PERCEPTION OF TEACHERS ON ACOUSTIC ENVIRONMENT AND ITS EFFECT ON THE TEACHING PROCESS

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Abstract

Noise in classrooms has the potential to interrupt ongoing activities and to disrupt the perception of speech and cognitive processes. This is a problem that teachers have to face daily in their work environment and a problem that may be affecting the teaching process. Noisy conditions have direct negative effects on learning, language and reading development.

The purpose of this investigation was to examine the perceptions of teachers on the effect of noise in acoustic environment in school and its effects on the teaching process. This was a quantitative descriptive cross-sectional research. The participants were 44 teachers of the private school system from the metropolitan area. Information was gather through a questionnaire and the data was analyzed using a descriptive statistical method, using the SPSS v. 24.

The results showed the acoustic environment in school are noisy, and it affect not only the teaching process, but the teachers as well. Teachers believed that most schools and classroom are a little noisy and most of the time need to change something of their class to compensate the noise. Most teachers consider their classroom as noisy and the sources of noise are students in hallways and classroom and motor vehicles, causing the teachers to raise their voice causing them being at a high risk of voice problems and high level of stress. This research gives the opportunity to keep investigating the relationship between noise, the teaching process, the well-being of teachers and the role of speech language pathology in this subject.

Dedicatoria

En primer lugar, le doy gracias a Dios por sostenerme en todo este camino de mucho trabajo y por cobijarme con su amor y paciencia. Agradezco a todas las personas que estuvieron y aportaron para que esta investigacion se realizará. Le quiero dar las gracias a mis padres por siempre guiarme, educarme y ayudarme en este proceso. También agradezco a mi mentora la Dra. Lillian Pintado, por guiarme, ayudarme y estar consistentemente pendiente que la labor que se realizará fue una de calidad y profesionalismo.

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Table of Contents

Chapter I- Introduction

Introduction ……. 1

Statement of the Problem …… 3

Purpose …… 4

Research Hypothesis ……...…….. 5

Justification of the study …….. 5

Definitions …….. 7

Chapter II- Literature Review

Historical Background ……. 9

Noise-Induce Hearing Loss ……11

Occupational Noise and teachers ……... 12

Acoustic Environment in School ……..……. 14

Noise and Learning …… 15

Investigations ……. 16

Chapter III- Methodology

Introduction …… 18

Purpose ……..... 19

Justification ……... 19

Type of Investigation …… 19

Obtain Permission of IRB ……..…. 20

Scenery of Investigation ……...……..… 20

Participant Recruitment Procedure ……....… 20

Participant Description ……..…… 21

Inclusion Criteria ……...…… 21

Exclusion Criteria ……... 21

Investigation Procedure Method …… 21

Instrument ……..…. 22

Informational Letter ……... 23

Confidentiality and Disposal of Participant Data …….. 23

Data Analysis ……..… 23

Potential Risk to Participants ……...…….. 24

Potential Benefits to Participants ……... 24

Potential Benefits for Society ……..... 24

Chapter IV- Results

Introduction ……..…… 26

Purpose of the Investigation …… 27

Participants ……. …… 27

Instrument …….. …… 27

Method of Data Analysis ... …… 27

Findings …….. 28

Chapter V- Discussion and Conclusions

Introduction …… 39

Discussion …….. 39

Conclusion ……..…….…. 41

Future Investigations …….. 42

Recommendations ……..…. 43

References……44

Appendix…….. 51

Chapter I

Introduction

The word noise comes from the Latin word nauseas, meaning seasickness (Ibrahim, 2012). The Environment Quality Board of Puerto Rico (EQB, n.d.), define noise as an unwanted or perturbing sound that affect psychologically or physically at the human being. People could be experiencing high level of noise and don't even being aware that they are experiencing this problem. As established by National Institute on Deafness and Other Communication Disorders (NIDCD, 2015) more than 30 million Americans are exposed to hazardous sound levels on a regular basis. Ibrahim (2012) establish that the source of most outdoor noise worldwide is mainly construction and transportation systems including motor vehicle noise, aircraft noise and rail noise. Also Ibrahim stays that poor urban planning may give rise to noise pollution, since side-by-side industrial and residential buildings can result in noise pollution in the residential area. The urban noise or community noise is a consequence of multiples sound sources, operating all at once in our cities and rural areas, contributing to maintain an environment full of sounds and noises (EQB, n.d.).

Stansfield et al. (2005), stays that noise is an ubiquitous environmental pollutant, is a public health issue because it leads to annoyance, reduces environmental quality, and might affect health and cognition. The consequences of sounds or noise may affect hearing. Some of the consequences of highly amplified sounds and noises as reported by the EQB (n.d.), can cause damage such as temporary or permanent hearing loss and become a serious obstacle to effective communication. In addition to the physical damage caused by exposure to excessive noise, continued exposure has been associated with elevated levels of stress, high anxiety, continued annoyance, depression and fatigue (Grebennikov and Wiggins, 2006).

Many people can be stress due to the loud noise level on the work place. The American Speech- Language Hearing Association (ASHA, 2014) stated that millions of people are exposed to loud noise levels at work. This is what we called occupational noise. Occupational noise as define by Concha, Campbell and Steeland (2004) is undesired sound in the workplace. Occupational hearing loss, primarily caused by high noise exposure, is the most common U.S. work-related illness (NIDCD, 2015). Additional to occupational noise there is what we called environmental noise. The World Health Organization (WHO, 2011), defined environmental noise as noise emitted from all sources except industrial workplaces. Grebennikov and Wiggins, (2006) establish with examples the difference between occupational noise and environmental noise:

> Occupational noise is more likely to adversely affect an individual than environmental noise of comparable level (e.g. traffic, sports, music), simply because common noise sources are relatively occasional and avoidable, while occupational noise is inescapable in some workplaces, and employees have to endure it for many years on a daily basis. Besides, we should keep in mind that workers in noisy environment are subjected to common, unrelated to job noises like everyone else, so it is occupational noise are reported to result in higher levels of stress and lower task motivation. (Grebennikov and Wiggins, 2006, pp. 37-38)

In non-industrials professions like teaching, noise is presumed to be primarily a nuisance rather than a risk factor (Kristiansen et al., 2014). In schools, offices and other communicative work settings exposure to noise is becoming increasingly demanding in terms of attending to, remembering and retrieving new information (Enmark, 2014). For instance, ASHA (2014) stipulate that the presence of noise in schools is an element to be consider in the children health

during the different stages of their life and consider the teacher life. A student's ability to hear and understand what is being said in the classroom is vital for learning. Unfortunately, this ability can be reduced in a noisy classroom (ASHA, 2014). The Acoustical Society of America (ASA) by the American National Standards Institute (ANSI), created the ANSI S12.60-2002 Acoustical Performance Criteria, Design Requirements and Guidelines for Schools Standard; it's about creating an environment in the classroom to increase speech understanding (ASHA, 2014). ASHA also established that poor classroom acoustics occur when the background noise and/or the amount of reverberation in the classroom are so high that they interfere with learning and teaching.

Statement of the Problem

WHO (2016) estimates that 1.1 billion young people worldwide could be at risk of hearing loss due to unsafe listening practices. These numbers are very alarming. According to the Department of Education of Puerto Rico (2015) there are 1,332 schools in Puerto Rico with approximately 40,000 teachers and 360,000 students. ASHA (2014) states that both students and teachers are affected by the poor acoustics of classrooms. Today, risk factors for the development of hearing disorders such as noise exposure and associated annoyance reactions in the school environment are well known and examined to a remarkable extent (Meuer & Hiller, 2015). According to Pekkarinen & Viljanen, 2004 (as cited in Rantala, Hakala, Holmqvist & Sala, 2014) schools are especially noisy workplaces. This is a problem that teachers have to face daily in their work environment and a problem that may be affecting the teaching process. Noise in classrooms has the potential to interrupt ongoing activities and to disrupt the perception of speech and cognitive processes (Kristiansen et al.). Grebennikov and Wiggins, (2006) stipulate that in learning and teaching situations noise affects well-being and performance of teachers and

students both indirectly, through stress, and directly by disturbing teacher-student and student-student interactions. Also exposed that many teachers appear worried about the impact of noise on their hearing, as they often report going home with “ringing ears”.

Additional to problem with the learning process, the teacher student interactions and the impact of noise in their hearing, noise also affect the voice of teachers. Vocal dysfunction is a major problem for teachers (Van Houtte, Claeys, Wuyts, & Van Lierde, 2012). According to Cutiva, Voigel (as cited in Rantala, Hakala, Holmqvist & Sala, 2014), high noise levels in classroom have been found to load the voice and to be among the main work related risk factors for voice disorders in teachers. Teachers may not be only at risk of losing hearing, they are expose to have voice health issues. The prevalence of voice disorders in these professional voice users ranges from 11% to 81% (Van Houtte et al.)

Although studies have shown the adverse effects of both noise in the work environment and school environment, after an intense search for literature in Puerto Rico, it could not be find information about the perceptions of teachers to noise and the effect of the learning process and to the wellbeing of teachers.

Purpose of the Investigation

The purpose of this study was to describe the perception that teachers have about the acoustic environment of the school and explored the effects in the teaching process, through a questionnaire (Appendix A).

Research Hypothesis

1. **Alternative Hypothesis**: Teachers will perceives that the teaching process is affected by the noisy acoustic environment.
2. **Null Hypothesis:** Teachers will perceives that the teaching process is not affected by noise and their acoustic environment is not noisy.
3. **Alternative Hypothesis**: Teachers will perceives the acoustic environment in the school as noisy.
4. **Null Hypothesis:** Teachers will perceives the acoustic environment in the school as not noisy.

Justification

The places where we live and work can present hazards to our health and wellbeing. Several studies in school environments have investigated the effects of environmental factors, such as noise levels, acoustic conditions, and indoor air quality, on children's health and performance (Cutiva & Burdof, 2015). Also this factors of noise pollution can also affect the health and wellbeing of teachers. Grebennikov and Wiggins (2006) stated that in addition to the physical damage by exposure to excessive noise, also is been associated with elevated levels of stress, high anxiety, increased annoyance, depression and fatigue. There is limited information of how noise affect teacher's wellbeing during class and after class and there is limited information what their opinion about the matter is. Teaching involves the use of cognitive and communicative skills. However, both cognitions and oral communication are known to be sensitive to interference from background noise and the quality of room acoustics (Pearson et al. 2013). With the investigation of the perception of teachers on the matter and how this affect the

teaching process, this had given a more in depth look how this problem of noise has affected the teachers of Puerto Rico.

After an extensive search for information about the consequences of poor acoustic environment in school Puerto Rico, there was limited research about this problem. In 2009, a student from the master program of environmental issue at the Metropolitan University in Puerto Rico, did an investigation about the intensity of noise that teachers and students exposed themselves in a secondary school. Her finding proves that teachers in Puerto Rico are exposed to noise level that interfere with the learning process and she exhort that there should be more investigations on other schools to create a bigger picture of the problem of acoustic environment in the schools of Puerto Rico (López, 2009).

Definitions

C

Classroom Acoustic

Classroom acoustic are a sets specific criteria for maximum background noise and reverberation time in classrooms (United States Access Board, n.d.)

E

Environmental noise

Environmental noise defined as noise emitted from all sources except industrial workplaces (WHO, 2011)

H

Hearing loss

Hearing loss is A person who is not able to hear as well as someone with normal hearing (WHO, 2015)

N

Noise

Noise is defined as a sound signal that interferes with the detection or quality of another sound signal (ASHA, 2015)

O

Occupational Noise

Occupational noise is undesired sound in the workplace, and it is associated with some activities more than with others (Grebennikov and Wiggins, 2006).

R

Reverberation time

Reverberation time is a measure of the time it takes for the sounds from a sound source to decrease by 60dB after the sound emission has stopped (Pearson et al.)

U

Urban Noise

Urban noise or community noise is a consequence of multiples sound sources operating all at once in our cities and rural areas (EQB, n.d.).

Chapter II

Literature Revision

Historical Background

Noise as define by the EQB (n.d.), is an undesired sound. This definition opens up a discussion that noise is something that is relative because what may be something annoying for a person it could be normal or even pleasant to another person. ASHA (2015) stated that people who study sound define noise as complex sound waves with irregular vibrations and no definite pitch. Noise is one of the most common pollutants. It is often ignored because it is colorless, odorless, and tasteless; and yet it can have negative effects on human well-being (ASHA, 2015). However, it is without a doubt that today there is wide range of noise pollution in the world. According to Gilbert (1922) (as cited in Thurston, 2013) when people first became aware that loud sounds could cause permanent damage to their hearing is not known for certain. This is something that we can all agree due to the lack of detail documentation about noise. Baron (1973) (as cited in Rivera, 2009) explains that Romans had to deal with acoustic contamination and Julio Cesar try without any luck to banned that car will transit the streets of ancient Rome during the night, because the sound of the wheels did not let him concile his sleep.

Thurston (2013) wrote an article about the mention of noise in the working place as a cause of noise induced hearing. During the review of this article he mentions the appearance of noise as remotely to the ancient times specifically due to the sounds of the cataract in the Nile River. Then by the 14th century the noise from working metals has established itself as a nuisance, but also as a danger to hearing acuity. After establishing the noise induced hearing in ancient times he established how this made an evolution and the introduction of gunpowder from

China in the 13th century to the exposure to gunfire and cannon fire by the early 19th century. Thurston also establish that although some occupations such as coppersmithing and blacksmithing were noisy, the number of people exposed to potentially damaging noise would have been limited to the metalworking craftsmen within the workshop. Cradwell (1972), (as cited in Thurston, 2013), establish that the patter of limited exposure changed during the 18th century with the invention of the Industrial revolution with the creation of the Newcomen steam engine, developed by the Scottish mechanical engineer James Watt.

Gilbert (1922), (as cited in Thurston, 2013), stated that with the invention of the Newcomen steam there came locomotives and textile mills that became notorious for being noisy for the workers. By the 19th century the Australian physician J. Habermann, published the first histological report that described changes in the inner ear attributable to noise exposure. In the 20th century the people were more aware about the problem oh noise induce hearing. According to the Health Science Library (2016):

> In the 1940s thousands of young servicemen and women returned from World War II with noise-induced hearing loss. The U.S. government responded by establishing hearing rehabilitation programs at the nation's military hospitals where hearing aid fitting and aural rehabilitation procedures were standardized and implemented across the country.

During the 1950s and 1960s, several organizations, including the Industrial Medical Association, American Standards Association, and the National Research Council Committee on Hearing and Bioacoustics, issued recommended standards intended to limit workers exposure to hazardous noise levels (Thurston, 2012). By 1972 The Noise Control Act was establish a

national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare (Environmental Protection Agency, 1972).

Noise-Induce Hearing Loss

According to Rabinowitz (2000) noise induced hearing loss (NIHL) is a sensorineural hearing deficit that begins at the higher frequencies and develops gradually as a result of chronic exposure to excessive sound levels. According to the (NIDCD, 2015):

> Sound is measured in units called decibels. Sounds of less than 75 decibels, even after long exposure, are unlikely to cause hearing loss. However, long or repeated exposure to sounds at or above 85 decibels can cause hearing loss. The louder the sound, the shorter the amount of time it takes for noise induce hearing loss (NIHL) to happen. (para. 1)

Noise can be described in terms of intensity (perceived as loudness) and frequency (perceived as pitch). Both the intensity and the duration of noise exposure determine the potential damage to the hair cells of the inner ear (Rabinowitz, 2012). Noise induced hearing loss can be caused by a one-time exposure to an intense "impulse" sound, such as an explosion, or by continuous exposure to loud sounds over an extended period of time, such as noise generated in a woodworking shop (NIDCD, 2015).

Noise induce hearing loss can be caused by outdoor noise, recreational noise and occupational noise. The source of most outdoor noise worldwide is mainly construction and transportation systems including motor vehicle noise, aircraft noise and rail noise (Ibrahim, 2012). Recreational activities that can put you at risk for NIHL include target shooting and hunting, snowmobile riding, listening to MP3 players at high volume through earbuds or

headphones, playing in a band, and attending loud concerts (NIDCD, 2015). According to WHO (2015), occupations at highest risk for NIHL include those in manufacturing, transportation, mining, construction, agriculture and the military. Exist many other consequences due to the exposure of noise to the health of the human being additional of the hearing loss (Doherty 1999, Evans & Johnson 2000, Glass & Singer 1972, Kalveram 2000, Kryter, 1994,(as cited in Grebennikov & Wiggins, 2006), in addition to the physical damage caused by exposure to excessive noise, continued exposure has been associated with elevated levels of stress, high anxiety, increased annoyance, depression and fatigue.

Occupational Noise and Teachers

The National Institute for Occupational Safety and Health (NIOSH, n.d.) estimates that 30 million workers are exposed to noise levels high enough to cause irreversible hearing loss. Although noise is associated with almost every work activity, some activities are associated with particularly high levels of noise, the most important of which are working with impact processes, handling certain types of materials, and flying commercial jets (Campbell, Concha & Steenland, 2004). The Occupational Safety & Health Administration (OSHA, 1981), sets legal limits on noise exposure in the workplace. These limits are based on a worker's time weighted average over an 8 hour day. With noise, OSHA's permissible exposure limit is 90 dBA for all workers for an 8 hour day. Occupational noise is more likely to adversely affect an individual than environmental noise of comparable level, simply because common noise sources are relatively occasional and avoidable, while occupational noise is inescapable in some workplaces, and employees have to endure it for many years on a daily basis (Grebennikov and Wiggins, 2006).

For teachers around the world, occupational noise is something that they have to deal on a daily basis, due to the kind of work they do. The presence of noise in educational centers is an

element to consider to the health conditions of children in the different stages of life and teacher's life (Gonzalez, 2004). Cantor Cutiva and Burdorf (2015), explain some of the effects of different factors in the health of children and teachers:

> Several studies in school environments have investigated the effects on environmental factors, such as noise levels, acoustic conditions, and indoor air quality, on children's health and performance. However, these environmental factors may also influence the health and wellbeing of teachers. Teachers have been recognized as one of the largest groups of professional voice users. (p.17)

Due to occupational noise many teachers have voice problems. Cutiva & Burdorf (2015) stated that teachers have been recognized as one of the largest groups of professional voice users. Voice disorders are more prevalent among teachers than in other occupational groups. The prevalence of voice disorders in these professional voice users ranges from 11% to 81% (Van, Claeys, Wuyts, & Van, 2012). Previous studies on work-related factors of voice disorders among teachers have relied on self-reported physical conditions, such as high background noise and poor acoustics in the classroom (Cutiva & Burdorf, 2015). In an investigation with Danish teachers by the Work and Health Survey (2014) (as cited in Kristiansen et al.) state that classroom noise is so loud that it disturbs them in their teaching during at least one-fourth of the time. Teachers with voice problems tend to be more disturbed by noise than their peers without these problems (Lyberg et al. 2011). The reason for this statement could be for the long periods of time that teachers that work in noisy environment have develop less tolerance than teacher who don't suffer from noise in a daily situation.

!

Acoustic Environment in School

Many researchers have stressed that the acoustic environment is crucial to the speech perception, academic performance, attention, and participation of students in classrooms (Choi & McPherson, 2005). By analyzing the acoustics of a classroom, all sounds present on the site are verified (Destro, Mortari & de Souza, 2014). According to ASHA (2016), poor acoustical design in classrooms can result in excessive noise that is disruptive to the learning process and affects speech perception, student behavior, and educational outcomes. Teachers feel uncomfortable while teaching in noisy classrooms and students feel difficulty in receiving the information, as well as in dispersion of attention (Destro, Mortari & de Souza, 2014). Crandell & Smaldino (2000) (as cited in Choi & McPherson, 2005) believe that the measures of acoustical barriers that can compromise learning in classrooms include the background noise level, the speech-to-noise ratio, the reverberation time, and the speaker-to-listener distance. Another source of noise that is part of the acoustic environment is the ambient noise. Finitzo-Hieber (1988) (as cited in Ching Yee and McPherson, 2007) in general, ambient noise in classrooms is defined as any kind of unwanted auditory disturbance that interferes with student willingness and ability to perceive in a classroom. Destro, Mortari and De Souza, (2014). classify noise in three types:

- **External sources:** noise coming from outside the school, usually generated by vehicle and aircraft traffic, as well as from properties near the school (bars, horns, whistles, construction, nightclubs, gyms, etc.);
- **In-school sources:** noise generated within the school (in environments adjacent to the classroom) such as the schoolyard, recreation room, gymnasium, music room, kitchen, other classrooms, etc.

- **Internal sources:** noise generated inside the room itself, such as conversation, students' movement and activities, the use of teaching materials (paper, scissors, stapler, etc.) and noise from fans, lights and air-conditioning equipment. (Destro, Mortari and De Souza, 2005, pp. 157)

The (ASHA, 2004) Working Group on Classroom Acoustics recommended that an appropriate acoustical environment be established in all classrooms and learning spaces. ASHA endorses the ANSI standard and recommends the following criteria for classroom acoustics:

1. Unoccupied classroom levels must not exceed 35 dBA
2. The signal-to-noise ratio (the difference between the teacher's voice and the background noise) should be at least +15 dB at the child's ears.
3. Unoccupied classroom reverberation must not surpass 0.6 seconds in smaller classrooms or 0.7 seconds in larger rooms.

Noise and Learning

Harris (1996), (as cited in Davila, 2000) establish that noise can interfere in oral communications, making difficult the comprehension of language and words of students and teachers. This is a problem that teachers and students may encounter in their classroom that can have a negative effect on the learning and the teaching process. Woolner & Hall (2010) establish that noisy conditions have a direct negative effects on learning, particularly in language and reading development, as well as causing indirect problems to learners through distracting or annoying them. This negative effect on learning affect more children than adult. Klatte, Bergström & Lachmann (2013) stated that children are especially vulnerable to harmful effects

of environmental noise, as cognitive functions are less automatized and thus more prone to disruption. This will encounter a problem for the teacher and the teaching process.

Investigations

After an extensive search there are limited investigations concerning how noise affect teachers and the learning process there are a few that have work with a similar problem. These investigations have studied how teachers are exposed to noise in their workplace and what is their perception about it.

In Puerto Rico, Lopez (2009) evaluated the sound levels that teacher were exposed in a school located in a town in the Center of Puerto Rico and administrated a survey to 37 teachers to determine their perception about the acoustic environment in school. To measure the sounds levels in the school the investigator used a sonometer. The findings with the use of this equipment reveal that the noise level was over than allow by the World Health Organization. Also with the use of a survey the teachers indicated that they were aware of the problem of the noise problem in the work place and the survey offered information about what were the major problems teacher encounters with their health; being the vocal health the most harmful.

In Canada, Jaramillo, Ermann & Miller (2013) studied the teacher perspective on noise in the classroom. The investigators used a survey with third grade teachers in the County of Florida to find about their noise awareness and coping strategies. This survey wanted to measure the experiences and attitudes toward noise and it was distributed by email to 396 third grade teachers and of those only 87 answer the survey. The results of this investigation reveal that teachers were aware of the noise in the classroom and the majority answer that the source of the noise does not necessarily comes from the equipment that are in the classroom. Instead, they answer that most of the noise comes from the surrounding of the school, halls and inside of the classroom.

Additionally the results of this investigation show that teachers have coping strategies when noise sources are presented.

In Denmark, Pearson et al. investigated a group of Danish school teachers. Their aim was to investigate if noise was a risk of hearing impairment and study the association of noise exposure with vocal fatigue and mental fatigue. The investigator measured the noise in classrooms of 35 teachers during the teaching process. Additionally teachers answer a survey before and after class to assess things related with their health like voice and mental fatigue. The results of this investigation concluded that noise does not show a risk for noise induced hearing impairment but it did evidence a correlation between noise and health problems with teachers.

At the University of Turabo there are two investigations done by students that recommended that the acoustic environment in school should be investigated to keep finding information of how noise may affect the daily living of teachers. Otero (2014) reported in his investigation that 92% of teachers reported that the acoustic in the classroom is not appropriate for teacher's voice and one of his recommendations was that in future investigations it should be study the acoustic environment in school. Cruz (2015), recommended in her study to investigate the relationship of the possible effects and acoustic environment between students and teachers.

Chapter III

METHODOLOGY

Introduction

According to the National Institute of Health (NIH, 2015) loud noise is one of the most common causes of hearing loss and is estimated that 26 million Americans between the ages of 20 and 69 already have irreversible hearing loss caused by loud sounds. Noise is all around, from televisions and radios to lawn mowers and washing machines. Normally sounds that at a safe level will not affect hearing but sounds that are too loud over a long time are harmful (United Sates National Library of Medicine, 2014). One type of noise is the occupational one. According to OSHA (n.d), twenty-two million workers are exposed to potentially damaging noise at work each year.

OSHA (n.d) established a limit of noise in the workplace to 85db and establish some warning signs to establish if you are in a work environment that may be too noisy. The warning sign are: that you may hear ringing or humming in your ears when you leave work, you have to shout to be heard by a coworker and, you experience temporary hearing loss when getting out of work. This warning signs and the limit of noise for workers are the same. Some that it have to consider is that the classroom environment should not be measure by the same standard. Even though there is a limit set by ASHA and the EQB; OSHA does not set that limits in their information for a classroom.

Teacher exposure and perception of noise is an area where there was limited information to identify the possible problems and consequences to teachers and the teaching process. This chapter was intended to describe the methodology that was used to conduct the study. In addition it will describe the participants, the research tools to be used, the data analysis, study limitations and study benefits.

Purpose

The purpose of this study was to describe the perception that teachers had about the acoustic environment of the school and explored the effects in the teaching process, through a questionnaire.

Justification

Poor acoustical design in classrooms can result in excessive noise that is disruptive to the learning process and affects speech perception, student behavior, and educational outcomes (ASHA, 2016). Grebennikov and Wiggins (2006) stated that in addition to the physical damage by exposure to excessive noise, also is been associated with elevated levels of stress, high anxiety, increased annoyance, depression and fatigue. For teachers, who use their voices most of the time in learning environments, are at risk for vocal injury if they need to talk over the classroom noise to be heard by students (ASHA, 2016)

After an extensive research for information about the perceptions of teachers of the school environments and the effects on the teaching process in Puerto Rico, there was limited information about this problem. López (2009) did an investigation about the intensity of noise that teachers and students exposed themselves to noise in a secondary school. The finding proves that teachers in Puerto Rico are exposed to noise level that interfere with the learning process and she exhort that there should be more investigations on other schools to create a bigger picture of the problem of acoustic environment in the schools of Puerto Rico.

Type of investigation

The type of this investigation was quantitative descriptive with cross-sectional research. According to Hernández, Fernández & Baptista (2010), the quantitative approach uses data

collection to test hypotheses, based on numerical measurement and statistical analysis to establish patterns of behavior and test theories. Quantitative research should be as "objective" as possible where the phenomena observed and/ or measure should not be affected by the investigator (Hernández, Fernández & Baptista, 2010). The authors also exposed that descriptive studies look to specify the properties, characteristics, and the profiles of groups, communities, process, objects or any other phenomenon that is submitted for analysis. Liu (2008) & Tucker (2004) define the cross-sectional investigation as to collect data in a specific moment in a specific time. Its purpose is to describe variables and analyze the impact interrelation at one point.

Obtain Permission of the IRB

This investigation was presented to the Institutional Review Board (IRB) of the Ana G. Mendez University System. The IRB studied the investigation and approved it to do the investigation.

Scenery of investigation

The investigation was done in the private school system of the Metropolitan area in Puerto Rico.

Participant recruitment procedure

The recruitment of teachers was through a non-probalistic convenience sample. According to Etikan, Abubakar, Rukayya & Alkassim (2015) convenience sampling is a type of nonprobability or nonrandom sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study. Through the use of non-probability convenience sample, teachers that meet the criteria were participants of this

investigation. To recruit the participants of this investigation the principal investigator established a communication with different private school to hand in the questionnaire. The teachers were approached one at time at their recess period. The investigator explained what the research was about and gave each teacher and informative letter with all the explanation written in there. Before the teacher accepted they were inform they can leave the research whenever they wanted. After accepting, the investigator handed in to each teacher the questionnaire.

Participant description

The participants of this investigation were 44 teachers from the private school system from the metropolitan area of Puerto Rico.

Inclusion Criteria

The inclusion criteria for this study was:

1. Teacher of a private school in Puerto Rico
2. Full time working teachers

Exclusion Criteria

The exclusion criteria for this investigation were:

1. Not being a teacher
2. Retired teachers

Investigation procedure method

The investigation was presented to the committee of IRB of the Ana G. Mendez University System. After the IRB reviewed the investigation an approved it the researcher went to different schools of the Metropolitan area to visit the school's principal. Each director received a letter from the Dean of the School of Health Sciences at the University of Turabo certifying that the principal investigator was a student from the Speech- Language Pathology

program of the mentioned Institution. Also with the letter of the Dean the directors received a letter where it briefly explained the purpose of the investigation and why the need of using the teachers of that school. Once the school director authorizes and wrote the letter of support, indicating that the principal investigator may use the school for the investigation. After receiving the letter of support the principal investigator submitted the investigation to the IRB for approval. After having the approval, the investigator began recruiting the teachers from the different private schools.

Teachers were approached one at time at their recess period that was given by the school director. The investigator talked to them in person at their classroom and explained the investigation and gave them the informational letter that explained in written from what the investigation was about. If the teacher accepts to participate of the investigation; they investigator explained that they could leave the investigation whenever they wanted. After accepting to participate of the investigation, teachers received the questionnaire to be answer. The investigator came back another day to personally collect the questionnaire. The principal investigator was at office area collecting the questionnaire personally when the teachers are done with them. After completing the questionnaire, the investigator analyzed the survey to present the results. The principal investigator will be the only one in custody of the questionnaire. Nobody besides the investigator will have access to the questionnaires.

Instrument

The instrument to gather information for this investigation was a questionnaire. The questionnaire was made by the principal investigator Laura Ortiz Martinez, and it was verified by the mentor Lillian Pintado Sosa. The questionnaire was submitted to an expert panel for its validation. This questionnaire was composed of questions to gather demographic information

such as gender, years of service and the study variables associated with the perception of teachers of noise and its effect on the teaching process.

Informational Letter

Informational Letter is a document that explains the research's purpose, benefits, risks, confidentiality and notifies of the right to withdraw or refuse participating in the process at any time they wish without any penalty. It also includes the researcher's contact information and mentor. Participants had the opportunity to ask any questions concerning the investigation ad it's procedure.

Confidentiality and disposal of participant data

In order to maintain the confidentiality of the participants, at all times the researcher will save every document related to the investigation. Questionnaires were handle by the principal investigator and the mentor, Dr. Pintado. All the documents related to the research were stored in separate envelopes locked in a file, located at the home of the investigator for a period of five years. After that time, these documents will be destroyed in a shredder and disposed and any information contained in a pen drive of the research will be deleted.

Data analysis

The data analysis was done with a descriptive statistical method using the program Statistical Package for the Social Science (SPSS) 22. According to Hernández, Fernández & Baptista (2010), the descriptive statistical method describes the data, values or scores for each variable. This variable can be describe through the use of a frequency distribution. A frequency distribution is a set of scores with respect to a variable arranged in their respective categories and

is usually represented in the form of a table, histograms or graphics (Hernández, Fernández & Baptista, 2010).

Potential risk to participants

The potential risk for the participants were:

1. Tiredness.
2. Distraction.
3. Stress related to the process.

Potential benefits to participants

The potential benefits for the participants were:

1. Getting awareness of the acoustical environment in school.
2. The effects of noise in the teaching process.
3. Know the specifically the source of noise in their classroom.
4. Know if they are risk of noise induced hearing loss.

Potential benefits for society

Possible benefits of this investigation to society were to create an awareness of the risk of noise in the school environment and how the teacher perceived noise in their classroom and the effects on learning. This investigation could be used by the schools to evaluate how noise may affect the teaching process in school and work with teachers to find possible solutions to the problem. Another potential benefit for the teaching community is to create awareness of how noise may affect the voice of teachers. With this investigation, the Speech Language Pathologist

can put in use one of the roles as stated in ASHA (2016), by promoting efficient and effective education outcomes for students and supporting teachers in avoiding vocal abuse and overuse.

Chapter IV

Results

Introduction

According to Addison, Dancer, Montague and Davis (1999), ambient noise levels within a classroom can interfere with both teaching and learning and numerous studies show that noise levels in public school classes and in speech-language therapy rooms often markedly exceed the 35 dBA ambient level recommended by ASHA. Noise levels in classrooms are dependent on both outdoor sources, such as road traffic by the school, and indoor sources, such sound from building installations (Wålinder, Gunnarsson, Runenson and Smedje, 2014).

Wålinder, Gunnarsson, Runenson & Smedje (2014) stated current occupational limits for noise are set for the prevention of hearing impairment, however, there are several other unwanted effects of chronic noise exposure below the occupational limits. According to Golmohammadi, Ghorbani, Mahjub & Daneshmehr (2010), stated poor acoustical condition and high noise levels can cause many problems for the instructors and students. It is generally accepted that noise has a detrimental effect upon the learning and attainments of primary school children. Moreover, they may lead to voice problems for the instructor, who is forced to raise his/her voice when lecturing, to compensate for poor acoustical conditions (Golmohammadi, Ghorbani, Mahjub & Daneshmehr, 2010)

This chapter provides a detailed description of the results obtained through the research. In the same it includes explanation of each one of the graphs that allowed to analyze the variables of the study. Also, it is provided a brief description of the purpose, participants, instrument and the procedure which was carried out for the collection of data.

Purpose of the Investigation

The purpose of this study was to describe the perception that teachers have about the acoustic environment in their work place, how it affects the well-being of teachers, how this affect the teaching process and what strategies teachers use to compensate the noise.

Participants

The participants of this investigation were 44 teachers of different private school in the metropolitan area of Puerto Rico, who were willing to participate in this research.

Instrument

The instrument used to gather the data was a questionnaire. The principal investigator, Laura Ortiz Martinez, designed it for this research and it was verified by her mentor Lillian Pintado Sosa. After this process, it was presented to a panel of expert for its validation.

Procedure

The administration of the questionnaires to the teachers was carried out in private schools of the metropolitan area. The participation was requested by means of an informative letter which was given by the principal investigator through direct contact. At the end of the process of completing the questionnaire, they were collected at school inside a sealed envelope. The questionnaire will remain under the exclusive custody of the principal investigator for 5 years when the period expires, all information will be properly destroyed.

Method of Data Analysis

The study consisted of data collection, entry and the analysis of it. The Statistical Package for the Social Sciences (SPSS) version 24 was used for the descriptive analyzes of the data and to explore possible significant differences between the variables contemplated in the study.

Findings

Figure 1 shows the results of the first item of the questionnaire that established the gender of the respondent. It was found that 20.5% of the respondent were from the male gender as opposed to 79.5%, which belonged to the female gender. (See Figure 1)

Figure 1 ***Gender of the Respondent***

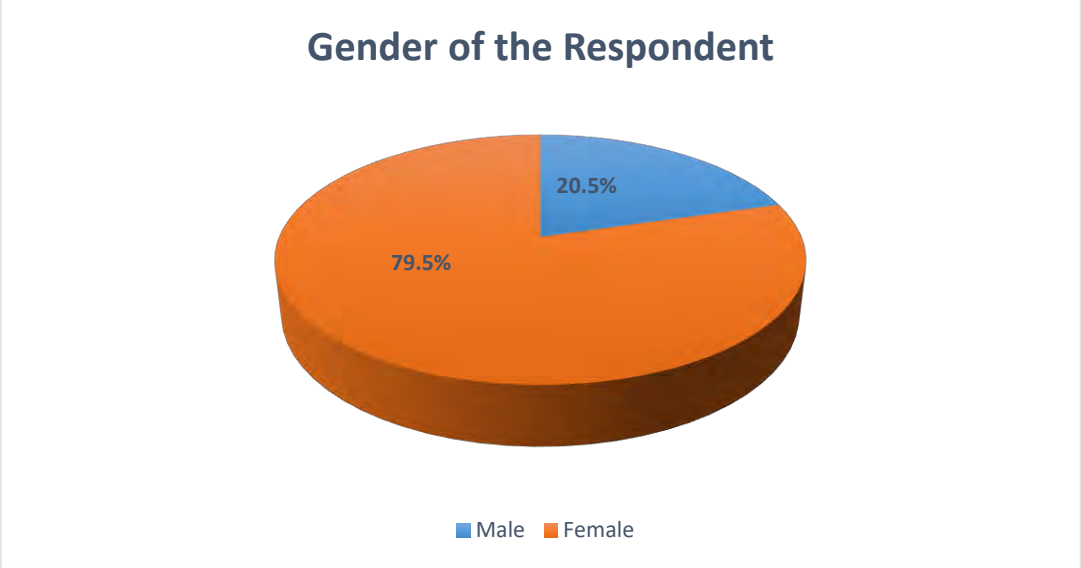


Figure 2 shows the results of the second question that was related to how many years of teaching experience the respondents had. The participants wrote their answers and this were divided into three teaching years intervals that went from: 1- 10 years, 11-20 years and 21-30 years.

It was found that 72.7% of the participants were in the teaching experience range of 1-10 years, the 20.5% between the range of 11-20 years and 6.8% between 21-30 years of teaching experience. (See Figure 2)

Figure 2 ***Years of Teaching Experience***

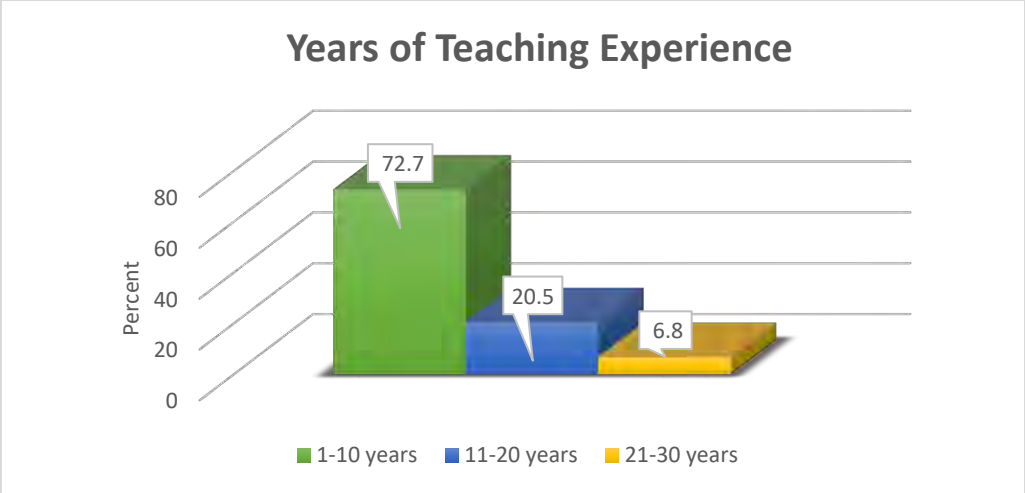


Figure 3 shows the result if there is noise in the school campus. The first question of the investigation was: Do you consider there is a problem of noise in your school campus?

It was found that the 75% of the participants answered that there is a problem of noise in the school campus and 25% answered that there is not a problem of noise on the school campus. (See Figure 3)

Figure 3 ***Noise in School Campus***

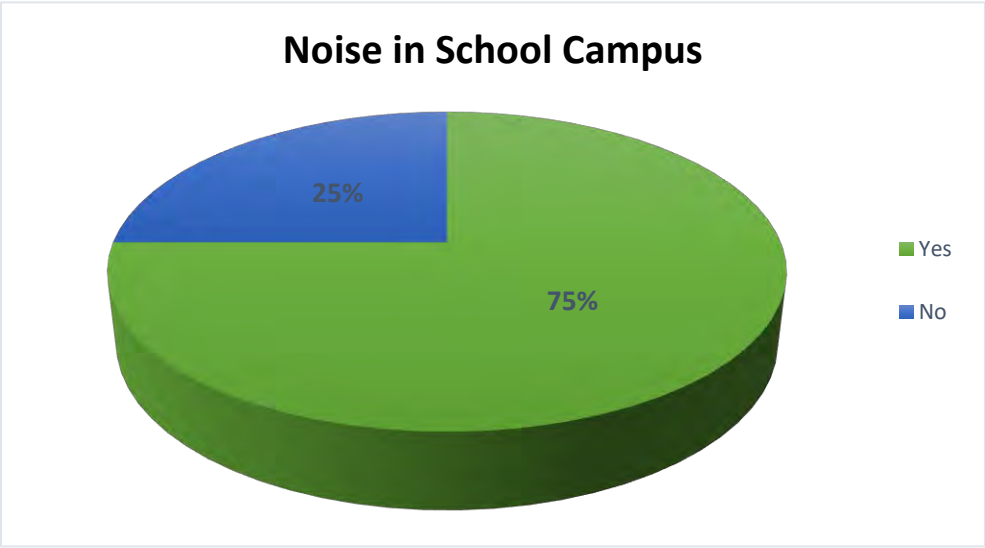


Figure 4 shows the results of how teachers described the acoustic environment in the school campus. The second question was: How do you describe the acoustic environment in your school campus?

It was found that 9.1% of the respondents describe the acoustic environment as silent, the 61.4% a little noisy, the 27.3% noisy and 2.3% very noisy. (See Figure 4)

Figure 4 ***Acoustic Environment in School Campus***

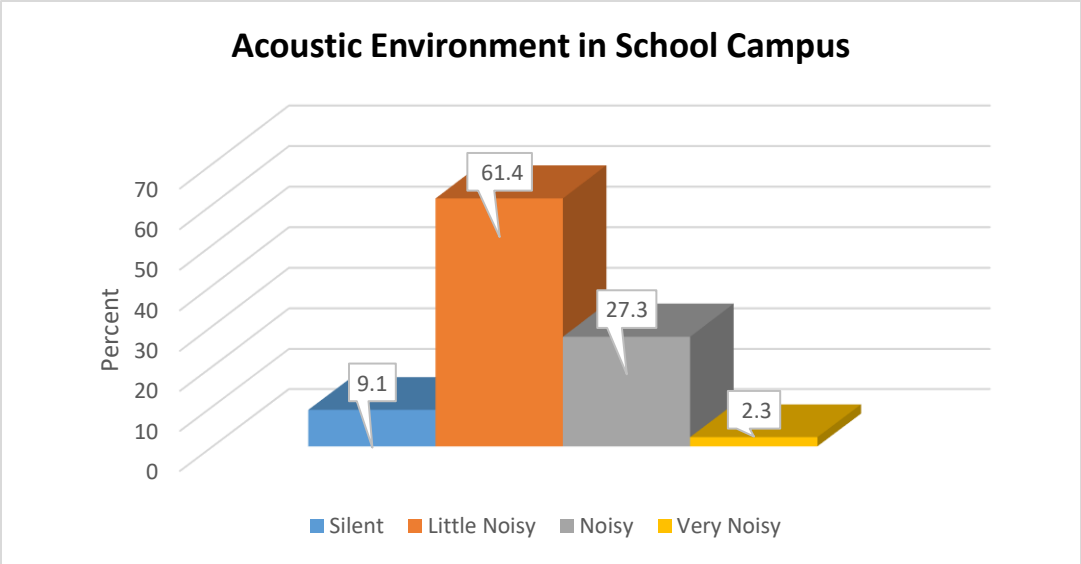
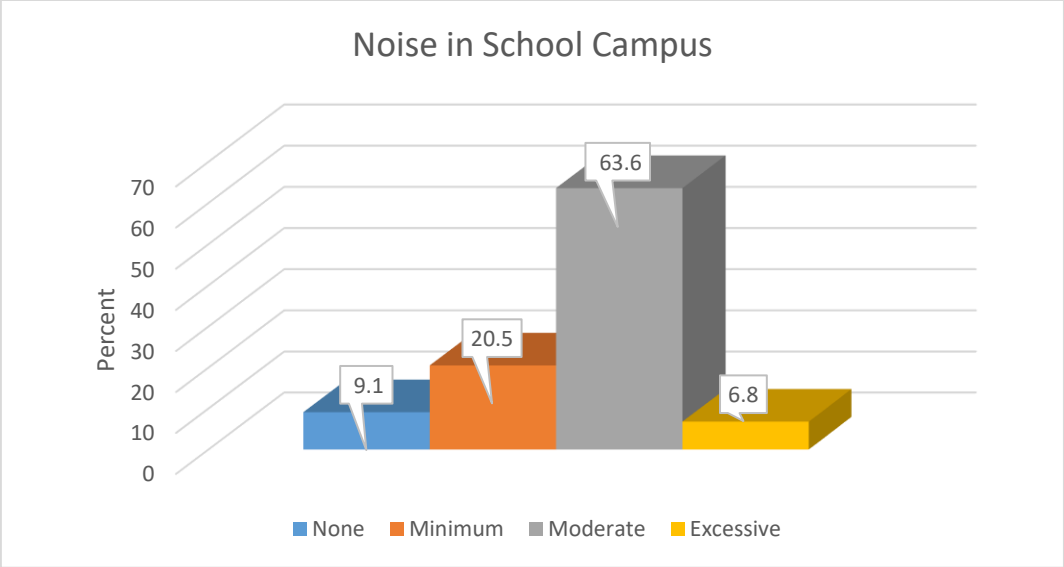


Figure 5 shows the level of nuisance caused on the school campus for those participants who answer there is noise at the school. The statement was: State de level of annoyance that noise cause in your school.

It was found that 9.1% of the respondents answered there was none level of nuisance, the 20.5% answered there was a minimum level, the 63.6% answered there was a moderate level and 6.8% answered there was an excessive level of nuisance in school campus. (See Figure 5)

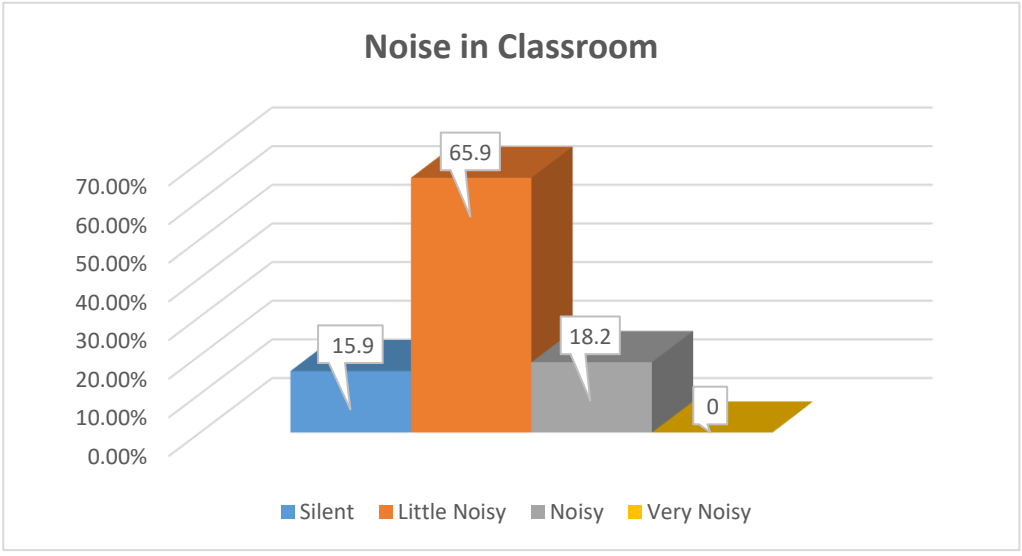
Figure 5 ***Noise in School Campus***



The following findings answer questions related how noise affect the teacher classroom of the participants and the possible source of nuisance. The fourth question was: Do you consider that your classroom is: silent, little noisy, noisy or very noisy.

Figure 6 shows how the participants classify the noise in their classroom. The participants classify their classroom as silent, little noisy, noisy or very noisy. It was found that 15.9% classify their classroom as silent, the 20.5% classified it was a little noisy, 65.9% answered that it was noisy and 18.2% classified it as very noisy. (See Figure 6)

Figure 6 ***Noise in Classroom***



.

Figure 7 shows if teachers consider if they consider they are exempt of exterior noise. The fifth question was: Do you consider that your classroom is exempt of exterior noise?

It was found that 34% answered they were exempt of exterior noise as opposed to 65.9% who answered they were not exempt of exterior noise. (See Figure 7)

Figure 7 ***Exterior Noise***

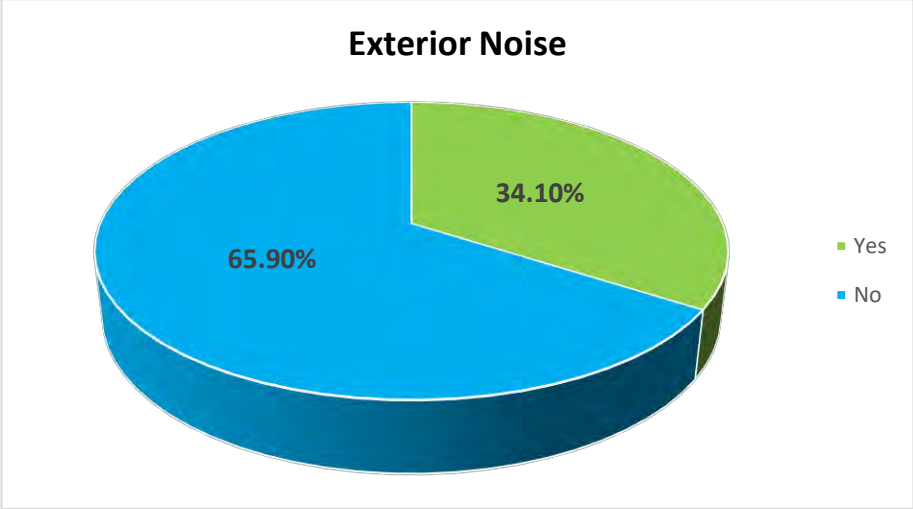
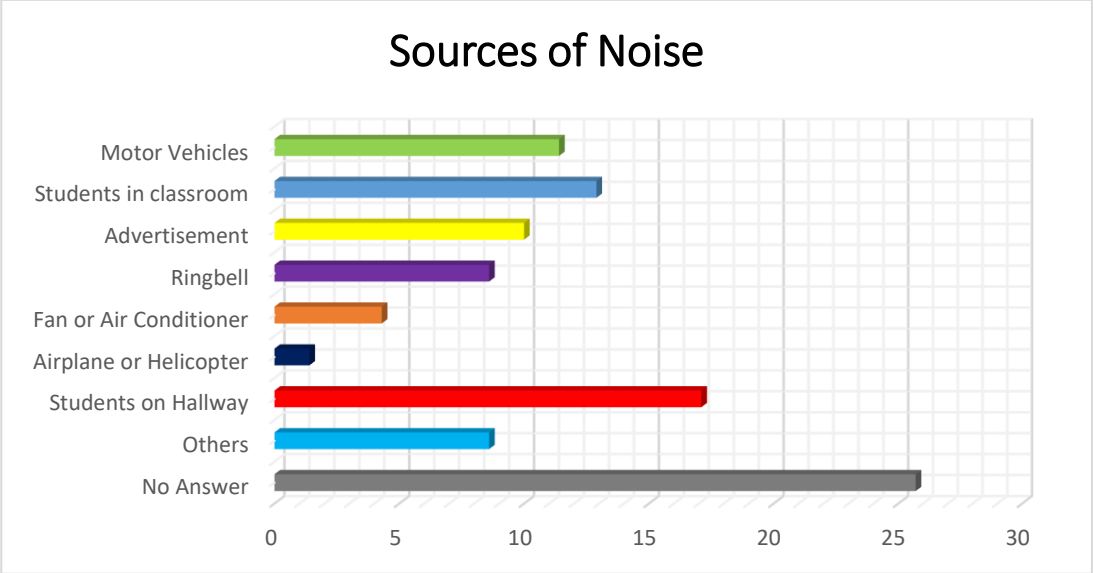


Figure 8 shows what were the mayor cause of noise in the school environment. The question was: What is the mayor cause of noise in the classroom? Select all that apply.

The results showed that 11.4% consider that motor vehicles were a cause of noise, 12.9% students in the classroom, 10%% advertisement through speakers, 8.6% the ring bell before, during and after school, 4.3% noise of fan or air conditioner, 1.4% noise of airplanes or helicopters, 17.1% students on hallways, 8.6% mark others and 25.7% did not answer. (See Figure 8)

Figure 8 ***Sources of Noise***



The following findings answer questions related how noise affect the people's well-being and possible symptoms noise may cause on people.

Figure 9 evidence the answers to the question related if noise could affect people's well-being. The question was: Do you consider noise could affect people's well-being?

The data showed that 90.9% consider that noise affects the well-being of people as opposed to 9.1% that consider that noise don't have any effect on people's well-being. (See Figure 9)

Figure 9 ***Noise could affect people's well-being***

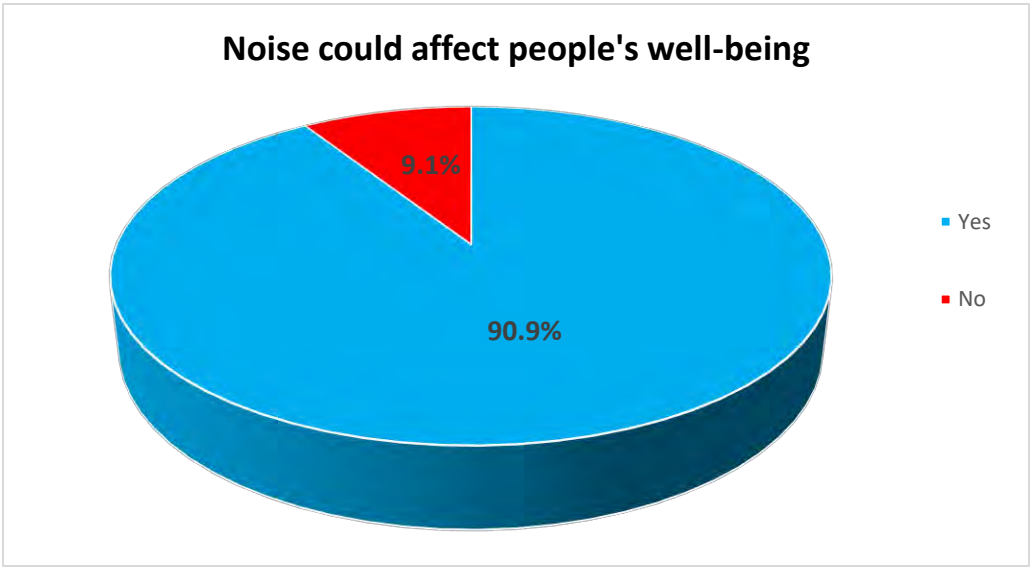


Figure 10 evidence the answers to the question related if noise could cause any change during the participants work day. The question was: Do you understand the noise may cause you a change at the beginning or end of your work day at a school site?

The results reported that 86.4% participants answered that noise may cause the participants to change during the work day and the 13.6% answered that noise did not may cause a change during the work day. (See figure 10)

Figure 10 Changes during work day

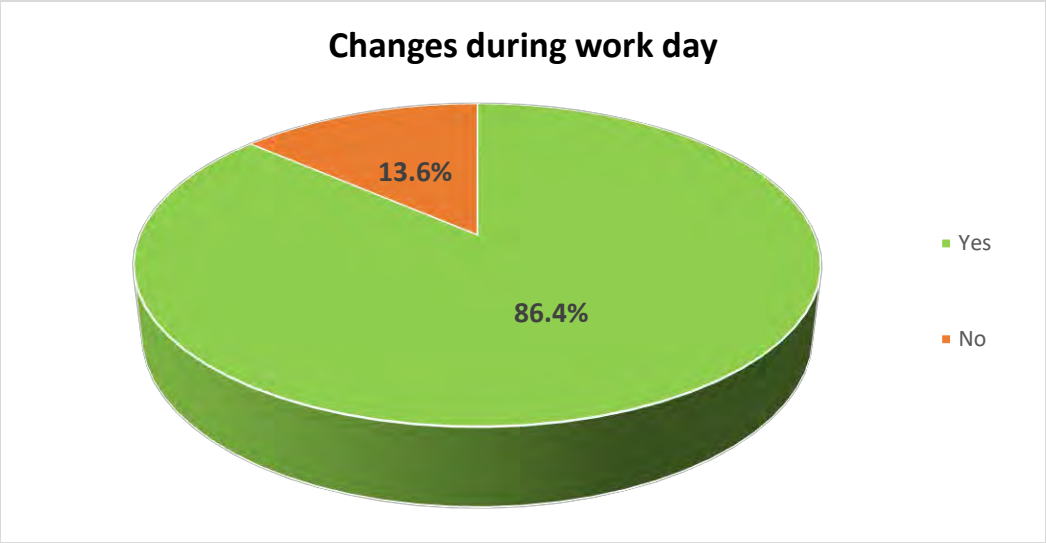


Figure 11 shows the data recollected of the question related of possible symptoms the respondent believes they exhibited during or finalizing their work day in school.

This question in the survey tender several options to select. The results reported that 9.3% of the surveyed exhibited the symptoms of irritation during or finalizing the work day in school, 9.3% exhibited difficulty concentrating, 5.3% exhibited memory of sound, 2.7% exhibited negative effects on their performance, 5.3% exhibited ringing in the ears, 5.3% exhibited stress, 6.7% exhibited physical tiredness, 1.3% exhibited not hearing well the sound, 13.3% exhibited

mental fatigue, 2.7% answered they exhibited others symptoms related to noise and 38.7% of the participants did not answer the questions. (See figure 11)

Figure 11 ***Symptoms caused by noise during and after a work day***

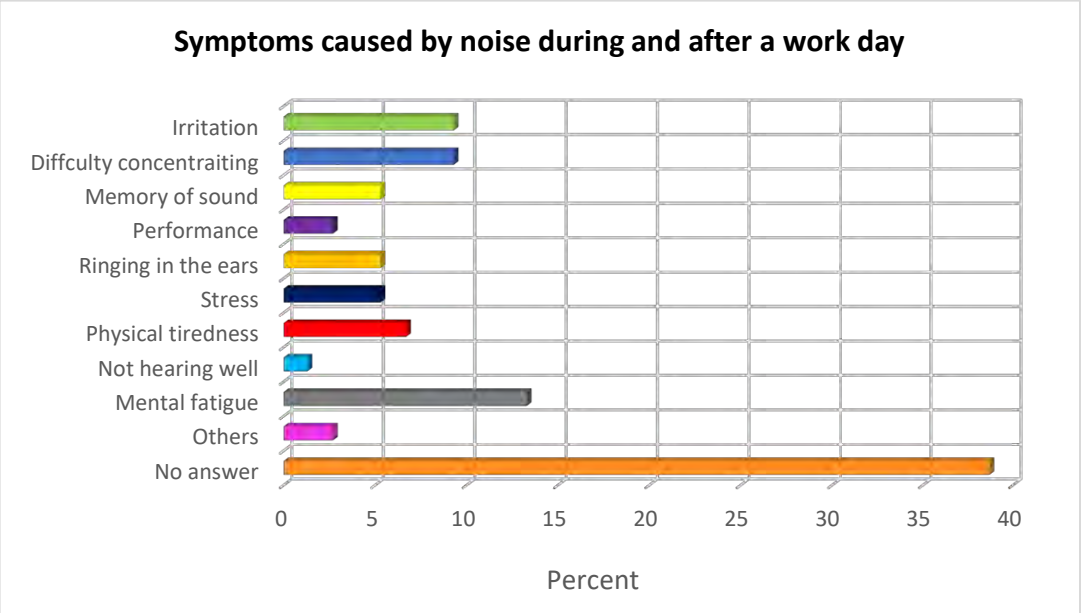
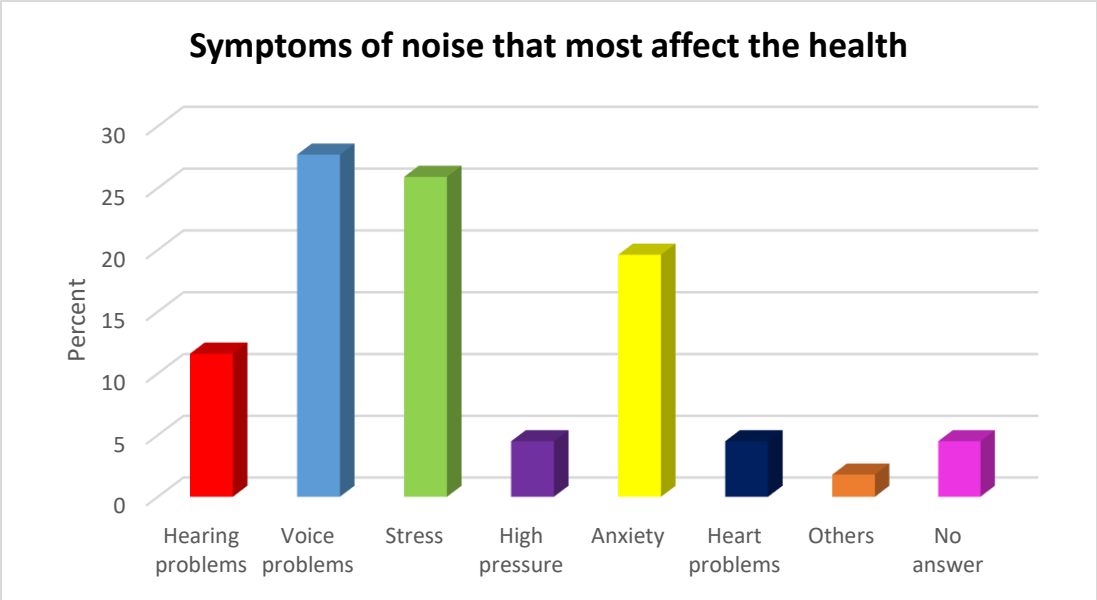


Figure 12 evidence the symptoms the participants understood noise affect the most to their health. The premise was: Mark with an X the symptoms that you understand that most the noise affects your health.

The premise in the survey tender several options to select. The results showed 11.6% of the surveyed indicated that hearing problems could be affected by noise, 27.7% indicated voice problems, 25.9% indicated stress problems, 4.5% indicated high pressure problems, 19.6% indicated anxiety problems, 4.5% indicated heart problems, 1.8% indicated they exhibit others symptoms and 4.5% participant did not answer the premise. (See figure 12)

Figure 12 ***Symptoms of noise that most affect the health***



The following findings answer questions related how noise affect the teaching process and how teachers deal with it.

Figure 13 evidence the teacher's experience if noise could affect the teaching process. The question was: Based on your experience, do you believe that noise affects the teaching process?

It was found that 97.7% of the surveyed believe the teaching process is affected by noise and 2.3% believes the teaching process is not affected. (See Figure 13)

Figure 13 ***Noise affects teaching process***

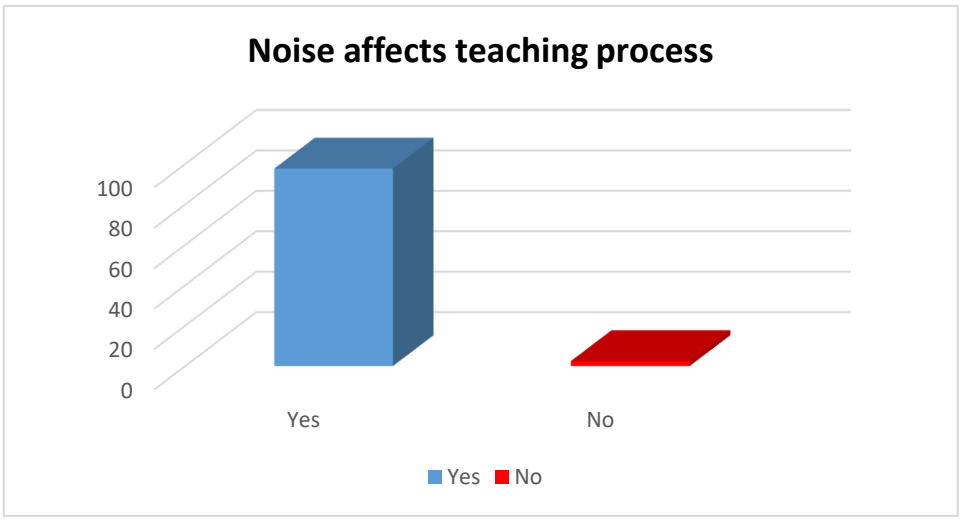


Figure 14 evidence if teachers had to change something of their class to compensate to noise. The question was: Do you make any changes in your class to compensate for noise?

It was found that 81.8% had to made changes to their class to compensate for the noise and 18.2% did not had to made any change to compensate for noise in class.

Figure 14 ***Need to change the class to compensate for noise***

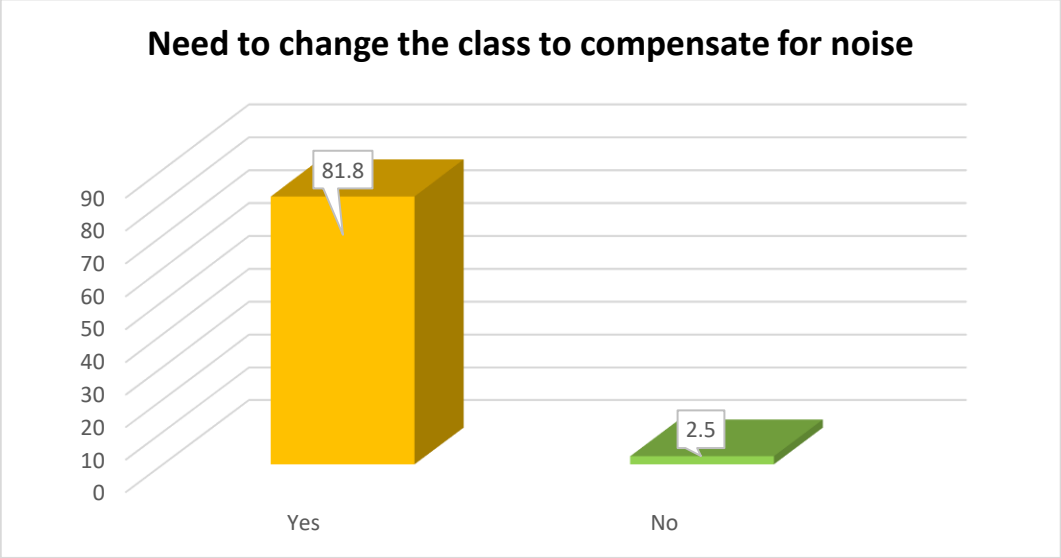
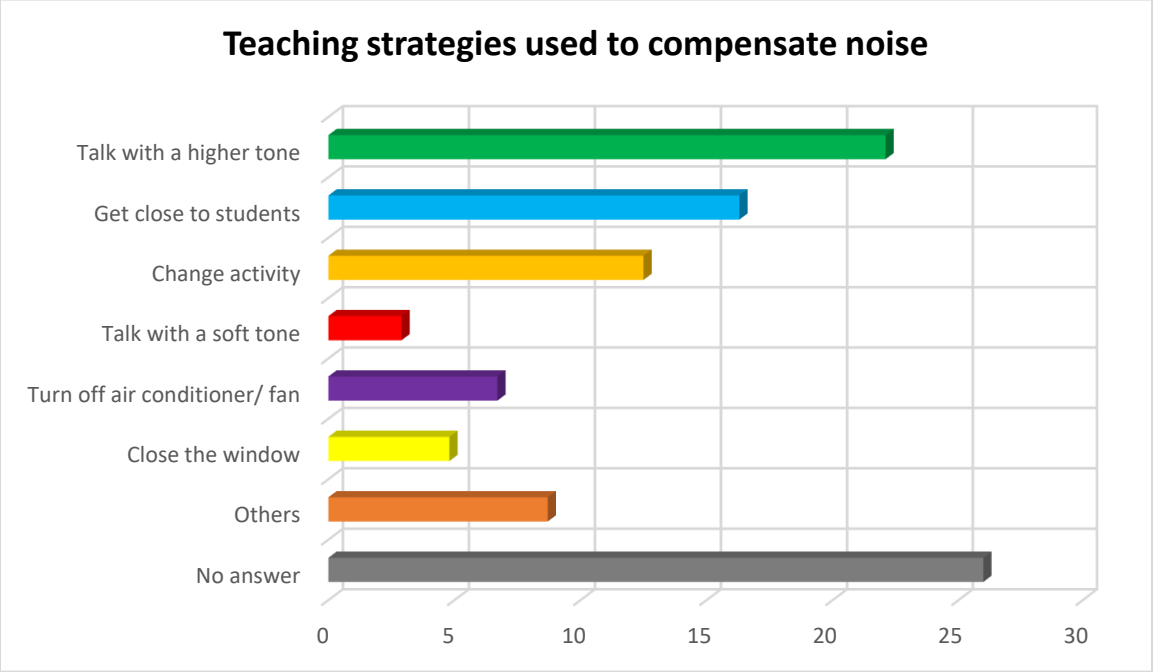


Figure 15 presents the strategies used by teachers to compensate the noise while teaching. The question was: What teaching strategies do you use to compensate for noise in the classroom? Mar with an X all of that apply.

The premise in the survey tender several options to select. The results showed 22.1% of the surveyed had to talk with a higher tone as a teaching strategy, 16.3% had to get close to student, 12.5% had to change the activity, 2.9% had to talk with a soft tone, 6.7% turn off the air conditioner or the fan, 4.8% closed the window, 8.7% used other teaching strategies and 26% did not answer the question. (See Figure 15)

Figure 15 Teaching strategies used to compensate noise



The last question of the questionnaire the participants had to write what they thought could be the consequences of noise in the teaching process. The answers in this question varied but there were some key answers that were repeated throughout the answers. Many teachers wrote that one consequence of noise in the teaching process is that students get distracted during class and lose concentration listening to the noise. One teacher wrote: “Students get distracted lose concentration and most of the time don’t listen to the instructions and instructions has to be repeated. Another common answer was the student lack of attention and it could cause health problems to the students as well as the teachers.

Chapter V

Discussion and Conclusions

Introduction

The interest of this research was centered in describing the teachers' perception of noise, the possible effects on the health condition in teachers and their effects on the teaching process. From this interest, two hypotheses were established, which allowed the writing of research questions that provided a detailed and clear way to compile the information necessary to carry out the purpose of this research.

In this last chapter of the investigation, it will be presented a discussion of the hypotheses of the study, based on the purpose of the investigation and with the support from the literature that help to establish the veracity of the study. Also, it was established the recommendations for future investigations.

Discussion

Throughout the revision of literature, we encounter the problem of inappropriate acoustic environment in school and the adverse effect of noise on the well- being of workers, like teachers, and the adverse effect it had on the teaching process between students and teachers. As stated in, Sundaravadhanan, Selvarajan & McPherson (2017), classroom listening environment international standards have been developed by the WHO, ANSI and ASHA, among others, with respect to background noise and reverberation time. Even though these standards have been developed most school do not meet these requirements.

Most of the investigations related about noise and school were focused on how noise affect the students, but there are limited investigations related about how teachers perceived noise and the effect it had on the teaching process and the well- being of teachers.

The first hypothesis of this investigation was that teachers will have perceived the teaching process is affected by the noisy acoustic environment. Jonsdottir, Rantala, Oskarsson& Sala (2015), stated that too high noise levels in the teaching premises can place children's education at a high risk since children have to hear the speech sounds, syllables, words and sentences satisfactorily. It was found that 97.7% of the teachers answered that noise do affect the teaching process and 81.8% had needed to change the class to compensate for the noise. Most teachers describe the teaching process was affected, because noises cause distraction in students, decrease concentration, students had attention problems which they believe could affect the academic performance of students and lastly, it creates health problems for both students and teachers. Dockrell & Shield (2006), stated that excessive noise in the classroom can serve as a distraction and annoyance for teachers and pupils alike.

Based on the gather information not only the teaching process is affected, also the teacher's well-being is affected by noise. Sundaravadhanan, Selvarajan & McPherson (2017), established the presence of poor classroom acoustics not only affects student learning, but may also affect teachers and cause them several health issues in teachers including poor hearing status, stress-related factors and annoyance. When the participants answered if noise could affect the well-being of people 90.9% answer the well-being can be affected and 86.4% answered noise could cause a change through their working day. Those who answer noise could made a change throughout the day answered that the most symptoms they exhibit were irritation, difficulty to concentrate, physical tiredness and mental fatigue. Additionally, to these symptoms when asked what health problems they understood noise most affect their health were: hearing problems (11.6%), anxiety problems (19.6%), stress problems (25.9%), and voice problems (27.7%). Sundaravadhanan, Selvarajan & McPherson (2017), teachers have also reported issues related to

vocal health that included hoarseness, fatigue, discomfort when using their voice for speaking or singing, difficulty in projecting their voice, vocal monotony, effortful speaking, chronic throat dryness and soreness, frequent throat clearing and swallowing difficulties.

The second hypothesis of this investigation was that teacher will have perceived the acoustic environment in the school as noisy. Gokdogan & Gokdogan (2016), stated noise is an important environmental pollutant which has negative effects on people hearing health and sense, upsets physiological and psychological balance, decreases work performance, changes the characteristic of the environment by reducing or destroying its pleasantness and calmness, and has a haphazard spectrum consisting of unwanted sounds. Based on the gather information 75% of the participants considered there is a problem of noise in their school and level of nuisance in their school was minimum (20.5%) and moderate (63.6%). Based on the previous information, 61.4% considered their school a little noisy, 27.3% considered it noisy and 2.3% very noisy. Additionally, most teachers considered their classroom as a little noisy and 65% of the teachers thought their classroom were not exempt of exterior noises. Those who answers they were not exempt from exterior noise point out the mayor cause of noise around the school site were: motor vehicles, advertisement through speakers, students on hallways and classroom. Chan, Mei Li, Yiu & McPherson (2015), stated that classroom background noise can arise from several possible sources, including external noise (such as traffic noise), internal noise (students running in corridors), and room noise (such as students talking).

Conclusion

Background noise refers to sounds that hinder an individual's ability to listen to what they want or need to hear (Chan, et, 2015). Dockrell & Shield (2006), stated there are two different sources of noise can influence the acoustic environment of the classroom: environmental noise

and noise generated by the children themselves. Since teachers and pupils to a large extent share environments, it appears plausible that the acoustic environment and high noise levels via increased cognitive load and general feelings of discomfort also may exert a negative influence on teacher's social relationships and well-being (Dockrell & Shield, 2006).

Based on the previously exposed and the results got in this information, it can be concluded that both hypothesis were proved. There is a problem of noise and poor acoustic environment in schools and this affect the teaching process and it also affects the well-being of teachers. Teachers believed that most schools and classroom are a little noisy and most of the time need to change something of the class to compensate the noise. With this investigation, we could prove that the teaching process is affected, students will not concentrate and they will have difficulties in the learning process. Also, teachers are at high risk of voice problems and high level of stress. Doing this investigation could create an awareness in teachers, students and other workers to make an environment that follow the standard established on acoustic environments in schools.

Future Investigations

Based on the investigation it was identified a several areas that could be developed for future investigations. A future investigation could be one that divide the investigation between elementary, intermediate and secondary schools to see if the level of noise varied for each level.

Another future investigation could be one that investigate the perception of teachers about noise in the rural area of Puerto Rico and compared it with answers of metropolitan school teachers.

Lastly, an investigation could be made with teachers that have hearing loss and investigate if their hearing is associated with noise induced hearing.

Recommendations

The results obtained from this investigation suggest:

- A sample of noise nuisance could be collected at the school site, in the classroom with and without students, may be added to this study.
- A description of the surroundings and structure of the school can be integrated to see how this can influence the perception of noise among teachers.

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Appendix A

PERCEPCIÓN SOBRE EL RUIDO EN MAESTROS

Universidad del Turabo
Escuela de Ciencias de la Salud
Programa de Patología del Habla-Lenguaje

Cuestionario

PERCEPCIÓN DEL AMBIENTE ACÚSTICO DE LOS MAESTROS Y SU EFECTO EN EL PROCESO DE ENSEÑANZA

La estudiante universitaria Laura Ortiz Martínez pertenece al programa de maestría en Patología de Habla y Lenguaje de la Universidad del Turabo. Como parte de los requisitos de dicho programa es necesario llevar a cabo una tesis. En este caso el estudio es sobre la percepción del ambiente acústico de los maestros y su efecto en el proceso de enseñanza. Este cuestionario es el instrumento fundamental para la recopilación de datos sobre este problema. El mismo tomará aproximadamente 15 minutos para completarse.

Un concepto importante para esta investigación es el de **ambiente acústico**. Ambiente acústico es definido como la mezcla de ruido de fondo y sonidos útiles en los que continuamente nos encontramos en nuestro diario vivir.

Instrucciones

- Para garantizar su confidencialidad y que las preguntas sean totalmente anónimas no escriba su nombre en ningún lado del cuestionario.
- Es de suma importancia que conteste todas las preguntas (a menos que las instrucciones indique lo contrario).
- Seleccione la contestación que más se parezca a su realidad actual de trabajo.
- Recuerde, esto no es un examen, sino una forma para recoger sus opiniones. Por lo tanto, no hay contestaciones correctas ni incorrectas. Solo hay contestaciones correctas para usted.
- Para seleccionar la contestación que desea haga una X en el recuadro correspondiente.

Universidad del Turabo
Escuela de Ciencias de la Salud
Programa de Patología del Habla-Lenguaje

Título de la investigación

Percepción del ambiente acústico de los maestros y su efecto en el proceso de enseñanza.

Número de Participante: _____ **Fecha:**_____

Género: ☐ Femenino ☐Masculino **Años de servicio como maestra(o)** ___

Instrucciones: Marque con una X la contestación

1. ¿Considera usted que el ruido es un problema en su plantel escolar?
   ☐ Sí
   ☐ No

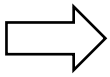
2. ¿Cómo usted describiría el ambiente acústico en su plantel escolar?
   ☐ Silencioso
   ☐ Poco Ruidoso
   ☐ Ruidoso
   ☐ Muy Ruidoso

   Si contesto Silencioso, pase a la pregunta número 4.

3. Indique el nivel de molestia que le causa el ruido en el plantel escolar.
   ☐ Ninguno
   ☐ Mínimo
   ☐ Moderado
   ☐ Excesivo

4. Considera que su salón es:
   ☐ Silencioso
   ☐ Poco Ruidoso

CONTINUAR EN LA PROXIMA PÁGINA



☐ Ruidoso

☐ Muy Ruidoso

5. ¿Entiende usted que su salón se encuentra exento de los ruidos exteriores?

☐ Sí

☐ No

Si contesto que No, pase a la pregunta número 7.
Si contesto que Sí, pase a la pregunta número 6.

6. A su entender: ¿cuál es la mayor causa de ruido en el entorno escolar? Marque todas las que apliquen.

☐ Vehículos de motor (carro, motora, camión)

☐ Estudiantes en los salones

☐ Propaganda a través de altoparlantes

☐ El timbre de entrada, salida y cambios

☐ Ruidos de abanicos y acondicionadores de aire

☐ Ruidos de aviones y/o helicópteros

☐ Estudiantes en los pasillos

☐ Otras: especifique _____

7. ¿Considera que los ruidos pudieran afectar el bienestar de las personas?

☐ Sí

☐ No

8. Entiende usted que el ruido le pudiera causar algún cambio al comenzar o finalizar su jornada de trabajo en un plantel escolar?

CONTINUAR EN LA PROXIMA PÁGINA

☐ Sí

☐ No

Si contesto que No, pase a la pregunta número 11.
Si contesto que Sí, pase a la pregunta número 10.

9. ¿Qué síntomas exhibe durante o al finalizar un día de trabajo en la escuela? Marque todas las que apliquen.

☐ Irritación

☐ Dificultad para concentrarse

☐ Memoria del Sonido (nos referimos a escuchar el sonido luego de estar expuesto al mismo)

☐ Efectos negativos en su rendimiento

☐ Zumbido en los oídos

☐ Estrés

☐ Cansancio Físico

☐ No oye bien los sonidos

☐ Cansancio mental

Otros: _____

10. Marque con una X los síntomas que usted entiende que más el ruido le afecta a su salud. Marque todas las que apliquen

☐ Problemas de audición

☐ Problemas de voz

☐ Estrés

☐ Presión alta

☐ Ansiedad

☐ Problemas del corazón

Otros:_____

11. Según su experiencia; ¿cree que el ruido afecta el proceso de enseñanza?

☐ Sí

☐ No

12. ¿Realiza usted algún cambio en su clase para compensar el ruido?

☐ Sí

☐ No

Si contesto que No, pase a la pregunta número 14.
Si contesto que Sí, pase a la pregunta número 13.

CONTINUAR EN LA PROXIMA PÁGINA

13. ¿Qué estrategias de enseñanza usted utiliza para compensar el ruido en el salón? Marque todas las que apliquen.

    ☐ Hablar con un tono más alto
    ☐ Acercarse a los estudiantes
    ☐ Cambiar de actividad
    ☐ Hablar con un tono más suave
    ☐ Apagar el aire acondicionado y/o abanicos
    ☐ Cerrar la ventana
    ☐ Otras: _____

14. ¿Cuál usted cree que son las consecuencias del ruido en el proceso de enseñanza?

    _____
    _____
    _____
    _____
    _____
    _____

¡Muchas gracias por su cooperación