73 - PHYSICAL EVALUATION FOR SCHOOL CHILDREN

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1 - Introduction

The relation between physical activity and health is old, but only in the last decades was possible to confirm this relation. Currently it is possible to confirm that an active life style is associated with a reduction of incidence of some illnesses such as, high pressure, osteoporosis, and some kinds of cancer, amongst others. According to the Brazilian Health Department (Ministério da Saúde, 2002), in the developing countries, about 60% of the population are not considered physically active. In developed and developing countries, only less than one third of young people practice some physical activity. Although, it has been observed that a physically active child has a higher probability of becoming a physically active adult, that is, the physical activity establishes a solid base for the reduction of the sedentary in the adult age, contributing for an improvement in the life quality of the individual.

Moreover, to put into motion itself is necessary, and earlier is better. Scientifically is proven that we are what we were in the first years of ours life, due to maturation of the brain. The movement is one of the main manifestations of life and it translates the relation of the man with its exterior, therefore, it is very important for the child development. It is with the movement that the child creates his/her image of body, corporal project and communication with the exterior, constituting, his/her individuality and history (Mattos and Neira, 2003).

One of the ways to put child in motion is by means of the physical activity. As defined by Lazzoli et al (1998), the physical activity is not only sports practice; it can be considered any movement resulted from muscular contraction that increases energy expenditure above the rest. In general, the first contact of the child with the physical activity, guided by a professional, is during the school years. In this context, the physical activity is of utmost importance, since it develops abilities and contents that the students must learn and that will enrich their life (Veal, 2003).

To reach the benefits that the physical activity can provide to the students, the Physical Education Scholar Programme must offer conditions so that the school children understand the relation between physical activity and health. According to Pitanga (2005), it is in the infancy and adolescence that different types of chronic-degenerative illnesses begin, but they can be avoided or delayed by practicing physical activity correctly, bringing a better life quality for the student in adult age.

Beyond improving the quality of the Physical Education Programme, professors must plan their classes and evaluate continuously the progress of the students, aiming at to identify possible problems or to check whether the classes' objectives are being reached. According to Veal (2003), only with continuous evaluations the professor will be able to find real answers about the quality of his/her Physical Education Programme and the benefits that it is bringing to his/her students.

It is important to observe that the main objective of the evaluation inside of the school is the knowledge of the relation amongst physical activity, longevity and reduction of chronic-degenerative processes. At any moment, such an evaluation must have a characteristic trait of the strongest student or that one with better athletic performance (Pitanga, 2005).

In accordance with Winnick and Short (2001) and Pitanga (2005), the set of physical evaluation tests can be classified in: 1) evaluation of the corporal composition; 2) evaluation of the aerobics capacity; and 3) evaluation of motor abilities. However, most part of the schools does not use physical tests to evaluate its students and the practice of physical activities is carried out, many times, without the necessary knowledge about the limitations and capabilities of each student.

The present work fits in this context and has the objective of to select a set of evaluation tests for school children that can be easily applied by the professors of Physical Education. The idea is to provide the necessary resource to evaluate their students, identifying their main characteristics and possible deviations, such as the overweight. If the evaluation tests are applied periodically, the professor will be able to accomplish the development of his/her students, and the quality of his/her class programme. Moreover, the results of the evaluations can be sent for their parents, allowing that they follow the development of their children and stimulate their children to keep practicing physical activities. Once the collection, storage and analysis of the test data are cumbersome activities, a tool support is required. In this sense, a computer program, called "Medida-Certa", is under development aiming at supporting the physical test application and also contributing with the generation of evaluation reports. Considering this objective, in Section 2 the related works are described. In Section 3 the set of selected evaluation tests is presented. In Section 4 it is discussed the importance of developing mechanisms to assist the evaluation test data collection and it is presented a program, called "Medida-Certa" that supports the application of the tests of Section 3. Finally, the conclusion and future works are presented in Section 5.

2 - Related Work

In the context of physical evaluation for school children there are few works found in the literature. One of them is the work of Winnick and Short (2001) which provides a definition of evaluation criteria related with health. In this direction they use tests as parameters to evaluate the health of children and adolescents from 10 to 17 years old. Although it is not directly related with the physical evaluation for school children, such a work presents a test selection guide very useful to indicate the target of each evaluation test. On such a guide, the evaluation tests are classified in aerobics function, corporal composition, and skeletal-muscle function.

Another work that presents a specific test classification to verify the physical ability of children is the one carried out by Pitanga (2005). The author suggests a series of tests for health student evaluation inside the school. These tests are classified into three categories: evaluation of the corporal composition, evaluation of the aerobics capacity, and evaluation of motor abilities. According to Pitanga (2005), the use of evaluation test inside the school to predict children abilities is practically inexistent and, when it is accomplished, in general, it consists only on measuring the weight and the height of children. For him, the evaluation tests should be accomplished continuously in a procedural way, using cognitive and health-based criteria, not as an election-based criterion.

It can be observed that the evaluation test classifications proposed by Pitanga (2005) and Winnick and Short (2001) are similar. The main difference is that besides the called "recommended tests", Winnick and Short (2001) also define some "alternative tests" that can be used in case the required resource to apply a recommended test is not available. In both works, it is not described any tool (computer program) which supports the evaluation tests application, and also, although both sets of tests

can be used in the physical evaluation of school children, they were not developed for this purpose. One additional concern is that we did not found any work describing the use of evaluation test to help the teacher evaluating the progress of his/her students and, consequently, the quality of his/her classes, motivating the accomplishment of the presented work.

On the other hand, there exist many computer programs which support the application of a variety of physical evaluation test, such as the Galileu (2006), Physical Test (2006), PhysEvolution (2006), amongst others. However, they are generic programs developed to be used by physical fitness academy or personal trainers; they are not developed for a specific purpose as the presented in this article. Moreover, the license cost of these programs can be prohibitive, mainly in the context of public schools. In this sense, the development of a specific tool which supports the application of a well defined set of tests specifically for physical evaluation of school children is required. It is very important that the supported evaluation tests can be easily applied, in the sense they do not demand expensive instruments for their application, but at the same time, they must provide enough information to assist the professor on the physical condition of his/her students and the quality of his/her classes programme, facilitating the taking of corrective actions in case discrepancies are found.

3 - Physical Evaluation Test for School Children

A fundamental aspect in the accomplishment of an evaluation is the set of tests used. It determines the measures to be collected and, consequently, the set of information that will be available for the evaluation. Vincenzi (2006) studied and selected a set of nine evaluation tests aiming at the physical evaluation of school children. The tests were selected based on three aspects. First, it should be ease of applying, not require sophisticated instruments, and provide enough information. Second, by means of the constant application of the tests, the professor will be able to follow the development of the students, contributing for the evaluation of his/her physical programme. Third, the results of the evaluations can be presented to the parents allowing that they follow the development of their children, stimulating them to keep practicing physical activities. Table 1 summarizes the evaluation tests that had been selected in the work of Vincenzi (2006). They are divided in four categories: Anthropometry, Corporal Composition, Flexibility and Physical Tests. The reader can found a detailed description of each test elsewhere (Vincenzi, 2006) or (Heyward and Stolarczyk, 2000).

Table 1: Evaluation tests for school children (Vincenzi, 2006).

Classification	Related Tests
Anthropometry	Weight Height Sitting Height Breadth
Corporal Composition	Triceps Skinfold Subescapular Skinfold
Flexibility	Wells
Physical Tests	Vertical Impulse Horizontal Impulse

It can be observed that the selected test set is composed for traditional tests found in the literature (Heyward and Stolarczyk, 2000), which can be easily applied, and that do not demand the use of sophisticated tools thus, becoming possible to be adopted for professors of Physical Education of public and/or private schools. The application of the set of test allows, at a first moment, to verify the initial state of the children before starting practice physical activity, and later, considering that the tests are applied periodically, to establish a classification prior and after-period of starting physical activity. In this manner, it is considered that the set of selected tests is able to provide enough information for the professionals of Physical Education, contributing for the preparation and evaluation of their classes, and in the evaluation of the physical status of the students, allowing the identification of anomalies, such as the childhood overweight (Vincenzi, 2006).

4 - Tool Support for Evaluation Test

The application of an evaluation test is not an easy task. Considering the set of tests presented in the previous section, the professor must collect and register the measures of each test and, some of them, demands that the measure to be collected three times to reduce the margin of error. Different mechanisms can be used to assist the professor to collect and to store these data. The simplest one is to use a paper form to register the measure data by hand; another option is to use an electronic spread sheet that supports the data collection for the applying tests. However, in both the cases, the data analysis and the accompaniment and track of physical evaluations for one or more students are complicated and demand more time on the part of the professor. In this direction, the best alternative would be the development of a computer program application specifically for this purpose, which deals with the problem of collection, calculation and analysis of referring evaluation test data.

4.1 - Program "Medida-Certa"

We are working on the development of a program, named "Medida-Certa", which supports the periodical accomplishment of evaluation tests and the storage and further analysis of the collected data. The tool is completely implemented in Java to use the portability aspect of such a programming language and makes the program available for different operation systems. We hope to finish a complete working version of this program until the end of the current year and it should be freely distributed for professionals of Physical Education to be used in public and private schools. The basic steps for the use of the program are: 1) creation of the database; 2) register of class, professor and student; 3) register of physical evaluation; and 4) generation of reports.

The accomplishment of these steps is supported by the program whose main screen and the set of available options are illustrated in Figure 1. Due to the limit of pages, the figure appears with clippings. To illustrate its use we registered in the tool the data corresponding to a group of 26 children of the San Francisco College at Anápolis city (Goiás, Brazil).



Figure 1: Menu options and main screen of "Medida-Certa".

Step 1: Creation of the Database

This step consists of creating a new database for the storage of the information for a given college. Since the professor can work in different colleges, he/she can create a different database for each one in order to organize the data of the evaluations per college. To execute this step it necessary to enter in the menu File ("Arquivo" in Portuguese), select the option New… ("Novo…") and give a name of the database ("sao-francisco.mce", in our example).

Step 2: Register of Group, Professor and Student

Created the database, the next step is to register class, professor and students. This step is of basic importance since such elements must have been registered in the database before an evaluation can be carried out. To initiate the register, it is necessary to to enter in the menu Register ("Cadastro") and to select the desired option. Figure 2 illustrates the necessary fields for the register of a student. The register of class and professor follow the same standard.

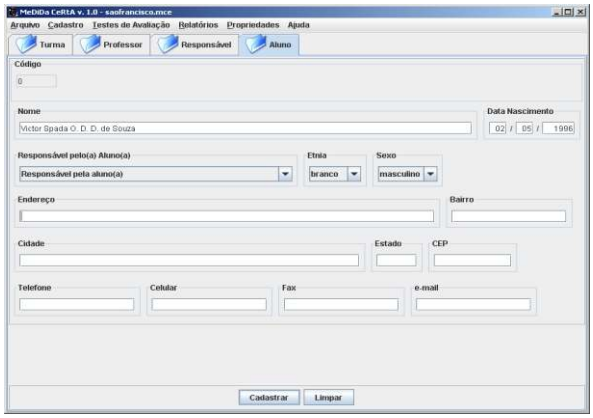

Figure 2: Register of a student.

Step 3: Register of a Physical Evaluation

The register of a physical evaluation is carried out by a professor, in one determined date, for a given student of a given class. All this information must be quested evaluation already exists its previously data are recovered ar f Figure 3 illustrates the register of measures corresponding to the Co ure corresponds to the referring data of Anthropometric tests. The regist .

Step 4: Generation of R

Once the physical eva time, can request the generation of reports that allow following the evo age, for instance. When requesting the generation of a report for class ne and, the tool generates a report in table format with the referring data n with better or worse marks on each test. Such a classification can be acilitate data analysis. For example, Table 2 (a) illustrates the evaluati Table 2 (b) illustrates the same data classified in decreasing order by w

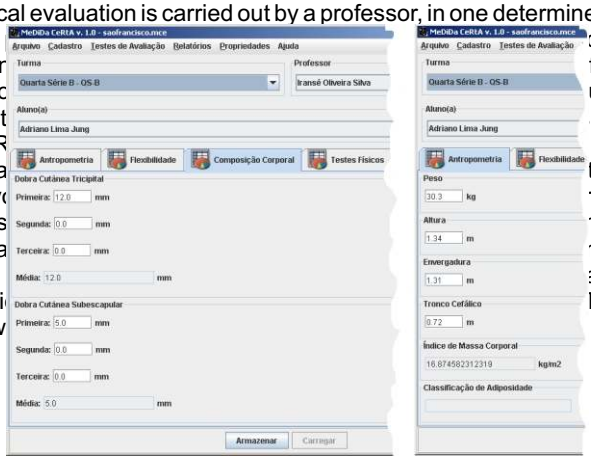

Figure 3: Register of a physical evaluation: corporal composition (left-side) and anthropometric tests.

Relatório da Turma: Quarta Série B

Relatório da Turma: Quarta Série B

Aluno	Turma	Prof...	Data	Peso	Altura	Enver...	Tronc...	IMC
Laisa Alves de Moura	Quart...	Irans...	25/05/2006	30.7	1.44	1.41	0.75	14.805...
Ana Clara Atagiba L...	Quart...	Irans...	25/05/2006	31.3	1.45	1.44	0.77	14.887...
Carolina Silva Miran...	Quart...	Irans...	25/05/2006	32.9	1.48	1.47	0.75	15.020...
Gustavo José Votõe...	Quart...	Irans...	25/05/2006	31.5	1.44	1.39	0.75	15.190...
Lucas Lourenço Al...	Quart...	Irans...	25/05/2006	28.3	1.36	1.31	0.71	15.300...
Matheus Eduardo d...	Quart...	Irans...	25/05/2006	27.2	1.31	1.26	0.7	15.849...
Eduardo Ferreira	Quart...	Irans...	25/05/2006	29.4	1.34	1.32	0.69	16.373...
Bárbara Heliodora	Quart...	Irans...	25/05/2006	27.7	1.3	1.3	0.7	16.390...

Relatório da Turma: Quarta Série B

Relatório da Turma: Quarta Série B

Aluno	Turma	Prof...	Data	Peso	Altura	Enver...	Tronc...	IMC
Juliano de Castro N...	Quart...	Irans...	25/05/2006	48.6	1.5	1.48	0.82	21.6
Emily Elizabeth F. d...	Quart...	Irans...	25/05/2006	45.6	1.51	1.55	80.0	19.999...
Daniel L. Coimbra	Quart...	Irans...	25/05/2006	44.4	1.46	1.48	0.77	20.829...
Victor Spada O. D. D...	Quart...	Irans...	25/05/2006	44.3	1.48	1.53	0.77	20.224...
João Antônio Vila N...	Quart...	Irans...	25/05/2006	43.0	1.35	1.38	0.73	23.593...
Gabriel Moreira Fraz...	Quart...	Irans...	25/05/2006	42.7	1.46	1.45	0.76	20.031...
Isabela	Quart...	Irans...	25/05/2006	42.5	1.42	1.41	0.77	21.077...
Natália Victor Elias	Quart...	Irans...	25/05/2006	41.35	1.38	1.32	0.76	21.712...

Table 2: Evaluation reports: (a) increasing order by BMI (IMC) and (b) decreasing order by weight (Peso).

5 - Conclusion

This article presented a set of physical tests specifically selected tests for evaluating school children. Such tests had been selected considering not only, the easiness of application, in terms of required resources, but also, the kind of information that they provided in terms of the physical characteristics of the children, considering their corporal composition, flexibility, physical, and anthropometric aspects.

Since the periodical application of evaluation test demands the collection and analysis of a huge amount of data which are cumbersome activities, we decided to develop a tool, named "Medida-Certa" to support the test application. The tool is currently under development but a prototype is already being used in the accompaniment of some classes of a public college at Anápolis city (Goiás, Brasil). Based on this experience, a new version of the program is almost done and should include additional features such as multi-language capability and graphical reports. Moreover, additional experiments are also being carried out, exploring other tool capabilities.

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PHYSICAL EVALUATION FOR SCHOOL CHILDREN

Summary

Physical activity is very important on any age and earlier initiated, more benefits must provide to the individual. In this sense, it is fundamental to stimulate the child to participate of Physical Education classes as soon as possible. However, to obtain good results it is necessary that the physical activity to be practiced under professional supervision, respecting the development of the children. One way of assisting the professor to follow the evolution of his/her students and also to make a self-evaluation of his/her class programme is by means of the periodic accomplishment of evaluation tests. The presented work is focused on this subject, aiming at to select a subset of evaluation tests which allows evaluating students during physical educational classes. The idea is that, by evaluating such students with the considered tests, it is possible the teacher to use the collected data to identify problems, such as the childhood overweight, and also to check whether the benefits of his/her classes are being reached. Since the collection, storage and analysis of the test data is a cumbersome activity, different mechanisms have being proposed to help the teacher to accomplish the evaluation tests. We are working on the development of a computer programme, called "Medida-Certa" which eases the collection and storage of evaluation test data, and also provides a set of reports to help the teacher to analyze the results of the tests from different perspectives. An example of using such a program is also presented and compared with other alternatives.

KEYWORDS: Tests. Evaluation. School Children.

ÉVALUATION PHYSIQUE SCOLAIRE

Résumé

L'activité physique est d'importance fundamental à tous les âges et, plutôt elle est initiée, plus de bénéfices elle fournira à l'individu. De cette manière, il est de fundamental importance de stimuler l'enfant à participer à des leçons d'éducation physique le plus tot possible. Cependant, afin que l'on obtienne de bons résultats, il est nécessaire que l'activité physique soit pratiquée avec l'orientation requise, tout en respectant le développement de l'enfant. Une des formes d'aider le professeur à suivre l'évolution de ses élèves et ainsi que d'appliquer une auto-évaluation du programme de ses leçons est au moyen de l'accomplissement périodique des tests d'évaluation. Ce travail s'encadre dans ce contexte et vise à choisir un sous-groupe de tests adequats pour évaluer les écoliers participants d'activité physique. L'idée est que, évaluant les élèves avec les tests considérés, il soit possible au professeur d'employer les données obtenues pour identifier des problèmes, tels que l'obesité infantile, ainsi que de vérifier si les objectifs attendus de ses leçons ont été atteints. Comme la collecte, le stockage et l'analyse des tests sont des activités difficiles, différents mécanismes ont été proposées afin d'aider le professeur à accomplir les tests d'évaluation. Nous travaillons au développement d'un programme d'ordinateur, appelé «Medida-Certa» qui facilite la collecte et le stockage des tests d'évaluation, et fournissons également un ensemble de rapports pour aider le professeur à analyser les résultats des tests sous différentes perspectives. Un exemple d'utilization de ce programme est également présenté et comparé à d'autres alternatives.

MOT-CLÉ: Tests. Évaluation. Scolaire.

EVALUACIÓN FÍSICA PARA EL ALUMNO

Resumen

La actividad física es muy importante en cualquier edad e cuanto antes iniciado, más ventajas deben proporcionar al individuo. En este sentido, es fundamental estimular al niño participar de clases de educación física cuanto antes. Sin embargo, para obtener buenos resultados es necesario que la actividad física sea practicado bajo supervisión profesional, respetando el desarrollo de los niños. Una forma de ayudar al profesor para seguir la evolución de su estudiantes y también para hacer una autoevaluación de su programa de clase está por medio de la realización periódica de las pruebas de evaluación. El actual trabajo se centra en este tema, teniendo como objetivo seleccionar un subconjunto de pruebas de la evaluación que permita evaluar los estudiantes durante las clases de educación física. La idea es que, evaluando a tales estudiantes con las pruebas consideradas, es posible al profesor utilizar los datos recogidos para identificar problemas, tales como el exceso de peso de la niñez, y también para comprobar si las ventajas de su clases se están alcanzando. Visto que la colección, el almacenaje y el análisis de los datos de prueba es una actividad trabajosa, diversos mecanismos son propuestos para ayudar al profesor a lograr las pruebas de evaluación. Estamos trabajando en el desarrollo de un programa de computadora, llamado "Medida-Certa" que facilite la colección y el almacenaje de los datos de prueba de la evaluación, y también proporcionamos un sistema de informes para ayudar al profesor a analizar los resultados de las pruebas de diversas perspectivas. Un ejemplo de como usar tal programa también se presenta y se compara con otras alternativas.

PALAVRA-CHAVE: Pruebas, Evaluación, Niños de Escuela.

AVALIAÇÃO FÍSICA PARA ESCOLARES

Resumo

A atividade física é de fundamental importância em todas as idades e, quanto antes iniciada, mais benefícios deve proporcionar ao indivíduo. Desse modo, é de fundamental importância incentivar a criança a participar das aulas de Educação Física escolar o quanto antes. Entretanto, para que se obtenha bons resultados é preciso que a atividade física seja praticada com orientação adequada, respeitando o desenvolvimento das crianças. Uma das formas de auxiliar o professor a acompanhar a evolução de seus alunos e também fazer uma auto-avaliação do programa de suas aulas é por meio da realização periódica de testes de avaliação. Este trabalho se enquadra nesse contexto e visa selecionar um subconjunto de testes adequado para avaliar escolares praticantes de atividade física. A idéia é que, avaliando os escolares com os testes propostos, seja possível para o professor utilizar os dados obtidos para identificar problemas, tais como a obesidade infantil, e verificar se os objetivos esperados de suas aulas estão sendo atingidos. Visto que a coleta, armazenagem e análise dos dados de teste é uma atividade trabalhosa, diferentes mecanismos vêm sendo propostos para auxiliar o professor na realização de testes de avaliação. Nós estamos trabalhando no desenvolvimento de um programa de computador, denominado Medida-Certa, o qual facilita a coleta e armazenagem dos dados de teste, e fornece diferentes relatórios que permite ao professor analisar os dados de diferentes perspectivas. Um exemplo do uso desse programa também é apresentado e comparado com outras alternativas.

PALAVRA-CHAVE: Testes. Avaliação. Escolares.