

Social-educational hearing health activities based on blended learning

Ações socioeducativas em saúde auditiva para jovens utilizando educação híbrida

Actividades socioeducativas en salud auditiva basadas en la educación híbrida

Maria Thereza Raab Piccino* 

Camila de Castro Corrêa** 

Cassia Pardo-Fanton* 

Wanderleia Quinhoneiro Blasca* 

Abstract

Introduction: young people often listen to amplified music, which calls attention to the importance of projects to promote their hearing health, raise their awareness, and change their behaviors. **Objective:** to promote learning on the topic, assess knowledge on hearing health, and spread acquired knowledge to the community. **Methods:** a hearing health social-educational program was carried out with 12 seventh graders at a public school in Southeastern Brazil. The program was organized for blended learning (in-person meetings and virtual learning environment [VLE] activities), using the Young Doctor Project methodology. For the assessment, students answered a questionnaire on their previous knowledge and auditory behavior, as well as a problem-situation questionnaire. VLE was assessed with a motivational survey sheet, and the impact of the program was analyzed through a questionnaire administered to the teachers. **Results:** there were changes in the students' behaviors regarding the time and volume at which they used the earphones. Also, 100% of them improved their knowledge of the risks high sound levels pose to hearing. The VLE descriptive analysis indicated that the mean values of the "organized" and "easy to use" domains had the best performances. The last stage involved 802 people in the classroom interactive activities and hearing health cultural spaces, which created a health production chain.

* Faculdade de Odontologia de Bauru (FOB/USP), Bauru – SP, Brazil.

** Centro Universitário Planalto do Distrito Federal (UNIPLAN), Brasília – DF, Brazil.

Authors' contributions:

MTRFP: Study conceptualization; methodology; data collection; manuscript draft.

CCC: Manuscript draft; critical review.

CPF: Critical review

WQB: Study conceptualization; critical review; supervision.

E-mail for correspondence: Maria Thereza Raab Piccino - mtrfp@hotmail.com

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Conclusion: the program directly reached young people, promoting their learning, behavior changes, and improved quality of life.

Keywords: Hearing; Health promotion; Health education; Quality of life.

Resumo

Introdução: O uso frequente de música amplificada pelos jovens traz a reflexão da importância de projetos de promoção de saúde auditiva, visando a conscientização dos jovens e mudança de comportamento. **Objetivo:** promover o aprendizado sobre o tema, avaliar o conhecimento sobre saúde auditiva e multiplicar o conhecimento adquirido junto à comunidade. **Métodos:** foi realizado uma ação socioeducativa em saúde auditiva com 12 alunos do sétimo ano do Ensino Fundamental II de uma Escola Pública no Sudeste do Brasil. A ação foi organizada com base em educação híbrida (encontros presenciais e uso do AIA), utilizando a metodologia do Projeto Jovem Doutor. Para a avaliação, os alunos responderam a um questionário sobre conhecimento prévio, comportamento auditivo e um questionário situação-problema. O AIA foi avaliado por meio da Ficha de Pesquisa Motivacional, foi realizada a análise do Impacto através de um questionário para os professores. **Resultados:** observou-se que houve mudança no comportamento dos alunos no que diz respeito ao tempo de uso e volume dos fones de ouvido, verificou-se que 100% melhoraram seu conhecimento sobre os riscos de altas intensidades sonoras para a audição. Ao avaliarmos o AIA, a análise descritiva evidenciou que os valores da média de melhor desempenho foram para as dimensões organizado e fácil de usar. Na última etapa, 802 pessoas foram envolvidas, nas atividades interativas em sala de aula e nos Espaços Culturais em saúde auditiva, criando uma cadeia produtiva em saúde. **Conclusão:** Por meio desta ação, foi possível atingir diretamente os jovens, promovendo o aprendizado, mudança de comportamento e melhora na qualidade de vida desses jovens.

Palavras-chave: Audição; Promoção da Saúde; Educação em Saúde; Qualidade de vida.

Resumen

Introducción: El uso frecuente de música amplificada por parte de los jóvenes, trae la reflexión sobre la importancia de los proyectos de promoción de la salud auditiva, orientados a la sensibilización de los jóvenes y al cambio de comportamiento. **Objetivo:** promover el aprendizaje sobre el tema de la salud auditiva, evaluar conocimientos y multiplicar los conocimientos adquiridos en la comunidad. **Métodos:** una acción socioeducativa en salud auditiva con 12 alumnos del séptimo año de la Escuela Primaria II de una escuela pública del sudeste de Brasil. La acción se organizó y basó en la educación híbrida (encuentros presenciales y uso del entorno de aprendizaje interactivo), utilizando la metodología del Proyecto Doctor Joven. Para la evaluación, los estudiantes respondieron un cuestionario sobre conocimientos previos, comportamiento auditivo y un cuestionario de situación problema. La entorno de aprendizaje interactivo se evaluó mediante el Formulario de Investigación Motivacional, el análisis de Impacto se realizó en un cuestionario para docentes. **Resultados:** se observó que hubo un cambio en el comportamiento de los estudiantes con respecto al tiempo de uso y volumen del audífono, se encontró que el 100% mejoró sus conocimientos sobre los riesgos de alta intensidad sonora para audiencia. Al evaluar el entorno de aprendizaje interactivo, el análisis descriptivo mostró que los valores del promedio de mejor desempeño fueron para las dimensiones organizadas y fáciles de usar. Durante la etapa final, 802 personas se involucraron en actividades interactivas en el aula y en los Espacios Culturales en salud auditiva, creando una cadena productiva en salud. **Conclusión:** A través de esta acción se logró llegar directamente a los jóvenes, promoviendo el aprendizaje, el cambio de comportamiento y mejorando la calidad de vida de estos jóvenes.

Palabras clave: Audición; Promoción de la Salud; Educación en Salud; Calidad de Vida.

Introduction

Quality of life is a topic that has been discussed worldwide to better understand what it means to “be healthy”¹. But how can public health be addressed in a country with approximately 215 million inhabitants?² This question points out how important it is for government agencies to participate in this concept of health and for the population to get involved in the process.

Hence, health promotion programs can be determinant mediating strategies between people and environments, combining personal health choices and social responsibility to usher in a healthier future³.

An important example was the first Ministry of Health regulation promulgated on November 14, 2000, establishing the Hearing Health Program and providing the distribution of hearing aids (SAS/MS Regulation no. 432). It was later expanded to the National Hearing Healthcare Policy in 2004, with GM/MS Regulation no. 2073, of September 28, 2004; its 2nd article organizes a line of comprehensive care (promotion, prevention, treatment, and rehabilitation), involving multiprofessional and interdisciplinary assistance. Along with all these public policies, the Brazilian Ministry of Health has encouraged the establishment of educational programs to guide health promotion.

Decree no. 6286, of December 5, 2007, established the School Health Program to contribute to the comprehensive training of public basic education students through prevention, promotion, and healthcare actions – thus, encompassing hearing health. The Decree was redefined and updated by Interministerial Regulation no. 1.055, of April 25, 2017.

These approaches can be characterized as health education. It is an important field of knowledge and practices of health, historically dedicated to promoting health and preventing diseases. The current concept of health education – which predominates in theoretical reflections – sees it as a theoretical-practical process aiming to integrate various aspects of knowledge (scientific, popular, and common sense), furnishing subjects with a critical view and greater, responsible, and autonomous participation in everyday health issues⁴.

Health education can be defined as a social practice that encourages changes in habits, practices, attitudes, knowledge transmission and acqui-

sition, and gradual changes in the way of thinking, feeling, and acting. To this end, pedagogical methods are selected and applied to encourage participation and identify problems. Thus, health education and learning form a continuous process marked by inquiries, reflection, questions, and especially collective, articulated, and shared construction⁵.

Educational practices must value the collective construction of knowledge, as educators and students take on an active learning role – students become actors in the educational process⁶.

Using interactive technologies to construct new educational models will have results if such use is planned and developed to stimulate learning in different spheres (knowledge, reasoning, decision-making, and behavior).

Technology use is transforming human relations in social, economic, and educational contexts to construct knowledge, challenging educators to use new technologies adequately. Technology is an important pedagogical support in teaching systems, but this tool must be analyzed in further detail⁷.

Even though individuals acquire knowledge through various means, certain factors provide greater interaction with and retention of such learning. People learn more through their sight than any of the other senses. Hence, virtual learning environments (VLE) are potential tools to this end because as students browse them, they not only see the content but also participate, interact, and cooperate, thus constructing their knowledge⁸.

New educational approaches encourage the use of important educative tools and/or platforms. Hence, educators have different learning environments available to teach through technology according to their objective⁹.

Health education includes not only public policies but also innovative pedagogical approaches, committed to developing solidarity and citizenship, and aiming at health promotion, prevention, and improved quality of life.

Audiology is particularly focused on raising awareness of hearing care. When people think of noise-induced hearing loss, they readily associate it with occupational hearing loss. However, there is a great concern nowadays about the popularization of noise exposure. Miniaturized, popularized, and low-cost personal sound devices (PSD) made them available to all social classes¹⁰.

It has been found that about 88.2% of Italian adolescents often listen to amplified music¹¹ for

long hours and at a high volume^{10,12,13} – which is even more intense when there is competing environment noise¹⁴ or when the person has hearing changes. This may further damage hearing over time¹², such as with the onset of tinnitus – a very frequent symptom^{11,15}.

In addition to this concern, studies that aim to promote hearing health have demonstrated that such measures are important allies in raising young people's awareness and especially helping them change their behavior¹⁶. Despite being incipient, such studies characterize the relevance of educational programs that encompass hearing health prevention.

Therefore, health education approaches are believed to be important paths to acquiring knowledge, involving the community, and promoting changes in young people's habits and behaviors.

In this regard, the school is an appropriate setting to carry out health education initiatives, as the active participation of adolescents in such projects helps strengthen health promotion and prevention^{17,18}.

This study aimed to train young people on hearing health, assess their knowledge on the topic, and spread such knowledge to the community with participative methods.

Method

This exploratory study was conducted in partnership with a public school in Southeastern Brazil, involving its middle school students.

The intervention was organized for blended learning (both in-person and VLE activities). Remote activities were carried out in the VLE of the Dental School of Bauru (FOB/USP). Having obtained permission from the dental school dean, the middle schoolers were given a username and password to access the VLE (Moodle), which hosts distance courses.

Quantitative and qualitative data analyses were performed through descriptive and inductive statistics.

This study was approved by the institution's Human Research Ethics Committee under evaluation report no. 682.356.

Organization of the Activities

Before conducting the study, the researchers visited the school to present the program to the coordinator, who then signed the consent form.

Altogether, 72 seventh graders aged 12 to 13 years were invited to participate in the study. Participants were selected according to their interest in the approach; hence, 12 out of the 72 students began the study. In the first meeting, they signed an assent form, while their parents/guardians signed an informed consent form. The students who did not finish all the study stages were excluded.

The program was divided into 3-month stages.

STAGE 1 – In-person Activity

The in-person activity comprised lectures and workshops involving the students and the researcher.

Lectures

Objective – To train students on how to prevent hearing loss caused by PSD use, presenting educational content on the topic.

The educational material used in the lectures was developed in Microsoft® Office PowerPoint, addressing hearing, noise, noise-induced and music-induced hearing loss, earphone types, care, and prevention.

Workshops

Objective – To provide greater interaction of students with the knowledge on the topic.

In two 1-hour workshops carried out at the school, students participated in an interactive quiz and prepared educational material with the content presented in the lectures and the Moodle platform. The educational material developed for the in-person meetings involved interactive tele-education, which provides technology-based benefits^{9,20,21,22}.

STAGE 2 – Access to VLE

Supported by the scientific literature, the researcher developed theoretical content on the topic with texts, images, and videos, grouped into five modules:

- Types and degrees of hearing loss
- The Physiology of Hearing
- Hearing loss
- Noise
- Hearing Care and Prevention

The researcher helped them with their first access, giving them due instructions. At the end of each module, students had access to quizzes to reinforce their understanding of the content that had just been presented.

Students had 15 days to access the VLE activities. They also had the opportunity to guide their own learning in the process, accessing the content as often as necessary.

STAGE 3 – Hearing Health Cultural Spaces

In this stage, interactive activities for the hearing health cultural spaces were prepared and carried out, with strategies created and developed by the students.

The first strategy they developed was the spoken news bulletin, presented in each middle school classroom. The second strategy was an event on music, sound, hearing, and hearing health, organized by the school, teachers, and coordinators, involving elementary, middle, and high school students and the community.

STAGE 4 – Assessment

The hearing health social-educational activities were assessed with the following instruments:

1. ASSESSMENT QUESTIONNAIRE

(previous knowledge and auditory behavior)

The assessment used a questionnaire adapted to the age of the students in the research¹⁹. It had 14 items – four multiple-choice questions and 10 yes/no questions. Items 1 to 7 addressed PSD use, and 8 to 14 referred to auditory behavior and previous knowledge. This instrument was administered before and after the activities in this educational program. The analysis approached the percentage frequency of each answer.

2. MOTIVATIONAL SURVEY SHEET

The motivational survey sheet¹⁰ subjectively assessed in Moodle the motivational aspects of the training program. It had 32 items, scored as follows: (3) totally agree, (2) partially agree, (1)

partially disagree, and (0) totally disagree. The questions in the survey were grouped into four domains: “stimulating”, “significant”, “organized”, and “easy to use”. Each domain had eight items, and their scores ranged from 0 to 24 points.

3. IMPACT ASSESSMENT QUESTIONNAIRE

A questionnaire was administered to teachers to assess the impact of the social-educational program. The assessment instrument aimed to verify whether there had been changes in the behaviors of students who participated in the study and those who received information from the research participants. It had six questions, dynamically assessed on a scale ranging from zero to three, in which 0 corresponded to the lowest score and three, to the highest score in the impact analysis of the training program from the teachers’ perspective.

Results

Students effectively participated in Stage 1, especially in the in-person workshops. This was essential for students to actively engage in the activities, ensuring greater confidence and involvement in Stage 3, when they spread their knowledge.

Two different activities were developed in Stage 3. Firstly, a practical activity was prepared for middle school students, which was presented in all classrooms. Afterward, a Talent Show was presented at the school to the community.

The cultural spaces strengthened the cooperation between students, teachers, the coordinator, and the researcher and helped spread the knowledge to the other students and the general community. This action involved 635 students, 35 teachers, 132 employees, parents, and friends in the community, totaling 802 people who attended the cultural spaces and acquired knowledge.

The quantitative assessment of the students directly involved in the research found that after the program 50% of them started using their PSD at a moderate volume, and 50% decreased the time they spent listening to PSD – even though there was no significant difference (Table 1).

Table 1. Comparison of students' questionnaire performances before and after training regarding the use of personal sound devices

Questions	Answers	Pre-training	%	Post-training	%	P
Q1 PSD use	YES	8	100	8	100	1.0
	NO	0		0		
Q2 Daily use time	0.5	3	42.9	2	25.0	0.317
	1 h	2	28.6	4	50.0	
	4 h	2	28.6	2	25.0	
Q3 Volume position	0%	1	14.3	1	12.5	0.083
	50%	0	0	4	50.0	
	100%	7	85.7	3	37.5	
Q4 Knows the PSD maximum volume	YES	6	75.0	6	75.0	1.0
	NO	2	25.0	2	25.0	
Q5 PSD warns that sound is too loud	YES	2	25.0	4	50.0	1.0
	NO	6	75.0	4	50.0	
Q6 Earphone type	Insert	6	75.0	6	75.0	1.0
	Circumaural	2	25.0	2	25.0	
Q7 Hears well	YES	4	50.0	2	25.0	0.5
	NO	4	50.0	6	75.0	

Q = Question; *p < 0.05 (statistically significant); McNemar statistical test for Q1, Q4, Q5, Q6, and Q7; Wilcoxon statistical test for Q2 and Q3.

Source: Developed by the authors

Table 2 shows a high occurrence of tinnitus after PSD use. Despite the lack of difference regarding knowledge, there was a qualitative difference.

Table 2. Comparison of students' questionnaire performance results before and after training regarding auditory aspects

Questions	Answers	Pre-training	%	Post-training	%	P
Q1 Hears well	YES	6	75.0	7	87.5	1.0
	NO	2	25.0	1	12.5	
Q2 Asks to repeat	YES	4	50.0	3	37.5	1.0
	NO	4	50.0	5	62.5	
Q3 Symptoms	Tinnitus	3	37.5	4	50.0	1.0
	Pain	2	25.0	2	25.0	1.0
	Dizziness	0	0	2	25.0	0.48
	Clogged ear	3	37.5	1	12.5	0.63
	Decreased hearing	1	12.5	0	0	1.0
	Others	1	12.5	1	12.5	1.0
Q4 Difficulties in noisy environments	YES	3	37.5	3	37.5	1.0
	NO	5	62.5	5	62.5	
Q5 Discomfort	YES	2	25.0	2	25.0	0.13
	NO	6	75.0	6	75.0	

Q = question, McNemar statistical test.

Source: Developed by the authors

In the VLE assessment, students took 20 minutes on average to fill out the motivational survey sheet²³. The mean values of “organized” and “stimulating” had the best performances, as

seen in Table 3. Moreover, the score was high in all domains, ranging from 75 to 87.5% of the highest possible score.

Table 3. Mean, median, minimum, maximum, and standard deviation (SD) values per dimension assessed in the Motivational Survey Sheet.

Domain	Mean±SD	Median	Minimum	Maximum
Stimulating	20.63±1.19	20.5	19	23
Significant	18.25±1.98	19	15	20
Organized	21.38±1.60	22	19	23
Easy to use	18.13±2.30	17.5	15	21

SD = standard deviation
Source: Developed by the authors

The impact assessment questionnaire was developed for teachers to assess aspects related to the impact of the training program.

In questions 1 to 4, teachers pointed out the impact of the dissemination of knowledge acquired in the hearing health training project, as seen in Table 4.

Table 4. Assessment of the impact/percentage of teachers’ answers to each question (Q1 to Q4)

QUESTIONS	ANSWERS			
	Never (0)	Almost never (1)	Almost always (2)	Always (3)
Q1 Interest in caring for their hearing	-	1 (12.5%)	3 (37.5%)	4 (50%)
Q2 Try to raise their peers’ awareness	-	-	6 (75%)	2 (25%)
Q3 Put the content they learned into practice	-	-	8 (100%)	-
Q4 Classroom behaviors have changed	-	-	4 (50%)	4 (50%)

Q = question
Source: Developed by the authors

On the other hand, Table 5, regarding questions 5 and 6, show a lack of significant impact toward changing habits.

Table 5. Assessment of the impact/percentage of teachers’ answers to each question (Q5 to Q6)

QUESTIONS	ANSWERS			
	Never (0)	Almost never (1)	Almost always (2)	Always (3)
Q5 Decreased time of earphone use		4 (50%)	2 (25%)	2 (25%)
Q6 Continued use of earphones in a high volume		1 (12.5%)	7 (87.5%)	

Q = question
Source: Developed by the authors

Discussion

Health education encompasses not only public policies but also innovative pedagogical approaches committed to developing solidarity and citizenship, aiming at health promotion, prevention, and improved quality of life. Hence, the school is an appropriate setting to carry out health education initiatives, as the adolescents' active participation in these projects helps strengthen health promotion and prevention measures¹⁷. At the beginning of the educational program, 12 students were interested in participating, eight of whom completed all study phases.

The study did not find significant differences between before and after the educational measures, possibly due to the small sample size. This difficulty may have occurred because the meetings were held on the opposite shift from their classes (making it difficult for some students to go back to school on those days), their lack of resources to access the VLE, and their lack of previous contact with projects like this one. Nevertheless, such characteristics of the sample did not hinder the program or the involvement of the whole community in learning about PSD. Other studies also reported similar difficulties, though reinforcing the social relevance of applying the methodology of the Young Doctor Project^{20,21,24}.

The students' effective participation with questions and comments was essential to their interaction with the researcher. Various authors agree that the contact with the research in in-person classes, along with audiovisual resources, increases the students' interest in the topic and contributes to better learning results^{22,24}.

There were no differences in the study population's behavior results regarding PSD use, probably due to the sample size (Table 1). The qualitative analysis of the relative frequencies before and after the training showed that even though they continued using PSD, they decreased the number of hours using it per day, improved its volume, were possibly more attentive to high-volume warnings, and had a better perception of not hearing well. These findings are relevant, given that the exposure time and the intensity are important factors that trigger hearing loss²⁹. The time of use, volume, and perception of risk from such use were similar to a study conducted in Korea with 490 individuals, in which 462 (94.3%) subjects used their PSD

for 1 to 3 hours a day and had been using it for 1 to 3 years¹⁰.

Concerning earphones, 75% of students reported using insert ones (Table 1). Since they are more discrete and aesthetic than external (circumaural) earphones, they are currently the most popular ones. However, if they are not well-fitted, insert earphones may lead young people to increase PSD volume²⁹ – besides the fact that the amplification goes directly into the external auditory meatus²⁷. This type of earphone has already proved to be associated with hearing loss in adolescents who used it for more than 5 years¹⁵.

The young people in this research believed they could hear well, did not have a variety of symptoms, and did not frequently complain of discomfort or difficulties understanding in noisy environments. Nonetheless, the possibility of hearing damage cannot be dismissed because continuous and intense PSD use may initially asymptotically impair hearing at high frequencies (4 kHz and 6 kHz), then gradually increase to hearing loss in the long run²⁵.

There was no significant difference regarding the reported symptoms. The qualitative analysis indicated a slightly increased report of hearing well, decreased need for asking to repeat, and increased tinnitus associated with PSD. The literature demonstrates that the onset of this symptom, as well as other ones such as dizziness and headache, is related to the exposure time^{18,26,27,28} (Table 2).

After the educational program, the assessments indicated that the young people might have understood that loud music impairs hearing. The qualitative analysis showed that the adolescents' lack of concern on the topic is evident, as they did not take any prevention measures – despite their previous knowledge that exaggerated use can pose risks to hearing, as shown in studies in the literature conducted in other places¹⁶ (Table 1).

The educational material must be assessed as a research object because its structure may influence both learning and final results. The motivational survey sheet had high scores overall, being a positive indicator of VLE construction and application to this population (Table 3). The literature demonstrates that attentively applying information and communication technology in health promotion initiatives ensures better use of knowledge and potentializes the adolescents' involvement in this type of activities¹⁸.

Once they have learned the content, they are expected to change their behavior³⁰. The teachers' assessment pointed out the impact of the students' interest in caring for their hearing, raising their peers' awareness, putting content often into practice, and changing all students' classroom behavior (Table 4).

Table 5 (in which the scale values are inverted) shows that students did not change habits to the expected degree, in contrast with the spread of knowledge. These data agree with what has been proposed by Paixão¹⁹: even when learning takes place, it may not be enough to ensure changes in behavior; when people learn, they recognize what is right, but may not yet be motivated to change their habits.

Final considerations

Despite the inexpressive number of participants in the program, students spread the acquired knowledge, sharing scientific-based quality information on hearing loss prevention. The number of people involved in the interactive hearing health activities highlights the need for educational initiatives in the community to address young people's behavior and habits regarding their hearing. Researchers recommend hearing preservation campaigns for young people to prevent damage, raise awareness, and change habits³⁰.

Thus, health education aims at changing people's behaviors through widely spread knowledge and practical understanding of healthier actions. Such approaches are challenging because of the complex process of establishing a health production chain, in which the community is involved with the active role of spreading knowledge. Thus, they transform the health practices of people around them, improving their quality of life.

References

- Andrade Júnior H, Souza MA, Brochier JI. Representação social da educação ambiental e de educação em saúde em universitários. *Psicol Reflex Crit* 2004; 17: 43-50.
- Instituto Brasileiro de Geografia e Estatística. Projeção da população do Brasil e das Unidades da Federação. [Acesso em 11 Feb 2022]. Disponível em: <https://www.ibge.gov.br/apps/populacao/projecao/index.html>.
- World Health Organization. The Ottawa charter for health promotion 1986. Geneva: World Health Organization; 1986.
- Wipfli H, Withers M. Engaging youth in global health and social justice: a decade of experience teaching a high school summer course. *Glob Health Action*. 2022 Dec 31; 15(1): 1987045.
- Volejnikova-Wenger S, Andersen P, Clarke KA. Student nurses' experience using a serious game to learn environmental hazard and safety assessment. *Nurse Educ Today*. 2021 Mar; 98: 104739.
- Figueiredo MFS, Rodrigues-Neto JF, Leite MTS. Modelos aplicados às atividades de educação em saúde. *Rev Bras Enferm* 2010; 63:21.
- Souza PJS, Corrêa CC, Yaedu RYF, Berretin-Felix G. Use of simulation technology for teaching of facial analysis in speech-language therapy. *Online J Distance Educ Elearn*. 2021; 9(2): 321-33.
- Mehlecke QTC, Tarouco LMR. Ambientes de suporte para educação a distância: a mediação para aprendizagem cooperativa. *Novas Tecnologias na Educação* 2003; 1:1-13.
- Albuodoor N, Peña ED. Factors influencing US speech and language therapists' use of technology for clinical practice. *Int J Lang Commun Disord*. 2021 May; 56(3): 567-82.
- Kim MG, Hong SM, Shim HJ, Kim YD, Cha CI, Yeo SG. Hearing threshold of Korean adolescents associated with the use of personal music players. *Yonsei Med J*. 2009; 50: 771-6.
- Pellegrino E, Lorini C, Allodi G, Buonamici C, Garofalo G, Bonaccorsi G. Music-listening habits with mp3 player in a group of adolescents: a descriptive survey. *Annali di Igiene: Medicina preventiva e di Comunità*. 2013; 25: 367-76.
- Widen SE, Båsjö S, Möller C, Kähäri K. Headphone listening habits and hearing thresholds in Swedish adolescents. *Noise & Health*. 2017; 19: 125-32.
- Kähäri KR, Aslund T, Olsson J. Preferred sound levels of portable music players and listening habits among adults: a field study. *Noise & Health*. 2011; 13: 9-15.
- Liang M, Zhao F, French D, Zheng Y. Characteristics of noise-canceling headphones to reduce the hearing hazard for mp3 users. *J Acoust Soc Am*. 2012; 131: 4526-34.
- Båsjö S, Möller C, Widén S, Jutengren G & Kähäri K. Hearing thresholds, tinnitus, and headphone listening habits in nine-year-old children. *Int J Audiol*. 2016; 55: 587-96.
- de Bruijn GJ, Spaans P, Jansen B, Yan't riet J. Testing the effects of a message framing intervention on intentions towards hearing loss prevention in adolescents. *Health Educ Res*. 2016; 31: 161-70.
- Silva MAI, Mello DF, Carlos DM. O adolescente enquanto protagonista em atividades de educação em saúde no espaço escolar. *Rev Eletr Enf*. 2010; 12: 287.
- Chang JL, Huwyler C, Yoshida N, Henderson Sabes J, Cheung SW. A smartphone application and education program for hearing health promotion in high school teenagers. *Laryngoscope*. 2022 Sep 28.
- Luz TS, Borja ALVF. Sintomas auditivos em usuários de estereos pessoais. *Int Arch Otorhinolaryngol*. 2012; 16: 163-9.
- Corrêa CC, Martin A, Pardo-Fanton CS, Silva ASCS, Barros TT, Wen CL et al. Ações de teleeducação interativa em saúde vocal baseadas na dinâmica do projeto jovem doutor. *Distúrb Comun*. 2012; 24: 359-68.



21. Pulga MJ, Spinardi-Panes AC, Lopes-Herrera SA, Maximino LP. Evaluating a Speech-Language Pathology Technology. *Telemed J E Health*. 2014; 20: 269-71.
22. Melo TM, Alvarenga KF, Blasca WQ, Taga MFL. Opinião dos agentes comunitários de saúde sobre o uso da videoconferência na capacitação em saúde auditiva infantil. *Rev CEFAC*. 2011; 13:692-7.
23. Paixão MP. Modelo de educação a distância em hanseníase voltado para a rede de detecção de casos e diagnósticos. [Tese]. São Paulo (SP): Faculdade de Medicina/ Universidade de São Paulo; 2008.
24. Maximino LP, Picolini-Pereira MM, Carvalho JLB. Telegenetics: application of a tele-education program in genetic syndromes for Brazilian students. *J Appl Oral Sci*. 2014; 22: 477-83.
25. Melo T. Perfil audiológico de jovens usuários de dispositivos de escuta pessoal. *Distúrb Comun*. 2014; 26: 337-47.
26. Mcneill K, Keith SE, Feder K, Konkle ATM. mp3 player listening habits of 17 to 23 year old university students. *J Acoust Soc Am*. 2010; 128.
27. Chiarelli FG, Momensohn-Santos TM. Percepções e práticas com relação à utilização de dispositivos portáteis de música entre os estudantes de medicina no litoral sul da Índia. *Distúrb Comun*. 2011; 23: 369-70.
28. Rabinowitz PM. Hearing loss and personal music players. Reducing exposure is prudent [editorial]. *BMJ*. 2010; 341: 57-8.
29. Oliveira MFF, Andrade KCL, Carnaúba ATL, Peixoto GO, Menezes PL. Fones de ouvido supra-aurais e intra-aurais: um estudo das saídas de intensidade e da audição de seus usuários. *Audiol, Commun Res*. 2017; 22: e1783.
30. Lacerda ABM, Gonçalves CGO, Zocoli AMF, Díaz C, Paula K. Hábitos auditivos e comportamento de adolescentes diante das atividades de lazer ruidosas. *Rev CEFAC*. 2011; 13: 322-9.

