



FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF PSYCHOLOGY

APPROVAL FORM

Topic: The impact of poor Classroom acoustics on student's attention and lecturers teaching ability at Midlands State University.

I. TO BE COMPLETED BY THE STUDENT

I certify that this dissertation meets the preparation guidelines as presented in the Faculty Guide and Instructions for preparing dissertation

(Signature of Student)

(Date)

II. TO BE COMPLETED BY THE SUPERVISOR

This dissertation is suitable for presentation to the Faculty. It has been checked for conformity with the Faculty Guidelines

(Signature of Supervisor)

(Date)

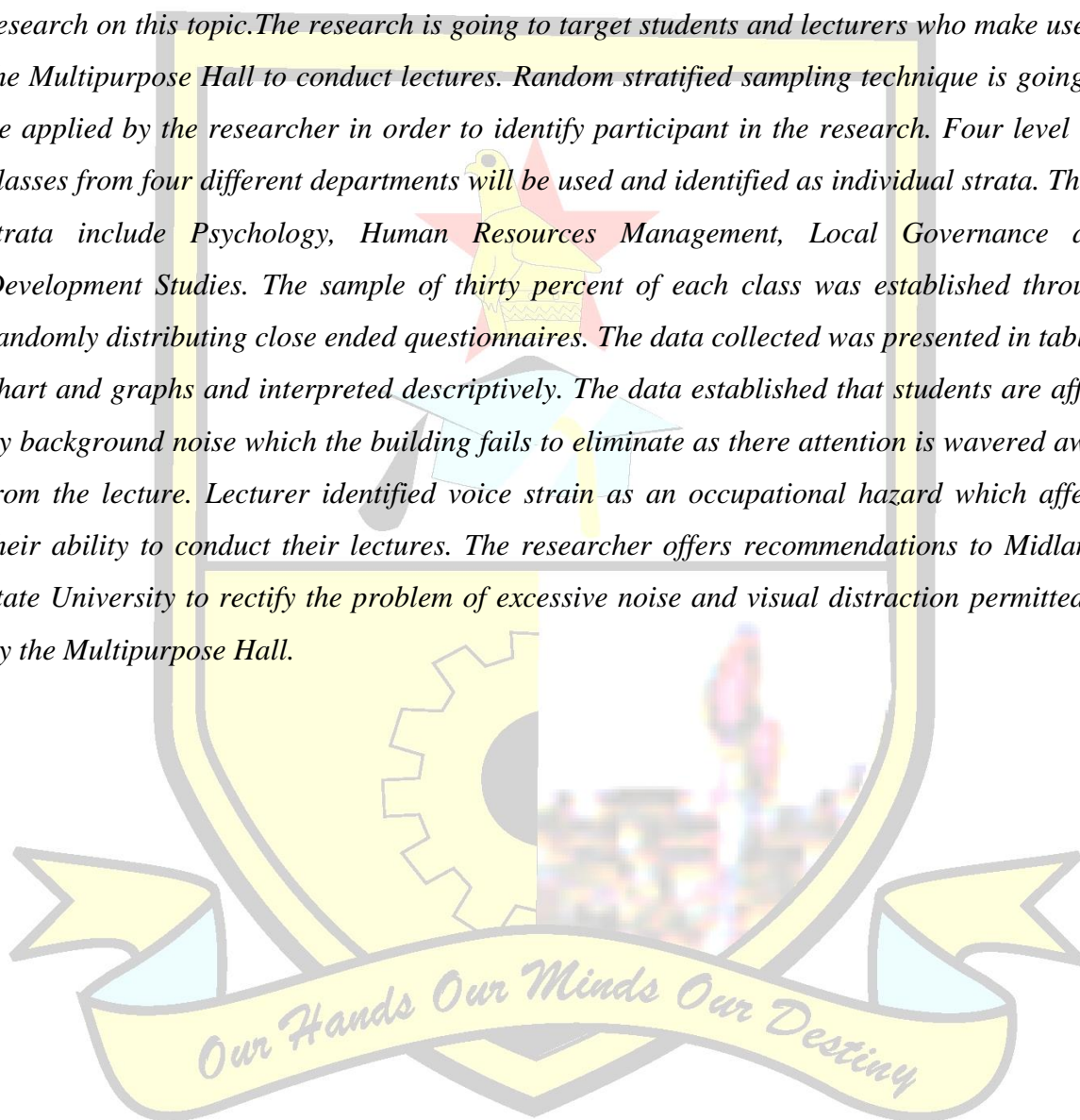
DEDICATION

This dissertation is dedicated to my parents Mrs E Gadzai and Mr P Mandisodza. You are my rock



ABSTRACT

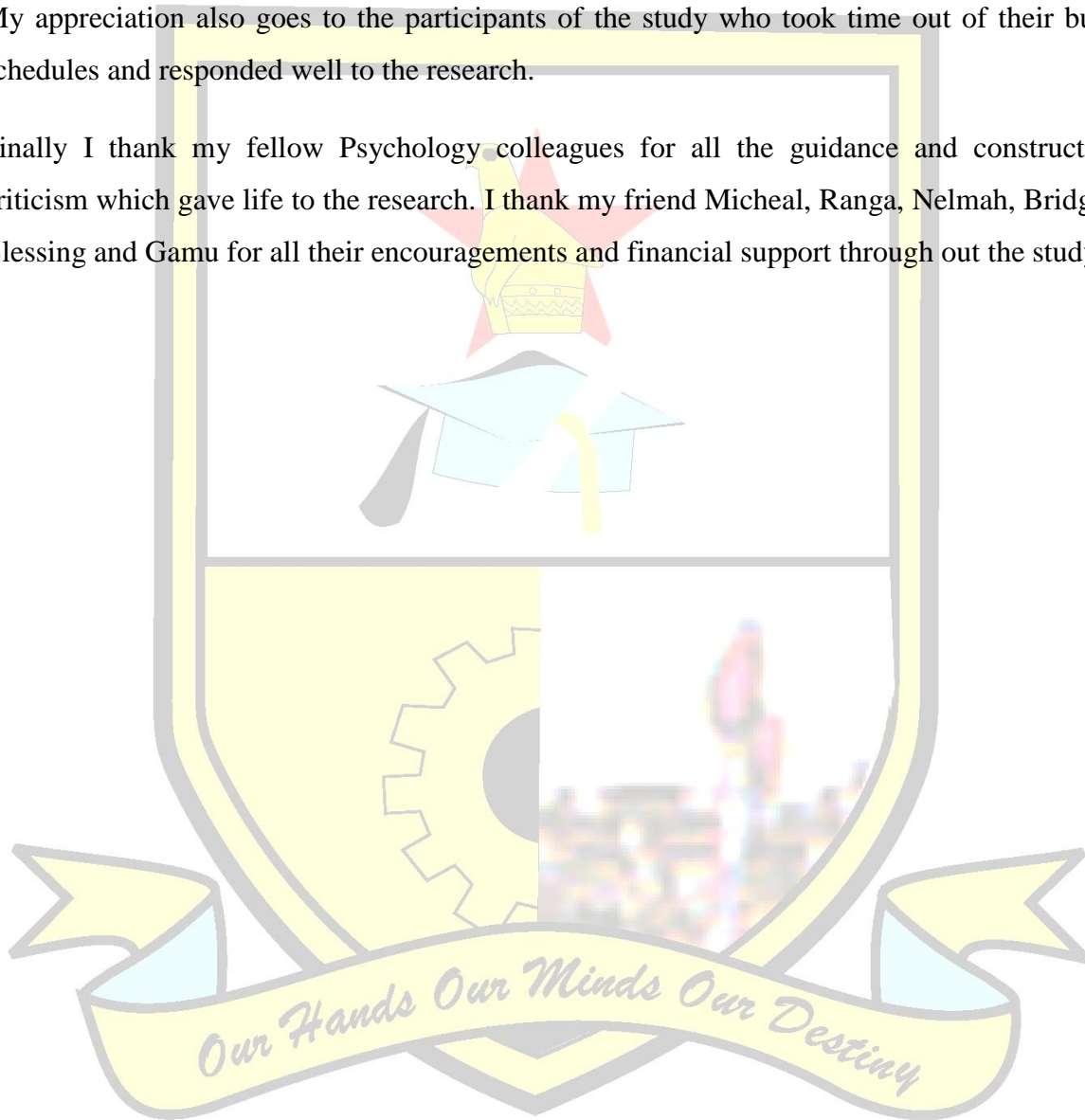
The researcher sought to study the impact of poor classroom acoustics on student's attention and lecturer's teaching ability on Midlands State University. The research made use of various related researches and literature in order to appreciate the thoughts of the scholar who have targeted this area of study. The researcher also made use of two theories of attention in attempt to further his research. The researcher used a quantitative approach to research on this topic. The research is going to target students and lecturers who make use of the Multipurpose Hall to conduct lectures. Random stratified sampling technique is going to be applied by the researcher in order to identify participant in the research. Four level 1.2 classes from four different departments will be used and identified as individual strata. These strata include Psychology, Human Resources Management, Local Governance and Development Studies. The sample of thirty percent of each class was established through randomly distributing close ended questionnaires. The data collected was presented in tables, chart and graphs and interpreted descriptively. The data established that students are affect by background noise which the building fails to eliminate as there attention is wavered away from the lecture. Lecturer identified voice strain as an occupational hazard which affects their ability to conduct their lectures. The researcher offers recommendations to Midlands state University to rectify the problem of excessive noise and visual distraction permitted in by the Multipurpose Hall.



ACKNOWLEDGEMENTS

First and foremost all glory and appreciation goes to the Almighty God for guiding giving me strength and knowledge to conduct, and make this research a success. Gratitude goes to my academic supervisor Miss Nkiwane for her unwavering support and guidance chapter by chapter to create a well structure research. I would like to thank Midlands State University Registrar Mr Mupfiga for granting me permission to conduct my research on the institution. My appreciation also goes to the participants of the study who took time out of their busy schedules and responded well to the research.

Finally I thank my fellow Psychology colleagues for all the guidance and constructive criticism which gave life to the research. I thank my friend Micheal, Ranga, Nelmah, Bridget, Blessing and Gamu for all their encouragements and financial support through out the study.

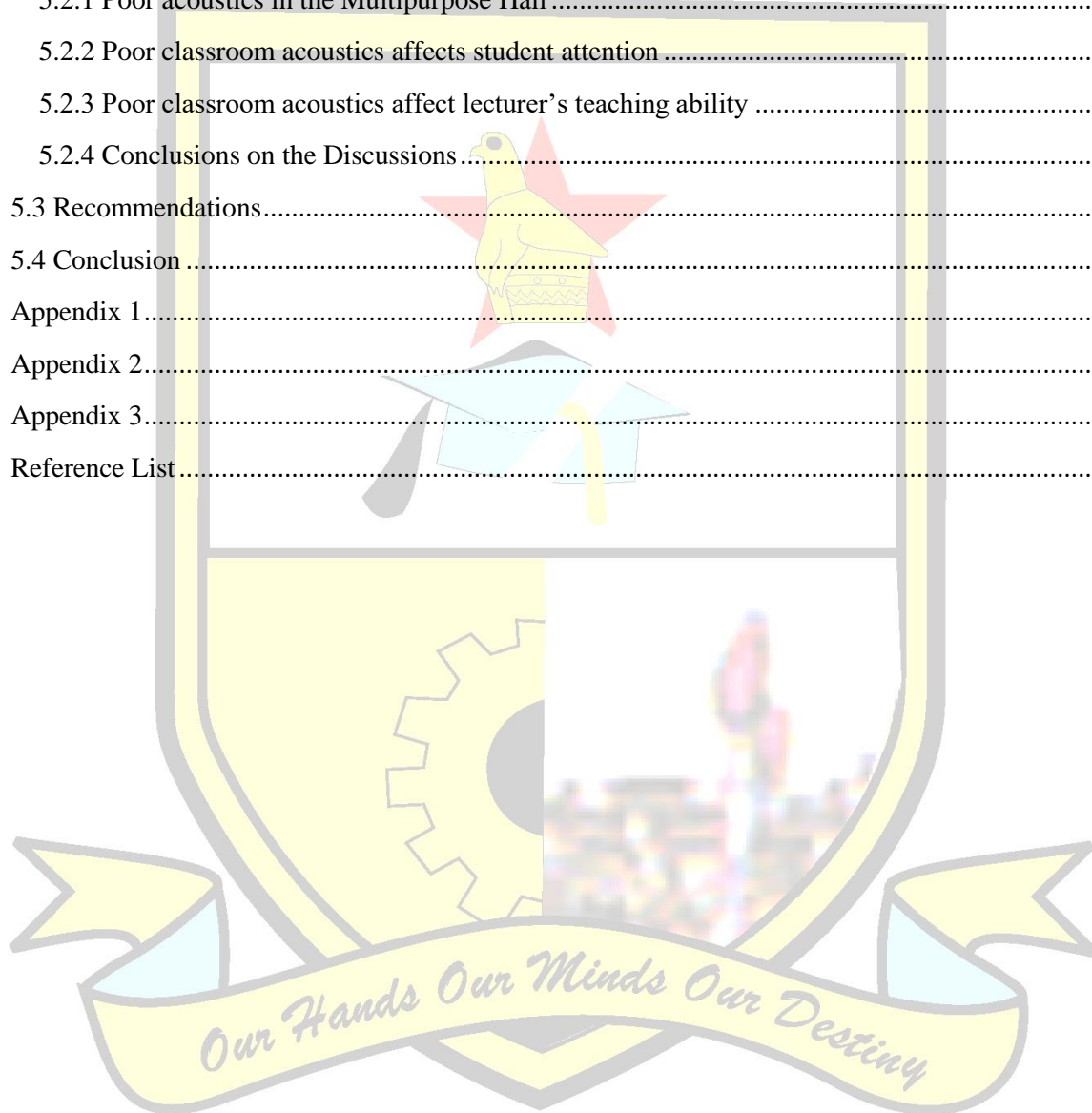


Contents

APPROVAL FORM.....	i
DEDICATION.....	ii
ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	iv
1.0 CHAPTER ONE- INTRODUCTION.....	4
1.1 Introduction.....	4
1.2 Background of problem.....	4
1.3 Statement of the problem.....	6
1.4 Purpose of the study.....	7
1.5 Significance of the study.....	7
1.6 Assumptions.....	8
1.7 Research questions.....	8
1.8 Objectives of the study.....	9
1.9 Delimitations.....	9
1.10 Limitations.....	9
1.11 Definition of terms.....	10
1.12 Conclusion.....	10
2.0 CHAPTER 2- LITERATURE REVIEW.....	11
2.1 Introduction.....	11
2.2 Identifying proper classroom acoustics for effective learning.....	11
2.3 Classroom acoustics effects on student attention.....	13
2.4 Classroom acoustics effects on lecturer's teaching ability.....	15
2.5 The positive effects of background noise on attention.....	16
2.6 Theoretical work frame.....	17
2.5.1 Early Selection theories of Attention.....	17
2.6.2 Broadbent's filter model.....	17
2.6.3 Treisman's Attenuation theory.....	19
2.7 Previous studies.....	20
2.8 Knowledge gap.....	22
2.9 Conclusion.....	23
3.0 CHAPTER THREE-METHODOLOGY.....	24
3.1 Introduction.....	24

3.2 Nature of study.....	24
3.3 Research Design.....	25
3.4 Target Population.....	26
3.5 Population Sample	26
3.6 Sampling Method.....	26
3.7 Research instruments	27
3.8 Data Collection	28
3.9 Data Presentation and Analysis.....	29
3.10 Ethical considerations	29
3.11 Conclusion	30
4.0 CHAPTER FOUR-DATA PRESENTATION AND ANALYSIS	31
4.1 Introduction.....	31
4.2 Presentation of questionnaire response.....	31
List of Tables	31
Table 4.1- Sample Population per strata	31
Table 4.2- Response Rate for Students	32
Table 4.3- Response Rate for lecturers	32
Table 4.4 - Student Demographics of Response Rate.....	32
List of Figs	33
Fig 4.1- Response rate by gender.....	33
Fig 4.2- Lecturers and Student’s reflection of the importance of Classroom acoustics.....	33
Fig 4.3- Attitude towards the Listening environment (Acoustics).....	34
Fig 4.4- Ratings for current Acoustics	34
Fig 4.5-Source of background Noise (Students).....	35
Fig 4.6- Source of background Noise (Lecturers).....	36
Fig 4.7- Perspective on noise reduction.....	36
Fig 4.8- Attention Deficiency Disorder and Hearing impairment	37
Fig 4.9- Reported background noise which diverts attention.....	38
Fig 4.10- Concentration rate	38
Fig 4.11- Perceived negative effect on performance in Students.....	39
Fig 4.12- Visual Distraction and its relation with Concentration	39
Fig 4.13- Lecturers-Class size and Teaching style.....	40
Fig 4.14- Voice Level	40
Fig 4.15- Voice Strain.....	41

Fig 4.16- Student’s ability to hear the Lecturer	41
Fig 4.17- External Noise as a demotivating factor.....	42
4.3 Conclusion	42
5.0 CHAPTER FIVE- DISCUSSION OF FINDINGS	43
5.1 Introduction.....	43
5.2 Discussions on findings	43
5.2.1 Poor acoustics in the Multipurpose Hall	43
5.2.2 Poor classroom acoustics affects student attention	45
5.2.3 Poor classroom acoustics affect lecturer’s teaching ability	46
5.2.4 Conclusions on the Discussions.....	48
5.3 Recommendations.....	48
5.4 Conclusion	49
Appendix 1.....	50
Appendix 2.....	54
Appendix 3.....	58
Reference List.....	59



1.0 CHAPTER ONE- INTRODUCTION

1.1 Introduction

In this chapter the researcher will explore at length the background of the problem, identify the affected group, statement of the problem, purpose of the study, significance of the study, assumptions, research questions, objective of study, limitations and delimitations of the study and definition of term. This is in attempt to articulate on the effects of inattentiveness of students in lectures and how lecturer's ability to deliver their service is negatively affected by the learning environment, classroom acoustics.

1.2 Background of problem

The research is inspired by a prior experience when the researcher was using the Multipurpose Hall for lectures and realized how background noise was affecting attention and progression of the lecture. As a student concentration and the capability to stay focused was affected due to external visual and audio distractions. The researcher has realised how much the influence of poor classroom acoustics has affected the academic performance of students without any recognition of being one of the reasons of bad grades obtained by students. In the course of this research the researcher will immensely focus on the in the use of the Multipurpose Hall at Midlands State University for lectures. Poor classroom acoustics occur when the background noise and the amount of reverberation in the classroom are too high or low that they interfere with learning and teaching. However, for the progression of this research emphasis will be on background noise. Background noise refers to any unwanted sound or visual stimuli that would interfere or distracts proceedings in a classroom. Background noise in a classroom can come from many sources such as traffic, lawnmowers, heating or air conditioning units, audio-visual equipment or other students.

Midlands State University was established in the year 2000 in Gweru, Zimbabwe as a fully functional institution with classroom structure that catered for its small pool of about only 800 students by then. The West and East lecture theatre where sufficient enough to cater for standard learning environment with proper acoustics. However, in the passing of years demand has gone up for university education hence the application pool has raised as well.

Currently the university enrolls more than 15 000 students, hence the university therefore resorted in the use of the Multi purpose Hall and Dining Hall as a way to accommodate the rising demand for education whilst also providing a public service for the greater good of the country.

This research will be conducted in regard of the Multipurpose Hall as a learning environment. The Multipurpose Hall acoustics are poor as the walls are thin and it is constructed in such a way that external sound is not restricted. Massie and Dillon (2006) propounded that a student's ability to hear and understand what is being said in the classroom is vital for learning hence the sound stimuli of students passing by the building and that of a lecture being conducted in another cluster distract student attention. A generator is also located just outside of the Multipurpose Hall hence when there is no electricity a great deal of noise can be traced back to this machine. The other sections of the Multipurpose Hall do not have any demarcation walls to avoid visual distractions. This would result in attention of students being drawn to activities outside of the classroom or the next lecture which may seem more attractive. Poor acoustics of the Multipurpose Hall forces lecturers to increase their voice pitch in order to compete with background noise. The poor classroom acoustics has seemingly negative effects on lecturers' teaching ability as lecturers would opt to conduct their lecture during the weekend when other lecture rooms are free than using the Multipurpose Hall. The inattentiveness of the student usually distracts the lecture as student-lecturer's interaction is negatively affected.

The Multipurpose Hall is divided into clusters in order to permit more than one lecture to be conducted within the building. The rising number of students being enrolled each year has made the university to resort to separation of classes according to mode of entry with the conventionals attended in the morning and the parallels in the afternoon. As a result to the implementation of this policy the number of lectures being conducted in the Multipurpose Hall has increased to a possible average of eight lectures at each given hour. This would therefore result in background noise and visual distraction emanating from surrounding lectures being conducted.

In order for one to comprehend the magnitude of the problem, one has to understand and be aware that the lectures that are being conducted at the same time and close proximity lack familiarity as there are usually from different degree programs. The Multipurpose Hall is used for lectures by students and lecturers from degree programs such as Psychology, Human

Resource Management, Development Studies and Local Governance. This then entails that when a student is able to hear what is being taught in the next lecture which has no relevance to his or her learning curriculum, then this becomes noise which can distract or wave one's attention from what his or her lecturer is teaching.

Upon separation of a class into two the size of the class still remains unmanageable considering the available learning environment. An estimated average of the number of students each class would have ranges from one hundred to one hundred and twenty learners. With such a large class and external noise factor from surrounding lectures and different activities from outside the building, the lecturer is inclined to elevate his or her voice as an attempt to be heard by every student.

Background noise has been so destructive in both the lecturers and the students to an extent that lectures are being cancelled, students no longer attending the lectures or even the lecturers increased absenteeism due to voice strain or demotivation. Overly the grades of the students are deteriorating due to distracting noise factor.

1.3 Statement of the problem

Poor classroom acoustics allows noise into a building which in turn affect student's ability to articulate what there are taught due to background noise and external visual stimuli that may distract them from the lecture hence degrading overall performance (grades). Students abscond from lectures blaming distraction from noise which interferes with them hearing what the lecturer would be teaching. Cancellation and shift of lecture occurs now and then due to the sound and visual distractions. Lecturers tend to prefer to move the lecture to weekend or in the evenings as an attempt to eliminate the noise factor in the classroom. This inconveniences other student who would have other commitments the same time as the postponed lecture. Lecturers seem to be demotivated by student's lack of concentration and feedback as attention is directed elsewhere. Due to the huge size of the classes these lecturers teach, elevation of voice pitch is required in order to be heard. Therefore, voice strain in lecturers is a major consequence for conducting a lecture. This therefore affects their job satisfaction as what they do would seem unappreciated whilst hindering their personal development.

1.4 Purpose of the study

This section of the research seeks to illuminate on the aims and target of the research. This section seeks to show how the research will have a positive impact on the current situation and livelihood of students and lecturers at Midlands State University.

- Advocate for student academic development
- Midlands State University to achieve world-class university status with appropriate classroom requirements
- This study seeks to review how the learning environment has inhibited students and lecturers to access their full potential

1.5 Significance of the study

This section of the research seeks to identify those who and how may they benefit from the study being conducted. The beneficial parties include the participants, the institution, various universities globally and the different fields of the study of psychology

To Students

- Participating students may benefit as they would get an opportunity to air out their views of the current learning environment to an ear willing to hear them out.
- Students learning at Midlands State University may benefit by improvement of academic performance if the learning environment is up to par.

To Lecturers

- Participating lecturers may benefit through ai
- The research may protect the lecturers from physical impairment caused by voice strain. Elevation of voice daily by lecturers may damage their voice pitch permanently.

To Midlands State University

- This research will be of great significance to Midlands State University as it would comprehend the importance of the learning environment to student performance. This would result in the educational development of the university and global recognition.

To the field of Cognitive Psychology

- The field of Cognitive psychology through understanding how an individual's ability to devote attention can be affected by the environment one is in

To the field of Environmental psychology

- The field of Environmental psychology through the study of the impact which the classroom acoustics have to how the human being is able to function appropriately and effectively when the environment is permitting.

To universities country wide

- Universities country wide will benefit as they get insight on the importance of classroom acoustics in students' overall performance.

1.6 Assumptions

- Participants are readily available and would cooperate upon realisation that this research seeks to develop the institution.
- All participants will be truthful in responding
- The research will receive support and cooperation from Midlands State University
- This research will be beneficial globally
- Poor classroom acoustics has a negative effect on attention.
- Lecturer's teaching ability is negatively affected by poor classroom acoustics.

1.7 Research questions

- What kind of room can be referred to as having poor acoustics?
- How does the classroom acoustics affect student attention?
- How does classroom acoustics affect lecturer's teaching ability?

1.8 Objectives of the study

- To identify the proper classroom acoustics that permit effective learning
- To appreciate the impact of classroom acoustics to student attention
- To illuminate the effects poor classroom acoustics on teaching ability

1.9 Delimitations

- This research will be undertaken on Midlands State University which is located in Gweru, Zimbabwe in the Midlands province.
- Midlands State University is located 15km due East from the Central Business District
- The Multipurpose Hall is located 200 meters away from the main gate along the main road into campus
- The participants will be approached and found whilst attending or conducting lectures in the Multipurpose Hall

1.10 Limitations

- This research may be affected by conformity bias as participants may tend to agree with the research if they realise that they may know the researcher. The researcher is not going to participate in handing out of the questionnaires but will rather use a second party.
- Participants may shun away from criticise the institutional system due to fear of implication from the administrator and system planners themselves. Therefore this research may be administered upon agreement of anonymity of the participants.
- Participant may be unwilling to participate in the research due to their own busy schedules. Therefore the researcher may construct questionnaires that are simple and easy to understand such that it would take less to fill for the participants.
- The research can also be affected by the habituation factor as both students and lecturers are used to the presented background noise such that they tend not to notice its presence any more. The research may influence the intellects (both students and lecturers) to begin to critically analyse their learning environment and come up with their own perceptions.

1.11 Definition of terms

Poor- refers to that which is sub-standard

Classroom- is the place where a group of students gather and conduct a lecture with the lecturer

Acoustics- refers to sound wave distribution depending on the structure of the room

Attention – is the ability of a student to focus and concentrate on the proceedings of a lecture.

environment while ignoring other things

Background noise- refers to any unwanted sound or visual stimuli that would interfere or distracts proceedings in a classroom

1.12 Conclusion

This chapter aid as an overview to the research study which seeks to find the negative effects of poor classroom acoustics on student’s attention and lecturer’s teaching ability. This chapter introduces the research through elaborating the background of the problem, stating the problem, showing the purpose of the study, identifying who the research will be beneficial to, assumptions based on, the question that will guide the study, the objective of the research, delimitations, limitations and the definition of terms. The next chapter will be the literature review from basing on scholars and researchers who have worked along the area of concern of this study.

2.0 CHAPTER 2- LITERATURE REVIEW

2.1 Introduction

In this chapter the researcher seeks to explore the recent studies which relate to the area of research at hand in attempts to further and critically analyse different areas of concern. The review will describe, summarize, evaluate, clarify and show relevance to the research this literature. According to Cooper (1984) cited in Creswell (2003) the purpose of literature review is to share with the reader the results of other studies that are closely related to the study being reported, it's related to large on going dialogue in the literature about the topic, filling in the gaps and extending prior topic studies. In the course of this part of the research, the researcher will discuss the suggested proper classroom acoustics for a conducive learning environment. An analysis of the suggested theories process of attention and the various types of attention will be conducted in the progression of this chapter. Within this chapter an analysis of how poor classroom acoustics affect lecturer's ability to deliver their service will be also dwelt on. The researcher will critically examine the notions of accredited scholars and researcher who have dwelt into issues that discredit this research such as then positive influence of white noise to student's attention span.

2.2 Identifying proper classroom acoustics for effective learning

The influence of acoustics during structural development of classrooms has been grossly underrated in consideration of the most suitable learning environment. Acoustics have been defined as the total effect of sound, especially as produced in an enclosed space (American Heritage Dictionary of the English Language, 2011). The word "acoustic" is derived from the Greek word akoustos which means "heard, audible". The researcher defines acoustics as the ability of a room to distribute sound waves from the source to the rest of the room. It is of utmost importance that one understands what is meant when a classroom is labelled to having poor acoustics for one to understand this research.

Classroom acoustics vary due to difference in construction design (structure) and the building materials used. Seabi et al. (2013) acknowledged that acoustics variations in a classroom have an impact on the learning process as there will be transition of sound waves from source

to receptor in order to establish verbal communication. Henceforth if the learning environment does not permit for this interaction the learning process in itself is disturbed. In an acoustical standpoint, open-plan tutorial room are perhaps the poorest design as students are easily distracted by visual signals that spill over from adjacent classes (Wilson et al, 2002).

Nelson (1999) propounded that the classrooms that have been constructed have been anticipated to encourage hands on activities or discussions, however the issue of excessive background noise remains a hindrance to the learning process. A classroom with proper acoustics should not permit excessive background noise which interferes with the learning environment. The Acoustic Accredited Standards Committee, S12, Noise (2002) suggested that up to 60% of classroom activities include speech between teachers and students or between students hence indicating the importance of environments that support clear communication. Pepi, 1999 propounded that a good acoustics is a basic classroom need to ensure that all students access to spoken instruction and discussion by eliminating access to background noise.

Larsen and Blair (2008) suggested that site planning of classrooms should immensely consider external noise sources that could disrupt learning and attempt to locate classrooms away from such areas. Knecht (2002) suggested that while constructing new places for schools, there are a number of objects needs into consideration, starting with the location. When constructing a classroom it is best to locate them as far as possible to noise sources such as aircraft flyovers, busy roads, idling school buses, sports fields, exterior mechanical equipment and lawn mowers (Seep et al, 2000). This would affect the students concentration to the lecture and also call for the lecturer to elevate his/her voice such that he can be heard, resulting in voice strain.

Valente et al (2012) propounded that listening is an imperative prerequisite for effective learning as information is primarily presented orally to the learners, hence the acoustical conditions under which tutoring takes place play a major role in learning facilitation. This would explain the notion by Nabelek and Nabelek (1985), "Speech produced in one place in a room should be clear and intelligible everywhere in the room" suggesting the importance of proper, appropriate and effective classroom acoustics. One can ask what is there to consider when constructing proper classroom acoustics. Much of the answer to this question can be addressed by the field of architectural acoustics. In the first century B.C., the Roman architect

Vitruvius as cited in Seep et al. (2000) propounded that sound moves in an endless number of circular rounds, like the innumerably increasing circular waves which appear when a stone is thrown into smooth water, that is before sound waves encounters an obstacles like walls or ceilings hence how different rooms can be constructed in such a way that desirable acoustics are produced. For example, a room can be constructed in a way that background noise is absorbed into the walls.

2.3 Classroom acoustics effects on student attention

Bistafa and Bradley's (2000) notion that a classroom with poor acoustics can be identified when the background noise and the amount of reverberation in the classroom are too high or low that they interfere with learning and teaching, gives an understanding of the hindrances caused by such a room. Therefore suggesting students would be affected through deprivation of information due to background noise which would distract them from the proceedings of the lecture. According to Nelson et al, (2002) various institutions cater students with students with Attention Deficit Disorders and hearing problems therefore if background noise is present in such a learning environment these students would be affected as their ability to concentrate on the lecture would be challenged by external forces. Smith (2008) made a notion that, "If students with hearing impairment or attention deficit disorders have difficulty concentrating on the teacher's voice in a classroom with loud mechanical noise consider their plight in a classroom where not only background noise is present but also visual stimuli from outside the lecture". Therefore schools need quiet learning spaces for their students and teachers because many learning spaces serve students with disabilities such as learning disabilities, language learning problems, behaviour problems, reduced cognitive skills, hearing loss, auditory processing disorders and chronic illnesses

Sutherland and Labman (2001) were particularly interested on the effects of poor classroom acoustics to students, regardless of there differences like disability. These scholars are of the notion that speech communication hindrance would result in lack of attention to proceedings of a lecture. Speech intelligibility which refers to when the students fail to hear what is being taught by the teacher usually resulting in the lack of interest to the lecture by the pupils (MacKenzie and Airey, 1999). Therefore as a result of speech communication interference student either strain themselves as they try to eliminate the background noise or ultimately give up on the lecture and directs their concentration elsewhere, be it social interaction or the

presented background noise (visual or auditory). This would therefore suggest that any student regardless of disability can be affected by noise from outside the classroom.

Purdy et al. (2009) propounded that perfect conveyance of information is essential for best academic success in a classroom hence the teacher's voice level, background noise and distance from the teacher to the child are acoustical variables that can compromise attention and alternately student performance. Klatte and Hellbrück (2010) suggest that background noise is capable of compromise educational performance, spelling skills and reading, attention, and behaviour in children. The noise levels incline to influence focus and consideration more critically in with high anxiety levels or lower IQs. Purdy et al. (2009) conducted studies which established that reduction in classroom noise had a considerable result on rising attentiveness, focus and sharing behaviour among children. The researcher acknowledges the several areas of which students are affected by background noise but the research will focus on attention alone.

According to Dockrell and Shield (2003), “the general effects of chronic noise exposure on children are deficits in sustained attention and visual attention, poorer auditory discrimination and speech perception, poorer memory for tasks that require high processing demands of semantic material, and poorer reading ability and school performance on national standardised tests”. This entails that poor acoustics resulting in permission of background noise has a negative effect on children academic performance as there are not able to understand or listen to what would have been taught in a lecture as concentration would have been wavered elsewhere. Sanz et al. (1993) as cited in suggest that when students who conduct lectures in a classroom prone to excessive background noise are bond to perform dismally on test of attention than those who use quite classrooms.

According to Berglund and Head (2001) excessive background noise due to poor classroom may have health risks to the students. Children learning exposed to such learning environment are prone to have higher systolic and diastolic blood pressure (Passchier-Vermeer and Passchier, 2000). The health effect are particularly probable to older students therefore may result in reduced motivation of the learner hence willingly withdraw their attention to the proceedings of the lecture.

However, scholars such as Higgins and Turnure (1984) as cited in suggest that how an individual's concentration is deviated is sorely dependent on individual developmental

changes. This argument is based on the biological and cognitive development in humans. The suggestion is that as we grow older our attention span also develops hence when demand of attention increases a university student concentration increases as well.

2.4 Classroom acoustics effects on lecturer's teaching ability

Rosenberg (2010) noted that several teachers with strong voices are able to project their voices for long period of time without tiring, however, other teachers have fairly weak voices and when forced to raise their voice level, they become strained. Teachers are also more exhausted when teachers transfer their voices to compensate for high noise levels at the end of the day of school (Tiesler&Oberdörster, 2008). Sutherland and Lubman (2001) suggested that vocal strain is a serious occupational hazard for teachers and occurs because the teachers need to speak for long periods of time at an elevated voice level. This voice strain and fatigue has been linked to be the result of the café effect. The café effect is a term used to define the increase in noise intensities in a listening setting when the orator is required to raise their voice to be heard. In a café this is usually over the noise of plates and cutlery (Klatte and Hellbrück, 2010)

The distance between the lecturer and the student is one of the factors that call for voice elevation, hence Anderson (2001) noted that voice perception for a student sitting three to five meters away from the lecturer is much better than that of a student fifteen meters away. In one survey conducted by Smith et al. (1998), 32% of teachers reported having occasional voice fatigue, and 20% reported they had missed work due to voice problems. Noise of the classroom may influence teachers' function not only through voice strain but also emotionally as they receive less feedback due to inattentive students.

Demotivation is one of the results of poor classroom acoustics that has a negative effect on lecturer's teaching ability. Bebb (2009) suggested that voice fatigue and throat infections account for 11% to 16% of teacher absenteeism hence if this continue to be a problem to lecturers they end up lacking the intrinsic motivation to do their job. Other than physiological damage that will lead to demotivation, the lack of feedback from inattentive student can also be a causal factor. Kristiansen et al. (2011) propounded that background noise affect the morale of the lecture resulting in ineffective teaching methods which may result in poor performance of the students.

Nielson (2012) is of the suggestion that teachers who work in schools with poor classroom acoustics are less happy in the workplace than their colleagues in schools with standard, good, acoustics. It is Nielson's notion that when the background noise is unbearable to the teachers, the probability dissatisfaction with one's job and overall tiredness and laziness to perform required duties. These factors may affect the teacher ability to perform their duty as there do not regard themselves to be developing towards self actualisation hence less effort is exerted to conducting lectures (Maslow, 1954 as cited in Chapman, 2010).

2.5 The positive effects of background noise on attention

Background noise is often viewed as to affect cognitive performance such as attention in a negative way. However, the moderate brain arousal model, basing on stochastic resonance and dopamine suggested that a moderate amount of auditory noise benefit individuals in hypo dopaminergic states. This model has suggested that the use of a moderate amount of background noise would stimulate inattentive student to concentrate better. Stochastic resonance is also known as noise-improved signalling. Söderlund et al (2010) propounded that stochastic resonance exists in any threshold-based system with noise that requires a threshold to be passed before a signal is registered. Therefore in the case that the desired sound stimuli is so low such that it is hard to hear, a regulated limited amount noise may be presented such that much concentration is directed to the desired auditory stimuli.

The model suggests that the sore precursor of inattentiveness in children is low level firing by the dopamine neuron. Therefore if an external noise stimulus is presented possibility is that internal noise is also restore hence forth leading to restoration of dopamine neurons full function. The external noise stimuli can be referred to as white noise. In a study with Stansfeld et al. (2005) establish that traffic noise could help children with attention deficient disorder in recalling events or occurrences tied with time and place. However the study also determined that although white noise has a positive impact on inattentive students, those who are attentive would be affected negatively resulting in performance deterioration.

2.6 Theoretical work frame

2.5.1 Early Selection theories of Attention

Attention refers to an individual's brain ability to take in stimuli from our environment, categorize and organize information as significant or irrelevant, and ultimately focus the mind on one thing. Henceforth attention is the interaction between the brain and the environment selecting the most attractive stimuli presented for further processing, that is storing into memory. James (1890) as cited by Underwood (1993) defined attention saying, "It is the taking possession in the mind, in clear and vivid form, of one out of several simultaneous possible objects or trains of thought. Focalization, concentration of consciousness is of its essence. It implies withdrawal from some things in order to deal effectively with others."

For a student in a classroom, paying attention to the lecturer means filtering out as many as 40 other students and the dynamics between them and background noises. Noise refers to unwanted sound or visual stimuli which can hinder or disturb an activity that one wishes to partake. Selective attention theories are meant to explain why and how persons tend to process certain parts of their environment, while ignoring others. Hence these theories would be helpful in understanding how poor classroom acoustics that permit background noise impact on student's attention and lecturer's teaching abilities. In the progression of the research the researcher will focus on the early selection theorists of attention. This would entail the use of Broadbent's filter model and Treisman's attenuation theory in this section of the research. The researcher is going to use these models of early selection of attention to illuminate on the competing of the activities of the lecture and background noise present. However, these models can also suggest that both stimuli from the environment can receive further processing although alternation of attention is involved.

2.6.2 Broadbent's filter model

Broadbent (1958) proposed an early selection view of attention, such that humans process information with limited capacity and select information to be processed early. Broadbent was of the notion that stimuli is attended to as early as from the sensory register and filtering occurs. Broadbent suggests that stimuli from the environment compete for processing depending on basic physical properties such as pitch, colour, loudness and direction. Basing

on physical characteristics, the selective filter in the sensory register permits certain stimuli through for further processing, while unattended stimuli will be filtered out and lost.

Broadbent's filter model further suggests that only one stimulus between the competing stimuli would be processed. This notion was arrived on after studies on dichotic listening where the partaker is to wear headphones and presented with different auditory stimuli to each ear in attempt to divide attention. The participants were instructed to attend to information from one ear and overlook that from the other ear. A test was then administered to the participants which required recall of any information presented on the unattended ear. After this study Broadbent's notion of one stimuli being further processed and the unattended information being lost was supported by the participants ability to recall the information there were required to pay attention to while unable to retrieve that of the inattentive ear.

Basing on this model, when the classroom acoustics are poor it would suggest competition between information from within the classroom (that being taught) and background noise being permitted by the room. Only one between these two would receive further processing whilst the other is completely lost. This in itself suggests that with proper classroom acoustics which restricts as much background noise as possible in would eliminate it as a competing stimulus and all attention is diverted to the lecture entirely. This would possibly result in establishing reliable retrieval cues that would be useful in the final exams resulting in increase in overall performance.

This model suggests that attention works in an all or none manner in which is therefore applicable in the research as to highlight how background noise would distract the progression of a lecture. This suggests that in a classroom of which the acoustics are poor in such a way that visual and auditory distraction from outside the classroom draws the attention of students in a lecture results in them missing out in what is being taught by the lecturer. According to Broadbent's notion that only one of the competing stimuli will get through the selective flitter would suggest that in a classroom with poor acoustics background noise can be processed instead of what is being taught in the lecture such that retrieval whilst in an exam is impossible as the information would have not been processed, hence resulting in poor performance in exams.

However, this model may also suggest that background noise may not necessarily affect students attention in the case that the lecture itself is much attractive than the possible

distraction from outside the classroom. This would entail the consideration of the teaching abilities of the lecturer and the student's perspective on the lecture itself. When the students have little regard of the lecture they will probably wave their attention elsewhere. Therefore even in the presence of background noise due to poor classroom acoustics, attention can still be directed to the lecture when it's more attractive.

This model is also of the flaw in suggesting that only one stimulus receives further processing although there is the existence of divided attention. This would suggest that information from both the background noise existing due to poor acoustics and what is being taught by the lecturer can both receive further processing. This explains how individuals are able to remember and link different stimulus from different moderates. For example, in a classroom with poor acoustics that is affected by background noise, students may be able recall both the audible stimuli from outside the room and as well able to retrieve the illustrations and what the lecturer wrote on the chalkboard (visual stimuli).

2.6.3 Treisman's Attenuation theory

Treisman (1969) like Broadbent was also of the perspective of early selection of stimuli as there are attended to in the sensory register. However, Treisman disagrees with Broadbent on the notion that there is the existence of stimuli competing for further processing. Treisman argues that stimuli from different moderates, be it visual, auditory or textual, will all reach some meaningful processing. The amount of attention given to all presenting stimuli will receive meaningful processing ranging from highest to lowest depending solely on the attractiveness of one stimulus to another. Therefore Treisman refers to attenuation of all stimuli such that all information is attended to.

The attenuation theory addressed the major critic which Broadbent encountered that of accounting how an individual can retrieve or attend to different information at once. For example, when one watches the television he/she receives both visual and auditory information at once and all is attended to. The most important aspect of Treisman's theory is that attended stimuli will always undergo full processing, whereas irrelevant inputs which often have a low threshold to be fully analysed, resulting in only physical qualities being remembered rather than semantics.

One can suggest that background noise resulting from poor classroom acoustics can affect students ability to pay attention to the proceedings of the lecture. This theory would suggest

that both the background noise and what is being taught is processed, however the issue of information competing is not utterly extinguished as even when the stimuli are attenuated one will always receive much more attention than the other. There forth in the case that the background noise is much attractive to the student than the lecture, the stimulus from the background noise would receive the much more intensified processing. This would affect retrieval of information under examination situation where misinformation and inability to link information to the relative cue. This suggests the overshadowing of relevant information by that which is irrelevant.

However, this theory may also suggest that student attention is negatively affected by background noise as individuals are capable of attending to different and multiple stimuli. Hence forth in a classroom setting an individual would be able to process both what is being taught and possible auditory and visual distractions from outside the room. This would therefore suggest that background noise would not have much of an impact on students overall academic performance as information is processed. Therefore other factors such as individual characteristics or lecturers teaching ability may come into play.

2.7 Previous studies

The researcher appreciates the various studied and researches conducted that are related to the area of study. The researcher is going to recognise studies which has been conducted regionally and those conducted globally in order to learn form other scholars work.

Various African scholars have conducted researches and studies that have similarity to the current research. Seabi et al. (2013) of South African heritage carried out a study on the effects of chronic aircraft noise exposure on learner's reading comprehension in South Africa. The study seeks to understand if the effects of aircraft noise (reading comprehension) remain upon relocation away from the airport hence to determine if the effects are revisable. The study took 732 pupils with age mean of 11.1 years where exposed to the chronic aircraft noise for a two months in the year 2009. After relocation from the airport, the researcher took 650 of the 732 where re-examined after a year and in 2011 another group of 178 students were re-evaluated.

The results showed significant deterioration in reading comprehension from before the experiment and years after the study. Subsequently the researchers established that exposure to aircraft noise may have a lifelong effect on children's reading comprehension function. Seabi et al. (2013) propounded that noise which interferes with speech comprehension can cause difficulties such as lack of concentration, fatigue, irritation, misunderstandings, decreased working capacity and stress reactions. Therefore if noise from the external environment affects the learner ability to comprehend verbal information then purpose of the lecture is lost. Therefore background noise is a distraction that affects student concentration to the lecture

Klatte and Hellbrück (2010) conducted a field study which intended on analysing the impact of classroom reverberation on reading abilities, annoyance due to indoor noise, and school attitudes in second graders. A sample group of 17 second grade classrooms from 8 schools out of 60 classrooms from 18 elementary schools in the district of Stuttgart in Germany. A total of 398 participants had questionnaires and performance tests administered to. The study tests focused on reading performance, nonverbal intelligence, social and emotional attitude of school and phonological processing. Questionnaire were used as a noise detriment and parental information which had questions of the child. The results got from the study showed that pupils that learnt in classrooms with poor classroom acoustics performed dismal in phonological processes, and reported a problem of noise in the classroom and also judged their social interactions less enthusiastic. However this differed from children in the classroom with good acoustics who performed better and had vibrant relationships between themselves and with their teachers. Therefore Klatte and Hellbrück (2010) propounded that good classroom acoustics are vital in for effective learning.

Shield and Dockrell from London, England are some of the most influential scholars in the research of the effects of noise, due to poor acoustics, to children at school. The research sort to identify the effects noise and the environment had on pupils academic performance and how speech intelligibility is affected. Shield and Dockrell (2008) conducted the research by examined examining the relationship between noise intensities and the children's performance in standardized tests. The researcher also conducted experiments on pupils in different classroom setting with regard to acoustics (good or bad).

The researchers administered survey questionnaires to determine noise perception in 2000 primary schools in 2004. The questionnaires determined the children perception of noise

sources and the level at which the noise annoyed them. Upon retrieval of the questionnaires, the researchers correlated the noise perception results with the national standardized tests after four years (2008). The results of the survey showed that there was a strong positive correlation between children who reported background noise and noise annoyance with poor performance in the standardised tests. However, those who were in classroom with proper acoustics with limited access to background noise performed better in the tests.

A New Zealand perspective of the importance of classroom acoustic in the educational system is one of the influential published studies on the related research. The research by Wilson et al. (2002) aimed on identifying the classroom styles with good and poor acoustics such that appreciation of the learning environment and its effect on the pupils acquisition is recognised. The research was conducted in seven Auckland primary schools and made use of survey questionnaires which were administered to 122 teachers and speech perception tests in classrooms with access to background noise. The questionnaires results showed that 59% of teachers informed that most of the noise emanating from within the classroom is student generated. 86% of the teachers surveyed have problems with background noise from nearby road traffic, sports fields, classrooms and lawnmowers. The teachers also identified vocal strain as one of the major problem there faced. 33% of the teachers acknowledged that they often elevated their voice to be heard. The study therefore suggested that classroom acoustics affect the teachers as they face threat of voice impairment.

2.8 Knowledge gap

The research identified the existence of a huge knowledge gap on the impact of poor classroom acoustics on student attention and lecturer's teaching ability between African perspective and the knowledge of the researcher. Little has been discussed within Zimbabwe pertaining the effects of noise on the learning process. Research has dwelt much on the effects of noise pollution at a national level. Research has been conducted to determine the effectiveness of the learning environment and teaching style but in all these researches the impact of poor classroom acoustics on student attention and lecturer teaching ability has been grossly overlooked at national level. At regional levels, the impact of noise has been discussed although not to great length as focus is particularly on noise. African literature focuses much on the impact of noise on the students with little regard of the teachers themselves.

The impact of background noise from poor classroom acoustic on student attention and lecturer's teaching ability has been researched greatly in Europe and the United States of America as there seek to accommodate students with hearing and attention problems in their educational system. However, the researcher seems to address a concept that has been hovered around by most local and regional scholars and researchers hence the Afro-centric perspective on effects of poor acoustics is limited. The researcher will regard the different variations that may exist that may result in some Eurocentric perspectives and conclusion inapplicable in African contexts. Factors such as economical standpoint, technology and social inferences may influence difference in perspective.

Eurocentric literatures seem to focus much on the impact of poor classroom acoustics on children with hearing impairment and learning disorders. However, the researcher seeks to bridge the gap by further targeting the students without any hearing problems or learning disorder and focus on the general notion of the learner not being able to hear what is being said by the teacher due to excessive background noise.

2.9 Conclusion

The chapter stood as a review of the written and publicized literature of different scholars on the issues related to the current study. The chapter seeks to understand the notion of other scholars on classroom acoustics and their effects on students and their teachers. The chapter also shows the theoretical framework to be used by the researcher and its validity. Previous studies which has been conducted from different parts of the world on areas of concern of the research has be appreciated in this chapter. The researcher also established the knowledge gap between the research study and the previous studies on national, regional and global level. The next chapter will focus on the methodology in which the research may be conducted.

3.0 CHAPTER THREE-METHODOLOGY

3.1 Introduction

This chapter serves as a brief summary of how the research may be applied/ conducted practically. According to Rajasekar et al. (2013) methodology refers to the procedures by which researchers go about their work of describing, explaining and predicting phenomena. The researcher is going to stipulate the research approach may be used in order to collect information from the targeted group. Therefore these are the ways and procedures that may be used collected the views of how both students and lecturers on background noise and its effects on attention and teaching ability respectively.

3.2 Nature of study

This research will proceed in a quantitative nature. Quantitative approach which states what the processes are and how often they occur as well as the differences in their magnitude that can be measured overtime will be used in the research. Quantitative approach is defined by Aliaga and Gunderson (2000) as explaining phenomena by collecting numerical data that are analysed using mathematically based method. To authenticate the research, the results received from the research instrument will to be studied carefully and compared when being analysed. The researcher choose this approach as it appears to be able to cater for a large pool of participants, more effective in gathering and presentation of information, and ultimately analysing of the data.

Strengths

- It is useful for studying large numbers of people
- Can generalize research findings when the data are based on random samples of sufficient size
- Provides precise, quantitative, numerical data
- Useful for obtaining data that allow quantitative predictions to be made
- Data collection is quicker
- Reduce elements of researcher biasness as much basis is on statistics

- offers precise measurement and analysis

Weaknesses

- Prone to confirmation bias
- Knowledge produced might be too abstract and general for direct application to specific local situations, contexts, and individuals suggests that behavior is regular and predictable hence the nature of observation
- Many kinds of information are difficult to obtain through structured data collection instruments attempts to study behavior under controlled condition
- Self-reported information obtained from questionnaires may be inaccurate or incomplete.

3.3 Research Design

Coolican (2006) defined a research design as the manner of which arrangement of situations to effectively gather information. The research targets a rather large group of people hence the research is going to be conducted in a survey mode as it focuses on four different departments. Using a survey as the research design will help the researcher in quick and easy access to the participants hence it is convenient.

According to Scheuren (2004) survey research involves the collection of information from a sample of individuals through their responses to questions

Advantages of Surveys

- It allows the researcher to collect large some of data in a short space of time
- It is cost effective
- Can be created quickly and administered easily.

Disadvantages of Surveys

- Poor survey construction and administration can undermine otherwise well-designed studies.

- The answer choices provided on a survey may not be an accurate reflection of how the participants truly feel.
- Poor response rates can bias the results of a survey.

3.4 Target Population

A target population is as population of interest to one's study (Yount, 2006). The target population would accommodate factors such as size of the class, geographical area and individual differences (hearing impairment). The research used undergraduate students and lecturers at Midlands State University as the target population. The targeted population would be the students and lecturers from Midlands State University who use the various lecture rooms on campus. This therefore means that the target population is 15 000 plus in number. The researcher aims to get the total target population from the Midlands State University Admissions Office

3.5 Population Sample

Sampling is when a group of people or items taken from the population for examination by the researcher as a representative of the majority (Glynis et al, 2006). The sample will include both students and lectures who are predisposed to the poor classroom acoustics of the Multipurpose Hall. The research will aim and target students and lectures from the departments of Development Studies, Human Resource Management, Local Governance Studies and Psychology in level 1:2 who frequently use the Multipurpose Hall for lectures as a representative of the all Midlands State University students and lecturers.

3.6 Sampling Method

Barreiro and Albandoz (2001) propounded that a sampling method is the procedure in which participants and the way information is to be gathered is identified. The research will use probability sampling methods when identifying participants to provide required information as the target population is large. Stratified random sampling may be the type of probability sampling which can be used to carry out the research. Stratified random sampling entails the

sample containing the same proportion of each important characteristic as the study population (Swain, 2013).

The researcher favoured the use of stratified random sampling in hope of receiving diversified information base form different Departments. Stratified random sampling is also favourable to the researcher as it will ensure equal representation from the four different departments Stratification divides the sample up into separate subgroups and than selects random samples from within each group. For the sake of the research, the researcher is going to divide the four different classes into four independent strata. These strata will be the Psychology class, Human Resource Management class, Development Studies class and the Local Governance class of the level one semester two. The researcher is then going to randomly administer questionnaires to 30% of the students in each strata. This way equal representation within each strata is achieved.

3.7 Research instruments

According to Elsevier (2009) a research instrument is, “a testing device for measuring a given phenomenon such as a paper and pencil test, a questionnaire, an interview, a research tool or set of guidelines for observation”. The researcher will resort to the use questionnaires as research instrument to obtain information from the pool of sampled candidates. McLeod (2014) defines questionnaires as well structured questions which seek to investigate a particular issue. The research will make use of both close and open ended questionnaires. Close-ended questions will be used for the collection of data in this research. This is so that the data obtained is quantifiable. The questionnaires will target the learning environment, source of background noise and individual (participants) differences.

The researcher may use a What Is Happening In This Class Questionnaire. This questionnaire was first costructed by Fraser et al. (1996) with aim to bring meanness to the field of classroom environment by combining modified versions of the most salient scales from a wide range of existing questionnaires with additional scales that accommodate contemporary educational concerns (e.g. equity and constructivism).

This questionnaire was constructed after analysis of data from 355 junior high school science students, and extensive interviewing of students about their views of their classroom

environments in general, the wording and salience of individual items and their questionnaire responses (Fraser et al., 1996).

Within this study questionnaires will be used because:

Advantages

- Provides anonymity of the participating candidates
- Fast to administer
- Simple to administer
- Cost efficient

However, questionnaires may present their own shortfalls the research

Disadvantages

- Participants lack of seriousness (cooperation) resulting in spoiled papers.
- There might restrict the participant's true thoughts when desired questions are not raised.
- Return turnover time can affect the duration of the research
- They do not exactly determine truthfulness of the participant hence prone to bias

3.8 Data Collection

Data collection entails the procedures of information gathering which may occur in the course of the research. The researcher will collect data from the direct environment whilst relying on the candidate which would be selected through stratification. The researcher will collect a conformation letter from the department of Psychology to verify he is conducting this research on educational basis. An application letter is going to be drafted requesting permission to collect data at the institution. The researcher is going to approach institution administration with the application letter, department conformation letter and a copy of the research proposal.

If permission to collect data is granted, the researcher will write proposition to the student records requesting statistical information of selected group to determine the size of the population targeted. Upon getting this information the researcher will calculate the 30% of each class in order to establish the number of participants per class. The researcher will approach the respective participants (lecturers and student) to educate on the purpose of the study while pleading for their cooperation. This may be achievable through administration of a brief introductory letter. Administration of questionnaires (to both the lecturers and student) and research awareness will be conducted in their respective lectures rooms therefore consent from the lecturer will be sort.

Participants of the research are going to be chose basing on Gray and Arisan's (2006) assumption that if a population size is greater than 500, 30% should be sampled. Therefore stratified sampling will be then applied as questionnaires may be administered to 30% of the students from each level 1.2 of the four departments. Due to the limited number of lectures, questionnaires will also be administered to all lecturers form the four departments who conduct lectures in the Multipurpose Hall. Questionnaires are then going to be administered to the sample in a self-completion manner. Questionnaires are then going to be collected from the sample for analysis and presentation.

3.9 Data Presentation and Analysis

The researcher aims on conducting data presentation and analysis in order to make sense of the large amounts information acquired by the research instrument in data collection. Data will be presented in descriptive format and numerical data through the use of graphs, charts and tables. Analysis of data entails justification and verification of the relevance of the information obtained to the research topic. In this research data will be analysed descriptively in order to critically measure and show relevance to the research topic.

3.10 Ethical considerations

The researcher will acknowledge and observe ethics such as

- Anonymity of the participants will be observed by not exposing any of their personal details such as their names or student identification number of the participants.

- Informed consent will be sort from both the student participants and the lecturer's themselves. This entails that the participants have taken part in the research on their own will. Consent forms will be signed after the participants have read the introductory letter and understood the purpose of the study.
- The research will be conducted in such a way that there may be transperence of procedures to collect data and analysis of the data itself. This would be in such a way that the privacy and identity of the participants is revealed but the findings of the research are not concealed.
- The researcher is going to preserve the participants right to withdraw their contribution to the study and also the right of non participation will be observed. The research is not going to force participation from the students or lecturers but allow the participants to withdraw at any time without any persecution.
- The researcher is not going to indulge into the personal life of the participant's hence observing their right to privacy. The data collected within this study will be guided in a confidential manner and is only viable to thee research purpose only.

3.11 Conclusion

This chapter served to show the manner in which the research may be conducted. The chapter identified that the research will be quantitative in nature using descriptive survey as a research design. The chapter also highlighted the target population and sample population of the study. Stratified random sampling will be used as the sampling method. The chapter also identified the research instrument, data collection procedures, how the data will be analyzed and presented, and the ethics that will be considered.

4.0 CHAPTER FOUR-DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter serve to present and analyse the data collected by the researcher. The researcher is going to make use of tables, charts, bars and graphs in presentation of data. The presentation of the discoveries will be according to research questions. Analysis of the findings will be presented in a descriptive manner.

4.2 Presentation of questionnaire response

List of Tables

Table 4.1- Sample Population per strata

Strata	Size of class	Sample size (30%)
A (PSY)	116	35
B (HRM)	113	33
C (LGS)	133	39
D (DS)	146	43
TOTAL	508	150

The researcher randomly administered questionnaires to thirty percent of the size of every class to obtain a sample size per strata. The Development Studies class registered the highest number of participant due to the fact that it is an Arts program hence its reluctant in its recruitment procedures which results in the enrolment of a larger number of students. However, the Human Resource Management class has the lowest number of participant due to it strict recruitment demands hence have a lower class size.

Table 4.2- Response Rate for Students

Strata	Target Sample	Responses	Response Rate (%)
A (PSY)	35	34	97
B (HRM)	33	28	85
C (LGS)	39	25	64
D (DS)	43	33	77
TOTAL	150	120	80

Upon retrieval of questionnaires from the student participants, the researcher identified that the response rate for the Psychology was apparently high due to the participant the fact that they sympathised with the researcher due to similarity of degree program. The overall target sample was above average although did not meet the researchers expectation due to the unwillingness of the students to participant due to fear of implication and reluctance toward the research.

Table 4.3- Response Rate for lecturers

Target Sample	Responses	Response Rate (%)
18	18	100

The researcher obtained a hundred percent response rate from the lecturer participants in the study due to the intensity of which there are affected by the current situation. This response rate can also be attributed to the educational and maturity level of the lectures which enable them to respond effectively.

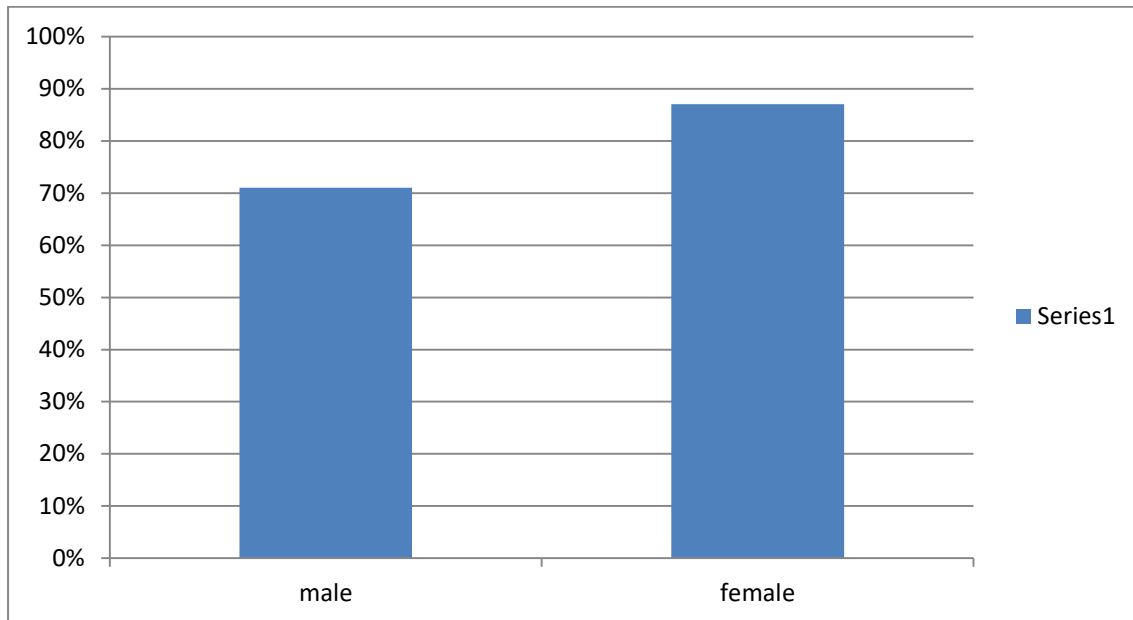
Table 4.4 - Student Demographics of Response Rate

	Target Sample	Responses	Spoils
Female	84	73	11
Male	66	47	19

The response rate for the male students was lower than those of the female due to lack of seriousness and consideration for the researcher. This resulted in much spoiled papers, however the female population responded well possible due to attraction to the opposite sex.

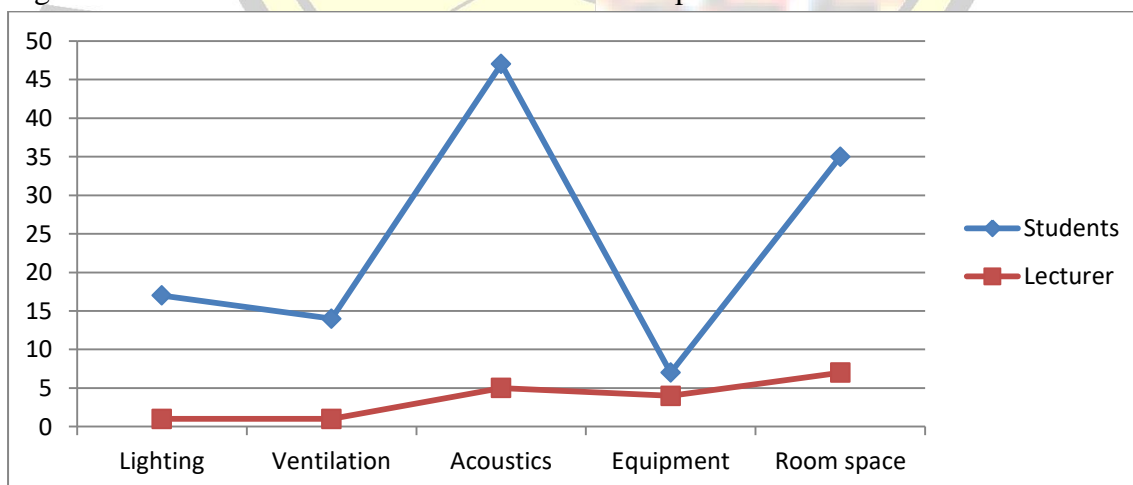
List of Figs

Fig 4.1- Response rate by gender



The histogram shows that the response rate for females students was 87% and that for males was 71%.

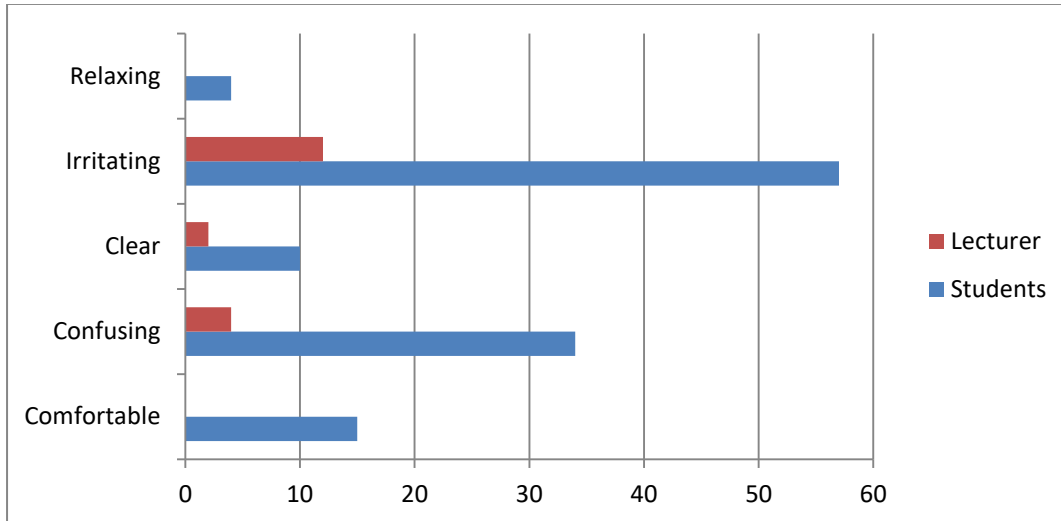
Fig 4.2- Lecturers and Student's reflection of the importance of Classroom acoustics



Line Graph showing how students identified the importance of acoustics in the learning environment due to the fact that there are not able to hear what the lecturers due to excessive

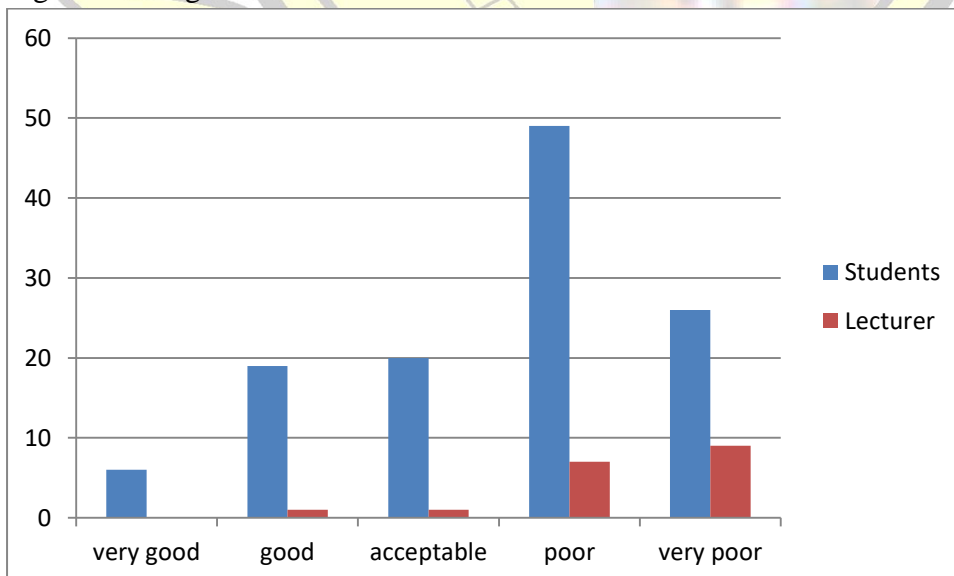
noise in the Multipurpose Hall. However, lecturers rated room space as the most important aspect as there have to possibly consider the large sizes of their classes hence need for comfort the lecture room. Lectures also consider the listening conditions for the student hence they rated acoustics second to most important aspect of the learning environment.

Fig 4.3- Attitude towards the Listening environment (Acoustics)



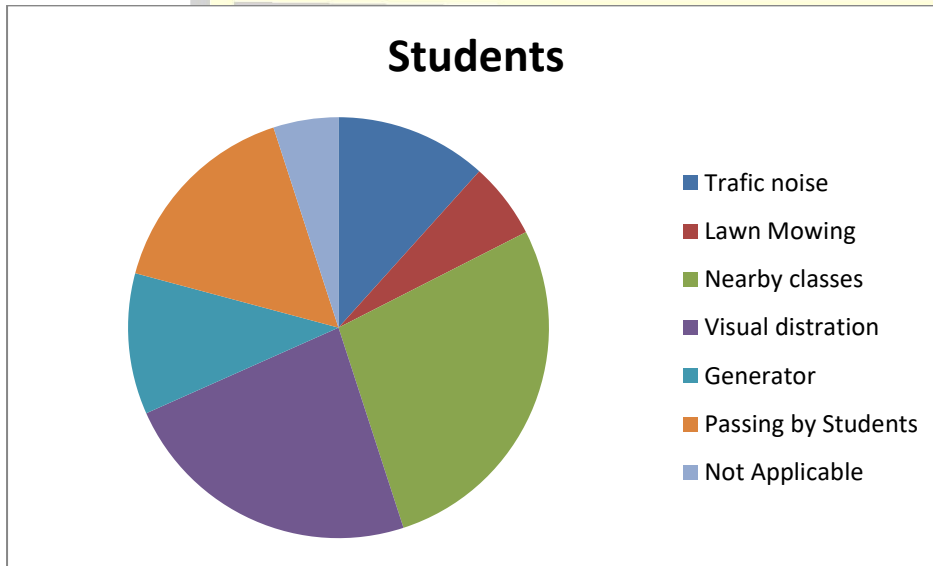
The researcher enquired of the view of lecturers and students on the listening environment. As presented in the Bar graph both the lecturers and student seem to be irritated by the environment probably due to the fact that that there are frustrated by their inability to communicate with each other due to excessive noise from outside the classroom. A limited number of the students are relaxed and comfortable in the current Multipurpose Hall possible because there have a better attention span and probably sit closer to the lecturer.

Fig 4.4- Ratings for current Acoustics



The participants were asked to rate their classroom acoustics and the researcher used a column to present the findings. Both groups students and lecturer and student rated the current Multipurpose Hall acoustics as either poor or very poor because of its incapability to eliminate background noise and visual stimuli that will possible distract students. Non of the lecturers appreciated the acoustic as very good as there have first hand recognition of how the poor acoustics is affecting performance of the students.

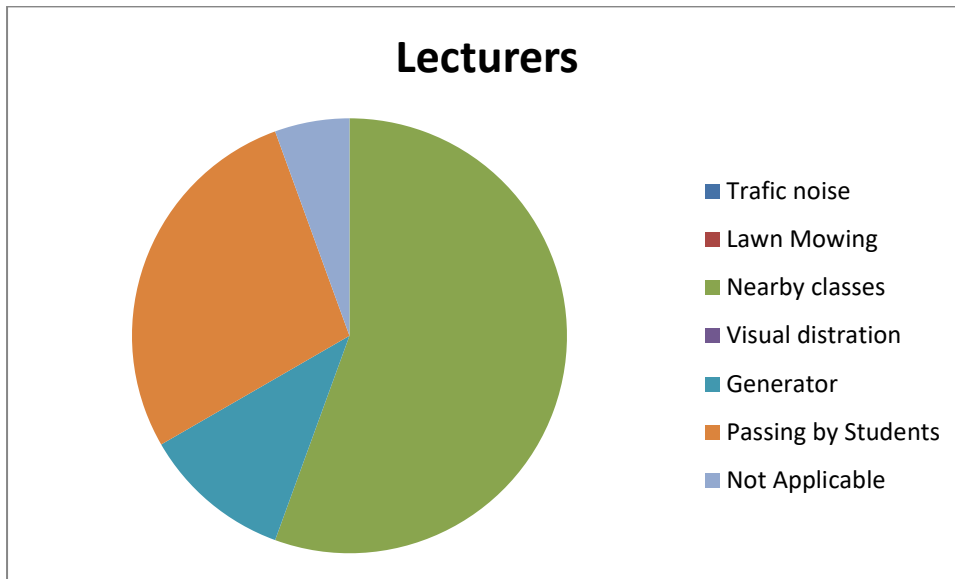
Fig 4.5-Source of background Noise (Students)



A pie chart showing sources of background noise identifies that nearby classes to be the main source of background noise into the Multipurpose Hall. This is because classes are conducted to close to each other such that proceedings of the lectures interfere with the next one. Lawn mowing was regarded as the least affecting source probably because of seasonal changes.

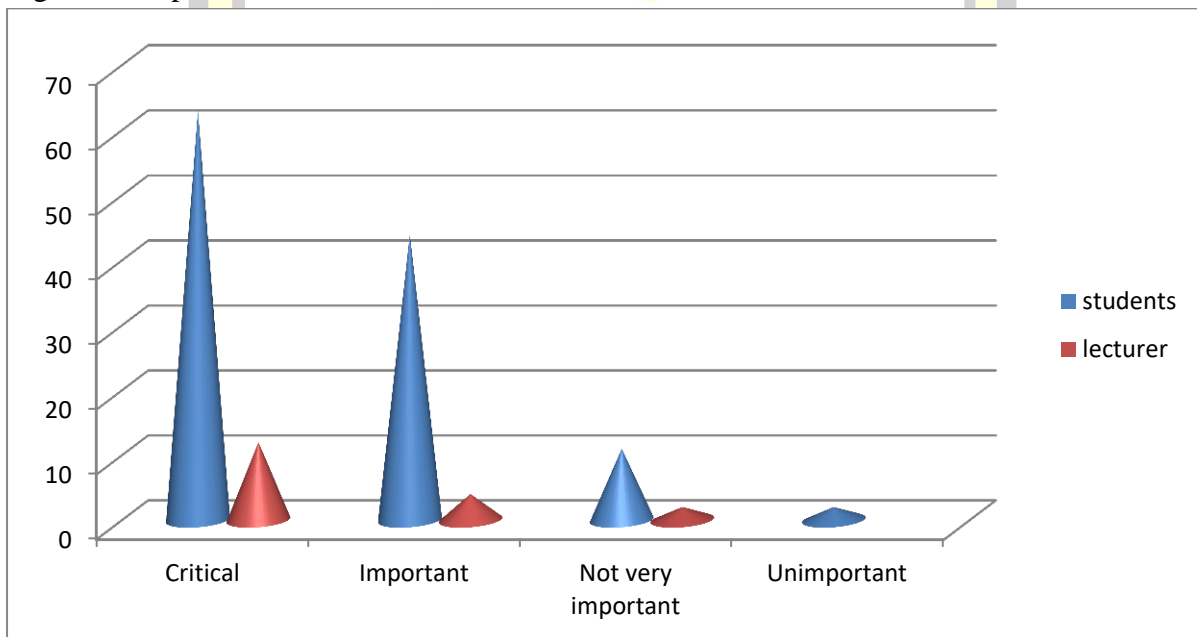


Fig 4.6- Source of background Noise (Lecturers)



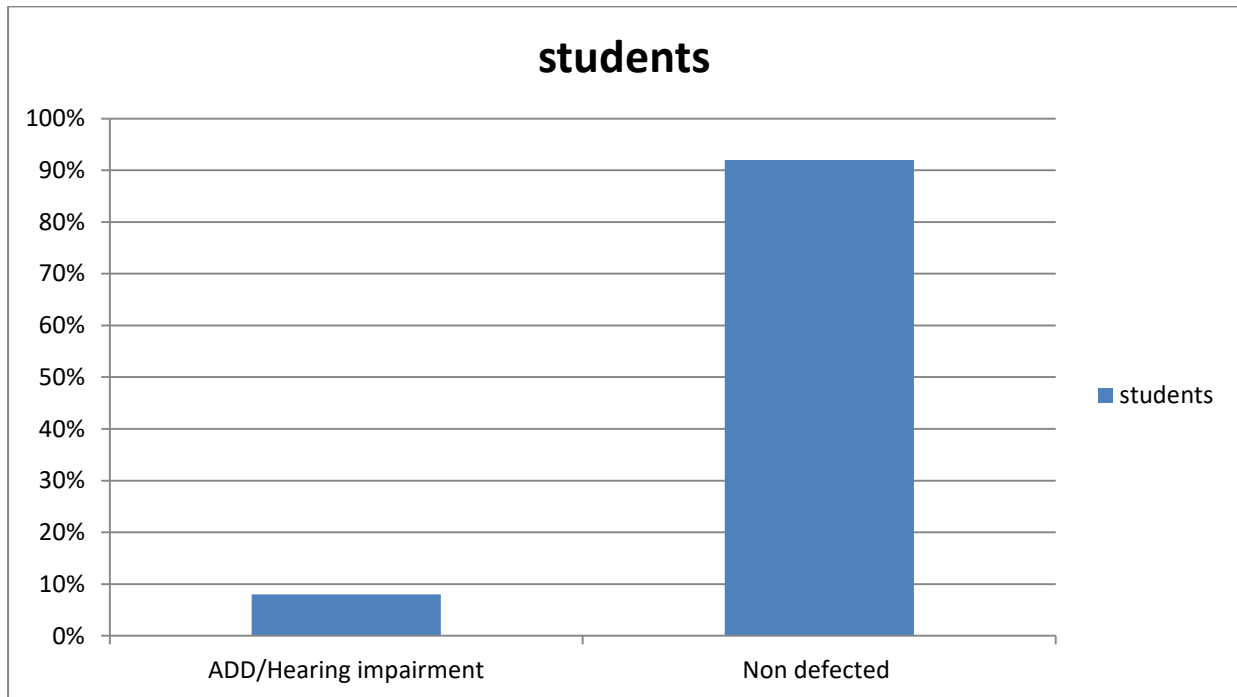
Lecturers identified their appropriate sources of background noise as well as being nearby classes hence strongly suggesting that the proximity between lectures is so small such that lecture interfere with each other.

Fig 4.7- Perspective on noise reduction



The researcher used clustered cones to present student and lecturer's perspective on noise reduction. Most of the students and lectures found the need for noise reduction as critical and important as there have suffered from the poor acoustics in the Multipurpose Hall which prevented effective communication in the learning space. However, a limited number of the lecturer did not feel the need for noise reduction probably due to their high pitched voices.

Fig 4.8- Attention Deficiency Disorder and Hearing impairment



The column shows the percentage student participants who either have been diagnosed with Attention Deficiency Disorder or Hearing impairment. The lesser group of the target population have been identified to naturally have problem with paying attention and hearing problems.

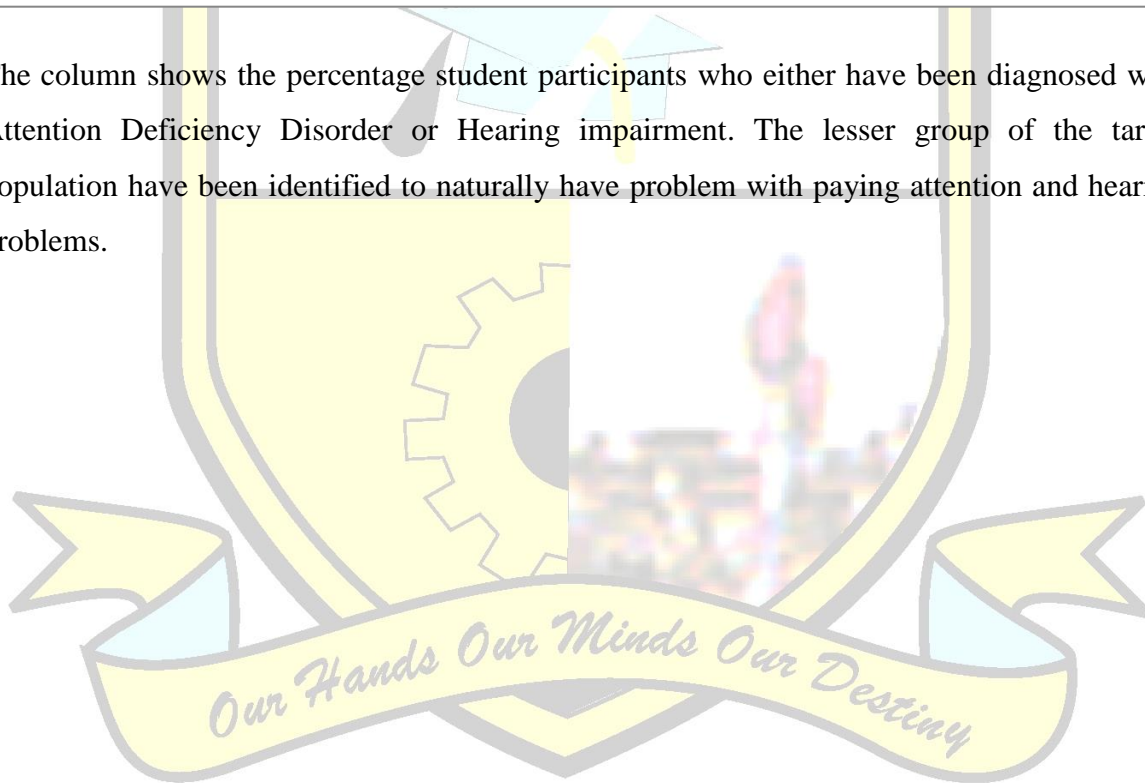
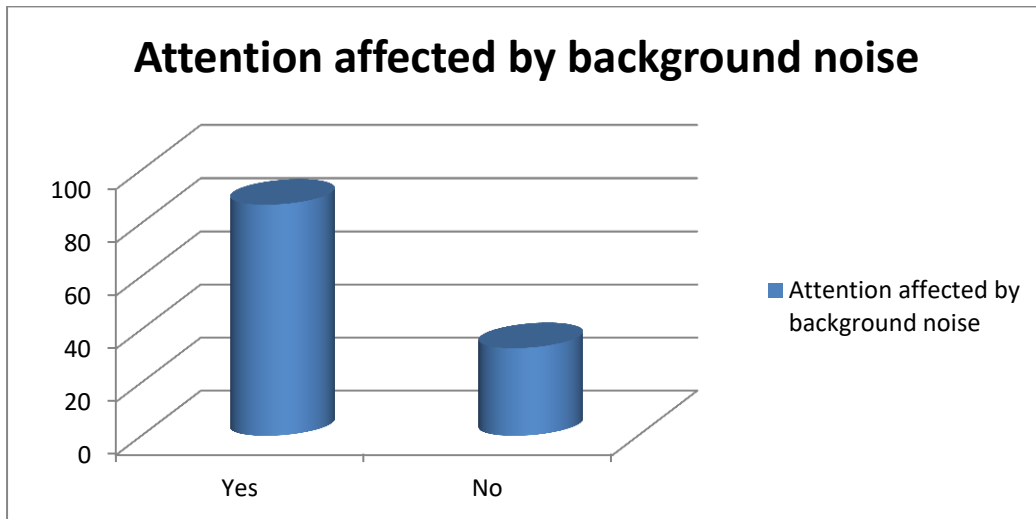
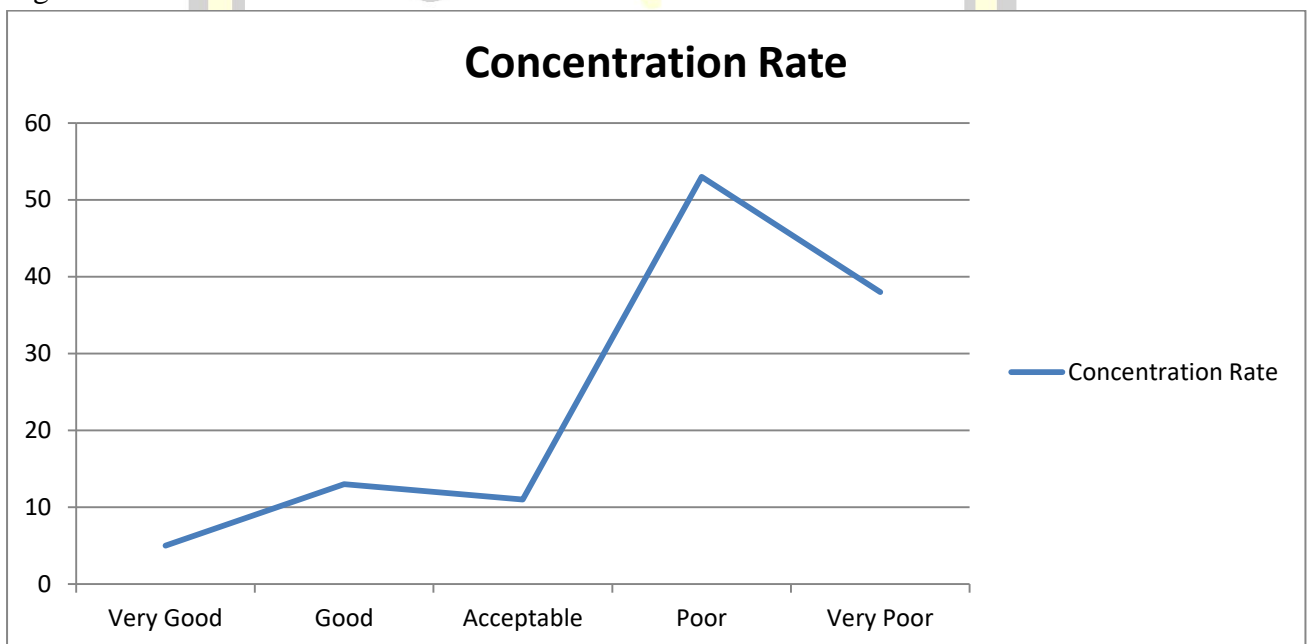


Fig 4.9- Reported background noise which diverts attention



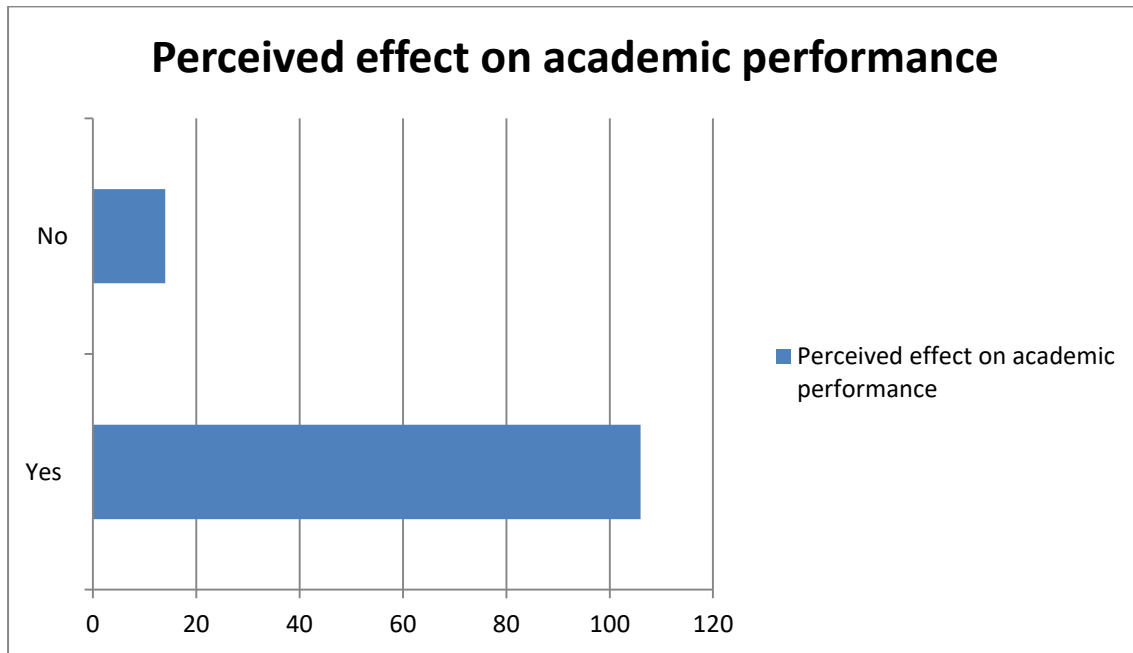
The Stacked cylinder above represents the responses to the question of whether background noise affects student's attention. A larger population of the student participates have been distracted by background noise due to the excessive exposition and probably the extent to which the lecture itself does not excite the students.

Fig 4.10- Concentration rate



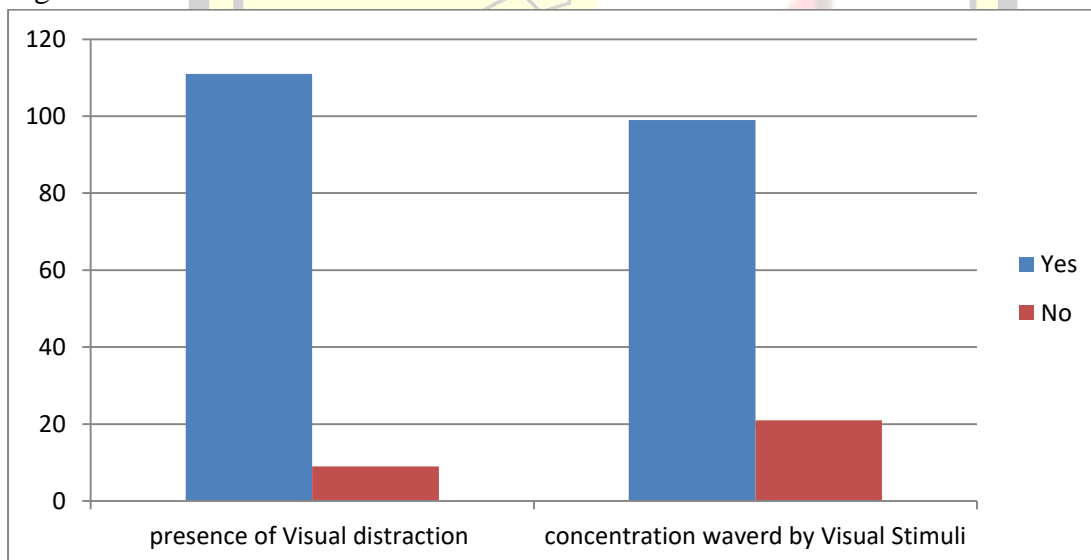
The line graph shows the number of students as they rated their ability to concentrate to the lecture if background noise is present. The rating of concentrate would suggest that noise is destructive to the students as there are not able to be fully included in the proceedings of the lecture. This suggests that those who are able to concentrate are due to influence of personal attributes.

Fig 4.11- Perceived negative effect on performance in Students



The bar graph shows the number of students and their respective belief if their academic performance is affected by background noise is apparently high than those who suggests that noise has no effect on their academic performance because of its hindrance for students to concentrate to lectures .

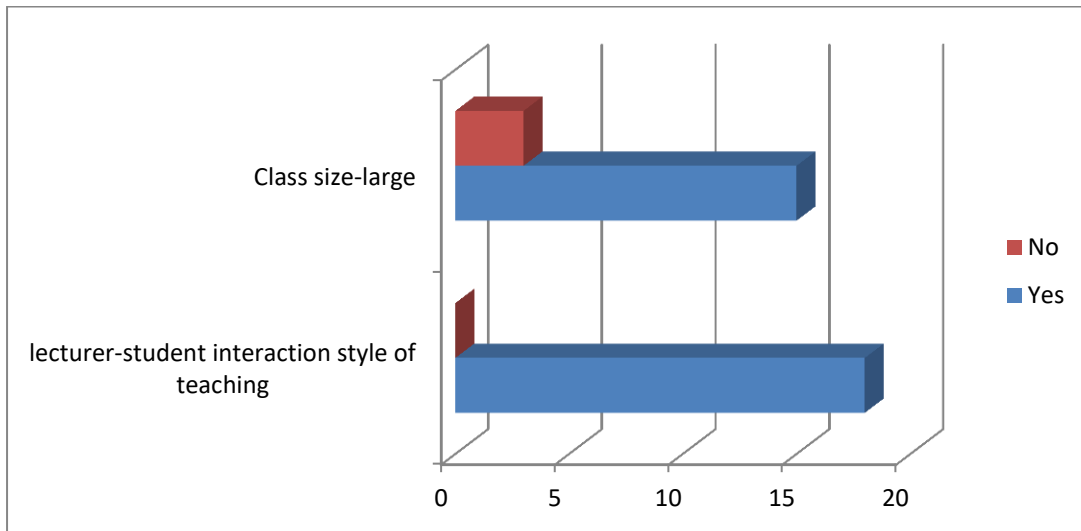
Fig 4.12- Visual Distraction and its relation with Concentration



The column above shows that the larger population of student participants identified that their classrooms were affected by various visual distraction stimuli. This is probably because of lack of demarcation walls and privacy when lectures are being conducted. The greater

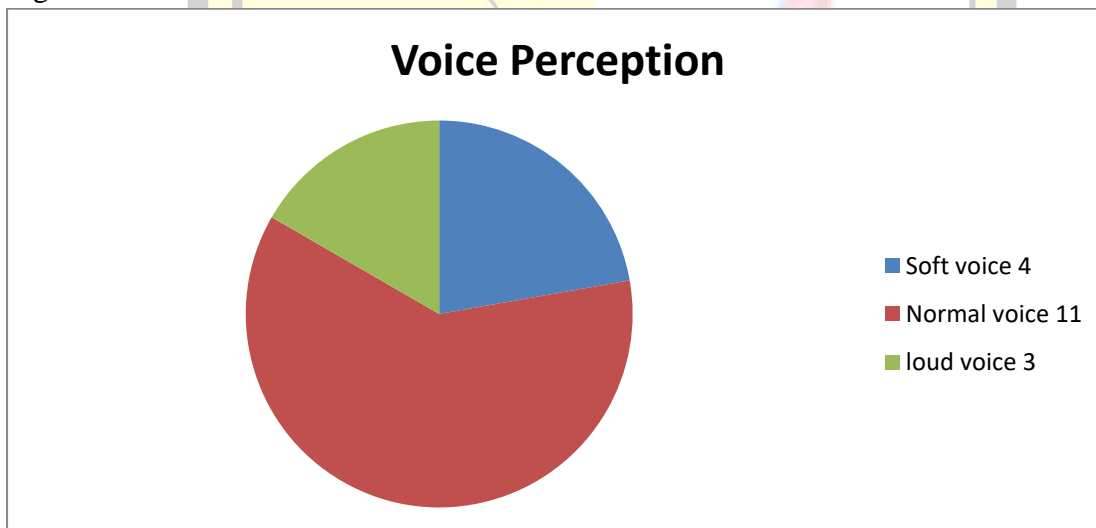
population of the students also agreed to have their attention/ concentration wavered by the visual stimuli probably through curiosity to understand what is happening around them.

Fig 4.13- Lecturers-Class size and Teaching style



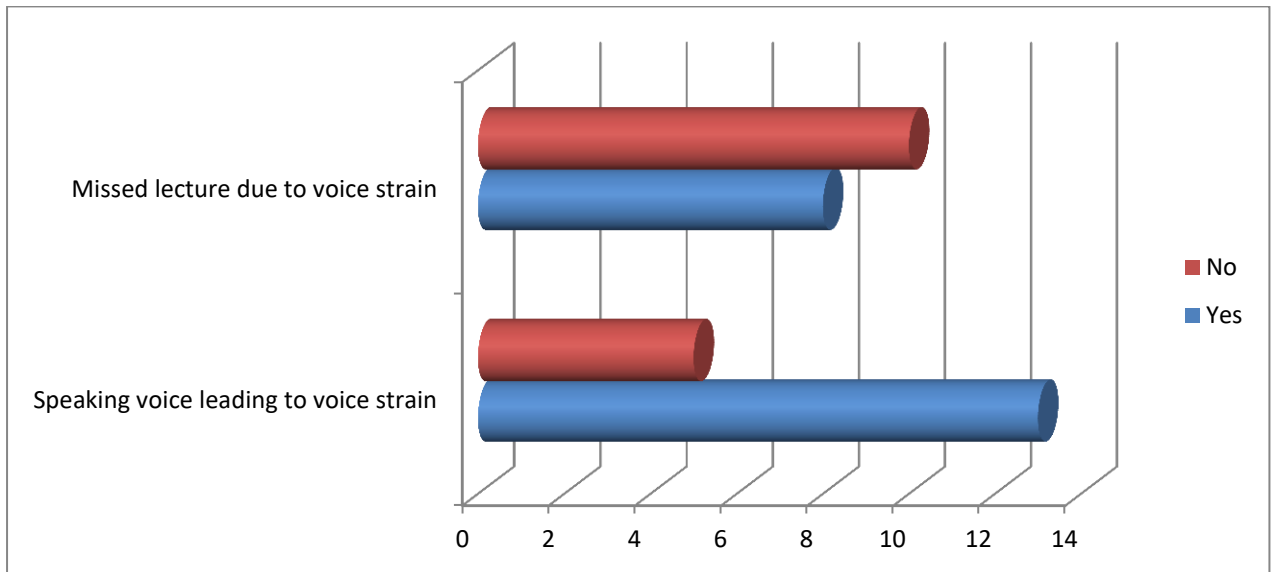
The bar graph above shows that the class sizes are large due to the constant demand put on the institution of students requiring university education. Student-lecturer interaction style of teaching seems to be familiar due to the need to obtain feedback for effective learning.

Fig 4.14- Voice Level



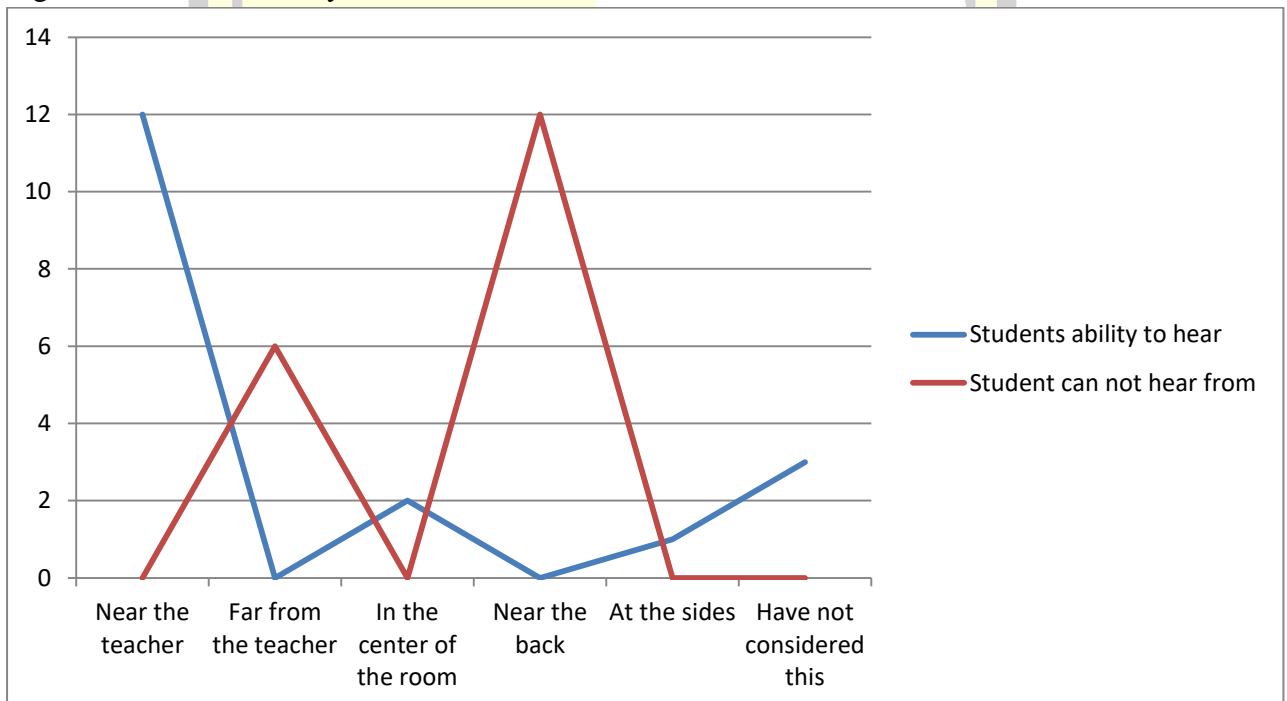
The pie chart shows that more of the students have the normal speaking voice. Those with soft speaking voice lectures are most likely to find it difficult to communicate and be audible to their large class sizes.

Fig 4.15- Voice Strain



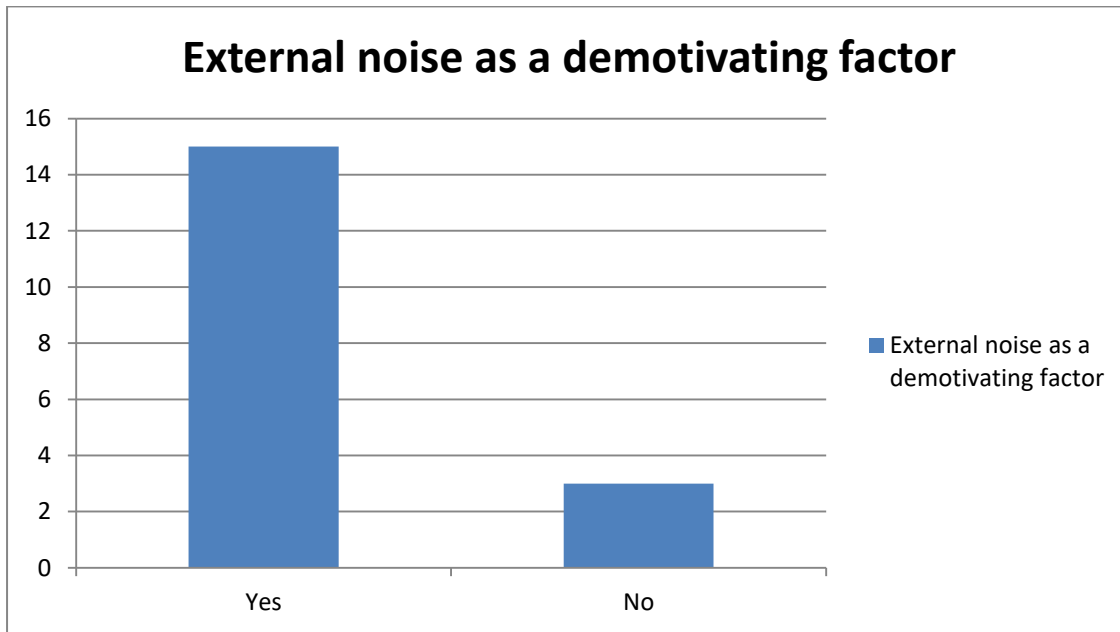
The graph shows how a large population of the lecturers have suffered from voice strain as there are forced to elevate their voice to be intelligible to their largely populated classes. However, the number of lecturers who have missed reduces due to their motivation and commitment to their cause (teaching).

Fig 4.16- Student's ability to hear the Lecturer



The line graph above shows that it is the lecturers perspective that students who sit closer to the lecture are able to understand more the instruction of the lecture than those far from them. This assumption may have been reached by the feedback the lecturers receive.

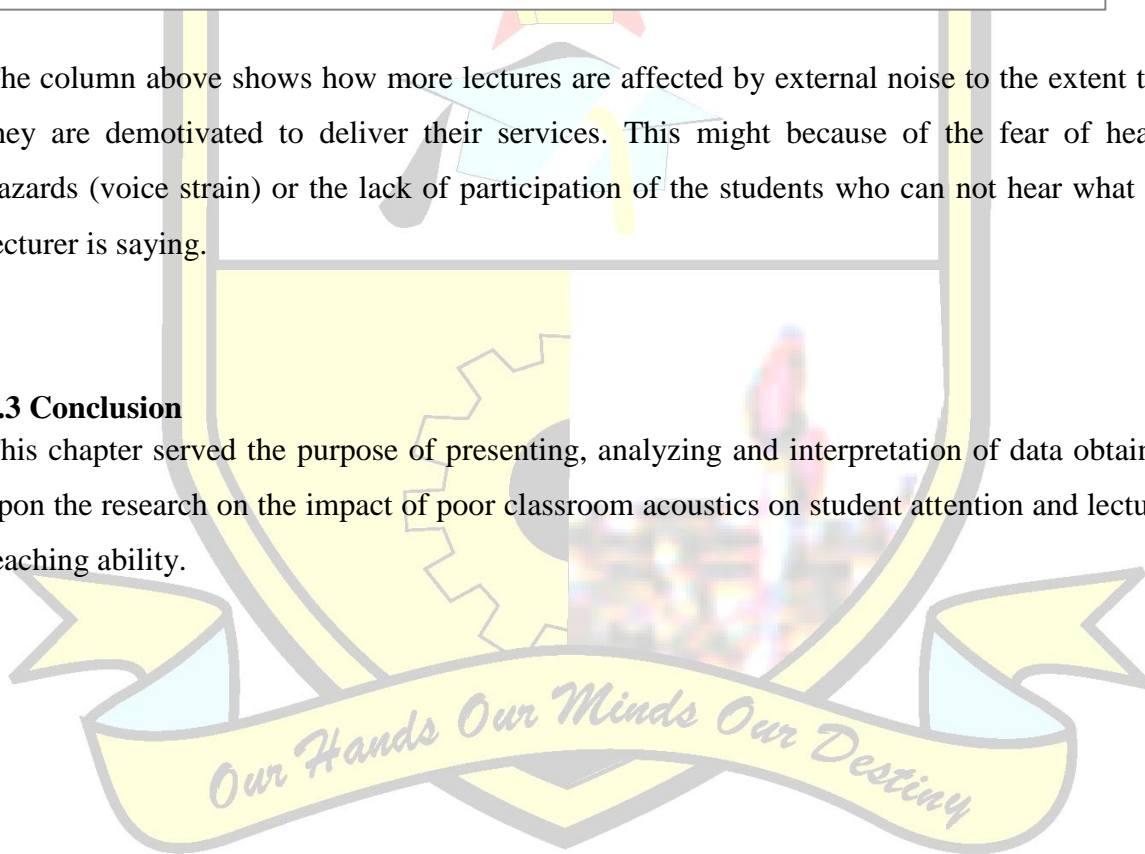
Fig 4.17- External Noise as a demotivating factor



The column above shows how more lectures are affected by external noise to the extent that they are demotivated to deliver their services. This might be because of the fear of health hazards (voice strain) or the lack of participation of the students who can not hear what the lecturer is saying.

4.3 Conclusion

This chapter served the purpose of presenting, analyzing and interpretation of data obtained upon the research on the impact of poor classroom acoustics on student attention and lecturer teaching ability.



5.0 CHAPTER FIVE- DISCUSSION OF FINDINGS

5.1 Introduction

In this chapter the researcher is going to discuss his findings in relation with the research questions such that the objective of the study is achievable. The researcher is going to further propose various recommendations to possibly ratify or eliminate the environmental effect on student's attention and lecturer teaching ability.

5.2 Discussions on findings

The research seeks to establish the impact of poor classroom acoustics on student's attention and lecturers teaching ability. Therefore the data collected aimed on researching how the Multipurpose Hall can be referred to as being poor. This was established by how the building permits background noise inside and is prone to visual distraction for students. Students attention is drawn away by background noise and visual distraction, whilst lecturers face voice strain as an occupational hazard.

5.2.1 Poor acoustics in the Multipurpose Hall

The first research question focused more on the environment of the learning process in relation to sound intelligibility in a room which Seabi et al. (2013) referred to as transition of sound waves from source to receptor . Bistafa and Bradley's (2000) notion that a classroom with poor acoustics can be identified when the background noise and the amount of reverberation in the classroom are too high or low that they interfere with learning and teaching, gives an alike description of the Multipurpose Hall. To get a better perspective on the Multipurpose Hall acoustical capabilities and worthiness, the researcher enquired from both the students and lecturers who use the building. When asked to identify which aspect of the lecture room is most important the majority of the students identified acoustics. This may be so because students value their ability to hear what the lecturer in order to understand or grasp a concept being taught. The value of effective communication has been highlighted by researchers such as Valente et al (2012) who propounded that listening is an imperative prerequisite for effective learning as information is primarily presented orally to the learners, who have conducted similar studies. However, majority of the lecturers identified room space as the most important. This may be the case because of their value of a comfortable

environment which may ensure undivided attention being paid to what they are teaching. Six of the lecturers viewed the listening environment as most important maybe because the reason that most, if not all of them use teaching styles that involve lecturer-student interaction hence effective communication is of great value. This therefore may suggest that acoustics are of great value in the learning environment than any other aspect of a classroom.

The findings of the research showed that the greater population of the student body and the lecturers themselves either viewed the listening environment as irritating or confusing probably due to the extent at which they strain themselves in trying to eliminate/overlook noise and visual distractions, and tend to fail most of the times. This therefore would result in frustration in the student's part. Lecturers may be irritated by the extent or frequencies of which they have to elevate their voices in order to be intelligible than the background noise while teaching in the Multipurpose hall. This is probably because the noise in the room does not permit effective listening. Henceforth suggesting that the building acoustics are poor is viable due to its incapability to exclude distraction.

Larsen and Blair (2008) who suggested that site planning of classrooms should immensely consider external noise sources has been stressed further by the findings. The findings show that the majority of the students identified noise from outside the room as the reason of such a deploring listening environment. This inability of the building to reduce intensity of background noise can be traced back to the structural construction of the Multipurpose Hall. The building walls permit transference of sound waves from outside the building and afford less absorption. This may be the case as the lecturer expects maximum concentration, participation and feedback from the students but the student would be drawn to the background noise and visual stimuli outside the lecture. This possibly results in student engaging in conversations in the lecture commenting on the presented distracting stimuli. The majority of the lectures identified noise emanating from classes nearby. This is so because there are too many lectures being conducted in the building at every given hour hence there are bound to interfere with each other.

The elimination or reduction of noises present in the Multipurpose Hall is critical for the development of both the students who use the building and the reputation of the university. This is so because this noise has affected the students learning inquisition hence resulting in their academic performance being negatively affected. Therefore if these noises are reduced a learning experience without any interruptions of hindrance would result in raise in

performance. This is also the perspective of the lecturers as sixteen of them either answered critical or important. This may be so because lecture yawn for an environment which permits them to deliver their services without and unnecessary hindrances and complications such as raising one's voice.

Therefore upon research of the perspective of the participants in the research, the researcher identified that the room of which can be referred to have proper acoustics would permit an effective listening environment by eliminating any unnecessary sound from out side the room that in most cases interrupt the progression of a lecture. A room with proper acoustics will also not permit any visual stimuli which are not part of the lecture. This unneeded visual stimuli will be nothing more than a distracting factor. Henceforth the researcher considers the Multipurpose Hall as lacking the appropriate acoustics to permit effective learning process for both the students and lecturers.

5.2.2 Poor classroom acoustics affects student attention

The research had also focused on whether poor classroom acoustics has any effect on student attention. Klatte and Hellbrück (2010) suggest that background noise is capable of compromise educational performance, spelling skills and reading, attention and behaviour in children. The researcher to accommodate the factor of distance from the lecture and class size, he enquired on the siting position of the participants. Most of the students out of the 38 that sit in front of the class had no problem concentrating to the lecture than those who sit at the back of the class. This has an impact in the Multipurpose Hall to the extent that 84% of the student have considered changing their sitting position (based on the research). This therefore suggest that if the class size is large those at the back will not be able to hear what the lecturer would be instructing hence tend to have their concentration easily by background noise. The findings of the research showed that eighty seven of the students had once or frequently had their attention wavered from the proceedings of the lecture. This is probably because without the ability to hear what is being taught by the lecturer, background noise tends be much more attractive to the students hence neglecting the lecture. For example, when one hears a familiar voice or an issue being discussed that pertain someone they know.

The learning space (classroom) itself should be constructed in such a way that noise from outside the class, background noise, is not permitted into the room. The outside wall of the Multipurpose Hall should be able to absorb the noise and reduce the intensity in such a way

that no interruptions are incurred. The acoustics of the Multipurpose Hall must be deemed poor as its walls do not afford this vital role. Therefore suggesting that the room's inability to extinguish sounds from outside the room results in students not concentrating on their respective lecture.

Inappropriate visual stimuli, which in this research has been identified as a form of noise, is also influential in negatively affecting the student's ability to concentrate (pay attention) to proceedings of the lecture. Findings of the research showed that one hundred and eleven of the students established that their learning environment is prone to visual distraction. Ninety-nine of these students established that they have missed a thing or two said by the lecturer whilst concentrating on visual stimuli unrelated to the lecture. This is so because with the open-plan structure of the Multipurpose Hall, most of the lectures are conducted in the absence of any demarcation walls. In an acoustical standpoint, open-plan tutorial rooms are perhaps the poorest design as students are easily distracted by visual signals that spill over from adjacent classes (Wilson et al., 2002). Visual stimuli which continuously present itself affects the concentration of the students on the lecture if it is attractive. For example, a girl passes nearby the lecture wearing revealing clothing it is going to probably turn many heads.

The researcher also dwelt into the consideration that the background noise may have a positive impact on the student who has Attention Deficiency Disorder and hearing problems. Out of the ten students who were identified to have been diagnosed with ADD and hearing problems, none of them were benefiting from the noisy environment. Most of these individuals identified that they sit in front of the room but also identified concentration being wavered by background noise. Therefore, the researcher agrees with Nelson et al. (2002) who insinuated that various institutions cater to students with Attention Deficit Disorders and hearing problems; therefore, if background noise is present in such a learning environment, these students would be affected as their ability to concentrate on the lecture would be challenged by external forces, hence refuting the use of white noise to enhance attention based on the notion that noise in its natural state can not be regulated.

5.2.3 Poor classroom acoustics affect lecturer's teaching ability

The research was also particularly concerned with how these poor classroom acoustics affected the lecturer's ability to teach effectively. Kristiansen et al. (2011) propounded that

background noise affect the morale of the lecture resulting in ineffective teaching methods which may result in poor performance of the students. In the study all of the lecturers identified that their teaching methods/style involve interaction between the lecturer and the student. This therefore would suggest the extent at which lecturers value the listening environment for effective communication. When background noise experienced in the learning space interrupts with the communication the lecturer is possibly going to get frustrated and irritated by the situation. In turn no feedback is received to the lecturer as students can not hear what he is teaching. This in itself is an effective demotivating factor to the lecturer such that their teaching effort and willingness reduced.

In the research fifteen of the lecturers suggested that their classes are large hence sixteen of them feel the need to elevate their voices such that they can be heard. Regardless of the speaking voices of the lecturers on average they are forced to elevate their voices now and there. The size of the classes for the lecturer are too large such that when presented with additional background noise the situation would worsen for the lecturer who seeks for ever student regardless of sitting position to benefit from what he or she has to offer.

Voice strain seems to be indeed an occupational health hazard as suggested by Sutherland and Lubman (2001). Midlands State University lecturers spend more than nine hours a day conducting lectures and according to the research they usually will be elevating their voices as they compete with background noises permitted by the poor acoustics and also due to the size of their classes (café effect). Teachers are also more exhausted when teachers transfer their voices to compensate for high noise levels at the end of the day of school (Tiesler&Oberdörster, 2008) In the research thirteen of the lecturers tend to strain their voices as they try to elevate their voice and eight of the lecturers have missed lectures for voice related reasons. Thus the researcher suggests that the due to these poor acoustic in the Multipurpose Hall lecturers suffer from voice strain hence there are not able to deliver lecturer, their sore purpose.

The size of the classes and intensity of background noise are influential in the inability of the lecturers to teach. The lecturers are forced to find a position of which there can be heard by the whole class. This therefore restricts the lecturer without that freedom to explore various teaching styles and illustrations. The research showed that student are probably more able to hear what is being taught or instructed when there are closer to the lecturer. However,

considering the sizes of the class everyone can not be near the lecturer. Thus there is need to target the problem at its root by addressing the Multipurpose Halls acoustics.

5.2.4 Conclusions on the Discussions

The Multipurpose was constructed without much regard given to the possibility of the learning process being affected by background noise and visual distractions. The Multipurpose Hall can be regarded to have poor acoustics because it allows noise from outside the building inside and permits visual stimuli unrelated to the lecture. These poor acoustic reduce the concentration of the students as they tend to pay attention to noise from outside the room and visual distractions which will result in affecting the performance of the students. These poor acoustics result in voice strain and demotivation of the lecturers hence affecting their ability to provide their service effectively.

5.3 Recommendations

Upon recognition of the problem of poor classroom acoustics, the researcher has come up with possible solutions of which Midlands State University can consider to rectify the situation and ensure better academic results.

- The researcher recommends the renovation of the Multipurpose Hall such that the building meets the acoustical standards. Target may be put on the exterior walls in order to achieve noise reduction through adsorption. MSU may replace the hard cardboard classroom walls by concrete and brick wall's which are able to lessen the ear-splitting and potentially disruptive activities going on outside of the classroom.
- Renovations may be more costly than the construction of new acoustical standardized lecture rooms. Therefore MSU may commit in the construction of new lecture rooms which would benefit the students and lecturer immensely.
- MSU can also resort to other alternatives in attempt to reduce noise and visual distractions if the financial power to renovate or build new lecture room is not available. The Multipurpose Hall in its open-plan manner can be improved by adding more demarcation walls in every bay's lecture area such that unrelated visual stimuli

is eliminated. This therefore would ensure closure and reduce the possibility of student lack of concentration in lectures.

- Occurrence of health hazards such as voice strain can be reduced through the use of voice amplification devices.. Sound field systems operate by elevating the lecturer's voice so students have a better chance to hear clearly the lecturer's directions. The use of sound amplification system may also increase attraction of the lecture resulting in the student switching off any concentration to background noise, as Broadbent (1958) suggest this is how attention functions.
- Midlands State University can establish measures to which reduce and even eliminate some of the sources of the background noise which has been destructive to the lectures being conducted within the Multipurpose Hall. Blocking and removing the pathways that passes by the Multipurpose Hall will result in eliminating the noise of thousands of students produce noise by their chatters as the socialize.
- Relocation of the generator which is next to the Multipurpose Hall would also ensure a quite conducive environment for effective learning at Midlands State University.
- The reduction of the sizes of classes which are enrolled in every intake hence resulting in manageable groups. This would reduce pressure exerted on the lecturer

5.4 Conclusion

The chapter focused on discussions on the impact of poor acoustics on student attention and lecturer's teaching ability. The chapter also provides recommendations to Midlands State University.

Appendix 1

QUESTIONNAIRE FOR STUDENTS

DATE: DEGREE PROGRAM:

The researcher Kumbirai Maidas Mandisodza is a fourth year Psychology student at Midlands States University conducting a research in your area (Midlands State University). This is in partial fulfillment of BSc Psychology Honours Degree that I m currently undertaking. Could you please spare your precious time to fill this questionnaire? The information acquired from this research will be used for academic purposes and will be treated with confidentiality. I deeply appreciate your co-operation and support.

Instructions.

- Do not write personal details not asked for e.g. names addresses or phone number
- Put an tick where appropriate.
- Please answer all questions.

SECTION A

Room Characteristics:

1. In your opinion what aspects of your classroom is the most important?

Lighting	<input type="checkbox"/>
Ventilation	<input type="checkbox"/>
Acoustics (Listening environment)	<input type="checkbox"/>
Equipment	<input type="checkbox"/>
Sufficient room space	<input type="checkbox"/>

2. How do you experience the listening environment in the classroom?

(Please choose the word that best describe your present room)

Comfortable	<input type="checkbox"/>
Confusing	<input type="checkbox"/>
Clear	<input type="checkbox"/>
Irritating	<input type="checkbox"/>

Relaxing

3. How do you rate your classroom listening environment?

Very good

Good

Acceptable

Poor

Very poor

4. If you answered "poor" or "very poor" what do you think is the reason why it's hard for you to hear well in your classroom?

Open plan style room

Too much echo in room

Too much noise from outside the room

Noise level produced by students too high

SECTION B

Noise sources from outside the classroom

1. Do you have any problems with outside noise entering your classroom (this includes noise from adjacent rooms)?

Yes

No

2. Identify what you may consider as sources of the outside noise? You can tick not more than one)

Traffic noise

Lawn mowing

Audible noise from other classrooms

Visual distraction from other classes

Student passing by

Generator

Not Applicable

4. How important do you think it is to eliminate or reduce these noises for your learning experience?

- Critical
- Important
- Not very important
- Unimportant

SECTION C

1. Have you ever been diagnosed with any hearing problems or impairment?

- Yes
- No

2. Have you ever been diagnosed with Attention Deficiency Disorder?

- Yes
- No

3. Which position do you usually sit in class?

- In front
- In the middle
- At the back

4. Do you regard your current learning environment as noisy?

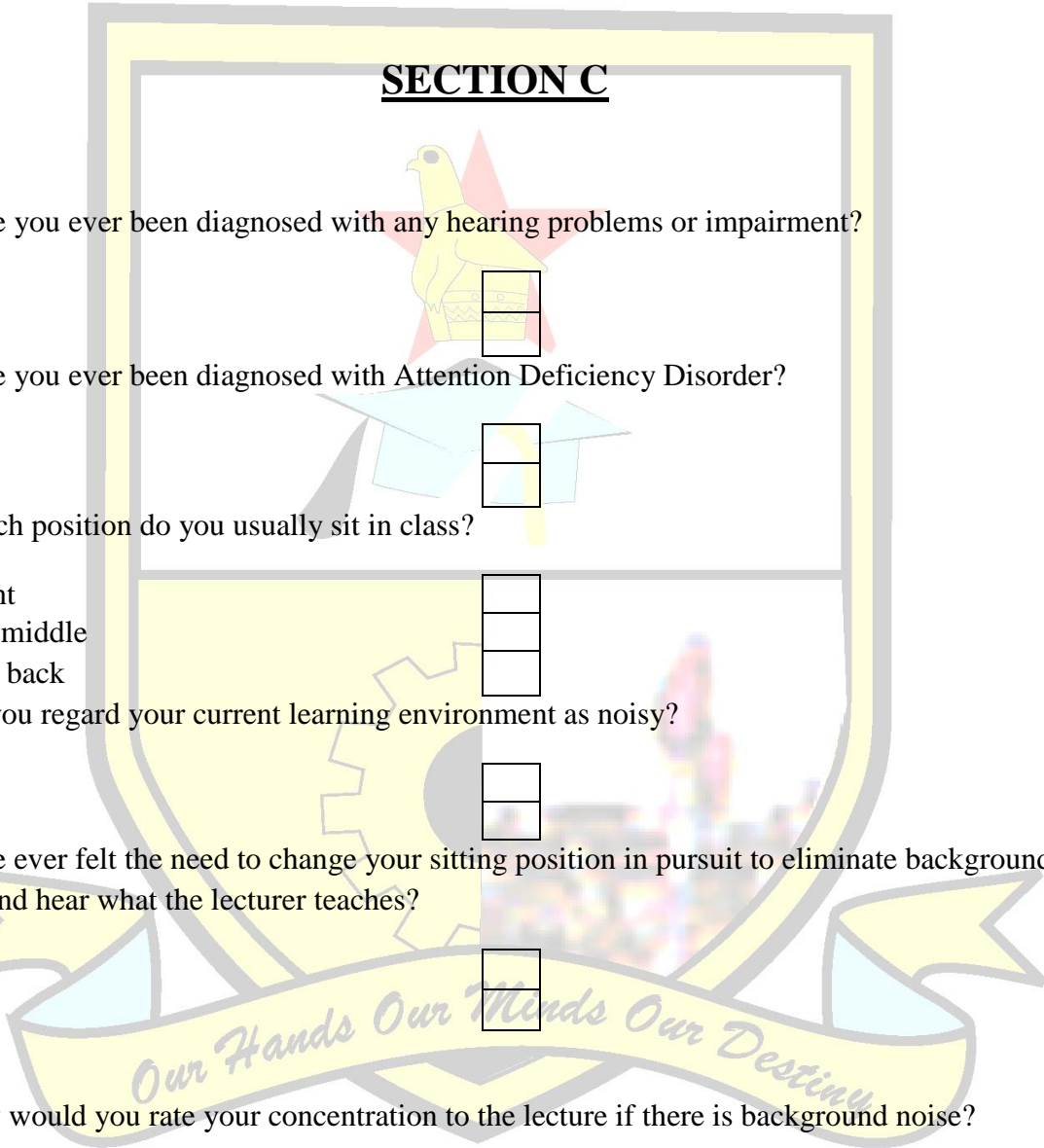
- Yes
- No

5. Have ever felt the need to change your sitting position in pursuit to eliminate background noise and hear what the lecturer teaches?

- Yes
- No

6. How would you rate your concentration to the lecture if there is background noise?

- Very good
- Good
- Acceptable
- Poor
- Very poor



7. Have you ever missed a lecture with noise as the causal factor?

Yes

No

8. Do you think that noise interrupts your learning experience and overly your academic performance?

Yes

No

9. Would you view your learning environment as being prone to visual distractions?

Yes

No

10. Have you ever missed what the lecturer has mentioned while concentrating on visual stimuli which were unrelated to the lecture?

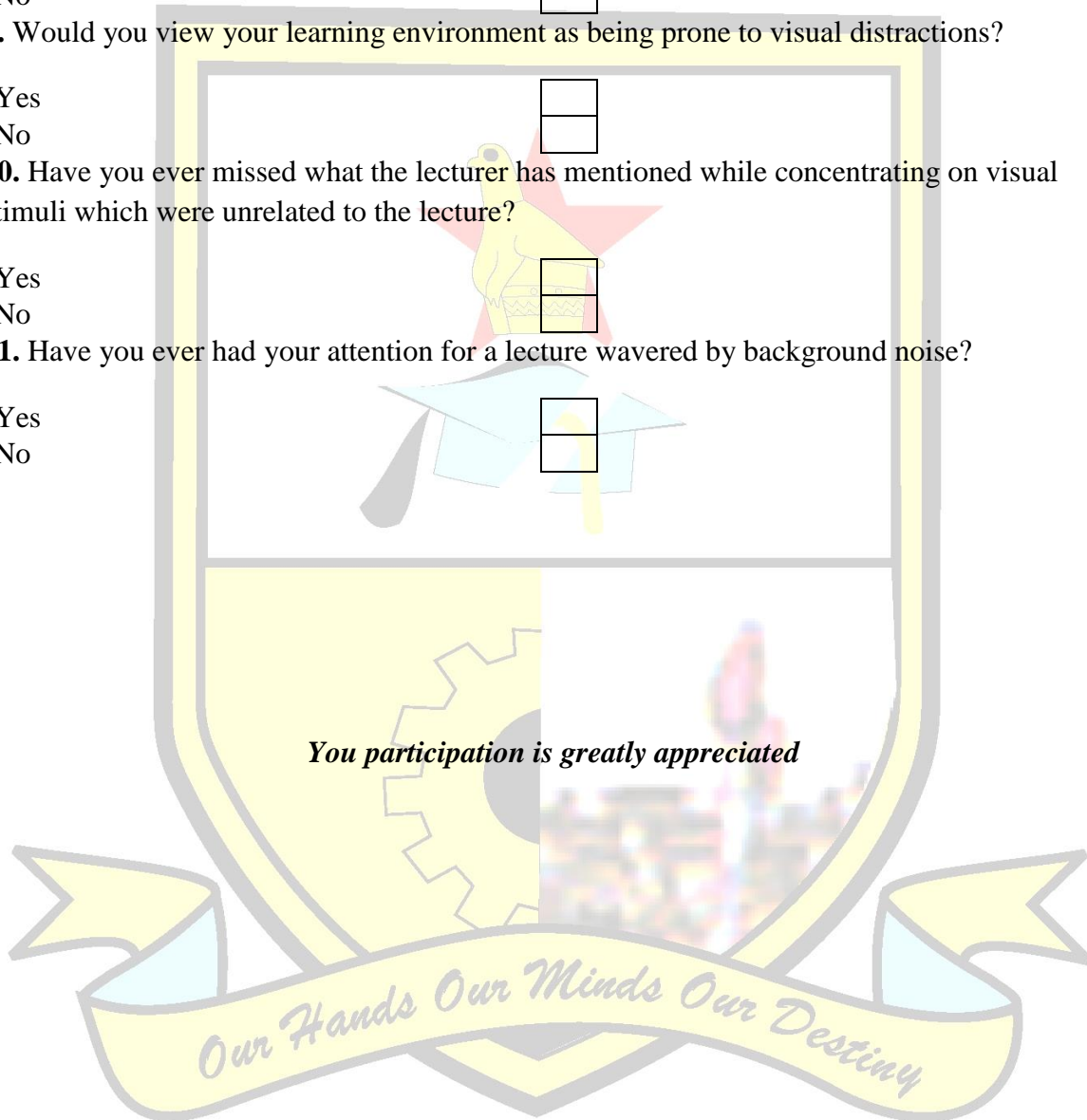
Yes

No

11. Have you ever had your attention for a lecture wavered by background noise?

Yes

No



Appendix 2

QUESTIONNAIRE FOR LECTURERS

DATE: DEGREE PROGRAM:

The researcher Kumbirai Maidas Mandisodza is a fourth year Psychology student at Midlands States University conducting a research in your area (Midlands State University). This is in partial fulfillment of BSc Psychology Honours Degree that I m currently undertaking. Could you please spare your precious time to fill this questionnaire? The information acquired from this research will be used for academic purposes and will be treated with confidentiality. I deeply appreciate your co-operation and support.

Instructions.

- Do not write personal details not asked for e.g. names addresses or phone number
- Put an tick where appropriate.
- Please answer all questions.

SECTION A

Room Characteristics:

1. In your opinion what aspects of your classroom is the most important?

Lighting	<input type="checkbox"/>
Ventilation	<input type="checkbox"/>
Acoustics (Listening environment)	<input type="checkbox"/>
Equipment	<input type="checkbox"/>
Sufficient room space	<input type="checkbox"/>

2. How do you experience the listening environment in the classroom?

(Please choose all the words that best describe your present room)

Comfortable	<input type="checkbox"/>
Confusing	<input type="checkbox"/>
Clear	<input type="checkbox"/>
Irritating	<input type="checkbox"/>

Relaxing

3. How do you rate your classroom listening environment?

- Very good
- Good
- Acceptable
- Poor
- Very poor

4. If you answered “poor” or “very poor” what do you think is the reason why it’s hard for you to hear well in your classroom?

- Open plan style room
- Too much echo in room
- Too much noise from outside the room
- Noise level produced by students too high

SECTION B

Noise sources from outside the classroom

1. Do you have any problems with outside noise entering your classroom (this includes noise from adjacent rooms)?

- Yes
- No

2. Identify what you may consider as sources of the outside noise? You can tick not more than one box)

- Traffic noise
- Lawn mowing
- Audible noise from other classrooms
- Visual distraction from other classes
- Student passing by
- Generator
- Not Applicable

4. How important do you think it is to eliminate or reduce these noises for the students?

Critical

Important

Not very important

Unimportant

SECTION C

1. Would you regard your teaching style to involve lecturer-student interaction?

Yes

No

2. Do you consider your class as being rather large?

Yes

No

3. When teaching would you consider yourself to have?

A soft speaking voice

A normal level speaking voice

A loud speaking voice

4. How often is it necessary for you to elevate your voice to be heard clearly?

Always

Often

Sometimes

Never

5. Does the level at which you need to speak seem to strain your voice?

Yes

No

6. Have you ever missed a lecture for voice strain related reasons?

Yes

No

7. From where in the classroom do students appear to be able to hear your instructions best?

Near the teacher	<input type="checkbox"/>
Far from the teacher	<input type="checkbox"/>
In the centre of the room	<input type="checkbox"/>
Near the back	<input type="checkbox"/>
At the sides	<input type="checkbox"/>
Have not considered this	<input type="checkbox"/>

8. From where in the classroom do students seem to have most difficulty hearing?

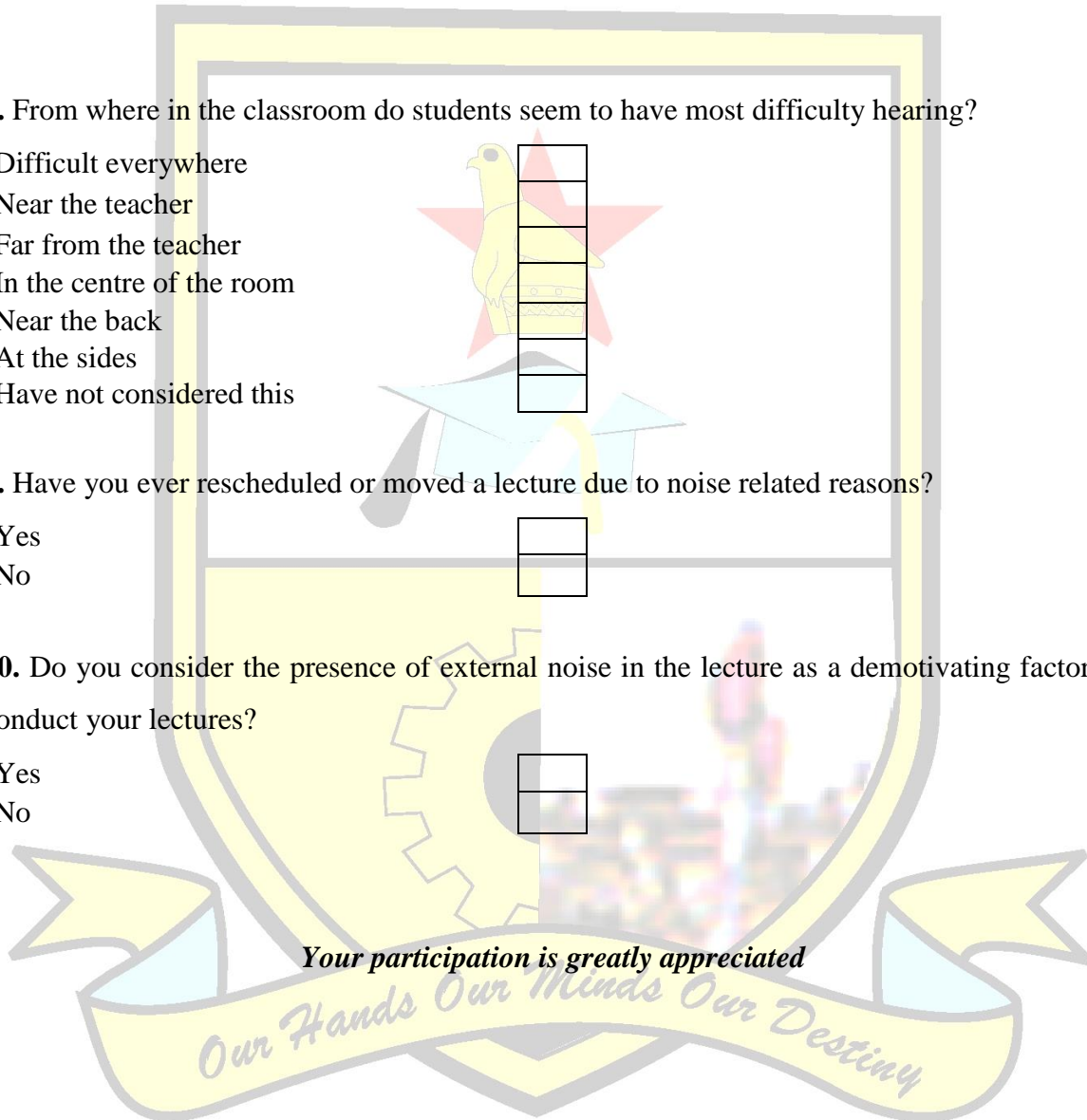
Difficult everywhere	<input type="checkbox"/>
Near the teacher	<input type="checkbox"/>
Far from the teacher	<input type="checkbox"/>
In the centre of the room	<input type="checkbox"/>
Near the back	<input type="checkbox"/>
At the sides	<input type="checkbox"/>
Have not considered this	<input type="checkbox"/>

9. Have you ever rescheduled or moved a lecture due to noise related reasons?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

10. Do you consider the presence of external noise in the lecture as a demotivating factor to conduct your lectures?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>



Reference List

- Accredited Standards Committee S12, Noise. (2002). *American national standard: Acoustical performance criteria, design requirements, and guidelines for schools (ANSI S12.60-2002)*. Melville, New York: Acoustical Society of America.
- Acoustics (2011). In *American Heritage Dictionary of the English Language*. Retrieved from <http://heritage.oed.com>
- Bebb, B. (2009) Classroom Acoustics Affect Students and Teachers. *Canadian Teacher Magazine*, 172(8), 28-30.
- Bistafa, S. R. & Bradley J. (1999), *Reverberation time and maximum background-noise level for classrooms from a comparative study of speech intelligibility metrics*, Institute for Research in Construction–Acoustics National Research Council–Canada.
- Bistafa, S.R., and Bradley J.S. (2000). “Predicting reverberation times in a simulated classroom,” *Journal Acoustics of America*. 108,
- Bradlow, A., Krauss, N., & Hayes, E. (2003). Speaking clearly for children with learning disabilities: sentence perception in noise. *Journal of Speech Language and Hearing*. 46: 80-97.
- Broadbent, D. (1958). *Perception and communication*. London: Pergamon Press.
- Coolican, H. (2006). *Introduction to Research Methods in Psychology*, London: Hodder Education.
- Crandell, C. C., & Smaldino, J. J. (1999). Acoustic modifications for the classroom. *The Volta Review* 101(5), 33-46.
- Crandell, C., Smaldino, J., & Flexer, C. (1995) *Soundfield Amplification: Theory and Practical Applications*. California: Singular Publishing Group
- Creswell, W (2003). *Research design qualitative, quantitative and mixed approaches*. New York, USA :Sage Publishers.

- Davis, D. & Davis, C. (1991). Audio measurements. In G. Ballou (Ed.), *Handbook for sound engineers: The new audio cyclopedia 2nd edition*. Indianapolis: Howard W. Sams.
- Dockrell, J., & Shield, B. (2006). Acoustical barriers in classrooms: the impact of noise on performance in the classroom. *British Educational Repertory Journal* 32: 509-525.
- Earthman, G. I. (2004). Prioritization of 31 Criteria for School Building Adequacy. *American Civil Liberties Union Foundation of Maryland*. Retrieved online on 03 January 2015 from <http://www.aclumd.org/aTop%20Reform/EarthmanFinal110504.pdf>.
- Fisher, K. (2004). Re-voicing the Classroom: a spatial manifesto. *Forum*, vol. 46, no.1, pp.36–38. Retrieved online on 03 January 2014 from <http://www.wwwwords.co.uk/forum/>.
- Fraser, B. J., Anderson, G.J. & Walberg, H.J. (1982). *Assessment of learning environments: manual for Learning Environment Inventory (LEI) and My Class Inventory (MCI)*. Perth: Western Australian Institute of Technology
- Fritz, J. B., Elhilali, M., David, S. V. & Shamma, S. A. (2007). Auditory attention-focusing the searchlight on sound. *Opinion in Neurobiology*, 17:1–19
- Fritz, J., Shamma, S., Elhilali, M., & Klein, D (2003) Rapid task-related plasticity of spectrotemporal receptive fields in primary auditory cortex. *National Neuroscience Journal*, 6:1216-1223.
- Klatte, M., Hellbrück, J., Seidel, J. & Leistner, P. (2010). Effects of classroom acoustics on performance and well-being in elementary school children: A field study. *Environment and behaviour* 23, 67-102.
- Knecht, P., Whitelaw G., & Feth L. (2002). Background noise levels and reverberation times in unoccupied classrooms: Predictions and measurements, *American Journal of Audiology*. 11, 65–71.

- Larsen, J. B., & Blair, J. C. (2008). The effect-of classroom amplification on the signal-to-noise ratio in classrooms while class is in session. *Language Speech and Hearing Services in Schools*, 39(4)
- Massie, R., & Dillon, H. (2006). The impact of sound-field amplification in mainstream cross-cultural classrooms: Part 1 - Educational outcomes. *Australian Journal of Education*, 50(1), 62-77.
- Mohammad Moslemi Haghghi¹, LohEe Chiao², Mahmud Bin Mohd Jusan³ International Journal of Modern Engineering Research (IJMER) www.ijmer.com Vol.2, Issue.4, July-Aug. 2012 pp-2557-2560
- Nabelek, A.K., & Pickett, J.M. (1974). Monaural and binaural speech perception through hearing aids under noise and reverberation with normal and hearing-impaired listeners. *Journal in Speech and Hearing* 17,724-739.
- Nabelek, A.K., & Nabelek I.V. (1994). *Room acoustics and speech perception*” in *Handbook of Clinical Audiology*, 4th ed., edited by Katz, J. (2001). Baltimore: Williams and Wilkins.
- Nelson, P. (2003). Sound in the classroom: Why children need quiet. *ASHRAE Journal*, 45, 22-28.
- Nielsen, M. H. (2012) *Poor classroom acoustics drive teachers away*. <http://eab.sagepub.com/content/early/2011/12/11/0013916511429700>
- Olsen, W.O. (1988). *Classroom acoustics for hearing-impaired children,*” in *Hearing Impairment in Children*, edited by Bess, F.H. (1998). New York: York Press.
- Picard, M., and Bradley, J. S. (2001). Revisiting speech interference in classrooms. *Audiology* 40, 221–244.
- Purdy, S. C., Smart, J. L., Baily, M., & Sharma, M. (2009). Do children with reading delay benefit from the use of personal FM systems in the classroom? *International Journal of Audiology*, 48(12).
- Rajasekar, S., Philominathan P., Thanjavur , P. & Chinnathambiar, V. (2013) Research Methodology . [physics.ed-ph] rajasekar@cnld.bdu.ac. 14 Oct 2013

- Rosenberg, G. G. (2010) Classroom Acoustics. *Seminars in Hearing* 31 (3): 188-202
- Seabi, J., Cockcroft, K., Goldschagg, P. and Greyling, M. (2013) A prospective follow-up study of the effects of chronic aircraft noise exposure on learners' reading comprehension in South Africa. *Journal of Exposure Science and Environmental Epidemiology*, 25, 84–88; doi:10.1038/jes.2013.71.
- Seabi, J., Goldschagg, P., & Cockcroft, K. Does aircraft noise impair learners' reading comprehension, attention and working memory? A pilot study. *Journal of Psychology in Africa* 2010; 20: 101–104.
- Shield, B., & Dockrell, J. (2004). External and internal noise surveys of London primary schools. *Journal Acoustics Society of America*, 115: 730-738.
- Shield, B., & Dockrell, J. (2005). Environmental noise and children's academic attainments. *Environment and Behaviour journal*. Retrieved 15 September 2014 from <http://www.acoustics.org/press/149th/shield.html>.
- Shield, B., & Dockrell, J. (2008). The effects of environmental and classroom noise on the academic attainments of primary school children. *Journal of Acoustic Society of America*, 123: 133-144.
- Söderlund GBW, Sikström S, Smart A: Listen to the noise: Noise is beneficial for cognitive performance in ADHD. *J Child Psychol Psychiatry* 2007, 48:840-847.
- Söderlund, G. B. W., Sikström, S., Loftesnes J. M., Sonuga-Barke, E. J. (2010) The effects of background white noise on memory performance in inattentive school children licensee Stockholm: BioMed Central Ltd.
- Treisman, A. M.; Riley, J. G. (1969). "Is selective attention selective perception or selective response? A further test". *Journal of Experimental Psychology* 79 (1): 27–34.
- Treisman, A.M (1969). Strategies and models of selective attention. *Psychological Review* 76 (3): 282–299
- Valente, D .L., Plevinsky, H. M., Franco, J. M., Heinrichs-Graham, E.C. & Lewis, D. E. (2012) Experimental investigation of the effects of the acoustical conditions in a simulated classroom on speech recognition and learning in children. *Journal of Acoustical Society of America*. 2012 131(1): 232–246.

Wilson, O., Valentine, J., Halstead, M., McGunnigle, K., Dodd, G., Hellier, A., Wood, J., & Simpson, R. (2002). *Classroom acoustics: A New Zealand perspective*. Wellington: The Oticon Foundation in New Zealand

Zentall, S.S., & Zentall, T.R. (1983) Optimal stimulation: A model of disordered activity and performance in normal and deviant children. *Psychology Bulletin*, 94:446-471

