



# Hearing Health Promotion Based on the Dynamics of Young Doctor Project

## Promoção da Saúde Auditiva baseada na Dinâmica do Projeto Jovem Doutor

## Promoción de la Salud Auditiva fundamentadas en la Dinámica del Proyecto Joven Doctor

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### Abstract

**Introduction:** ATelehealth enables knowledge to reach a greater number of people by the use of dynamic and interactive resources. In this context, the Young Doctor Project consists in training students of the elementary and high school about themes of health area in a motivating dynamic so they can multiply knowledge to the community, through training courses and extension programs in the Universities. **Objective:** This study aimed to develop and evaluate a training program about hearing health. **Methods:** It was developed the training program about hearing health, using the Young Doctor Project. Ten students coursing the elementary school of public education participated on the research. The content was presented to them by dynamics attending classes and distant activities accessing the Cybertutor. The closure of the study was market by the sustainable social action, which in the “young doctors” transmitted the acquired knowledge to the scholar and family community. Through a pre and post program questionnaire it was evaluated the satisfaction on the use of Cybertutor and the quantity of information retained. **Results:** Students participated in all education methodologies, transmitting knowledge to 100 people. It was verified the high level of satisfaction on using the Cybertutor, and also

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the improvement in the students' performance in the post training program. **Conclusion:** The elaboration and execution of the training program for hearing health led to satisfactory results in increased student information on the subject, helping them to be able to multiply the knowledge to the community.

**Keywords:** Audiology; training; Speech-Language and Hearing Sciences; telemedicine.

## Resumo

**Introdução:** A tele-saúde possibilita que o conhecimento alcance um maior número de pessoas, utilizando recursos dinâmicos e interativos. Nesse contexto, o Projeto Jovem Doutor consiste na capacitação de estudantes do ensino fundamental e médio sobre temas da área da saúde, em uma dinâmica motivadora, a fim de que multipliquem o conhecimento para a comunidade em que estão inseridos, por meio de cursos formativos e atividades de extensão das Universidades. **Objetivo:** Este estudo teve como proposta elaborar e avaliar, por meio de questionários, um programa de capacitação sobre saúde auditiva. **Métodos:** Foi desenvolvido um programa de capacitação em saúde auditiva, utilizando a dinâmica do Projeto Jovem Doutor. Participaram 10 alunos do ensino fundamental da rede pública de ensino, aos quais foi apresentado o conteúdo por meio de aulas presenciais e à distância, com acesso ao cybertutor e também foi feita uma dinâmica. A finalização do Projeto foi marcada pela ação social sustentada, quando os "jovens doutores" multiplicaram o conhecimento adquirido para a comunidade escolar e familiar. Por meio de um questionário aplicado pré e pós-programa de capacitação, foram avaliados a satisfação quanto ao uso do cybertutor e o nível de informação adquirido pelos alunos. **Resultados:** Os alunos participaram das metodologias de ensino, transmitindo o conhecimento a 100 pessoas. Verificou-se alto nível de satisfação com o cybertutor, assim como aumento do desempenho dos alunos no questionário pós-capacitação. **Conclusão:** A elaboração e execução do programa de capacitação em saúde auditiva produziu resultados satisfatórios no aumento de informações dos alunos sobre o tema, contribuindo para que eles se tornassem aptos a multiplicar o conhecimento à comunidade.

**Palavras chave:** Audiologia; capacitação; Fonoaudiologia; telemedicina.

## Resumen

**Introducción:** La tele-salud permite que el conocimiento llegue a un número mayor de personas, con el uso de recursos dinámicos e interactivos. En este contexto, el Proyecto Joven Doctor consiste en la capacitación de estudiantes de la educación primaria y secundaria sobre temas de la salud en una dinámica motivadora, para éstos multipliquen los conocimientos para la comunidad donde viven, a través de cursos de formación y actividades de extensión de las Universidades. **Objetivo:** Este estudio tuvo como objetivo elaborar y evaluar, a través de cuestionarios, un programa de formación en salud auditiva. **Métodos:** Se desarrolló un programa de formación para la salud auditiva, utilizando la dinámica del Proyecto Joven Doctor. Participaron 10 estudiantes de primaria de una escuela pública a quienes se presentó el contenido en clases regulares y a distancia, con acceso al cybertutor y también se hizo una dinámica. La finalización del proyecto fue marcada por la acción social sostenida, cuando "los jóvenes doctores" multiplicaron los conocimientos adquiridos para la comunidad escolar y familiar. Por medio de un cuestionario administrado antes y después del programa se evaluaron la satisfacción en cuanto al uso del cybertutor y el nivel de información adquirido por los estudiantes. **Resultados:** Los estudiantes participaron en todas las metodologías de enseñanza, transmitiendo el conocimiento a 100 personas. Hubo alto nivel de satisfacción con el cybertutor, así como aumento en el rendimiento de los estudiantes en el cuestionario después de la formación. **Conclusión:** La preparación y realización del programa de capacitación a cerca de la salud auditiva generó resultados satisfactorios en el aumento de la información de los estudiantes sobre el tema, ayudando les a ser capaces de multiplicar los conocimientos a la comunidad.

**Palabras clave:** Audiología; capacitación; Fonoaudiología; telemedicina.



## Introduction

Data from the World Health Organization<sup>1</sup> present that more than 275.000.000 people in the world suffer from hearing impairment on moderate to severe level. In Brazil, 5.735.099 of the habitants suffer from some kind of hearing impairment declaring themselves to be incapable, or to have some/great permanent difficultness in hearing<sup>2</sup>.

Face to Brazilian territorial dimension of 8.547.403 km<sup>2</sup>, approximately 190 million people, and an heterogenic distribution of social, cultural, economic and mainly, educational resources<sup>2</sup>, it is important to consider strategies and public politics of hearing health focusing the social development of projects related to this need.

Therefore, since 2004, it was stated the National Politics in Attention to Hearing Health in Brazil, through decree GM no 2073 and SAS no 5874, in which there are established intervention measures in hearing impairment through health promotion actions, as also, the entire process of rehabilitation<sup>5</sup>.

Although, the intervention initiatives should be attached to education, an excellent strategy developed in several countries aiming to work on population's needs in a Productive Health Chain. Tele-health actions are emphasized in this manner, focusing on health care empower using technologies<sup>6</sup>.

Tele-health can be analyzed as a real practice and application of Tele-assistance (tele-diagnose and tele-rehabilitation) and Tele-education engaged to health area needs and benefits<sup>6,7</sup>. It is possible to divide it into three qualities: Tele-education training programs to population based on Information and Communication Technologies; Tele-assistance in activities as specialized second opinion; and the Multi-center Research which enables sharing advances in studies of different centres<sup>8</sup>.

Accordingly, Tele-health provides for information to reach a greater number of people, regardless social-economic situation or age, using dynamic<sup>9</sup> and interactive<sup>10</sup> resources with low cost<sup>11</sup>. Its practices are diversified and consist in patient attending assistance, health promotion, professional and patient education, disease prevention, epidemiologic surveillance, health service management, etc<sup>12</sup>.

For educational projects success (Tele-education) it is necessary a conscious theme choice, concerning participants' needs and interests,

providing autonomy by establishing a theoretical-practical<sup>13</sup> relation. This feature is important to participants' involvement in projects, therefore, to guarantee the knowledge acquisition and use.

The Young Doctor Project was developed by a partnership among Universities, concerned about actions and projects in Tele-education. It is the combination of information and technology in the application of educational programs providing a change in the attitude related to health, making learning more effective<sup>14</sup>.

The Young Doctor Project proposal provides an effective approach regarding the citizenship, with practice of knowledge acquirement in the classroom, under researchers' guidance. For elementary and high school students, it represents an opportunity of digital inclusion and learning about health, through educational courses and extensions activities of the University<sup>14</sup>.

The content of the Project related to communication disorders is current and considering that hearing is essential so this process occurs effectively, it is indicated the proposal validity, approaching topics of hearing health prevention and promotion. The effects of this intervention are expected on the increase of students' and community's life quality, who receive information directly and indirectly, creating a productive health chain.

Information dissemination about hearing health, hearing disorders and treatments, reflect on the possibility of fighting the stigma present in society related to hearing impairment carriers, minimizing the occurrence of bullying<sup>15</sup>, exposed to negative reactions from students and, also, external population.

This study aimed to develop and evaluate educational actions about hearing health for elementary students, spreading knowledge among the community, based on Young Doctor Project principles.

## Methods

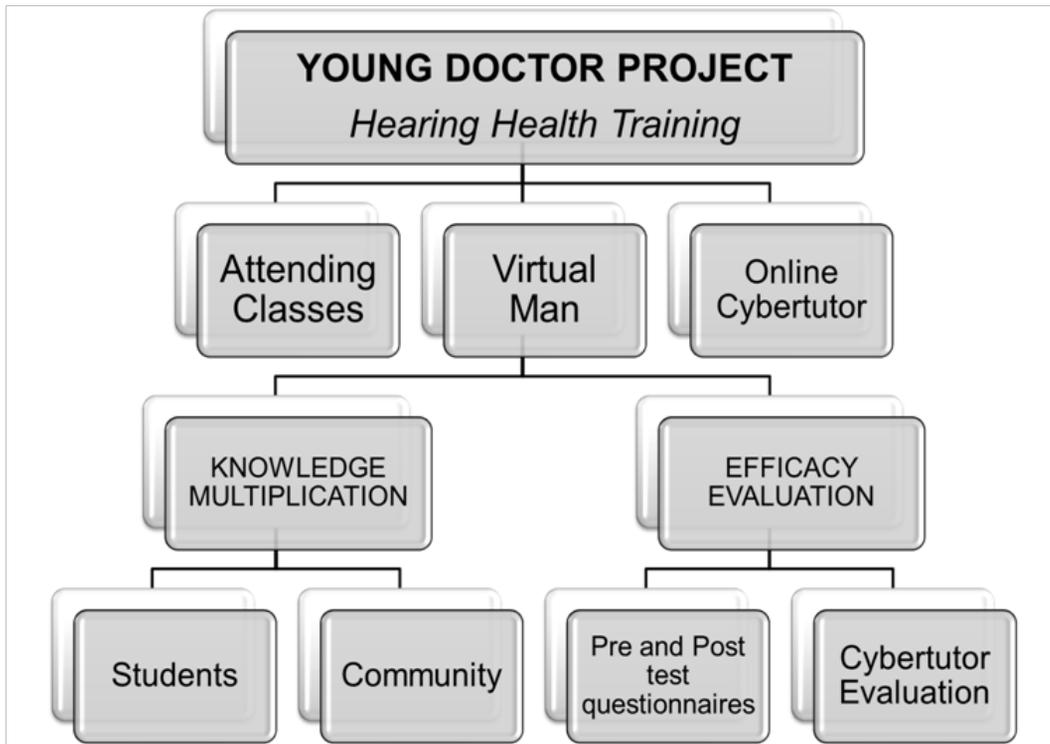
This study is part of a wide research inserted in the edictal no. 6 PROEXT 2009 – Ministério da Educação, funded by São Paulo Research Foundation. It was approved by the Committee of Ethics in Research of the institution in which the project was conducted, under protocol number 164/2010.

The methodology involved the Young Doctor Project dynamic, which has as characteristic to bring University closer to community and school.

The sample was composed of 10 students from a public school in Bauru – São Paulo, SP, both genders, ages from 13 to 15, coursing the 8th grade in the afternoon term, being their participation

volunteered, according to interest and availability. Students' parents/tutor were properly informed and assigned the Consent Form.

To provide a greater involvement and motivation to participants, it was adopted in the training program the Young Doctor methodology, as presented in the organogram of Figure 1.



**Figure 1** – Young Doctor Project in Hearing Health Organogram

The organogram was created based on the fundamental structure of all Young Doctor Projects, that is: attending training, complementation through Cybertutor, followed by knowledge multiplication by the “young doctors”. It is important to quote that evaluation of the efficacy is a private manner of each project, regarding its characteristics and needs.

The theme Hearing Health was chosen according to needs related to students' age and the aspect of social development and inclusion, so that the theme is interesting and motivating to be transmitted to people.

The Training Program was divided into two stages – first, there were conducted attending classes using Virtual Man, Interactive Tele-education and dynamics, followed by the sustained social action developed by students from the acquired knowledge. Secondly, it was evaluated the level of success of this collaborative learning model. Questionnaires pre and post training evaluated the satisfaction on using the Cybertutor and the efficacy of the knowledge exposed in this period.

### ***1<sup>st</sup> Stage- Training Program and Social Action***

#### *Attending Classes*

First of all, it was settled a contact with students and an enlightening about the objective and importance of the training program was made. An informal dynamic was conducted aiming to bring researchers and students closer, and to motivate them to participate in the activities proposed.

Then, it was conducted, by the researchers, the attending classes about “Hearing Health in children, teenagers, adults and elderly people”. Everything was oriented by the professor specialist and coordinator of Young Doctor Project. The didactic material was developed in PowerPoint 2007 using technologic resources – images and videos in 3D from the Virtual Man Project in Hearing<sup>16</sup>.

The two attending classes were conducted on Saturdays’ mornings, taking four hours total, on October 2011. All participants attended the activities and participated actively with questions and experience reports.

#### *Cybertutor*

The Cybertutor is an electronic environment that aims to promote Tele-education by displaying information interactively and conducting the performance of each participant, aiming to complement contents given in classroom.

It was developed a bibliographic research to construct the Cybertutor. The articles indexed were selected, resumed and adapted to material language and also, it was used audiovisual resources to make the material motivating and attractive, using illustrations from the CD-ROM Virtual Man of Hearing<sup>16</sup>.

At the end of each module, the students had to answer correctly to five questions, and after that they would be able to continue. Otherwise, they should go back to theory and answer the questions with 100% of success.

The school provided computer laboratories for the students to perform their activities, ensuring the participation of all.

#### *Dynamic*

It was conducted a Quiz with the objective to elucidate doubts and analyze students’ learning while attending classes. The right answers were reviewed and, the theory was brought to clarify questions.

#### *Social Action*

After training, on the last day of the program, students developed a lecture guided by researchers and presented to the entire school, family and the community, as a sustained social action. It was also created a presentation on PowerPoint with pictures, videos and banners to show the relevant information about hearing health, prevention and tips to improve the daily basis health.

#### ***2<sup>nd</sup> Stage – Evaluation of the satisfaction in using the Cybertutor and Efficacy of Knowledge exposed***

The questionnaire to Cybertutor evaluation was divided into two. The first part, with five questions, evaluated the material inserted on electronic tutor, regarding the themes – illustration quality; videos quality; animation quality; surfing easiness; and material availability. The second part, with six questions, referred to content evaluation – comprehension easiness; vocabulary; organization; enlightening resources (e.g. illustrations, pictures, videos, animations, etc.); content update; links to other websites. In this questionnaire the possible answers were: Excellent; Satisfactory; Passable; Unsatisfactory.”

To measure knowledge acquired immediately after training, students answered questionnaires with closed questions in two moments: pre-training, at the first meeting, before the lectures about the theme; and post-training, after the attending classes and access to the Cybertutor. The questionnaires categories were about the contents developed in training: hearing anatomy and physiology, hearing impairments, preventions and treatment of hearing losses.

It was applied the T Test to compare the questionnaires pre and post-test, and to the evaluation of the Cybertutor it was developed a descriptive analysis.

**Results**

**1<sup>st</sup> Stage- Training Program and Social Action**

*Attending Classes*

During attending classes, students showed interested regarding the theme by making questions and they were motivated in participating on the project. This could be evaluated by the perception of the

researchers, plus the absence of evasion percentage of the training program.

*Cybertutor*

It was developed two modules about hearing health and inserted on the Young Doctor Project website - <http://www.projetojovemdoutor.org.br> - as shown in Figure 2, being available for two weeks with topics related to hearing anatomy and physiology, hearing abilities, hearing impairment, prevention and treatment.



**Figure 2** – Modules 1 e 2 inserted on the Cybertutor – Young Doctor Program website

At this stage participants conducted their own learning, accessing the content more than once, making their own studying schedules at home and at school. It was observed that 100%

of students answered the questions correctly in the first attempt; they did not need to review the content.

### Dynamic

During the quiz, it was observed doubts regarding the professionals who work with hearing care, ear anatomy, specifically with terms auricular and otorhinolaryngologist. The dynamic allowed the doubts to be explained, illustrating several situations about the themes already approached in the attending classes and in the Cybertutor.

### Social Action

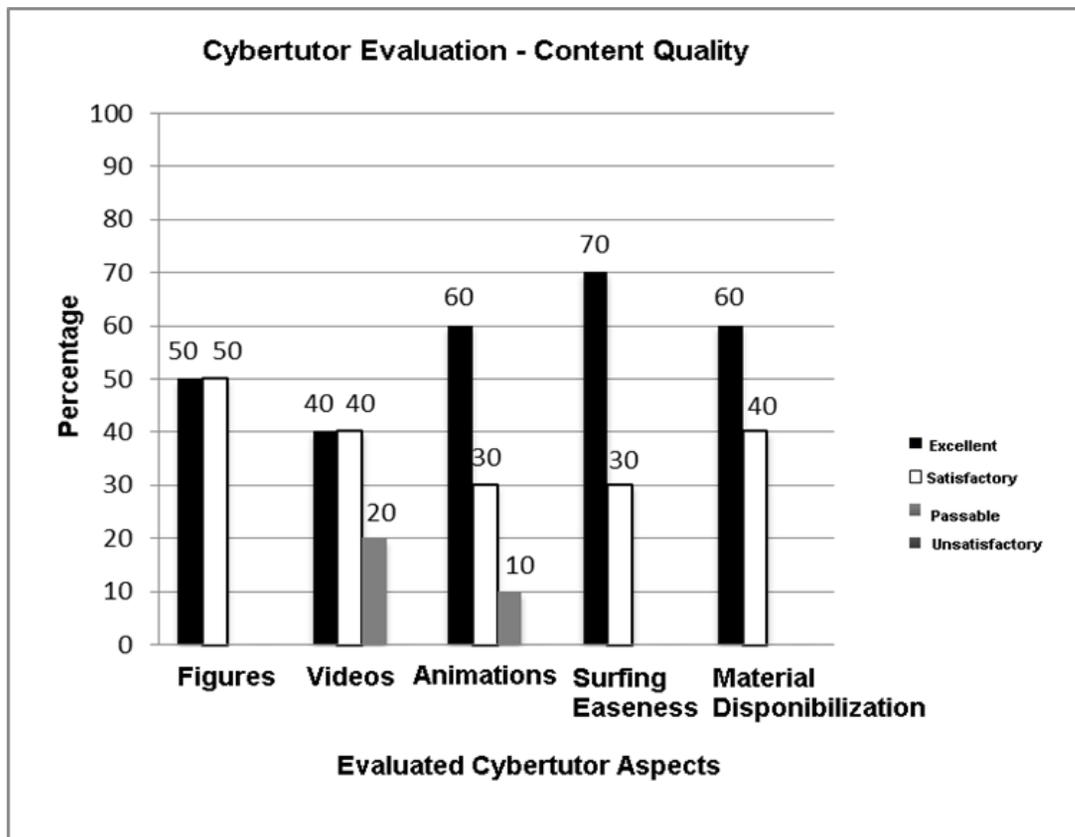
Once the tasks were successfully completed, students were entitled 'Young Doctors' and received a certificate and a white jacket engraved with

the Young Doctor Project logo as a symbolic award. Then, the knowledge acquired was transmitted to 100 people from the community that participated on the lecture.

### 2<sup>nd</sup> Stage – Evaluation of the satisfaction in using the Cybertutor and Efficacy of Knowledge exposed

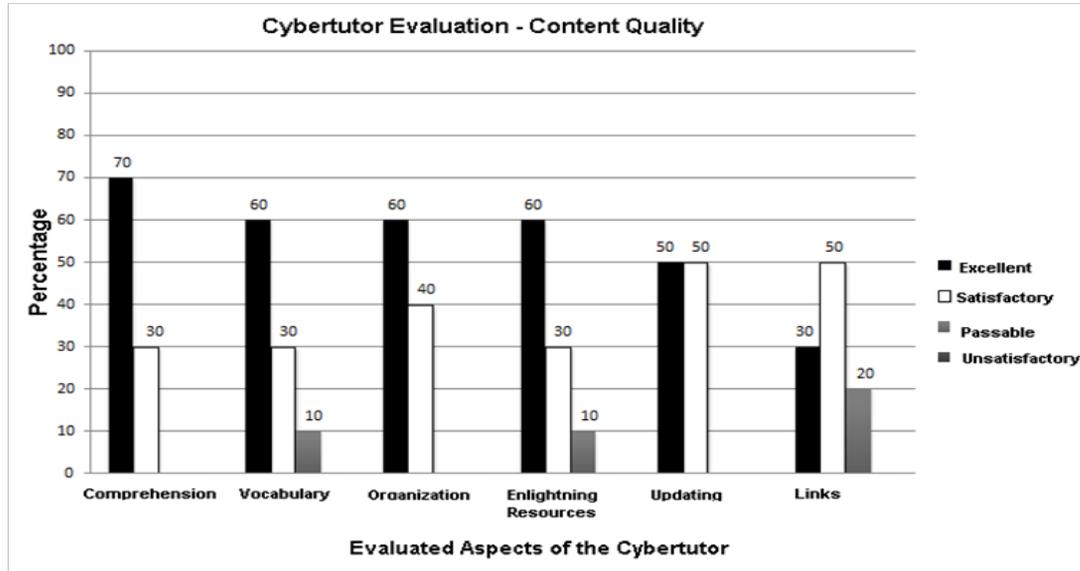
After accessing the Cybertutor, students answered the questionnaire that evaluated the material quality, which was – 56% Excellent, 38% Satisfactory, 6% Passable and 0% unsatisfactory (Graphic 1)

**Graphic 1** – Cybertutor evaluation related to quality of the material used in both modules - 5 evaluated categories with percentage results, respectively



Related to the second part of the evaluation, students the content classification was excellent and satisfactory (55% and 38%, respectively), 7% about the content inserted on Cybertutor (Graphic 2), it was observed that, in the opinion of 93% of passable and 0% considered unsatisfactory.

**Graphic 2** – Evaluation of the Cybertutor related to the content quality – 6 categories evaluated with the percentage results, respectively



Data from questionnaires, applied pre and post the training process of the Young Doctor Project, enable to verify that students present an average of 22.63% (sd=11.42) of knowledge about hearing

health before training. However, the average of correct answers after training was 52.63% (sd=14.21) (Table1).

**TABLE 1** – percentage of each student’s performance in pre and post questionnaires

Students	% of right answers pre training program	% of right answers post training program	Difference between pre and post right answers
1	13,3%	73,3%	60,00
2	20%	33,3%	13,30
3	40%	66,6%	26,60
4	20%	46,6%	26,60
5	26,6%	40%	13,40
6	26,6%	66,6%	40,00
7	33,3%	60%	26,70
8	6,6%	53,3%	46,70
9	33,3%	53,3%	20,00
10	6,6%	33,3%	26,70
<b>Median</b>	22,63%	52,63%	30
<b>Standard Deviation</b>	0,12	0,14	14,83



It was verified an improvement in 30% of knowledge acquired by students with standard deviation of 14.83%. It was applied the T – Test to compare results from questionnaires' samples, adopting significance level of 5% and it was verified difference statistically significant of students development pre and post training ( $t=6.4$  and  $p<0.001$ ).

## Discussion

It is very common and an essential practice in the Young Doctor Project, the attending classes in the first contact with students to offer an initial approach about the project goals and theme proposed, besides local and community recognition where the project is about to be developed<sup>20</sup>. In this research, it was observed in students, that this action allows them to be introduced to an academic project functioning, raising interest about the university and learning, creating a curiosity about the scientific field being explored by the means provided, as the Cybertutor.

It was observed low level of students' performance in closed questions by assessing it pre training program, and after the Interactive Tele-education actions, it was presented a significant increase of knowledge about hearing health. This correlates to different studies developed using the Young Doctor Project dynamic to multiply knowledge about health themes<sup>19;20;21;22;23;24;25</sup>.

The Project provides the possibility to work with different themes, with results similar to a study developed in the city of Tatuí, SP, which approached seven themes, and brought positive results in transmitting knowledge by attending classes and Cybertutor contents, disseminating to 3000 people of the community<sup>21</sup>.

The efficacy demonstrated by increasing students score pre and post training process is similar to results from a 2011 study that compared the conventional teaching to the online teaching. It is emphasized that distance education offers to the individual a focused study, since it has time flexibility and the comfort of choosing where and when the training will be developed<sup>26</sup>.

In 2008, Blasca et al. conducted the Young Doctor Project in Bauru, SP, with 17 students from elementary school in a private school, presenting to them information about hearing and vocal health. During the social action with the community, it

was applied a questionnaire evaluating the satisfaction on students' presentations, revealing from the visitors' opinion excellence level of 66%, 28% classified as very good, 6% as good and none of the visitors classified the exposition as poor or irregular. Besides this quantitative evaluation, it was developed an analysis on the young doctors' reports in which they verified the dynamic success<sup>20</sup>. Therefore, the initiatives were valid, both in private and public schools, providing student's motivation in acquire and transmit information about health behaviors.

Evaluating the educational material, the Cybertutor has high level of acceptance, since 100% of students participated on the project and accessed the entire online content. The Cybertutor saves teacher time since the lectures and videos can be transmitted by previous recording, motivating students to conduct actively their role as apprentice<sup>27</sup>.

In this context, it was created the Cybertutor contents about Hearing Aids, in which 13 students were evaluated regarding pre and post access performance, presenting average of 37.1% of pre access scores and 63.3% in post access scores. The success in using the Cybertutor was verified in both undergraduation students, as also in elementary school students, as presented in the study.

Considering the educational field, technologic products has gained a significant role, mainly due to the characteristic of "active posture" for both apprentice and tutors, changing the student behavior of learning passively to being active in this process<sup>29</sup>. It has been used different technologic tools besides the Cybertutor, attending classes and dynamics, as the CD-ROM, with considerably levels of efficacy for self-learning<sup>30</sup>.

This moment was important to greater reflection about changing the attitude concerning students caring disabilities, fact mentioned by school teachers. Thus, the Young Doctor Project gave to students theory information and its applicability in daily routine, adapted to theirs', teachers' and community reality<sup>25</sup>.

The students' motivation was essential during the Project activities and, mainly, on their feeling about being able to transmit information to community. Also, it gave an account to the importance of the social action so that information can reach a greater number of people and, therefore, a new behavior to be adopted regarding health<sup>21</sup>.

Considering the Young Doctor Project an effective model of education in health, the continued reproduction of these initiatives is essential in accordance to the goal of increasing life quality.

Therefore, it is suggested to apply the Young Doctor Project in several themes that are favorable to proper health behaviors, in general, and also to be performed in different regions of the country, mainly in regions with lower economic development, with greater indicators of illiteracy.

## Conclusion

The educational actions about hearing health were developed and performed, using the Interactive Tele-education. It was observed on students' significant increase on the knowledge related to the theme and also, the dynamics trained students to multiply information to the community. Studies bring to discussion the importance of permanent education to health promotion, corroborating to the results found in this research.

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