for learning, i.e., formative assessment. This is an assessment that is continuous and has one main goal: improving learning. Similar conclusions were reached by experts in the 2003 international study Self-Evaluation in the Global Classroom. This study involved pupils (aged 13–15) and teachers from the UK, Czech Republic, Germany, Sweden, Japan, South Africa and South Korea. The study analysed assessment, self-assessment and motivation in schools, and when pupils were asked whether they had self-assessed their learning, 75% said they had not even thought about it. The above shows once again that in the successful organisation of the learning process, time needs to be devoted to issues of assessment of learning and pupils achievement (MacBeath & Sugimie, 2003).

In the context of physical activity, it is important for young people to understand the importance of physical activity in their lives, so that performing such outside school and in lessons is a deliberate, purposeful process. This is the main aim of the sport and health subject; to create this awareness in pupils. Distance learning makes this process more independent; these goals can also be achieved remotely using smart devices, both by the pupils independently carrying out and monitoring their daily physical activities, and by the teachers guiding and monitoring the process where the pupils are involved.

For teachers, summative assessment is an effective way of assessing pupils' performance in the subject *sport and health*, both face-to-face and in distance learning, and involves the use of various criteria and parameters that contribute to a clearer understanding by pupils of the assessment process. Teachers have a great deal of responsibility in providing an assessment mark, which is why it is necessary to ensure the most equitable assessment marks, especially as marks are often determined by one person – the subject teacher. There may be various subjective reasons for interpreting a mark, but summing up the appropriate criteria and parameters can make a mark quite objective, which is very important for both teachers and pupils.

The novelty of the study: Distance learning in schools is currently a hot topic all over the world and in Latvia as well. It has created many challenges for pupils, teachers and the education system as a whole. This distance-driven learning process has forced educators and pupils to adapt to the situation, both to teach and to learn all their subject content in a very versatile/advanced way by developing their digital skills. Sport lessons are no exception. The motivation, attitude and understanding of secondary school pupils during this period is very relevant. Teachers' approach to the learning process and its assessment is a very important turning point in shaping pupils' attitudes towards physical activity and its use for health purposes. It is therefore very relevant to assess to what extent the existing teacher assessment parameters and criteria in distance learning sport lessons are in line with the existing Health Organisation recommendations on physical activity for the Latvian population.

The problem of the study: The compulsory content of general secondary education in sport, or health, safety and physical activity education, inherently involves pupils' independent engagement in physical activities that contribute to the development of physical condition and overall health. During the distance learning process, the biggest problem is an even more inactive daily routine – long hours spent in front of a computer screen, which is not good for health and the body.

The study process of sport lessons is something that can help to improve this situation. Given the emphasis on assessing pupils' skills in the learning process, it is just as important to follow guidelines on the amount and nature of physical activity that is recommended to improve health. In the current distance learning process, this is not being done effectively and purposefully enough, given that there are existing recommendations on physical activity for the Latvian population from the Health Organisation.

The objective of the study: The application of assessment parameters and criteria in distance learning in sport lessons, to promote daily physical activity and to improve the assessment of the subject *Sport*.

Material and methods

The study used a deterministic experiment; initially pupils were surveyed about the distance learning approach and transcripts of records were collected. The pupils then worked for a month according to a “distance plan” and were assessed according to a set of parameters and criteria. After two months, the pupils were surveyed again and the transcripts of records were collected.

Two questionnaires were used in the study. Questionnaire 1 – for pupils in grade 10. The questionnaire is anonymous, with six closed multiple-choice questions and one open-ended question. Aim of the questionnaire: to find out pupils' attitudes towards sport in distance learning and its impact on physical activity. The questionnaire was administered from March 2021. Questionnaires were sent to 300 pupils and 96 completed questionnaires were returned. The questionnaire included questions about daily life in the context of distance learning, the impact of assessment criteria on motivation in sport lessons, and additional physical activity outside sport lessons. Questionnaire 2 – for sport teachers. Aim of the questionnaire: to find out the opinion of sport teachers on the effectiveness of sport lessons during distance learning. The questionnaire was administered in March 2021. 50 questionnaires were sent out and 19 completed questionnaires were returned. The questionnaire asked how they evaluated the effectiveness of sport lessons during distance learning, as well as how the balance between practical and theoretical exercises had changed. In addition, they were asked about the criteria used in the assessment and whether the WHO recommendations on the minimum amount of physical activity required according to age are taken into account. The questionnaires were processed using Microsoft Office Excel and the “Student's t-test for linked samples” add-in (the confidence interval $\alpha < 0.05$), as well as the “Pearson's rank correlation coefficient”.

In the next step, the information obtained was used to design the programme to be carried out during the sports lesson and the assessment parameters and criteria to be applied over a one-month period for pupils in grade 10. The programme included both the performance of all-round strength-building exercises and physical activities such as running, walking, cycling. In addition, theoretical exercises related to the content of the programme. The programme was carried out both indoors and outdoors, with the individual following his/her own plan and with me supervising it. After the completion of the one-month plan, the effectiveness of this set of assessment parameters and criteria was evaluated by summarising the transcripts of records and analysing them. The data was collected from Garmin Connect, Polar Flow, Suunto smart devices and MapMyRun, Runkeeper, TrainingPeaks, STRAVA apps. With these apps it is possible to record both the amount and frequency of physical activity done and one can verify the actual day and time of these activities.

Results

Development and application of a set of assessment parameters and criteria in the subject Sport for grade 10 pupils. Based on the World Health Organisation's recommendations on health-promoting physical activity, which are based on the scientifically proven correlation between the frequency, duration, intensity and certain types of physical activity in order to avoid non-communicable diseases such as cardiovascular disease in the future, the desired intensity and amount of exercise included in the set of criteria were taken into account. Also, based on the WHO guidelines for physical activity (WHO, 2020), which recommend muscle-strengthening exercises as part of physical activity, four strength exercises were selected that could be performed at home, without the need for additional equipment, and with the possibility of remote visual assessment of exercise technique.

Summative assessment was used to assess the performance of this exercise plan. The assessment parameters and criteria for this set of exercises included: time spent exercising, technical performance of the strength exercises, and overall frequency of the exercise, taking into account the systematic nature of the exercise plan. Each exercise and physical activity was assessed on the basis of parameters such as frequency, time spent and technical performance. Each exercise and physical activity was assessed individually by fulfilling one of the criteria and accumulating the points for the whole exercise and physical activity, and at the end calculating a final score as a mark. All pupils were given information on the use of this type of assessment and were familiarised with all the assessment criteria.

Table 1

Assessment parameters and criteria

Parameters Criteria	5 points	4P	3P	2P	1P
Plank – assessment	1 st sport lesson – lying prone on forearms, shoulder width or slightly wider 2 nd – back and neck line straight 3 rd – tucked tailbone 4 th – looking towards the ground 5 th – holding the position for at least 10 seconds.	Four completed	Three completed	Two completed	One completed
Lifting and lowering the upper body – assessment	1 st sport lesson – lying on back, arms folded on the chest, knees bent 2 nd – feet pressed to the ground 3 rd – back rounded 4 th – looking forward 5 th – legs shoulder width apart	Four completed	Three completed	Two completed	One completed

Squats – assessment	1 st sport lesson – legs – shoulder width apart, toes turned outwards 2 nd – back is straight 3 rd – knees not moving inwards or forwards 4 th – weight kept on the full foot 5 th – hands bent behind the head	Four completed	Three completed	Two completed	One completed
Straightening and bending of the arms while keeping a prone position – assessment	1 st sport lesson – prone position, arms – straight, shoulder width apart or slightly wider 2 nd – back straight and tucked tailbone 3 rd – looking towards the ground 4 th – arms while bending – elbow joints form a 90° angle 5 th – legs shoulder width apart	Four completed	Three completed	Two completed	One completed
Frequency of physical activity (Cycling, running, walking)	20–17 (days)	16–13 (days)	12–9 (days)	8–5 (days)	4–1 (days)
Time spent performing physical activity (Cycling, running, walking)	(60–49) (min.)	(48–37) (min.)	(36–25) (min.)	(24–13) (min.)	(12–1) (min.)

Survey data on pupils' daily physical activity time was collected and compared with the data collected on the amount of physical activity during the distance learning period (12 April – 7 May 2020/2021 school year). Below, the average time in minutes obtained will be compared and the increase or decrease in the scores before and after the deterministic experiment will be determined.

Figure 1 shows the average time per day spent performing physical activity before and after the experiment.

Arithmetic average value	34.6	45.2
Standard deviation	8.006537	5.594594
Coefficient of variation	0.231554	0.123773
Standard error	0.950201	0.663956
Pearson correlation coefficient	0.62351853	
Critical value of the correlation coefficient	0.481	
Correlation is reliable		
Average growth	10.06	
t-theoretical value for two-sided distribution	2.12	
Empirical value of Student's t-test	1.19E-022	

Figure 1. Time spent by pupils performing physical activity before and after the experiment

Based on the Student's t-test calculations for linked samples, this increase is statistically reliable. Given the Pearson correlation coefficient of the data with respect to the critical value of the correlation coefficient, the correlation is reliable. The average scores have improved by 10:55 min.

Based on theoretical knowledge and empirical experience, it can be said that this increase is significant and is already approaching the 60 min. time limit that is recommended for daily physical activity. Of course, it is important to bear in mind that it is partly a free choice for pupils to be more physically active in the context of this study, as this influences or determines their mark in sport, but certainly some young people would probably be more motivated to exercise more in the future. The principle of habit formation should be taken into account, and a month is also a sufficient period of time for the body and the organism to get used to a more active lifestyle and to adjust to it more easily. It can be assumed that for some pupils it made them feel better during such a stressful period when so much time was spent in front of screens.

The final assessments for Semester I marks were collected for the period (1 September – 31 December 2020/21 school year) and the marks obtained for the “remote plan” were compared for the period (12 April – 7 May 2020/2021 school year). The resulting assessment obtained in marks will be compared and the increase or decrease in the scores before and after the deterministic experiment will be determined.

Figure 2 shows the average marks obtained by pupils in the subject *Sport* – before and after the experiment. Based on the Student's t-test calculations for linked samples, the change in average increase is statistically reliable. Given the Pearson correlation coefficient of the data with respect to the critical value of the correlation coefficient, the correlation is reliable.

Arithmetic average value	5.9	7.0
Standard deviation	1.83087757	1.139381
Coefficient of variation	0.308770327	0.161792
Standard error	0.217285192	0.13522
Pearson correlation coefficient	0.768440311	
Critical value of the correlation coefficient	0.481	
Correlation is reliable		
Average growth	1.1	
t-theoretical value for two-sided distribution	2.12	
Empirical value of Student's t-test	4.2E-11	

Figure 2. Pupils' marks before and after the experiment

The average marks have improved by 1.02. This is a significant increase, and has risen from an '*almost good*' rating to a '*good*' rating. It should be noted that in Semester 1, pupils completed different tasks in the subject *Sport*, which were both physical and theoretical in nature. Each has its own strengths and weaknesses, but the average mark is a sufficient indicator to understand how productive the pupils were in completing the tasks in the subject *Sport* with the other criteria and to be able to compare the marks obtained in this experiment with the other approach. An average mark of 7 is a good indicator to be able to judge that young people have generally been able to do this, improving their physical activity in everyday life and possibly also improving their scores in the subject *Sport*.

A linear pairwise correlation was also performed between the frequency, duration and end-of-term scores of pupils' physical activity, indicating the closeness of the relationship between the two characteristics. The pairwise correlation depends on the nature and intensity of the influence of other traits or background. Correlation analysis identifies which pairs are correlated.

Figure 3 shows the correlation between the amount of physical activity performed and the mark obtained in the subject sport and health. After analysing the data, it can be seen that there is a trend – more physical activity leads to higher marks. According to mathematical calculations, the Pearson correlation coefficient is 0.99, indicating a strong correlation between these two factors.

Pearson correlation coefficient	0.997002547
Critical value of the correlation coefficient	0.481
Correlation is reliable	

Figure 3. Correlation of scores, physical activity

Considering the fact that the main objective was to promote physical activity among pupils, it can be seen that this distant learning process has not influenced pupils to perform this task conscientiously; marks in the subject *Sport* even improve in this way when considering the Semester 1 marks.

Discussion

As Covid-19 spreads in 2020–2022, schools need to think about how to organise their work while taking care of the health of pupils and school staff and the success of teaching and learning, including the workload, technical support and psychological aspects of teachers and pupils. The pandemic has created an unprecedented situation in education, where the debate is not about whether to use educational technologies and at what age, but about which technologies to choose, which ones are likely to support learning more effectively and which technological solutions will allow better organisation of the learning process for different target groups of learners. The focus has now shifted to how such distance learning can be used to deliver quality education as well as opportunities for enhancing knowledge growth, access to knowledge and assessment of knowledge.

Assessment is a challenging and complex activity, made more difficult by the fact that the learning process is remote, so the tasks of what to assess and how must be well thought out and theoretically grounded. So far, most of the assessment has focused on motor skills, based on the national secondary education standard, but this distance learning process is made more difficult by the fact that communication takes place in an e-environment, and this applies to all subjects. Therefore, it is necessary to reflect that by implementing the Standard, we can change the implementation and assessment of the content of the subject *Sport*. Based on the recommendations established by the Ministry of Education and Science, a coherent curriculum should be created among teachers for pupils for each week. Distance learning does not mean the online transmission of face-to-face lessons, forcing pupils and teachers to spend long periods of time at the computer, and to do assignments in digital format only. It is important that pupils have clear instructions on what to do and how to do it, access to quality content and the necessary learning materials to complete these tasks, and feedback on their performance and what needs to be done to improve it (Boston, 2002; Chung, 2018). The same approach was taken in this study; pupils were offered physical activities that were already known and based on WHO recommendations on healthy living, a set of assessment parameters and criteria were created with the aim of realising the requirements of the Standard, promoting health prevention and fostering self-directed mediation skills, planning physical activity breaks throughout the day and the workload of the week.

This type of assessment could also be used to shape the development of long-term physically active lifestyle habits. If we can accept assessment as a motivating factor, then motivation is the set of motives associated with a given activity, arising from needs through the interaction of intrinsic and extrinsic triggers. In turn, it is believed that through habits, people develop their motives and habitual behaviour can become a need. Motivation performs several functions: it motivates behaviour, guides and organises it, and gives it personal meaning and significance. (Wiklund, 2016). This is evidenced by the fact that the amount of physical activity has improved for these particular pupils.

Conclusion

The results obtained show that the example of assessment parameters and criteria developed for pupils in the distance learning process, based on the part of the national secondary education standard on health-promoting activities and the WHO recommendations on physical activity, is motivating for pupils to engage in independent physical activity. Of course, it is important to bear in mind that it was partly a free choice for pupils to be more physically active in the context of this study, as this influences or determines their mark in sport, but certainly some young people would probably be more motivated to exercise more in the future. The principle of habit formation should be taken into account, and a month is also a sufficient period of time for the body and the organism to get used to a more active lifestyle and to adjust to it more easily.

It can be assumed that for some pupils it made them feel better during such a stressful period when so much time was spent in front of screens. The average score of mark 7 for this experiment is also a good indicator to be able to judge that young people have generally been able to do this, improving their physical activity in everyday life and possibly also improving their scores in the subject *Sport*. There is always a goal that, in an attempt to achieve it, is being pursued in a task that can indirectly provide an additional benefit. This is how I could describe a situation where pupils in a sports lesson earned a mark by performing the desired amount of physical activity. Not everyone achieved good or very good marks, but every pupil who performed more physical activity in their daily routine than they did before – benefitted, even if it was a minimal increase.

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