



## THE IMPACT OF CLASSROOM ACOUSTICS ON TODDLERS' COMMUNICATION AND ACTIVE PARTICIPATION DURING TEACHING

Panagiotis J. Stamatis<sup>1i</sup>,

Afrodite V. Ntouka<sup>2</sup>

<sup>1</sup>PhD, Associate Professor,

University of the Aegean,

1 Demokratias Ave., GR-851 32,

Rhodes, Greece

<sup>2</sup>PhD Student,

University of the Aegean,

1 Demokratias Ave., GR-851 32,

Rhodes, Greece

### Abstract:

The present study aims at approaching a special issue from the field of communication literacy. Specifically, it intends to investigate the acoustics in kindergarten in regard to communication and active participation of toddlers during the teaching process. Within the theoretical framework of this study, there are approaches related to the main characteristics of classroom acoustics and their impact on toddlers' communication, despite the lack of relevant studies on preschool education. After theoretical approaching the description of a study and its main stages follows, which are the method of the study including data collection instrument and sample. Actually, this is a case study based on a sample which consisted of toddlers and kindergarten teachers working with toddlers in municipal kindergartens. The results of the study reveal that classroom acoustics such as noise, eco, volume of teacher and/or children voice has an impact on toddlers' communication and active participation during teaching as they strongly affect the quality of teaching and classroom climate as well.

**Keywords:** classroom management, classroom noise, classroom acoustics, kindergarten, teaching process

### 1. Introduction

Teaching conditions are strongly connected to kindergarten and school classroom climate that is related to future health promotion and wellbeing of a classroom participant.

---

<sup>i</sup> Correspondence: email [stamatis@rhodes.aegean.gr](mailto:stamatis@rhodes.aegean.gr)

Excellent teaching conditions are usually supporting learning processes, school management and policy structures, plus to the students' stay and activity with the most appropriate manner. According to literature, many factors may influence the quality and effectiveness of teaching process. One of the mentioned factors is classroom acoustic. When the classroom acoustic is inadequate either because it isn't properly constructed or because the children are overly agitated the preschool teacher is unable to discipline them (Plevin, 2019; Morrison, Nichol, & Rammage, 1994). For any reason that may happens, a variety of problems arises, which usually affect negatively the communication and active participation of pupils of all ages and especially the toddlers, if this misbehavior happens during the teaching process. Classroom noise and bad acoustics harm current toddlers' and teachers' health and their future attitudes about democratic way of living and wellbeing (Stamatis, 2018).

American Speech-Language-Hearing Association (ASHA) stresses that *"hearing and understanding are important parts of the learning process. This means that it is hard for students to learn in noisy classrooms. Noise in the classroom is more than student talking. There are other factors that make it hard to hear and understand in the classroom. These factors are related to classroom acoustic, that is a term used to talk about how sound travels in a room. It is known that there are factors in the room design that may make sounds louder or softer. Examples include floor rugs, ceiling type, and air ducts. Two things cause poor classroom acoustics: too much background noise (i.e. sounds such as cars and lawnmowers, students talking in the hallway etc.) and/or too much reverberation, i.e. how sounds act in a room after they first happen. However, there are ways a teacher to reduce noise and improve classroom acoustic because it is important to keep the classroom as quiet as possible for all children. A quiet classroom helps teachers and students. Teachers also do better if there are good classroom acoustic. Talking in a loud classroom strains the teacher's voice and may lead to voice problems."*

Within this context, the aim of the present study is to investigate the impact that may have acoustics in kindergarten in regard to the communication and active participation of toddlers during a teaching process. Literature has revealed that although classroom acoustics have been a research concern in the past, it hasn't been sufficiently focused on the field of preschool education, which is the child's first contact point with formal teaching process. Also, the related literature to this subject has shown that, while the impact of climate in teaching communication has been in general investigated, individual parameters such as lighting and acoustics have been studied insufficiently in kindergarten. For this reason, the present study attempts to examine classroom acoustics and the ways they influence effectively the active communication and participation of toddlers in teaching process. This study attempts to investigate whether acoustics and noise developed in the classroom from various sources may influence or not the communication and active behavior of toddlers, by attracting their interest during teaching or by preventing it.

There is always the risk of creating intense noise from the teacher's and children's voices, as the modern teaching process enables to develop freely the dialogue between the teacher and all students and to express any concern during the teaching. At the same

time, effective teaching, as it is a mental process, requires to be carried out peacefully, without disturbing noises, requires necessary moments of serenity that will allow children to think, work silently, co-operate without creating any form of annoyance. Modern teaching cannot be based on classroom noise, on prevalence of conditions that don't foster the lesson and disturb the teacher and children. Hence, both the limitation of all noises and the problematic acoustics, whether originate in or out of the classroom, must be treated drastically and decisively. As ASHA stresses there are some simple ways to make a classroom quieter. These ways include *"rugs or carpet to be placed in the room, curtains or blinds to be hanged in the windows in addition to soft materials such as felt or corkboard on the walls, noisy equipment to be turned off when it is not in use, noisy light fixtures must be replaced, soft tips on the bottom of chairs and tables must be placed etc."* These matters are extremely interesting in preschool teachers' education.

How do kindergarten teachers and toddlers perceive the concept of classroom noise? Are they seeking for increasing or reducing noise to the minimum possible? What are the main sources of causing noise in the classroom? Is classroom noise tolerated? Do acoustics and classroom noise affect the interest of teachers and toddlers for the teaching process? Do acoustics and classroom noise affect the children's mood to communicate with the teacher and the other toddlers? What are the consequences of the lack of classroom noise management to the active participation of toddlers during the teaching process? What good practices are proposed for confronting the problem effectively? Have preschool teachers been appropriately educated or trained how to control kindergarten classroom acoustics during teaching process? These are some of the most fundamental questions that are being investigated in this study.

## 2. Method

This study is based on literature and empirical data. As a result, an overview of the relevant bibliography is first undertaken focusing on the subject of classroom noise management. This is the basis of the main study as it outlines the key points of a long-term approach to the subject. The subject of the study has become a major concern for the educational community, being linked to the conditions of teaching, which is considered to be one of the essentials for an effective educational procedure.

In the next stage of process of the present study, a list of questions, in the form of structured interviews, which was the data collection instrument, were addressed to kindergarten teachers and toddlers, which took place in kindergartens under the permission given by educational authorities and participated children's parents. The questions were intended to investigate their views on the issues raised in the research questions, as they were mentioned in detail within the section of instruction. The sample was consisted by twenty (20) preschool/kindergarten teachers (women all) who were been appointed in municipal nursery centers sited on the island of Rhodes during the school year 2019-2020. According to demographics of the participated teachers, four (4) of them were aged between 25-30 years, seven (7) between 31-35 years, five (5) between

of 36-50 years, just one (1) between 46-50 years and the rest three (3) were aged more than 50 years.

The study consisted of two parts. Data collection tool of the first part of the study was an improvised questionnaire, consisted of twelve (12) questions. Ten (10) of them were closed-ended questions as the teachers had to answer YES or NO. The last two (2) open-ended questions asked teachers to identify the actions and the practices they have implemented in their classroom and also, the practices they proposed in order to reduce classroom noise. The tool for the second part of the study, which involved toddlers, was also a three-question questionnaire, based on six recordings, through which researchers attempted to examine how toddlers perceive and respond to classroom noise and their attitude towards it.

The researchers after interviewing each teacher and toddler by calling them one by one in a specially configured room, introduced their answers anonymously on a numbered answer sheet in order to facilitate the input of data to the computer and their statistic process. Then, when all interviews were completed, the researchers process the answers statistically, using the SPSS v.22.0 statistical package and analyze the results at the level of descriptive and inductive statistics, correlating the views of toddlers, in regards to the classroom noise during teaching. Similarly, the views of kindergarten teachers on the same subject and in relation to their educational and professional profile were also exported. Finally, the actions they had done and the practices they had implemented in their classroom were exported, as well as the practices they proposed to reduce classroom noise, in case they consider it is a real teaching problem.

### **3. Results**

As observed in the following Table 1, the research questions are presented in a statement-like form. In the same table the exact results related to the provided answers given by the participants to the statements in this study are also presented. Specifically, in regards to statement 1 it seems the majority of the preschool teachers doesn't know even the scientific field in which classroom acoustics are belonged to, despite all of them believe that classroom acoustics like the classroom noise affect the teaching process and toddlers' behavior as shown by the results extracted by the statements No 2, 3 and 4.

Furthermore, noises bother teaching. As a result, many interruptions are taking place during teaching, as shown the results extracted by the answers of statement No 5. Preschool teachers are in awareness that toddlers can percept the differences existing between classroom acoustics. They trend to receive this under consideration in their teaching plan in accordance with acoustic dynamics developed in their own classroom. Teachers do this for two main reasons. First, because they know that classroom acoustics affect their communication quality with toddlers. Second, because toddlers' participation to teaching activities is affected as shown by the percentages related to the statements No 6, 7, 8, 9 and 10.

**Table 1:** Close ended statements (questions) provided by nursery school teachers about classroom acoustics

St. No	Statements	YES n	% fn	NO n	% fn
1	Classroom acoustics belong to the field of non-verbal communication.	6	30	14	70
2	Classroom acoustics affect the teaching process.	20	100	0	0
3	Children react to different sounds in the classroom.	20	100	0	0
4	Toddlers' reaction is a result of the classroom acoustics.	13	65	7	35
5	Teaching process is interrupted because of many sound stimuli.	16	80	4	20
6	Children perceive the different levels of classroom acoustics.	12	60	8	40
7	Teachers include different levels of classroom acoustics to their teaching plan.	16	80	4	20
8	Classroom acoustics affect teacher's communication with toddlers.	16	80	4	20
9	Classroom acoustics affect toddlers' active participation within teaching process.	15	75	5	25
10	Appropriate teaching plan would help teachers eliminate negative aspects of classroom acoustics.	12	60	8	40

In the following Table 2, results of the provided statements of the participants are included. Participants in this study were been requested to answer in two personal answers. The first question (see the 11th one in Table 2) was actually: "In which teaching activities are the negative impacts of classroom acoustics mostly considered?" Answers reveal that in activities taking place in "Circle Area Time" higher impact is noted compared to all other teaching activities. The second question (see the 12th one in Table 2) was about to examine «In which activities are the different levels of classroom acoustics integrated? » In this question the majority of preschool teachers stated that they try to include various levels of classroom acoustics in all activities they run.

**Table 2:** Open ended statements (questions) provided by nursery school teachers about classroom acoustics

Q. No	Questions	n	% fn
11	In which teaching activities are the negative impacts of classroom acoustics mostly considered?		
a	In all activities	5	25
b	"Circle Area Time" – Narration – Instructions for an activity	8	40
c	Narration of a fairy tale – Musical activities - Free play	5	25
d	Rebuke a child	2	10
12	In which activities are the different levels of classroom acoustics integrated?		
a	Depends on the activity	6	30
b	Narration of a fairy tale – Musical activities	2	10
c	In all activities	12	60

In Table 3 that follows, the answers of toddlers are noted. Toddlers were been requested to reply in three questions. Within each question two voice recordings had been connected. In first recording, the tone of voice was examined in combination with

external classroom noises that detract children's attention and bother teaching process that toddlers attend. The results of the answers provided indicate that toddlers can understand that differences in teacher's voice tone, may be so due to classroom external noises which force teacher to increase the tone of her voice as she tries achieving her voice become heard by toddlers.

After listening the second recording, toddlers were asked about the vocal meaning of hmm, amm, etc. uttered by teachers. Actually, toddlers were asked to reveal their beliefs on how they consider this kind of sounds. Do teachers like to use this in a tricky way against the annoyance of classroom noise, just taking the needed time for better organizing their thinking? Or these sounds are indications that teachers are not quite ready to say or do what is needed at the specific time that is the time of teaching? Alike to the first question, toddlers strongly believe that teachers use hmm, amm etc. in order to have the time for better organizing their thoughts and prepare themselves for speaking efficiently, i.e. toddlers believe that teachers seeking to find the most efficient way to express personal thoughts and utter the appropriate words in any instance.

Finally, after toddlers listened to the third recording, they were asked about the reason that make preschool teacher to increase the volume of her voice. Most of toddlers (63%) believe that teachers speak loudly inside the classroom in order they are able to put the noisy children into the right order. The rest of the toddlers believe that teachers' high vocal volume is related to various classroom noises that teachers try to cover for avoiding teaching interruption.

**Table 3:** The answers of toddlers

<b>1<sup>st</sup> recording:</b> «How many times do I have to say that you must be quiet when we are at the circle time area? ».	<b>Not quiet (t.1)</b> n	% fn	<b>External noise (t.2)</b> n	% fn
<b>Question:</b> «The teacher is nervous because you are not quiet or because she can't hear you, due to the external noise? What do you think? »	42	42	58	58
<b>2<sup>nd</sup> recording:</b> «Hmm can somebody tell me ammm, what time of the season hmmm do we have? ».	<b>Can't think clearly (v.1)</b> n	% fn	<b>Leaving time (v.2)</b> n	% fn
<b>Question:</b> «The teacher uses hmm, amm, because she can't think clearly due to the classroom noise, or she lets you time to think? »	27	27	73	73
<b>3<sup>rd</sup> recording:</b> « Now, we will make a group task. Please, everybody seats in his seat! ».	<b>Classroom noise (wp.1)</b> n	% fn	<b>Misbehaving (wp.2)</b> n	% fn
<b>Question:</b> «The teacher is shouting so you can hear her due to the classroom noise or because you are misbehaving? ».	37	37	63	63

#### 4. Conclusions

Despite any methodological constraints, this research aims to show trends concerning the perceptions of preschool teachers and toddlers about kindergarten classroom noise and their attitudes towards it. Through the study the views of toddlers are revealed on whether or not they adopt a positive attitude towards the classroom noise seeking for its creation or a negative one, wishing to minimize or even eradicate it. The study has also shown the initiatives of toddlers about classroom noise and illustrated the views of toddlers about the acoustics of the classroom, as well as the noise that is developed in it. Also, it sends light to the fact that noise which is caused by indoors or outdoors school sources affects toddlers' interest for the teaching process they attend.

Furthermore, research revealed what toddlers believe about the content of classroom activities and their willingness to communicate with the teacher and their classmates. Moreover, it has found out the degree of disintegration of toddlers due to classroom noise so as regulations for addressing the problem of classroom noise are proposed. Finally, the present study revealed the consequences related to inability of noise management in kindergarten by teachers, both for the communication and active participation of toddlers during teaching process. The outcomes of this study are of great interest within educational community, researchers and teachers working in the field of pre-school education, because they can provide literature with useful knowledge for further studies and better classroom management. This is extremely important to teachers' teaching effectiveness and professional development. Moreover, research outcomes are considered crucial to improve educational matters and pre-school aged children achievement, as they are connected to health classroom conditions and wellbeing and to innovative teaching and learning methods within kindergarten teachers' education and their life-long training.

In conclusion, the general inference of the present study is a designed training program for preschool teachers for better pedagogical handling of a noisy situation, which would contribute positively to the improvement of their teaching quality, to the improvement of their pedagogical climate, while improving their relations and, consequently, the improvement of the democratic spirit in the preschool class. Let us not forget that children need to cultivate their communication skills and their ability to communicate in a comprehensible and effective way.

Notwithstanding any limitations, the conclusions of the present study highlight - as an existing trend- the importance of classroom acoustics because they have an impact on toddlers' communication and active participation during teaching procedure. Thus, preschool teachers need to attend appropriate education or a training program specialized on noise classroom management in order they are able to handle the negative consequences which inappropriate classroom management acoustics usually create. Consequently, the present study could be a trigger for a larger sample research and, perhaps, it would greatly improve the quality of the educational procedure in preschool childcare centres, in kindergartens and furthermore in every subsequent school level.

### About the Authors

**Dr. Panagiotis J. Stamatis** (BA, BA, PGDE, PhD) is an Associate Professor of Communication Education at the Department of Preschool Education Sciences and Educational Design, University of the Aegean, Greece. His studies are focused on preschool and elementary school education. His main research interests are concentrated on the field of instructional and family communication and on school communication violence approaching it as a barrier for addressing bullying and bias problems among children and/or teachers. He has long term experience in school teaching, school administration and school counseling.

**Afrodite V. Ntouka** (BA, MEd) is a PhD student at the Department of Preschool Education Sciences and Educational Design, University of the Aegean, Greece. Her main studies are focused on Preschool Education and Educational Design. She has experience on toddlers' care and toddlers' activities organization.

### References

- American Speech–Language–Hearing Association (ASHA). Available at <https://www.asha.org/public/hearing/Classroom-Acoustics/>
- Berg, F. S., Blair, J. C., & Benson, P. V. (1996). Classroom Acoustics: The Problem, Impact, and Solution. *Language, Speech, and Hearing Services in Schools*, 27, 16-20.
- Boothroyd, J. (2011). *Loud or soft? High or low?: A look at sound*. USA: Lernerclassroom.
- Brophy, J. (2006). History of research on classroom management. In C. M. Evertson & C. S. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 17-43). Mahwah, NJ: Lawrence Erlbaum Associates.
- Canter, L. (2009). *Assertive Discipline: Positive Behavior Management for Today's Classroom*. USA: Solution Tree.
- Crone, D. H., Horner, R. H., & Hawken, L. S. (2004). *Responding to behavior problems in schools: The behavior education program*. New York: Guilford.
- Frank M. G., Griffin D. J., Svetieva E., & Maroulis A. (2015). Nonverbal Elements of the Voice. In A. Kostić & D. Chadee (Eds), *The Social Psychology of Nonverbal Communication* (pp. 92-113). Palgrave Macmillan, London.
- Knapp, M. L., & Hall, J. A. (2010). *Nonverbal Communication in Human Interaction*. 7th Ed. Boston, MA: Wadsworth CENGAGE Learning.
- Leppänen, K., Ilomäki, I., & Laukkanen, A.-M. (2010). One-year follow-up study of self-evaluated effects of Voice Message™, voice training, and voice hygiene lecture in female teachers. *Logopedics Phoniatrics Vocology*, 35(1), 13-18.
- Linsin, M. (2013). *The classroom management secret: And 45 other keys to a well-behaved class*. San Diego, CA: JME Publishing.
- Martin, S. & Darnley, L. (2018). *Voices in education*. UK: Compton Publishing.



- Marzano, R., Marzano, J. S., & Pickering, D. J. (2003). *Classroom management that works: Research-based strategies for every teacher*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Morrison, M. D., Nichol, H., & Rammage, L. (1994). *The Management of Voice Disorders*. Springer.
- Nelsen, J., Lott, L., & Glenn, H. S. (2013). *Positive Discipline in the Classroom: Developing Mutual Respect, Cooperation, and Responsibility in Your Classroom*. USA: Harmony.
- Nusseck, M., Richter, B., Spahn, C., & Echternach, M. (2017). Analysing the vocal behaviour of teachers during classroom teaching using a portable voice accumulator. *Logopedics Phoniatics Vocology*, 43(1), 1-10.
- Pellow, S. (2004). *A guide for using too much noise in the classroom*. USA: Teacher Created Resources.
- Plevin, R. (2019). *Take Control of the Noisy Class: Chaos to Calm in 15 Seconds*. Life Raft Media.
- Rantala, M., Hakala, S., & Sala, E. (2015). Classroom noise and teachers' voice production. *Journal of Speech, Language and Hearing Research*, 58(5), 1397-1406.
- Senechal, D. (2012). *Republic of noise: The loss of solitude in schools and culture*. USA: R&L Education.
- Shield, B. B., & Dockrell, J. E. (2008). The effects of environmental and classroom noise on the academic attainments of primary school children. *The Journal of Acoustical Society of America*, 123(1), 133-144.
- Simonds, C. J., & Cooper, P. J. (2011). *Communication for the classroom teacher*. USA: Allyn & Bacon.
- Stamatis, P. J. (2013). *Communication in education*. Athens: Diadrassi Publications.
- Stamatis, P. J. (2015). *Preschool and early primary school pedagogy: Communicative dimensions of the educational procedure*. Athens: Diadrassi Publications.
- Stamatis, P. J. (2018). Classroom noise and miscommunication as modern forms of violent communication and bullying. In P. J. Stamatis and E. N. Nikolaou (Eds.), *Violent communication and bullying in early childhood education* (pp. 93-113). New York: Nova Science Publishers.
- Stenberg, R. J., & Williams, W. M. (2009). *Educational psychology*. USA: Pearson.
- Towler, A. J. (2003). Effects of charismatic influence training on attitudes, behavior, and performance. *Personnel Psychology*, 56(2), 363-381.
- White, K. W. (2016). *Teacher communication: A guide to relational, organizational and classroom communication*. USA, Maryland: Rowman & Littlefield Publishers.
- Wong, H. K., Wong, R. T., Jondahl, S. F, & Ferguson, O. F. (2014). *The classroom management*. USA: Harry K. Wong Publications.
- Ziegler, M. F., Paulus, T., & Woodside, M. (2014). Understanding Informal Group Learning in Online Communities through Discourse Analysis. *Adult Education Quarterly*, 64(1), 60-78.

Panagiotis J. Stamatis, Afrodite V. Ntouka  
THE IMPACT OF CLASSROOM ACOUSTICS ON TODDLERS' COMMUNICATION  
AND ACTIVE PARTICIPATION DURING TEACHING

---

Creative Commons licensing terms

Author(s) will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Education Studies shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflicts of interest, copyright violations and inappropriate or inaccurate use of any kind content related or integrated into the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons Attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).