

EDUCATIVE GAMES AND EXPOSITIVE LESSON: COMPARISON OF EDUCATIONAL TECHNIQUES ON SITTING POSTURE

Alberto De Vitta¹, Fabiana Cristina Frigieri De Vitta²,
Márcia Aparecida Nuevo Gatti³, Sandra Fiorelli de Almeida Penteado Simeão³

Abstract

Introduction: Studies on education in health are important for the concretion of action of promotion of the health. **Objective:** To verify the changes of theoretical knowledge on sitting posture, evaluated at two moments (initial and final,) considering two programs of education (expositive lesson and operative groups). **Methods:** 75 pupils had been citizens, of both the sexes, three 4as series of a public school, evaluated previously (A1) on seated position; group 1 was submitted to a procedure of expositive education, the 2 educative games in the 2 and, the 3 to no intervention. After one week they had been reevaluated (A2). For the moments the test of Wilcoxon was applied and between the Kruskal groups Wallis. **Results:** In the comparison inside of the groups, of 2 and 3 they had presented increase in the number of rightness on position seated in the after-test, with statistical significant difference, whereas in the group has controlled, such fact did not occur. In the comparison between groups, at the first moment (A1), 2 groups e 3 had not presented significant difference statistical ($p > 0,05$), however, in as moment notices that it had difference statistics between the three groups ($p < 0,01$), being that the G3 presented minor frequency of errors ($md = 5$) in relation to the g2 ($md = 8$) and g1 ($md = 10$). **Conclusions:** It can be affirmed that educative techniques that supply information and promote debates and exchanges of experiences between the participants increase the possibilities of incorporation of the contents related to the sitting posture.

Key words: sitting posture; students; education; health; teaching procedures.

INTRODUCTION

Nowadays children spend more and more time on day-to-day sedentary activities while remaining seated, such as attending classes, watching television, playing videogames and doing their homework assignments. During these activities, sitting triggers several alterations on the musculoskeletal structures of the lumbar spine. It increases the intervertebral disc core's internal pressure by approximately 35%; all structures (ligaments, small joints and nerves) are elongated; it decreases return circulation on the lower limbs and promotes discomfort on the neck and upper limbs¹.

The ways to reduce the negative effects of the sitting posture for the musculoskeletal structures are: planning and/or re-planning the physical work environment, the performed tasks and the educational procedures.

Lecturing classes are one of the performed educational procedures. This approach allows questioning, while providing knowledge acquisition². Some studies show the effects of expositive educational programs. During a posture education program for students, it was possible to notice improvements on knowledge about posture deviations and their possible causes³. A lecturing program on knowledge about sitting posture of first grade students of a state school, a private school

1 PhD Professor of Physiotherapy in undergraduate and Masters courses of Community Health at the Universidade do Sagrado Coração (USC), Bauru, SP, Brazil.

2 PhD professor of Occupational Therapy in undergraduate course at the Universidade Estadual Paulista, Marília, SP, Brazil.

3 PhD Professor at Masters in Community Health of Universidade do Sagrado Coração (USC).

4 PhD Professor at Masters in Community Health of Universidade do Sagrado Coração (USC), Bauru, SP, Brazil.

Funding institution: Fapesp (proc. 06/60908-2)

Corresponding author: albvitta@yahoo.com.br

Suggested citation: De Vitta A et al. Educative games and expositive lesson: comparison of educational techniques on sitting posture J. Hum. Growth Dev. 2012; 22(1): 47-52.

Manuscript submitted Mar 19 2011, accepted for publication Dec 12 2011.

and a municipal school in the city of Bauru showed efficiency at improving students' knowledge on sitting posture⁴.

Educational games are another type of procedure that has been used on pedagogical and psychopedagogical contexts for diagnosis and intervention activities; through this, it is possible to promote development and learning⁵. There are countless benefits of gaming, including the development and stimulation of the mind, memory, attention, reasoning and creativity. It also favors disinhibition, stimulates self-confidence, and brings many other benefits for the language, thinking and construction and acquisition of concentration^{6,7}. Students increased their knowledge about this subject during a postural prevention educational program⁸.

The relevance of studies on education and health of students is in compliance with the National Curriculum Guidelines⁹. The guidelines propose an integrating relationship between health and education; accumulated knowledge on these fields may develop prevention actions for diseases and strengthening of protection factors. The educational sectors are major allies to the achievement of health promotion actions aimed at strengthening individuals' capabilities, for making favorable decisions towards their health and their community, and for the consolidation of an intersectorial policy aimed at quality of life.

Health intervention through an educational program is relevant for the health professional, to whom prevention is an end. This study, while proposing a comparison between two educational procedures, collaborates with education, i.e., acting before problems occur, even at the minimum, as it broadens the professional's work objectives up to more than recovery and rehabilitation¹⁰. It also collaborates with the physiotherapist's education, as it backs practice through educational intervention in a non-destructive way, but supported by empirical research.

Thus, the objective is to verify changes in knowledge about sitting posture, evaluated in two stages: in the beginning and in the end, while considering the educational procedures of expositive classes and operational games.

METHODS

We have conducted a quasi-experimental delineation whose dependent variable was represented by theoretical knowledge related to sitting posture, and independent variables were represented by educational procedures.

Subjects

The population of enrolled students in all four fourth grades of the "Santa Maria" Municipal Fundamental Education School in Bauru totaled 100 students. We justify the option for this grade due to

the content of the Science subject (introduction to the teaching of the human body) which may be a supplement to the posture education program. Besides that, preadolescents are in full physical development, which may bring unbalance and consequential discomfort.

Three student groups were selected by a raffle – 75 students total – of which three groups were then formed, by another raffle: group 1 had 25 students, group 2 had 23 students and group 3 had 16 students. Three students from group 2 and nine students from group 3 were excluded for not participating in 25% of the proposed activities, or for having been transferred.

Inclusion criteria were: literate students, able to read and write, whose parents or legal guardians have signed a consent form. Exclusion criteria were: having participated in a posture education class during another educational situation and missed classes, from the second class on.

Procedures were distinct for each group: for the first group (G1) the same initial questionnaire was applied, and no intervention occurred, so this was considered the control group. An educational expositive procedure was done with group 2 (G2), and group 3 (G3) was submitted to the educational procedure through educational games.

The researcher (who was also the applicator of procedures and had met the groups) was the only person to know each group's function. The teachers of all three groups were instructed not to make any postural correction on the students during the work execution.

Procedures

School management was informed about the project and had issued an authorization letter, so the subjects' parents were noticed about all stages of the study, the voluntary nature of participation, the possibility to leave the study at any time, the right to absolute confidentiality of personal data and (accepting the fact that their children participated in the project) signed a consent term, which was approved by the Research Ethics Committee of Universidade do Sagrado Coração, case number 79/2007.

The delimitation operation processes here proposed trailed the following described phases.

Initial Assessment (A1)

This phase was the application of a questionnaire on students from all three fourth grades, in the beginning of the educational program; the questionnaire was made of multiple choice questions and illustrative alternatives, which were answered, individually, immediately on the same sheet. The questionnaire was evaluated by two specialists as to objectivity, clarity and suitability for the proposed project.

Application of instruments was done in groups, by the researchers, in each respective classroom. The instruments were collected at the end of the session.

Educational Procedures

Educational procedure 1: Expositive

An educational procedure was applied on group 2 through expositive classes. The classes happened once in a week and lasted for sixty minutes, a total of four teaching units. The classes' schedules were discussed with the for 60 minutes, once a week, a total of four teaching units; they were applied only on group 3. In order to carry out this task, students were put in groups of about seven members, and one of the students was named responsible for replying to the coordinator.

Each event happened according to the following agenda: 1. Establishment of a favorable atmosphere for discussions and creation of a horizontal relation among researcher and students; 2. Motivation for students' participation; 3. Proposal of presentation for theme discussion, exposing material and encouraging group work; 4. Exposition of the syllabus through games, for each proposed theme; 5. Systematization of the presented content, supplemented with theme-related information (such as posters, films and others) to support understanding; 6. Summary of discussed items at the end of the meeting, so new issues could be conversed^{11,12}.

In the first meeting, the chosen theme was the anatomy of the vertebral column and upper and lower limbs; possible effects of the sitting posture on the back and the legs. The proposed activity was a "guess what" game, in which a question was raffled for each group, and if any student incorrectly answered it or wouldn't know the answer for it, the following group would be given the chance.

In the second meeting, the theme was transportation and loading weight and schoolbags. A "crossword" activity was used. Each group was given a sheet of paper with word gaps to be filled in according to questions. In the end, each groups' delegate would reply to the coordinator – for incorrect answers the applied procedure was the same as from meeting 1. For right answers, the question was made for the students to answer it altogether, and the words were written on the board.

In the third meeting, groups played a colored six-sided die, where each color corresponded to two questions and answers about possible effects and upper limbs movements in sitting posture. The group would answer, and if a mistake was made, the chance would be given to the next group. The game ends when all questions are answered.

In the fourth meeting each group was asked to make a collage which showed actions to be taken in a computer workspace. The group would then explain their picture and, as mistakes showed up, individual corrections were made; a debate took place in the end.

Final reassessment (A2)

The same instrument from Initial Assessment (A1) was used for a reassessment of their knowledge

on sitting posture. Final reassessment (A2) was made a week after the end of the educational programs of all groups.

Results Analysis

Obtained data were entered in a statistics database software called SPSS (release 10.0). Mann-Whitney test was used on intergroup comparison and on pre- and post-experiment; Wilcoxon test was used on intragroup comparison to verify differences of pre- and post-experiment regarding the informative questionnaire of theoretical knowledge on the vertebral column, for the experimental group and control group¹³.

For significance of the statistical result presentation the following criteria was used: 1) two medians followed by at least one repeated lowercase letter do not differ ($p > 0.05$) as for schools' responses; 2) two medians followed by at least one uppercase letter do not differ ($p > 0.05$) as for moments' responses. The adopted significance level was 0.05.

RESULTS

Table 1 shows descriptive measurements of error frequency in two assessment moments (A1 and A2), according to the study group. When comparing inside the groups, 2 and 3 presented an increased number of correct answers on sitting posture during post-test, with statistically significant difference, and this did not occur in control group.

When comparing groups, it is possible to notice that in the first moment (A1), groups 2 and 3 did not show statistically significant difference ($p > 0.05$), although, in the second moment there was statistically significant difference among the three groups ($p < 0.01$), whereas G3 showed lower error frequency (Md = 5) when compared to G2 (Md = 8) and G1 (Md = 10).

DISCUSSION

The comparison results inside the groups allowed us to prove if participation in educative procedures promoted knowledge acquisition about the sitting posture. Groups 2 showed decreased number of errors about sitting posture on posttest, with statistically significant difference, and the control group did not show significant difference. These results suggest that children who participated in educational strategies had learned about the theme.

Some studies showed the effects of postural education. In a postural program with expositive educational strategy, scholars increased their knowledge on the theme and improved in activities such as sitting and remaining seated to write in the classroom¹⁴ and showed improvement on postural habits while carrying schoolbags¹⁵. When studying effects of comic books and practical experiences of

Table 1: Descriptive measures of frequency of errors in two time points (first, second), according to study group

Group	Descriptive Measure	Avaliation Moment		p Value
		First (A1)	Second (A2)	
Control (G1)	Minimum Value	5	5	p > 0,05
	Median	11 aA	10 aA	
	Maximum Value	12	12	
Lecturing class (G2)	Minimum Value	6	4	p<0,05
	Median	11 a	8abB	
	Maximum Value	14	12	
Educational Game (G3)	Minimum Value	5	3	p<0,05
	Median	10 aA	5 bB	
	Maximum Value	12	9	
Group test result		p > 0,05	p < 0,01	

correct and incorrect postures, researchers¹⁶ noticed improvements on learning and memorizing correct postural habits, for all studied variables in the two groups.

During the pre-experiment period, results of control group (G1) and of the two experimental groups (G2 and G3) did not show significant difference, while in the second moment it was possible to notice statistical difference among the three groups; group G3 showed lower error frequency. This fact indicates that differences occurred as for questioning about sitting posture, in post-experiment, and they result from the apprenticeship of children who took part in educational procedures – mainly the ones who were submitted to educational games.

Many authors verify an increase of comprehension and quantity of information about different health subjects when they were taught by some sort of educational game: scholars' knowledge about parasitological diseases¹⁷; the knowledge of Venezuelan students about dengue¹⁸; mothers of premature babies¹⁹ and neonatal postpartum women rooming-in²⁰; students' knowledge about drugs²¹; training of community workers on respiratory diseases²²; teaching of medical practice on medical residents²³.

Apprenticeship is the process through which behavior is modified by experience. It refers to the acquisition of an entirely new response and to changes on how frequent a certain conduct is present in a child's repertoire. The author emphasizes that the apprenticeship also depends on motivation and effort, among other factors²⁴.

Educational games, from a structural point of view, have great importance on knowledge production. In activities with games with rules children are encouraged to think, since in this case they face situations and creative challenges which require them to reflect and seek solutions for problem situations. Various aspects are developed in child-game

interaction, such as the cognitive and the psychomotor, especially when use of special relations and constructions is needed^{25,26}. The game, a proper child activity, is centered on the pleasure afforded by practice, while it is the essential motor of their development²⁷.

The knowledge increase may be explained by the fact that the proposed activities ("guess what" and "question and answer") provide information, promote debates and experience sharing among participants, enlighten doubts satisfactorily, stimulates interest about a certain topic and open discussions of myths and attitudes of health risk^{7,11}.

Another important issue that may have affected the increase of correct answers is the "computer workspace collage" game, which made interaction possible, as well as the development of a group feeling, decision making among participants, stimulation of interest in certain themes, while allowing construction of apprenticeship and knowledge enhancement²⁰. These factors made activities more dynamic and pleasant, and they challenged a major point of particular interest^{28,29}. In this context, conveying knowledge reinforces learning by capturing the subjects' attention^{30,31}.

The educational process envelops multiple variables which may influence apprenticeship, such as nutrition and socioeconomic status. In this study, these variables were controlled by including children, with no signs of clinical malnutrition, who attended the same school, lived in the same city area, with the same socioeconomic status.

Nevertheless, the necessity of controlling the variables implies that the conclusion of games being helpful for instruction strategies for health applies to scholars with similar characteristics to this study's students. For other populations, specific educational strategies must be applied.

In this study Hawthorne effect must not be excluded – change of attitude regarding the studied theme, when it is of special attention and interest.

That is, the long-term effect of educational intervention was not measured; as was not also its impact on attitude changing and improvement of health conditions. However, the objective was only to determine whether an educational intervention is useful for increasing basic knowledge about sitting posture of scholars^{32,33}. Yet, habit changes may not be proved and need further studies. With no doubt, long-term assessments are necessary to determine whether knowledge increase reflects on attitude changes and on better healthcare.

This research allowed us to conclude that educational games increased scholars' knowledge about the sitting posture. These results confirm that educational games promote comprehension and improvement of acquired knowledge, as interaction,

REFERENCES

1. Coury HJC. Programa auto-instrucional para o controle de desconfortos posturais em indivíduos que trabalham sentados. [Thesis]. Campinas: Faculdade de Educação da Universidade Estadual de Campinas; 1994.
2. Veiga IPA. Técnicas de ensino: POR QUE NÃO? Campinas, São Paulo: Papirus; 1995.
3. Santos SG. Educação postural mediante um trabalho teórico. *Rev Bras Ativ Fis Saúde* 1998; 3(2): 32-42.
4. De Vitta A, de Vitta FCF, Rossi G, Chiti L, Padovani CR. Eficácia de um programa de educação sobre postura sentada para escolares do ensino fundamental. *Fisiot Mov* 2004; 17(3): 37-43.
5. Gomes MAM, Boruchovitch E. Desempenho no jogo, estratégias de aprendizagem e compreensão na leitura. *Psic.: Teor. e Pesq.*, 2005; 21(3): 319-326.
6. Furtado VQ. Crianças com dificuldades em escrita e estruturação espacial: uma reeducação psicopedagógica. [Thesis]. Campinas: Faculdade de Educação da Universidade Estadual de Campinas; 2004.
7. Lamas SO. Livro dos jogos educativos. Portugal: Liv Psic; 2008.
8. Ferriani MGC, Kanehira A S, Ferreira E, Cano MAT. Orientação postural aos escolares em escolas da rede pública do ensino de 1º e 2º graus, no município de Ribeirão Preto/SP. *Rev Bras Saúde Escolar*. 1996; 4: 51-54.
9. Brasil. Ministério da Educação. Secretaria da Educação Fundamental. Parâmetros curriculares nacionais de primeira à quarta série: língua portuguesa. Brasília; 1998. Disponível em: <http://www.mec.gov.br/sef/estrut2/pcn/pdf/livro02.pdf>.
10. De Vitta A. Atuação preventiva em fisioterapia. Bauru: EDUSC; 1998.
11. Torres HC, Hortale VA, Schall V. A experiência de jogos em grupos operativos na educação em saúde diabéticos. *Cad. Saúde Pública*. 2003; 19(4): 1039-1047.
12. Kishimoto TM. O jogo na educação infantil. São Paulo: Pioneira; 2003.
13. Norman GR, Streiwner DL. Biostatitics: The base essentials. Londres: Mosby-year; 1994.
14. Ritter, ALS. Programa postural para escolares do ensino fundamental. [Dissertation]. Porto Alegre: Escola de Educação Física da Universidade Federal do Rio Grande do Sul; 2003.
15. Fernandes SMS, Casarotto RA, João SMA. Efeitos de sessões educativas no uso das mochilas escolares em estudantes do ensino fundamental. *Rev Bras Fisioter*, 2008; 12 (6): 447-53.
16. Rebolho MCT, Casarotto RA, João SMA. Estratégias para ensino de hábitos posturais em crianças: história em quadrinhos versus experiência prática. *Fisioter Pesq*, 2009; 16 (1): 46-51.
17. Toscani NV, Santos AJDS, Silva LLM, Tonial CT, Chazan M, Wiebbelling AMP, Mezzari A. Desenvolvimento e análise de jogo educativo para crianças visando à prevenção de doenças parasitológicas. *Interface: Comunic, Saúde, Educ*. 2007; 11(22): 281-294.
18. Vivas E, Sequeda MG. Un juego como estrategia educative para el control de Aedes aegypti en escolares Venezolanos. *Rev Panam Salud Publica*. 2003; 14(6): 394-401.
19. Fonseca LMM, Scochi CGS, Biss CEF, Serra SOA. Utilizando a criatividade na educação em saúde em alojamento conjunto neonatal: opiniões de puérperas sobre o uso de um jogo educativo. *Rev Bras Enferm*. 2000; 53(2): 301-310.
20. Fonseca LMM, Scochi CGS, Mello DF. Educação em saúde de puérperas em alojamento neonatal: aquisições de conhecimento mediado pelo uso de um jogo educativo: *Rev Latino-Am. Enfermagem*. 2002; 10(2): 166-171.
21. Rebello S, Monteiro S, Vargas. A visão de escolares sobre drogas no uso de um jogo educativo. *Interface: Comunic, Saúde, Educ*. 2001; 5(8): 75-88.
22. Andrade RD, Mello DF, Scochi CGS, Fonseca LMM. Jogo educativo: capacitação de agentes comunitários de saúde sobre doenças respiratórias infantis. *Acta Paul Enferm*, 2008; 21(3): 444-8.

23. Akl EA, Mustafa R, Slomka T, Alawneh A, Vedavalli A, Schünemann HJ. An educational game for teaching clinical practice guidelines to Internal Medicine residents: development, feasibility and acceptability. *BMC Medical Education*, 2008; 8 (50): 1-9.
24. Mussen C. Desenvolvimento e personalidade da Criança. São Paulo: Harbra; 1997.
25. Macedo L. Os jogos e o lúdico na aprendizagem escolar. Porto Alegre: Artmed; 2004.
26. Marzura AAS, Silva JB, Peres MR, Spagno RS. O jogo no ensino da língua inglesa: Contribuições psicopedagógicas *Rev Educat*, 2009; 3(1): 44-55.
27. Le Boulch J. Educação psicomotora: psicocinética na idade escolar. Porto Alegre: Artes Médicas; 1987.
28. Brasil. Ministério da Saúde. Relatório final da 12ª Conferência Nacional de Saúde. Brasília; 2003. Disponível em: http://conselho.saude.gov.br/12%AA_Conf_Nacional/index.htm.
29. European Commission Research Directorate General. Low back pain. Guidelines for prevention in low back pain. Amsterdam; 2004. Disponível em <http://www.backpaineurope.org>.
30. Schall VT. Educação ambiental em saúde para escolares de primeiro grau: uma abordagem transdisciplinar. *Cad Saúde Pública*. 1994. 10(2): 259-263.
31. Fontoura TR. O brincar e a educação infantil. *Revista Pátio Educação Infantil*. 2004; 1(3): 7-9.
32. Lizardo JMC, Rodríguez-Morán M, Gerrero-Romero F. El juego como alternativa para la enseñanza de conceptos básicos de salud. *Rev Panam Salud Publica/Pan Am J Public Health*, 2001; 9(5): 311-314.
33. Galante AC, Aranha JA, Beraldo L, Pelá NTR. A vinheta como estratégia de coleta de dados de pesquisa em enfermagem. *Ver. Latino-Am. Enfermagem* 2003; 11(3):357-63.