EDUCATION PROGRAM ON GENETIC SYNDROMES: MOTIVATIONAL EVALUATION OF AN E-LEARNING MATERIAL

Programa de educação em síndromes genéticas: avaliação motivacional de um material educacional on line

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ABSTRACT

Purpose: to evaluate the motivational aspects of an material e-learning known as Cybertutor on genetic syndromes for elementary school students. **Methods:** 21 students of the 9th grade in the city of Bauru participated in the study. After 30 days of access Cybertutor, was used a Web Site Motivational Analysis Checklist adapted (FPM) to assess motivational aspects of this tool. The questionnaire is composed of 32 statements grouped into four domains: stimulating, meaningful, organized and easy-to-use. **Results:** all participants evaluated positively material e-learning developed, considering it as "impressive." The Friedman Test found statistically significant differences between the domains, with p = 0.002239. The comparison between the individual domains, shows significant results in the scoring area organized. **Conclusion:** Cybertutor on genetic syndromes developed received high motivational satisfaction. Thus, we conclude that this material e-learning can be used as a strategy of health education on this theme.

KEYWORDS: Health Education; Education, Distance; Motivation; Genetics

INTRODUCTION

In Brazil, a country with approximately 190 million inhabitants, health education addressing information on genetic syndromes is extremely necessary as the data of the DataSUS show that, from 2005 to 2008, there was a total of 11,806,180 live births, and 75,814 of these were suffering from some genetic abnormality[1].

This data make us reflect on educational practices involving genetic abnormalities in all perspectives, even contemplating disease prevention and health promotion. There is a lack of educational programs and health campaigns exploring the theme genetic syndromes specifically. Some preventive measures, guidance and genetic counseling, for instance, could be enough and significant to enable the reduction of such abnormalities incidence.

Health education is a set of knowledge and practice oriented for the prevention of diseases and promotion of health[2]. Scientific knowledge reaches people´s daily lives, and it may contribute to the incorporation of new habits and health behaviors[3]. Health education must be a critical and transformative social practice, enabling reflection, behavior change, self-care and social wellness.

The educational prevention programs aim at an early identification of diseases, a health care awareness and a consequent decrease in treatment costs for the health systems[4]. It is extremely important to invest in initiatives that strengthen health education and disease prevention in Brazil, a country with extensive geographic dimensions, and, above all, limited basic health structures. In this perspective, the modern information and communication technologies (ICTs) allow a fast dissemination of information. In this context, Distance Education (DE) becomes an important strategy to aggregate a higher number of people, minimize geographical difficulties and costs, as well as optimize the time

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necessary for the development of health education procedures[5,6].

The terms "ED" and "Tele-education" are often used as synonyms. However, Tele-education must be seen as an optimization of processes, an environment gathering technologies to increase educational efficiency of both traditional methods and distance courses[5].

The Interactive Tele-education gathers many technologies, such as videoconference (for real time interactions), Internet based systems (cybertutor, classroom of the future, online tutor, web conference) and learning objects (The Virtual Man Project and videos demonstrating surgical and clinical procedures)[7].

The Cybertutor enables the student learning through the internet, in an interactive way, allowing both student and tutor to verify the performance. It also presents interactivity resources, such as forum and discussion list, which assures a greater proximity between the program tutor and its participants[8].

Theoretical content, videos and images can be provided in this system. Besides that, it is possible to direct the students learning with the Cybertutor. After each topic studied, questions are asked and the answers are assessed immediately, offering a feedback to the user[5]. Individual performance reports are available for tutors, so that the student work can be monitored. This study aimed at verifying the motivational aspects of an e-learning material, the Cybertutor, on genetic syndromes for 9th grade students.

METHODS

Initially, the Department of Speech-Language Pathology and Audiology of the Bauru School of Dentistry, University of São Paulo, (FOB-USP) in a partnership with the discipline Telemedicine of the University of São Paulo (DTM/FMUSP) developed an e-learning material on genetic syndromes for elementary school students[9].

Entitled *Cybertutor*, the material was made available on the Project Young Doctor (http://www.jovemdoutor.org.br/jdr/).

In order to obtain the sample, we got in touch with the City Department of Education, located in the interior of the São Paulo state, to get a list of private and public schools. Some schools were randomly chosen to be visited and to receive the study proposal and 2 schools accepted to take part in the study.

The objective of the study was also presented to all 9th grade students attending Elementary School in both schools. The 9th grade was chosen mainly because the program theme was related to the Genetic Syndromes and the fact that these students were attending the discipline Sciences and / or Biology. The participation in the study was voluntary due to interest and availability.

In this context, 21 9th grade students enrolled in the elementary school in Bauru, took part in the study, 4 ((19%) were male and 17 (81%) female, aged from 13 to 14 years old.

The students could access the Cybertutor in computer rooms available in the school or on their own personal computers, at home, accessing as many times as it was necessary. So, the activities were carried out in different periods of the school period. After 30 days having access to the Cybertutor on genetic syndromes, the students answered an assessment questionnaire.

To assess the Cybertutor motivational aspects as an e-learning material, a Web Site Motivational Analysis Checklist (WebMAC) Professional Adapted was used as showed in image 1.

QUESTIONS	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
1-The screen layout of this course is attractive.				
2-There is a menu or of site map at the beginning that describes what content is contained within the course.				
3-Audiovisual information included in this course helps to clarify or describe the course content.				
4-Navigating this course does not require any special skills or experience by me.				
5-There is an eye-catching title and/or visual on the home page of this course that will attract participants' attention.				
6-This course provides valuable links to other useful references, including Web sites.				
7-The purpose of this course is always clear to me.				
8-The course has a help function that I can use at any time.				
9-This course is fun for participants to explore.				
10-The course information is provided by credible sources.				
11-The directions for using this course are simple and clear.				
12-I can control the pace of moving through this course at all times, including the use of the resources. [b]				
13-The content information included in course is interesting.				
14-The information contained in this course is current and up-to-date.				
15-There is useful information on each topic at the course resources. [b]				
16-The course resources [b] are crisp and clearly visible.				
17-The variety of formats used in all resources [b] helps to maintain attention.				
18-The information at this course is accurate and unbiased.				
19-All the information at this course is presented using clear and consistent language and style.				
20-All of the course resources [b] are active and fully functioning.				
21-This course has novel or unique features that make it more interesting for participants.				
22-There is little or no unimportant or redundant information at this course.				
23-The course content is well-written without no grammatical, spelling, or other errors.				
24-At all times, I can control what information at the course I wish to see.				
25-There are unexpected surprises at this course.				
26-This course provides opportunities for interactivity to engage students.				
27-This course provides the appropriate amount of information on the topic for a lesson or assignment.				
28-All resources[a] and other navigation mechanisms for moving around at this Web site work the way they should.				
29-The colors and/or background patterns used in this course are pleasing.				
30-This Web site provides opportunities to communicate with its authors, participants and technical support.				
31-No matter where I am in this course, I can access any resources[a] and return to the course page or exit.				
32-There is enough amount of time to learn how to use the resources.[a]				

[a]Resources used in this course included: discussion lists, chats, videos, activities diaries, and case simulator.

Figure 1 – Web Site Motivational Analysis Checklist (WebMAC) Professional Adapted (Paixão, 2008)

The questionnaire used was adaptation of the tool Web Site Motivational Analysis Checklist (WebMAC) Professional[11]. This tool was developed to assess websites and, after adaptation, it became applicable for the motivational subjective assessment of courses and programs involving DE.

The WebMAC consists of 32 statements. Each statement is scored numerically as follows: (3) strongly agree, (2) somewhat agree, (3) somewhat disagree, (0) strongly disagree.

These statements were gathered in 4 domains: "STIMULATING", "MEANINGFUL", "ORGANIZED" and "EASY TO USE". The domain "STIMULATING" consists of the statements 1, 5, 9, 13, 17, 21, 25 and 29; the domain MEANINGFUL" consists of the statements 2, 6, 10, 14, 18, 22, 26 and 30; the domain "ORGANIZED" of the 3, 7, 11, 15, 19, 23, 27 and 31 and the domain "EASY TO USE" of the statements 4, 8, 12, 16, 20, 24, 28, and 32. Each domain can reach a total of 8 statements. Thus, each domain has a maximal score of 24 points and a minimum score of 0 points.

After the score of each domain is carried out individually, they are grouped as the expression: V= E+S; XS= O+F. The score V is the sum of the domains "STIMULATING" and "MEANINGFUL" and it reflects the dimension "VALUE", that is, how much this material is valuable. The score XS is the sum of the domains "ORGANIZED" and "EASY TO USE" and it reflects the dimension "Expectation for Success".

To finish the score, the authors of the WebMAC recommend the use of a Cartesian projection. The abscissa (x-axis) is the score corresponding to the dimension "Value" and the ordinate (y-axis) is the score corresponding to the dimension "Expectation for Success". If the points or a high amount of individual points be located inside the area in grey, it means that the Cybertutor, as an e-learning material, is an "Impressive course", being positively assessed (Image 2).

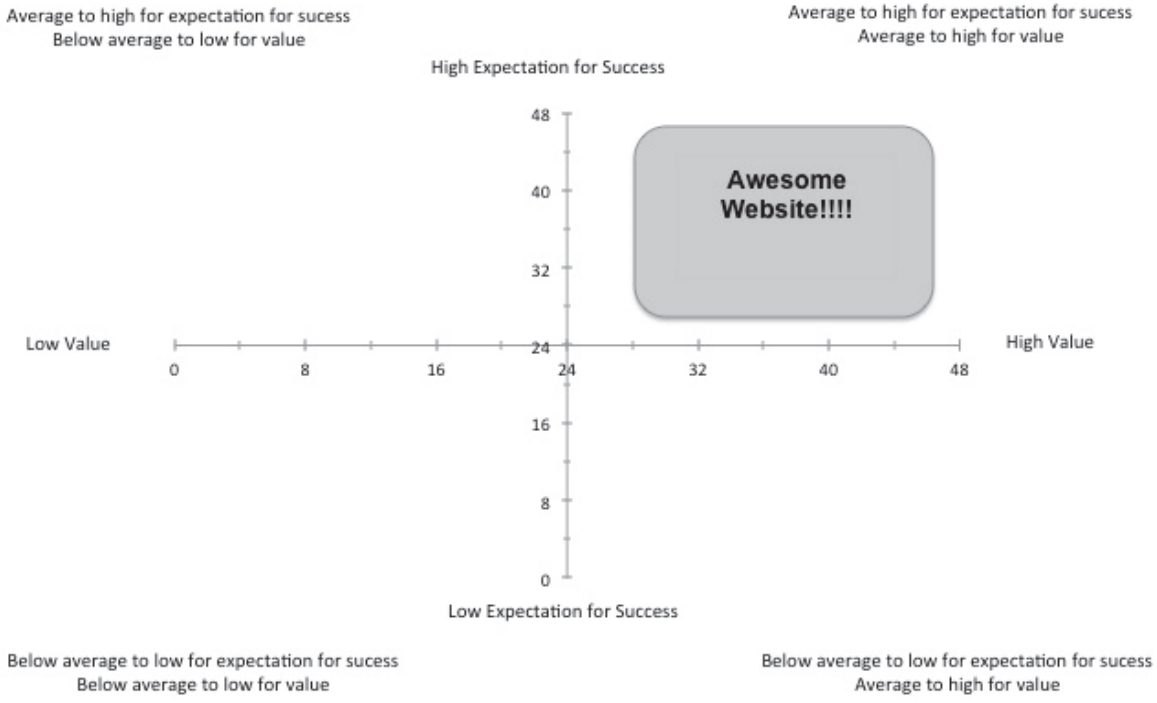

Figure 2 – Criteria of classification based on the *WebMAC Professional*

Previously to the study, the persons in charge of the students were properly informed on its objectives and procedures. Besides, the ones who agreed with their children taking part in the study were asked to sign an Informed Consent Form (ICF). This study was approved by the Research Ethics Committee of the FOB/USP, under the protocol number 039/2009.

Data analysis consisted of a descriptive analysis using the ranges maximum and minimum, mean and median. The Friedman test was used for the comparative analysis of the domains, considering a level of significance of 5% ($p \leq 0.05$).

RESULTS

The WebMAC was answered by all the students (100%) who accessed the Cybertutor (Image 3). The students took 15 minutes in average to answer it.

The domain with the highest mean according to the students was the "ORGANIZED", receiving a significant number of positive assessments (strongly agree and somewhat agree"). The domain with the lowest mean was the "EASY TO USE", receiving a significant number of negative assessments ("strongly disagree and somewhat disagree") (Table 1).

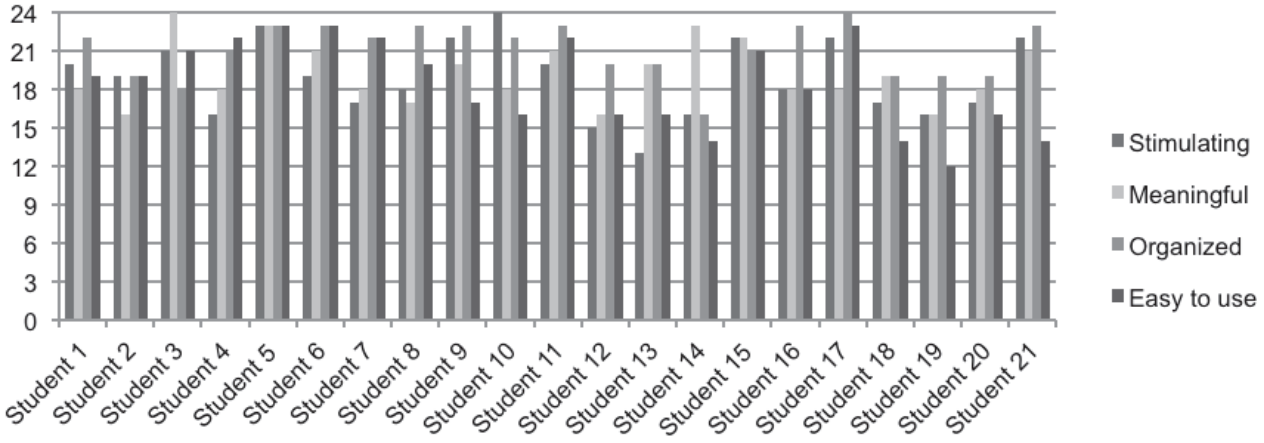

Figure 3 – Score obtained by student in each assessed domain of the WebMAC

Table 1 – Values of mean, median, minimum, maximum and standard deviation (SD) for assessed domain of the WebMAC

Domain	Mean	Median	Minimum	Maximum	SD
Stimulating	18.90	19	13	24	2.96
Meaningful	19.29	18	16	24	2.41
Organized	21.10	22	16	24	2.14
Easy to use	18.48	19	12	23	3.49

The Friedman Test was used to compare the domains assessed by the WebMAC, and it found a statistically significant difference with p=0.002239 (Table 2). Thus, considering the four domains, the individual comparison for the Friedman Test was applied, and it verified a significant difference comparing the domain "ORGANIZED" with the others (Table 3).

The level of motivational satisfaction verified for the e-learning material developed was "impressive", indicating a positive assessment for 100 % of the sample (Image 4).

Table 2 – Comparison of the assessed domains by the WebMAC

Domain	Mean	Median	Sum of scores	Mean rank	P
Stimulating	18.90	19	45.5	2.16	0.002239 *
Meaningful	19.29	18	49.0	2.33	
Organized	21.10	22	70.5	3.35	
Easy to use	18.48	19	45.0	2.14	

* Friedman test with a significance level of $p \leq 0,05$.

Table 3 – Individual comparison of the domains for the Friedman Test

Domain	Difference in the sum of scores	Result
Stimulating x Meaningful	-3.50	NOT SIGNIFICANT
Stimulating X Organized	-25.00	SIGNIFICANT
Stimulating X Easy to use	0.50	NOT SIGNIFICANT
Meaningful X Organized	-21.50	SIGNIFICANT
Meaningful X Easy to use	4.00	NOT SIGNIFICANT
Organized X Easy to use	25.50	SIGNIFICANT

Source: Adapted from SMALL and ARNONE, 1999.

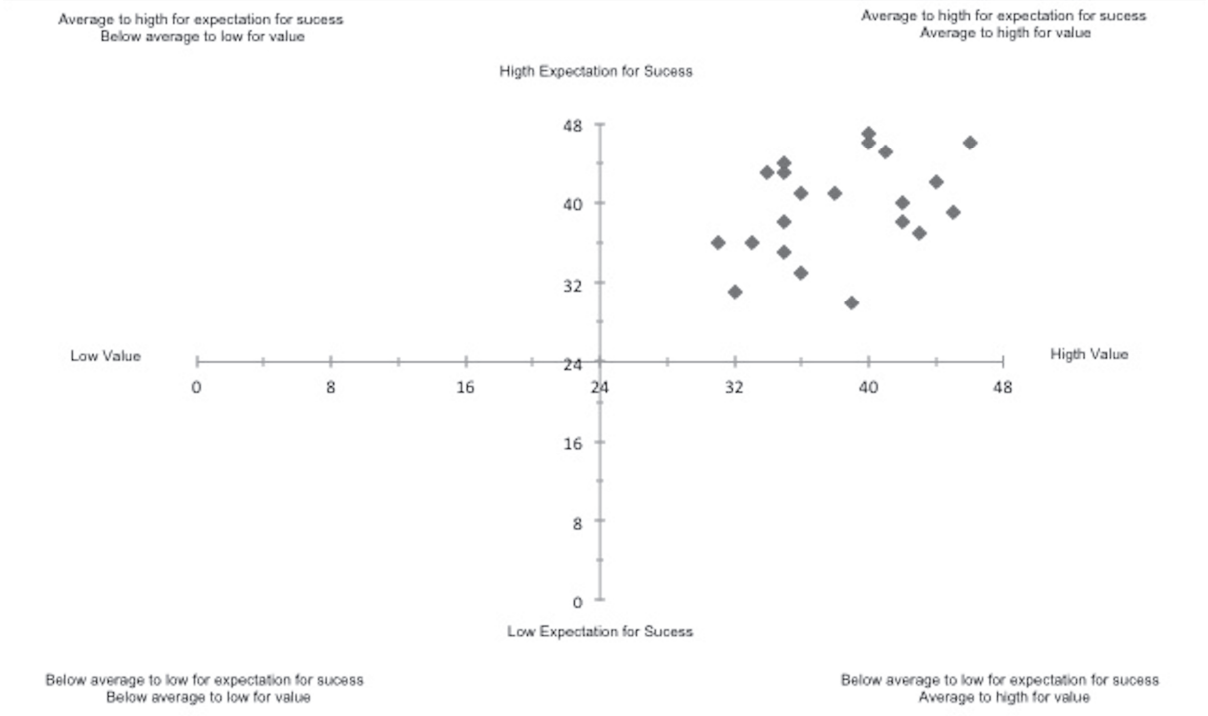

Figure 4 – Classification of the Cybertutor, as an e-learning material

DISCUSSION

Some studies[4, 12-14] show that the early incorporation of healthy habits can generate a change in the behavior; therefore, it must be encouraged by educational programs developed for children and adolescents.

As 100% of the sample consisted of adolescents, aged between 13 and 14 years old, there was a preoccupation in adopting an appropriate language and an engaging learning content.

The learning material developed was a Cybertutor on genetic syndromes. As it is an electronic tutor available on the internet, the time of access was flexible, according to the time availability and interest of the students.

Nowadays, a variety of studies are being developed aiming at assessing the effectiveness[15], acceptance[16] and motivation[17] of the users regarding distance education.

The domain "ORGANIZED" was the one with the highest score in the sample (Table 1). The organization of the learning material is an extremely important variable, as the planning, the development and the information layout are determining prerequisites that can influence in the users motivation, in the learning and consequently in the effectiveness of the education program.

Regarding the domain with the lowest score "EASY TO USE" (Table 3), this data enables us to conclude that distance education programs can still be considered an innovative education practice, mainly for this study age group.

According to Image 2, the results showed a high level of motivational satisfaction with the e-learning material developed. Other studies[17,18] have also verified that the MRF is a high valid tool to measure the motivational aspecto of distance courses.

This positive assessment regarding the Cybertutor as an e-learning interactive material corroborates with the literature checked[4,10,12,13,15,17-20]. Thus, if an e-learning material has a high motivational quality, the users visit, explore the content and access again[17].

The high motivational satisfaction was also verified in a study[21] on the theme genetic syndromes, demonstrating similar findings in the assessment of e-learning materials carried out by students who live in the state of Amazonas.

In this perspective, the results found in this study show that the development of health education programs must be encouraged by education practices, including those using the Interactive Tele-education.

CONCLUSION

Considering the data obtained, it was possible to conclude that the Cybertutor on genetic syndromes received a high motivational satisfaction among the elementary school students, and it can be used in health education programs on this theme for this age population.

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RESUMO

Objetivo: avaliar os aspectos motivacionais de um material educacional *on line* conhecido como *Cybertutor* contendo informações sobre síndromes genéticas para alunos do ensino fundamental. **Métodos:** participaram deste estudo 21 alunos do 9° ano do ensino fundamental do município de Bauru. Após 30 dias de acesso ao *Cybertutor,* utilizou-se a Ficha de Pesquisa Motivacional para avaliar os aspectos motivacionais desta ferramenta. A Ficha de Pesquisa Motivacional é composta por 32 enunciados agrupados em 4 domínios: estimulante, significativo, organizado e fácil de usar. **Resultados:** todos os participantes avaliaram positivamente o material educacional *on line* desenvolvido, considerando-o como "Impressionante". O Teste de Friedman encontrou diferença estatística significante entre os domínios avaliados, com p=0,002239. A comparação individual entre os domínios demonstra resultados significantes na pontuação do domínio organizado. **Conclusão:** o *Cybertutor* sobre síndromes genéticas desenvolvido obteve alta satisfação motivacional. Dessa forma, conclui-se que este material educacional *on line* pode ser utilizado como uma estratégia de educação em saúde nesta temática.

DESCRITORES: Educação em Saúde; Educação a Distancia; Motivação; Genética

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