

Noise in the Learning Space: Increasing Awareness and Breaking Down Barriers

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Abstract

This perspective paper critically examines the often overlooked phenomenon of noise within the learning space. It emphasizes the urgent need for increased awareness and the dismantling of barriers to enhance educational outcomes. The paper defines noise in two primary forms: physical noise, such as loud environments and external distractions, and cognitive noise, which includes internal distractions and a lack of focus. We discuss the barriers to addressing noise, including a need for more awareness regarding its impact and resistance to adopting noise-reducing strategies. However, noise can both positively and negatively influence teaching and learning. The paper proposes various methods for managing noise, such as creating an optimal physical learning environment and implementing mindfulness and techniques for improving focus to mitigate cognitive noise. The discussion extends to the beneficial impact of addressing noise, which includes enhanced student engagement and improved learning outcomes, alongside increased teacher effectiveness and satisfaction. The conclusion underscores the importance of tackling noise in educational settings and suggests areas for future research and practical applications to further this endeavour.

Introduction

Noise in the learning space is defined as any unwanted sound that interferes with the learning process and is known as noise pollution (Caviola et al., 2021). This can include external noise, such as traffic or construction sounds, and internal noise, like a student's wandering thoughts or worries. Noise can significantly hinder effective learning, impacting students' academic outcomes and teachers' execution of their duties, albeit they may need to realise they are creating it. While noise within the educational setting is frequently regarded as an obstacle to

sustained attention and pedagogical efficacy, we must acknowledge that specific ambient noise categories may facilitate cognitive acquisition and productivity (Helps et al., 2014). For example, moderate intensities of background sound can function as a variant of white noise that effectively conceals more intrusive auditory stimuli and can enhance concentration by furnishing a stable auditory environment (ibid). Within the context of HR teaching and learning, HRD educational practices have pivoted based on our experiences with the Covid-19 pandemic (Anderson, 2020). Our gaze is also drawn to the increased noise from providers that lack specific references to HRD in their programmes; this is a concerning shift to specialist HRD educators and practitioners (Harrison et al., 2021).

From its negative aspect, noise can profoundly impact module, teaching and learning outcomes. It can disrupt students' ability to concentrate, impede information retention, and hinder overall academic performance. Instructors may also find noise a barrier to effective teaching, as it can interfere with lesson delivery and student engagement. Yet, internal cognitive 'noise,' such as meandering thoughts, can occasionally foster innovative thinking and problem-solving by allowing the cognitive apparatus to forge novel associations between seemingly unrelated concepts (Murray et al., 2024). Consequently, awareness of noise in the learning space is a critical first step to ensure that all forms of noise are not categorised as harmful. It is crucial to differentiate among various types and degrees of noise, recognising that specific auditory inputs may benefit the learning process. Increased awareness can empower educators and students to identify noise when it arises and take proactive steps to mitigate its adverse effects (Souers & Hall, 2016; Cook, 2006).

Physical noise can be particularly disruptive in the learning space. External distractions, such as traffic or construction noise, can draw students' attention away from the lesson and make it difficult to concentrate. Similarly, internal distractions, such as a noisy air conditioner or adjacent classroom activities, can create an overall noisy environment that hampers learning. Awareness of physical noise involves acknowledging these various sources of disruption and understanding their impact on learning (Pervaiz et al., 2024). This heightened awareness enables educators to minimise physical noise and create a more conducive learning environment. Cognitive noise is another significant challenge in educational settings. Internal distractions, such as wandering thoughts, worries, or multitasking attempts, can impede students' ability to focus and engage with the presented material (Klatte et al., 2013). Awareness of cognitive noise involves recognising these internal distractions and their effects on learning. Increased awareness of cognitive noise empowers students to identify and address these distractions, improving their ability to concentrate and learn effectively. Educators can develop strategies for maintaining focus and engagement during lessons by recognising the internal distractions that impede effective teaching. Equally, by acknowledging the positive aspect of noise, educators can encourage students to leverage internal noise for creative thinking and problem-solving (Lee, 2018). To do so, they must develop strategies for managing cognitive noise and improving focus, such as mindfulness techniques (ibid). These strategies can help students navigate internal distractions and enhance their learning experience. Eventually, this balanced approach to noise management can enhance the learning experience and improve educational outcomes.

Types of Noise

Physical Noise in the learning space refers to audible sounds that can disrupt the learning environment (Munro, 2015). This can include noises from outside the classroom, such as traffic, construction, or playground activities, as well as sounds within the school, like the hum of an air conditioner or the shuffling of papers. Physical noise can also arise from adjacent

classrooms, hallways, or shared areas, contributing to an overall noisy environment. Such disruptions can significantly contribute to an overall noisy climate, potentially impeding teaching staff and students' ability to concentrate and participate effectively in academic activities. The reverberation of conversations, footsteps, and other ambient sounds can infiltrate the learning space, resulting in a challenging atmosphere for both teaching and learning (Gertner, 2021). This discordance could also disrupt the use of auditory learning aids, compounding the difficulty in upholding an ideal academic setting (Gertner, 2021). Consequently, recognising and mitigating these noise sources is essential to fostering a conducive learning environment. To achieve this objective, it is imperative for HRD educators to first cultivate an understanding of the diverse origins of physical noise and its potential ramifications on the educational environment. In this context, the training provided by their respective academic institutions is beneficial. Such training may encompass the identification of sources of physical noise, the evaluation of their effects on pedagogical practices and learning outcomes, and the formulation of strategies aimed at minimising disruptions caused by noise (Dockrell & Shield, 2006). This training can enhance educators' awareness, enabling them to recognise the emergence of physical noise and implement pre-emptive measures to address it, thereby alleviating its adverse effects and enriching the educational experience for all participants.

Conversely, cognitive noise encompasses internal distractions that impede learning (Woolner & Hall, 2010). These distractions can manifest as wandering thoughts, worries, or daydreams that divert attention from the learning task. Cognitive noise frequently arises in contexts where individuals engage in multitasking, experience significant stress levels, or endeavour to process an excessive amount of information concurrently. This phenomenon can significantly impair cognitive function, leading to diminished concentration, reduced accuracy, and slower information processing (Junco, 2012). Multitasking often divides attention across multiple tasks, each demanding cognitive resources that could otherwise be dedicated to a single task, thereby reducing overall efficiency (Junco, 2012).

Similarly, stress can exacerbate cognitive load, triggering a cascade of physiological responses that further hinder mental clarity and decision-making capabilities. Moreover, integrating a surplus of information all at once may overwhelm the cognitive mechanism, leading to cognitive exhaustion and reduced efficiency (Koolhaas et al., 2011). Hence, comprehending the origins and consequences of cognitive interference is crucial for formulating tactics to alleviate its adverse influence on cognitive functioning and general welfare. Therefore, educators must acknowledge the detrimental effects of cognitive noise and develop strategies to mitigate its impact on learning by cultivating a focused and attentive student mindset. To do so, they need to clearly understand the various sources of cognitive noise and their implications for the learning process. This awareness can empower them to implement strategies that enhance focus and minimise internal distractions, thereby optimising the learning environment (Choi et al., 2014). In this regard, relevant training may encompass the recognition of internal distractions, evaluating their effects on learning outcomes, and formulating techniques to enhance focus and engagement among students. Educators can create a conducive learning environment that promotes effective teaching and learning by fostering their awareness of cognitive noise.

Both forms of noise can significantly impact the learning process, hindering comprehension, retention, and overall academic performance. These examples show what is commonly called noise as a distraction, but noise can also be a positive factor. Consequently, by acknowledging the possible advantages of noise, including augmented creativity and improved problem-solving capabilities, educators may implement a nuanced strategy for noise management that capitalises on its beneficial elements while alleviating its detrimental impacts. This balanced

approach can enhance the learning experience and improve educational outcomes for both students and educators.

Barriers to Addressing Noise

Barriers to addressing noise in the learning space encompass a range of challenges that can impede efforts to create a quiet and focused educational environment. These barriers can arise from a need for more awareness regarding the impact of noise, resistance to adopting noise-reducing strategies, or logistical constraints that make it challenging to address noise effectively.

Lack of Awareness: One of the primary barriers to addressing noise in the learning space is a need for more awareness regarding its impact on teaching and learning. This lack of understanding can manifest in several ways. For example, educators and students may not fully appreciate how external distractions, such as traffic noise or classroom chatter, can disrupt the learning environment (Masulis & Zhang, 2019). Similarly, they may underestimate the effects of internal distractions, like wandering thoughts or worries, on their ability to focus and engage with the presented material. This lack of awareness can prevent educators and students from proactively mitigating noise and creating a more conducive learning environment. As noted earlier, training can enhance educators' and students' awareness of noise and its potential ramifications on the learning environment. This training can empower both to recognise noise when it arises and develop collaborative approaches for minimising its negative or enhancing its positive impact on teaching and learning.

Resistance to adopting noise-reducing strategies: Another barrier to addressing noise in the learning space is resistance to adopting noise-reducing strategies. Educators and students may hesitate to implement these strategies due to various factors. For example, they may perceive noise reduction as time-consuming or burdensome, believing it requires significant effort or resources to be effective (Chen et al., 2008). Alternatively, they may resist noise-reducing strategies because they are unfamiliar with these techniques or sceptical of their benefits. As a solution, relevant training can cultivate their understanding of noise-reducing strategies and their potential advantages for teaching and learning. This awareness can help them overcome resistance to adopting these techniques and motivate them to create a quiet and focused learning environment.

Logistical constraints: Logistical constraints can also pose a significant barrier to addressing noise in the learning space. For example, educators may lack the authority or autonomy to modify the physical learning environment by installing sound-absorbing materials or relocating to a quieter space (Shield & Dockrell, 2008). Similarly, students may face logistical constraints that prevent them from creating an optimal study environment, such as limited access to quiet spaces or resources. These logistical constraints can hinder efforts to address noise effectively, limiting the impact of noise-reducing strategies. Therefore, academic institutions must support educators and students in addressing noise by providing the necessary resources and infrastructure. This support can empower both to collectively create a quiet, focused learning environment that enhances teaching and learning outcomes (Garside et al., 2018). Moreover, relevant training can equip educators with the knowledge and skills to navigate logistical constraints and effectively implement noise-reducing strategies.

Strategies for Managing Noise and Related Impact on Educators and Students

Addressing noise in the learning space requires a multifaceted approach targeting physical and cognitive noise, which can benefit students, teachers, and the broader educational community. Appropriately, increased awareness of noise in academic settings can radically impact teaching

and learning outcomes. It empowers educators and students to identify noise when it arises and proactively mitigate its effects, creating a more conducive learning environment. Therefore, this section outlines various strategies for managing noise and creating a more conducive learning environment.

Creating an optimal physical learning environment is a critical first step in addressing noise in educational settings. This involves minimising external distractions, such as traffic or construction sounds, and reducing internal noise, like the hum of an air conditioner or the chatter of adjacent classrooms (Bentler and Chiou, 2006). Creating an optimal physical learning environment can enhance student focus, engagement, and overall learning outcomes (Shernoff, 2013).

Implementing mindfulness and techniques for improving focus can also help manage cognitive noise in the learning space. Mindfulness entails attentively focusing on the current moment without passing judgment, a practice that may assist students in enhancing their recognition of inner distractions and redirecting their focus towards the educational activity (Armstrong, 2019). The practice of mindfulness encompasses a range of methods, including deep breathing, body scans, and guided meditation, all of which serve to aid students in developing an increased level of concentration and mindfulness. These mindfulness techniques can be integrated into the classroom or individual study routines, providing students with valuable tools for managing cognitive noise and enhancing their learning experience.

The beneficial impact of addressing noise in the learning space extends beyond individual students and educators to encompass the broader educational community. Addressing noise within the learning environment yields significant benefits, notably enhanced student engagement and improved learning outcomes (Saggers & Ashburner, 2019). Mitigating auditory distractions ensures students can concentrate more effectively on instructional material, fostering a more conducive atmosphere for cognitive processing and comprehension (Macken et al., 2009). Furthermore, a quieter classroom promotes increased participation, as students are more likely to contribute to discussions and seek clarification without the hindrance of background noise. This elevated level of engagement not only aids in the retention of information but also cultivates a collaborative learning culture. Consequently, noise reduction strategies can be pivotal in pursuing academic excellence.

Increased teacher effectiveness and satisfaction are additional advantages of creating a quiet, focused educational environment. Teaching staff must know how their preparation, delivery, and classroom management can make noise. In the 'muddled space' (figure 1), the teacher is responsible for planning and preparing so that noise generated from different spheres is reduced to a level that minimises its impact but maximises learning opportunities. This is a particular issue for international students, teachers, and other students; ignoring cultural matters is a harmful noise and can lead to misunderstandings, leading to learners withdrawing from the learning process – physically or mentally (Williams & Green, 1994). Managing noise with aplomb and pivoting quickly to grasp learning opportunities is the responsibility of the teacher and students alike. It is about creating an environment and space conducive to learning. Educators operating in such an environment are better equipped to deliver high-quality instruction, as they can more successfully engage with their students without the disruptions that often plague noisier, less disciplined settings. This increased efficacy facilitates improved student outcomes and contributes to higher job satisfaction among educators (Munna & Kalam, 2021). When teaching staff can witness the tangible progress of their students, it fosters a sense of professional fulfilment and motivation. Consequently, establishing a serene and focused academic atmosphere is instrumental in advancing the educational objectives of both teaching staff and students.

While trying to mitigate noise's negative impact or enhance its positive aspect, HRD educators must be cognisant of the diverse sources of noise and their potential ramifications on

the educational environment. Thus, awareness is crucial for cultivating an optimal learning environment that promotes effective teaching and learning.

Towards a new framework of noise in teaching and learning

Conceptually, noise emanates from different sources within teaching and learning. Drawing on Kanter's work (1977), which highlights the intricate interplay of various factors within organisations, we use a dual frame of reference - man-made and environmental that holds the potential for being somewhat contradictory in application and conceptually (Sundaramurthy et al., 2013). Our model (Figure 1) is based on two overlapping spheres, each with a dotted line indicating that items can move between them. Where the overlap occurs, we define this as a 'muddled space' where the symbolic interaction can be both positive and negative. The model draws on the chaotic bricolage of noise, bringing together two overlapping spheres, 'Man-made' and 'Environmental', by alerting us to consider both positive and negative aspects within the 'Muddled Space'. This categorisation introduces a new level of theoretical nuance in studying the impact of noise on teaching and learning within a continually morphing space. To illustrate how the model can be used we present one example from either sphere. In the 'Man-made' sphere, noise triggers from a teacher's perspective could include not speaking clearly or the delivery being too fast whilst describing a theoretical model or concept. One example emanating from the environmental sphere is that many universities developed and upgraded their campuses with different teaching and learning spaces; however, this has also created a visual (noise). With the desire to create open spaces, interior floor-to-ceiling glass walls that are transparent and close to student throughways, management's action to deliver an open space creates a visual noise of distractions whenever a class change occurs or someone walks past (Stanton, 2012). Teachers must make semantic choices in building a learning space that has seen greater use of digital technologies and online, especially during and after the COVID-19 pandemic, enacting particular epistemologies and power dynamics (Lamb, 2019). Designing digital content can also create noise unknowingly; here, we are referring to using colours that cause issues for students with Special Educational Needs and Disabilities (SEND) or can be culturally sensitive and present too much content, which may be vague and unhelpful.

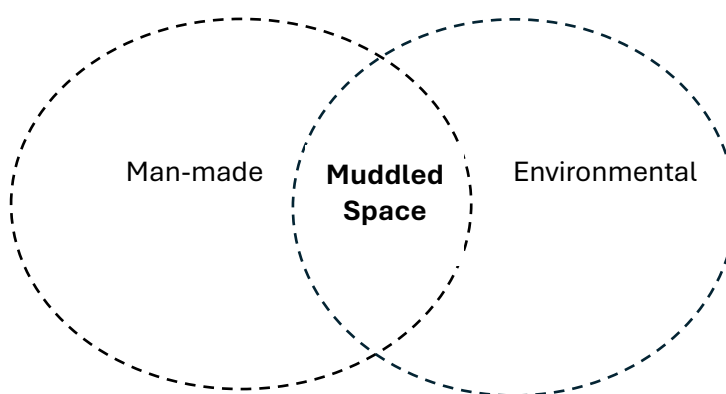


Figure 1. The man-made and environmental spheres of noise, with the muddled space overlapping.

It is within the 'muddled space' where noise is a distractor and a facilitator, like the push and pull of magnets. We suggest that within this space, the noise triggers can converge from the two different spheres, potentially resulting in chaos bricolage. This noise emanates from a

system that includes leaders, policymakers, managers, programme leaders, module leaders, teachers and students, who all have a dual foothold on both spheres of the model. There is an inherent dualism here; the commonality among noise producers is that they may not be aware that noise is being created, and it is this ‘blindness’ that contributes to negative noise creation; this dual frame of reference creates ‘blurred lines’.

In turning to student-induced noise, it can be double-edged. In the learning space, as educators, we want students to engage, contribute to the discussion, and complete the work that has been set. However, student metacognition highlights the dimension of their noise experiences that creates cognitive, behavioural, or physiological responses (Malaspina, 2023). These responses can be positive as well as a reaction. Students need to be aware of their learning strategies and behaviour in the learning space, for example, when to be active and passive participants (Brown & Atkins, 1988). Therefore, the simple model (Figure 1) helps shine a light on the two spheres and the muddled space where noise can hide in plain sight.

Dealing with students who generate noise is conceptually multifaceted. If noise is seen as a distractor, teachers must understand the available approaches to deal with it without impacting learning. This involves dealing with disruptive behaviour, noisy students, inattentive students, late arrivals, early leavers, and domineering or rambling students (Race & Pickford, 2007). However, it is suggested that teachers within this context create noise by being guilty of fisheye syndrome (Powis, 2023). The fisheye syndrome is often unnoticed by teachers as they believe that all students are actively participating, or they may focus on an individual or group at the expense of other students. This fits in the ‘Man-made’ sphere; here, noise is passive and active, and based on the teacher's philosophical position, the approach may be inductive or deductive. Whilst we would argue that this is down to personal preferences, awareness of noise production is paramount.

Teachers must identify when noise is also joyous; silence can be construed as noise but can be considered harmful. The focus on silence as a negative raised its head during the Covid-19 pandemic with delivery switching to online. However, silence can be a means of communication; Glen (2004), drawing on the work of Saviile-Troike (1985), made the distinction between “*the absence of sound when no communication is going on, and silence which is part of communication*”. In higher education, we want students to get involved in our “talky culture”; we can deduce that silence is often seen as a non-participation or non-engagement (Glen, 2004, p. 18). However, silence as a positive might be students from different cultures internalising the content and trying to make sense of it. Feng et al. (2023) draw our attention to the seminal work of Picard (1948), “silence is not simply what happens when we stop talking; the absence of speech-language *simply makes the presence of silence more apparent*” (p. 15). Silence may also be seen as a buffer, a pause in language, and explicit sound. Still, sound is being made internally by decoding the message or content to contribute or stay silent.

By increasing their awareness of noise and adopting a holistic lens on teaching preparation, teachers can reduce noise by focusing on their professional practice at different stages of the learning process. In the various stages of planning and preparing a lesson, teachers must consider the materials, the learners, delivery and classroom management. By understanding how noise can morph positively or negatively, teachers can create positive learning experiences.

Conclusion

In terms of future research directions, interestingly, the literature on noise in the learning space is fragmented, and a renewed effort is required to increase awareness of how noise in

educational settings can radically impact teaching and learning; adding to both internal and external benchmarking which is an essential part of the higher education landscape. Addressing noise in the learning space has a beneficial impact and is crucial for students, teachers, and the broader educational community. This paper has outlined the phenomenon of noise in the learning space, emphasising the necessity for increased awareness and the dismantling of barriers to enhance educational outcomes. It has defined noise in two primary forms: physical noise, such as loud environments and external distractions, and cognitive noise, which includes internal distractions and a lack of focus. The paper has discussed barriers to addressing noise, including a need for more awareness regarding its impact and resistance to adopting noise-reducing strategies. The paper has proposed various methods for managing noise, such as creating an optimal physical learning environment and implementing mindfulness and techniques for improving focus to mitigate cognitive noise. The discussion has extended to the beneficial impact of addressing noise, which includes enhanced student engagement and improved learning outcomes, alongside increased teacher effectiveness and satisfaction. The conclusion underscores the importance of tackling noise in educational settings and suggests areas for future research and practical applications to further this endeavour. This perspective paper provides a platform for HRD scholars and practitioners to consider different aspects of noise. As previously discussed, addressing noise in the learning space underscore the importance of continued efforts to enhance educational environments and outcomes; for example, one person's disturbing noise can be another's familiar background (Lamb, 2019). Future work may seek to examine the ways in which noise happens at the university level. Equally, HRD practitioners may seek to identify how and what forms noise takes at a strategic level within the context of the corporate world. Future research may also explore new strategies for managing noise, evaluate the impact of noise reduction on teaching and learning outcomes, and investigate the broader implications of noise in educational settings. Practical applications of addressing noise in the learning space can provide educators and students with tangible tools for creating a more conducive learning environment. Do programme and module teams consider noise when designing the curriculum? This would allow HRD scholars to uncover more nuanced understandings of curriculum design and barriers that might be overlooked. Furthermore, we invite scholars to explore theoretical and practical alternatives that may illuminate the noise phenomenon by considering stakeholders' positionality within and outside the space. These applications can encompass a range of strategies, from creating an optimal physical learning environment to implementing mindfulness techniques for improving focus. In addition, future research should address questions that remain unanswered, including:

- How and what form does noise take at the university level through strategy and policy?
- To what extent does digital technology create noise in the teaching and learning space?, and what is the impact on universities, staff and students?
- How should noise be considered to heighten awareness of its dimensions within teaching and learning and what are the views of staff and students?
- What practical steps can programme and module teams take to reduce noise in the curriculum?

Finally, it may be helpful to explore the life experiences of teaching staff through the lens of noise. By researching their perceptions of noise, how do they define it, and what does it mean practically? We hope these insights will spur additional research on a topic that informs teachers, facilitators, and students of HRD.

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