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Revisiting the role of listening in online architectural design studio pedagogy

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Abstract
Online education during Covid-19 left most architectural design studios with two sensory realms: the visual and the auditory. Although the initial reaction focused on sharing and collaborating on the visual material, it was the auditory affordances of the remote design studio environment which designerly operations and communications relied on, and were even characterized by. Considering the significant change in the role of sound for the design studio, and the evolution of the notion of listening in the 21st century, the capacities of sound and listening in understanding, reimagining and space-making for architectural learning, as well as organizing the studio experience in virtual and physical environments remains understudied. This paper aims to launch a discussion on the role and potentials of listening in the evolving practices of remote architectural education, feeding from 21st century listening theories and practices. A threefold inquiry is performed: revisiting the role of sound in architectural education, reviewing contemporary discourses on listening, and discussing the pedagogical affordances of the new auditory environments in remote architectural education through the project series "Spaces of Sounds", designed specifically to tackle with the altered relationship with space, sounds and architectural communications in the first-year online design studio. Borrowing from theorists, artists and scholars' discourses on listening, the discussion will be reflected on the new methodologies and critical approaches in design studio pedagogy to make use of the capacities of new auditory experiences. Finally, the emancipatory potentials of listening will be discussed for architectural learning in the new generation architectural learning environments.

Keywords
Audio-spatial awareness, First-year architectural design studio, Listening, Online architectural education, Sound.

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1. Introduction

When the physical design studio environments were abolished and transferred onto online platforms due to Covid-19, our communications were essentially reduced to the two sensory realms that online media and devices enabled: the visual and the auditory. Most of the academic discussions in this process were directed towards the affordances of online platforms in sharing and collaborating on visual material.[1] Yet, as much as the visual, it was the auditory affordances of the remote design studio environment which designerly communications and operations relied on, and were characterized by.

The transition to online education was a significant moment for the role of sound in design learning and organizing the design studio environment. To maintain a sense of design studio in online platforms, the medium of sound was charged with additional roles. In the absence of bodily and tactile senses, sound became the organizing medium that bridged the physically and socially distant individuals, spaces and geographies. It facilitated the exchange of content for architectural education: imagined, intended, constructed or represented spatial ideas, forms, concepts, intentions and the discussions through them. Even verbal communication, which has long been accepted as a significant component of the architectural design studio (Wendler & Rogers, 1995), was reshaped according to the affordances of the intermediary devices; speakers, computers, sound algorithms and protocols of online communication platforms.

The situation posed additional challenges for the first-year design studios executed entirely online. Sound and listening took on a perplexing role in introducing students for the first time to the notions of architectural thinking, concepts, language, tools as well as the studio's culture, workings, and to each other, in an unfamiliar online environment. Yet some first-year design studios, including the one presented in this article, used sound and listening beyond the conventional means of verbal communication, to explore its novel and undiscovered potentials for online architectural learning.

Hence, considering the significant change in the role of sound for the design studio, and the evolution of the notion of listening in the 21st century, the capacities of sound and listening in understanding, reimagining and space-making for architectural learning, as well as organizing the studio experience in virtual and physical environments remains understudied.

This paper aims to launch a discussion on the role and potentials of listening as a tool in the evolving practices of remote architectural education, feeding from 21st century listening theories and practices. It does so by carrying out a threefold inquiry: revisiting the role of sound in architectural education, reviewing contemporary discourses on listening, and discussing the pedagogical affordances of the new auditory environments in remote architectural education through the project series "Spaces of Sounds". Borrowing from contemporary discourses on listening, the discussion will be reflected on the new methodologies and critical approaches in design studio pedagogy where the capacities of new auditory experiences are experimented. Finally, the emancipatory potentials of listening will be discussed for architectural learning in its new generation environments.

2. Sound in architectural education

Although architectural discipline and culture is primarily built on the capacities of visual communication, sound is a foundational medium that has long been integral to architectural learning in manifold ways.

Sound is inextricably engrained in architectural education, due to space and sound being phenomenologically and ontologically intertwined (Eisenberg, 2015) and architectural learning relying on multisensory communication and shared experiences in learning environments. Although not as dominantly as the visual, there have been efforts in investigating the capacities of sound as a medium in understanding, representing and designing space in architectural learning. Some of the more cultivated intersections between sound and architectural education will

be briefly reviewed in this chapter.

The most archaic presence of sound in architectural education has been in the form of verbal communications. The efforts in understanding the nature of verbal communication in the architectural design studio increased 1980's onwards, with the rise of the protocol analysis technique. Verbal design communications in the studio, such as design instruction, critique, or collaboration and their effect on learning were investigated by scholars like Schön (1983, 1988), Dinham (1987), Akin (1986), Wendler and Rogers (1995), Anthony (1987, 1991). Schön (1983) argued that the "language of designing" consisted of the tightly connected verbal and non-verbal elements, which he assigned as foundational elements for his "reflective communications" theory (Schön, 1988).

Another tie between sound and architectural learning lies in the tradition of translating sound and space via graphic representations, notations, drawing and sketch visualizations. This tradition can be traced back to Bauhaus' pioneering interdisciplinary ethos. Even if it was not officially part of the curriculum, music played an essential role in Bauhaus, both in everyday culture and in cross-pollinating the disciplines. Some influential masters were affiliated with music and used it in their teaching:

"Kandinsky's conception of synaesthetics - the acoustic and optical equivalence between colors, shapes, and tones influenced his painting, and in his teachings inspired new forms of transcription for the translation of musical structures into visual compositions. Itten's basic courses in pictorial composition attributed a central focus to musical rhythm... Gertrud Grunow's "harmonizing theory", together with her concept of a unity of color, form, and tone assured a music-oriented class at the early Bauhaus" (Wingler, 1999, p.142).

Bauhaus's stage workshop, aspired cross-disciplinary forms of dance, movement, light, costume and graphic design with the use of sound and music. The credo of the Bauhaus teachings, from the elementary to a synthesis of the arts, could not omit music (Wingler, 1999).

Black Mountain College, iterated this tradition in the US with the involvement of seminal figures like John Cage. During Cage's teaching in the school (1948, 1952, 1953) his avant-garde and unconventional approach triggered the dissemination of new concepts and approaches in the context of liberal arts education. Known for his experiments and innovations in music, Cage's led the collective[2] creation of the first-ever "happening", later titled "Theater Piece No.1", in the dining hall of Black Mountain College. Such experiments with sound-space-movement, chance, indeterminacy, found-sound, etc. laid the groundwork for future generations of composers and interdisciplinary artists, with undulating effects for artistic and architectural education.

The Bauhaus originated exercises with sound, space and representation perpetuated to further geographies. An example is the Basic Design Course in School of Architecture in the Middle East Technical University (METU), Turkiye. Besides the exercises on rhythm and sound, experiments with color plates and musical scores, mechanical light composition apparatus controlled by music, listening to and painting language/sound impressions were common (Savaş, 2019). A footage from 1968 (ODTÜ GİSAM, 2021) shows a drumset being brought and played in the studio for the students to listen and visualize the sounds through drawings.[3]

The 1960's saw the flourishing of the conceptual and representational tools for understanding, documenting and interpreting space from a sonic perspective. Influenced by post-war contemporary art movements, modern graphic notation stirred the creative visual representations of sound. Sound-mapping, mappings about, in, of and by sound (McMurray, 2018) expanded the multisensory qualities of cartography, and evolved into digital formats after 1990's. Soundwalking exercises provided 'a deeper appreciation of each sound effect as a site-specific visceral experience' (Milo, 2019). A new generation of acoustic notions such as soundscapes (Schafer 1969, 1977/1994), acoustic communication (Truax, 1984), audio architecture

(Blesser & Salter, 2007) expanded the range of sonic conceptualization of the environment not only for sound artist but also for geographers, anthropologists, urban planners and architects. Publications like "The Eyes of the Skin" (Pallasmaa, 2005) invited architects to consider space through other senses. Such sound-based tools and concepts found more applications in architectural design studios or programs[4] dedicated to the study of sound and space. Milo (2019) presents from Harvey (2008) a summary of six categories of design studios as an example of working with sound in architectural education:

- Sonic-based form generators: sound or music is used to generate 2D or 3D graphics.
- Acoustic design: sound as data/numerical-based for distinct auditory programmes (e.g.signal-to-noise ratio for lecture theater).
- Acoustic communication: spatial design to achieve particular auditory communication or experience.
- Heightening auditory awareness: resonant objects or materials, sound installations or wind chimes (e.g.design for blind people).
- Virtual acoustic spaces: sound design for/in other media (animation, virtual reality or game engines).
- Soundscape studies: analysis and documentation through recording, observation and interviews of interior, urban or natural environments.

Although limited, there are published design studio approaches[5] that suit one or more of these categories. While all categories above benefit from digital media and tools, virtual acoustic spaces and sonic-based form generators depend on their innovative use.

In the universities worldwide, the most common sound study in architectural curriculum (Meriç & Çalışkan, 2013) is acoustic design. However, some scholars criticize the study of acoustics for forging the relationship between architectural design and the human auditory sense into a completely utilitarian nature. In undergraduate architectural education, the essentials of acoustics are mostly only taught in 'some architectural schools with an engineering focus and embedded in either building physics or architecture technology courses' (Milo, 2019, p.18). Fowler (2013b, p.160) states that "*precedents of engineering, mathematics and physics provide a rationalist paradigm of constraints in which the metrics of acoustic parameters are positioned as essentialist knowledge tools*", which leads to the optimization of the acoustic performance to take precedence over other design decisions. Harvey (2008) reporting from Lines's thesis (1997, pp.62-63) also problematizes the didactic approaches to acoustic education for failing to "*contribute to designers' ability to tackle acoustic design tasks*". Lines (1997, pp.118-119) iterates: "*These attempts to teach a domain of design knowledge separate from design have resulted in poorly remembered learning experiences often associated with dislike, anxiety and a perceived lack of relevance.*"

The intersection of sound and architecture captures a vast range of subjects and practices that reflect onto architectural education in ways beyond those presented here. Yet, an important note in this brief review of sound-related notions in architectural education serves the motivation of this paper. The emphasis on the very act of listening, even if it constitutes the basis of every sonic experience, is subsidiary or inexplicit. Not only the changing conceptions of sound and space but also the new discourses around listening require theoretical and practical updates on how it establishes relationships in architectural education. Hence, this article aims at bringing into discussion the role of sound in online architectural design studio with a specific emphasis on listening; both by resorting to the contemporary discourses on listening, and by pointing to the rather under-addressed potentials of new-generation learning environments at the service of architectural education.

3. Contemporary discourses on listening

The International Listening Association defines listening as "*the process of receiving, constructing meaning from and responding to spoken and/or nonverbal messages*" (ILA cited by

Usera et al., n.d.). Yet, the definitions, methodological approaches, and theoretical frameworks around listening multiply and fragment as listening is a multidisciplinary field studied by various disciplines such as psychology, communication, linguistics, anthropology, and management from wide-ranging perspectives (Bodie et al., 2008).

Nevertheless, Motzkau and Lee (2022) states that given how listening is a core aspect of human perception, communication and experience, it is surprising that scholars interested in listening have frequently called it a neglected, misunderstood and ill-defined phenomenon that is difficult to define and operationalize. Barthes (1985, p.260) calls listening an 'apparently modest' act, lacking a disciplinary home: because it "*does not figure in the encyclopedias of the past, it belongs to no acknowledged discipline*". Back (2007) suggested that our culture is one where listening has long been eclipsed by speaking. Similarly, Lipari (2014a) highlighted how listening has always been implied as a given, although being a key function of communication and has been positioned as the 'other' of speaking.

Listening is a prerequisite to sound's ontological existence, and therefore to communication. Nancy (2002/2007) defines sound neither as a thing in itself, nor an object that is present, and nor entirely independent of the listener as there is no essence of sound independent of listener/sense. He goes on to suggest an alternative model to communication that is not a transmission of information, but 'sharing of a self as it takes place', "*an unfolding, a dance, a resonance*" (Nancy, 2002/2007, p. 41). Sound in this sense is communication between synchronous, processual, intra-active, contagious, unfolding of co-constituting subjects (Motzkau & Lee, 2022) rather than being single-directional, isolated or stagnant.

Lipari (2014b, p.50) differentiates listening from hearing by emphasizing "listening" as a pursuit: "*Listening comes from a root that emphasizes attention and giving to others, while "hearing" is a passive phenomenon, as it comes from a root that emphasizes perception and receiving from others' including external sound sources.*"

While the early approach to listening[6] relegated it to "the acquisition of information" (Bostrom cited by Bodie et al., 2008, p.105), used in understanding how individuals listen during lectures or situations, "*this simplistic and linear notion of listening began to be replaced by a more sophisticated view, that acknowledged the multidimensional nature of listening*" (Bodie et al., 2008).

Hence, this article is invested in the reconceptualization and methods of listening advocated by artists, composers and scholars from the 1960's into the 21st century, investigating the broader and deeper understanding of sound in relation to the listener, culture and the environment.

A pioneering environmental approach was developed by the interdisciplinary movement of acoustic ecology in the early 1970's, led by R. Murray Schafer[7] and Barry Truax, as mentioned earlier. Schafer (1977/1994) described the necessity for an interdisciplinary acoustic designer, who's first task would be to "learn how to listen". He published numerous exercises on soundwalks, ear cleaning, etc. to increase the listeners' sensitivity and skills in discerning, analyzing, categorizing the ever-increasing complexity of our sonic surroundings.

> *"Many exercises can be devised to help cleanse the ears, but at first are those which teach the listener to respect silence. Stop making sounds for a while and eavesdrop on those made by others... Such sounds will not be found in every environment, but the listener will be forced to inspect every sound carefully in the search*" (Schafer 1977/1994, p.208).

Truax's Acoustic Communication (1984) resorted to the then newly emerging discipline of communication[8] by focusing on the information in sound, how it is "created, shared, distributed, consumed and used" (Simon Fraser University, n.d.), as well as its meaning for the listener and the interlocking behavior of sound as a system of relationships (Wrightson, 2001).

"*At the most basic level of each*

> *system (speech, music and the soundscape), we find that sound is in some way 'organized' and that through the structure of this organization, meaning can be inferred.*" (Truax, 1984, p.55).

To decipher these organizational structures, a listener could have a "soundscape competence", similar to competencies for linguistics or music. He offers acoustic ecology as a vehicle for auditory awareness, design intervention, urban planning and the conservation of particular soundscapes (Truax, 1984).

Both scholars reclaimed the learning position of the interdisciplinary listener in relationship to the environment:

> "*The listener, who can be considered an ever-learning open-minded and open-eared student, is invited to explore these relationships with the acoustic environment through a reflexive process which includes (1) exploration; (2) auditory observation; (3) the association with semantic constructs such as words; and (4) the documentation through the means available, including recording practices.* (Milo, 2019, p.8)

Pauline Oliveros, composer, performer, activist, has also been an influential figure in the listening field since the 1960's with her concept of Deep Listening. Deep listening takes the form of a performance, exercise, book, retreat, game or meditation, employing different types of attention, verbal and written inquiry, recording, sound-making, breathing, body movements and other such collective and/or individual activities. She explains:

> "'*Deep*' *has to do with complexity, boundaries or edges beyond ordinary or habitual understandings. ...coupled with Listening, is learning to expand the perception of sounds to include the whole space/ time continuum of sound - encountering the vastness and complexities as much as possible.*" (Oliveros, 2005, p.23).

Her theory and practice of listening is differentiated for its meditative and humanitarian approach, focusing on healing, expanding consciousness, understanding, developing compassion and intelligence through listening in every possible way to everything possible to hear no matter what you are doing. This approach to listening is more engaged with creativity, sensations, intuitions, thinking, feelings, and places experience above all. She claims listening to be a collective state of action and awareness that continually develops via multi-directional interactions. Her famous quote states: "*Listening is selecting, interpreting, acting and making decisions.*" (Oliveros cited by Tsonami and Tuned City, n.d.)

Oliveros intended for deep listening to merge the involuntary and unfiltered nature of hearing, with the voluntary act of listening involving selective inclusion and exclusion of sounds from the auditory experience. Numerous exercises and sonic meditations published in her books provide creative resources to experience the total spectrum of available sounds, by altering between focal and global attention, inclusive and exclusive listening etc. for anyone interested (Britannica, T. Editors of Encyclopaedia, 2023).

A more architecture-oriented account on listening was made by acoustician Barry Blesser and environmental psychologist Ruth-Linda Salter who coined "aural architecture"; spatial properties which can be experienced through listening (Blesser & Salter 2007, p.5).

> *"Aural architecture is that aspect of real and virtual spaces that produces an emotional, behavioral, and visceral response in inhabitants which are parallel to those of visual architecture, except that the space is experienced by listening rather than seeing.*" (Blesser & Salter, 2006, p.1).

They coin "auditory spatial awareness", a fundamental skill in experiencing space by attentive listening, which can be developed from listening experiences and sonic practices, similar to the ones Schafer and Truax suggest (Fowler, 2015). Aural architecture focuses on the experiential qualities of space, beyond the scientific and physical properties of sound in space.

Likewise, the aural architect is not an exclusive specialist (like the acoustic designer), but "an ensemble of roles often unaware of their contributions towards our aural experience of a space". They locate aural architecture at the "interdisciplinary bridges" (Fowler, 2015) of many disciplines interested in human experience, but mainly physical science, perceptual psychology, and cultural anthropology (Wrightson, 2001).

More recently, architect and sound designer Fowler (2015, p.69) proposed "critical listening", problematising the ongoing disconnection between architecture and listening: "*Both aural architecture and soundscape studies have nominated themselves as somewhat equipped to tackle, or at least present alternative frameworks for conceptualising sound as a design parameter leaves the processes of architectural design still in need of new ears*". He defines critical listening as "*an acute attentiveness to the impact and potential of sound to act as a purveyor of meaning also assists in illuminating the hidden characteristics of an architectural context*" (Fowler, 2013b, p.171).[9]

In the last decade, critical investigations on the rather overlooked political, ethical, cultural etc. consequences of listening practices and theories arose. An increasing number of scholars resort to feminism, racial biases, new epistemologies of nature and culture through listening.

Musical scholar Nina Sun Eidsheim's "Ethical listening" (2019) draws on listening being an encultured experience that offers a choice of exploration or rejection, as long as we acknowledge our "trained ears" and listening practices conditioned by political contexts, societal positions and power dynamics we are situated in. With this recognition, the first step of establishing an ethical listening framework, she proposes, is to ask: "who am I, the one who is listening? instead of "who is it speaking?" (Eidsheim, 2019). She uses the term "informal listening pedagogy" to address how our listening experiences and expectations are formed by the dramatization of our everyday experiences (Eidsheim & Whelden, 2018).

> "*In our daily lives, we act out an entrained listening pedagogy with such frequency and confidence that we complete the process with almost no awareness of our continuous stream of automatic responses. Our attention is only drawn to the fact that we are responding automatically when there is a disagreement between the internal response that we believe to be correct and the external response that our experiences provide. Where do these automatic and naturalized responses come from? How do listeners, in a given time and place, come to the same, seemingly intuitive "answer key" to a question that could invite complex and nuanced responses? Why do these responses align with structured racial divisions that underpin social, cultural, and political actions and relations?*" (Eidsheim & Whelden, 2018, p.678)

Annie Goh (2017) presents a feminist account on listening by problematizing the shortcomings of sound studies in theorizing knowledge production. In examining "the subject-object relation in sonic knowledge production, most often theorized through listening" she claims that "the majority of sound studies work leaves both the subject and object implicit". Goh (2017, p.284) states: "*Feminist epistemologies, positioned against a presumed neutrality in science and philosophy, have demonstrated the uncritical continuation of a traditional subject-object dualism to be a crude limitation on knowledge practices.*". Deriving from Haraway's "Situated Knowledges" and feminist epistemologies, her article launches "sounding situated knowledges", a sonic knowledge production method aiming to disrupt the dominant dualisms of traditional nature-culture and subject-object relations for sound studies. Her study in archaeoacoustics, examining the role of sound in human behavior in archaeology, illustrates an example of exposing "*the importance of both embodiedness and situatedness for sonic knowledge production.*" (Goh, 2017, p. 284)

As a final account, Motzkau and Lee's (2022, p.16) "cultures of listening"

is a concept devised to capture "*circumstances where listening has become a function of authority; that reduce modes of listening, to a unidirectional form of validation*". To distinguish and characterize authority-driven cultures of listening from others, they resort to the emancipatory and relational concept of 'listening with care', based on Puig de la Bellacasa's (2014) notion of care, as they illustrate in their study on child protection practices in the UK.

4. Listening (presence) in the online architectural design studio

This brief review of critical discourses and practices of listening, provides a compelling impetus to reimagine the scope and potentials of listening for architectural education.

As stated, listening is an integral and inextricable cognitive, social and pedagogic act for every architectural design studio. However, the implicit or explicit practices, the spatio-temporal habits, protocols, hierarchies, traditions around listening should be rightfully considered as part of the hidden curriculum, and as suggested by Dutton (1991), be critically examined for the unstated values, attitudes and norms prevailing in architectural education.

Listening, in the context of architectural education, entails much more than what can be reduced to information processing. Particularly in the design studio, listening has the capacity to establish meaningful and sensitive learning relationships within the studio community, as well as with the environment, geography, society, ecosystems, human and non-human beings at large. As addressed earlier, biases, cultural conditionings and power dynamics could also stem from lack of or problematic practices of listening, with dire consequences and missed opportunities in spatial imagination and creativity.

How do architects learn to listen? The non-native nature of the geographically dispersed hybrid studio environment, and its unfamiliar communicational conditions, made the authors, who designed and tutored the below presented design studio case, question the otherwise unacknowledged listening practices in the design studio.

Advances in virtual communication and collaboration technologies, including immersive and simulated design environments, have enabled new modalities of learning and teaching design at a distance (Jones et al., 2020; Rodriguez et al., 2018; Sopher et al., 2019) (Nespoli et al., 2021). In-person listening and listening through digitally transmitted signals via electroacoustic devices are technically, experientially and ontologically different. Yet, Oliveros (n.d.) points to listening regardless of these differences: "*The base skill is listening: how I'm listening to the material, how I'm listening to the space. With electronic sound, it's a similar situation of how to produce it and place it so that it works in a space.*"

Henceforth, the article offers the online design studio as an "acoustic community", defined by Truax (1984, p.58) as "*any soundscape in which acoustic information plays a pervasive role in the lives of the inhabitants (no matter how the commonality of such people is understood*)". In this "information rich" system, sound plays "*a significant role in defining the community spatially, temporally as well as socially and culturally in terms of shared activities, rituals and dominant institutions*" (Truax, 1984, p.59).

For members of an acoustic community, the act of listening emerges as an existential practice. Truax (1984, p.xii) states listening as "*creating a relationship between the individual and the environment, whether interactive and open-ended, or oppressive and alienating*". Particularly, considering the first-year design studio's role in establishing foundational habits in approaching, understanding and representing complex spatial environments, motives such as "auditory spatial awareness", "soundscape competence", as well as "critical" or "ethical" listening appear resourceful in triggering inclusive and creative opportunities for an acoustic community dedicated to architectural learning.

To further this investigation, the paper will resort to the project series Spaces of Sounds,[10] designed specifically to take advantage of the altered relationship with space, sounds and architectural communications in the

first-year online design studio. Exploring the immediacy of digital and physical spaces with sounds, newly formulated design exercises involving deep-listening, sound-mapping, graphic scoring, explorative notational drawing were employed to produce collective and individual design projects.

This series of experiments will be examined in their pedagogic methods, use of audio-spatial design communication tools and their learning outcomes. These newly formulated, or adapted pedagogies which operate through audio medium and acts of sound, will be examined and discussed for their capacities and potentials in; enhancing architectural learning, providing an often-disregarded connection to space and to the (online) design studio community, enhancing an audio-spatial awareness in understanding the environment through listening, and the architectural potentials of sound as a collective and individual design tool.

5. A case study: Spaces of Sounds, explorations on space and sound

The severe Covid-19 restrictions in Turkey prohibited all physical gathering at the universities, including the schools of architecture. Education was transformed entirely to online platforms and all participants (students and tutors) resided in their own locations, spanning across Turkey and countries abroad.

Starting architectural education online presented particular challenges to students who were unfamiliar with the language, tools, skills or architectural design studio culture refrained from social connections. The tutors' response to gage this difficulty was to seek for novel and engaging connections through whatever means possible: writing of a studio manifesto, having students install it in their living spaces to turn it into a DIY studio environment, where all living and non-living constituents of their close environment (including household members, pets, everyday items, furniture etc.) blend in as creative opportunities for architectural learning. 'Spaces of Spaces' project series aimed at introducing basic tools and concepts in architecture, by employing scale, sound and light as space-making agents.

The second module of 'Spaces of Spaces', "Spaces of Sounds" was a "*three-week long project in the first term of the first-year architectural design studio, composed of two working modes: common studios where workshops and guest lectures*[11] *were held with 95 students and 8 tutors, and studios within 4 sub-groups where collective and individual design projects were developed with 24 students and 2 tutors*" (Türkkan & Avanoğlu, 2021) (Figure 1). The three workshops offered students different focuses on sound in relation to space, using the online interfaces allocated for the design studio.

5.1. Workshop 1: Listening to and through the new design studio environment

The workshop series began with an inspiration from Deep Listening exercises by Oliveros (2005). Run by the Spaces of Spaces tutors, the workshop focused on "*listening as an agency to raise our awareness of the sensory realm of sound in establishing the new hybrid environment we inhabit as our studio space*" (Türkkan & Avanoğlu, 2021). The auditory setting of our new studio space consisted of multiple physical, electro-acoustical, electro-visual and digital layers: our separate physical environments where studio participants (95 students and 8 tutors) were present during the occasion (bedrooms or study rooms in dorms or homes, living rooms, university offices, occasionally outdoor or public spaces), the chosen software platform of online education (Zoom), the hardware devices that captured the sound from our physical environments, transmitted electronically and digitally to serve it to our ears (microphones, computer processors, speakers), and the infrastructure for the communication network (cables, satellites, etc.) to transmit the audio data across geographies.

The first workshop was structured as an experiment series on Zoom, investigating the capacities of audio-visual notations and sound controls in three different settings. 103 participants (ex-

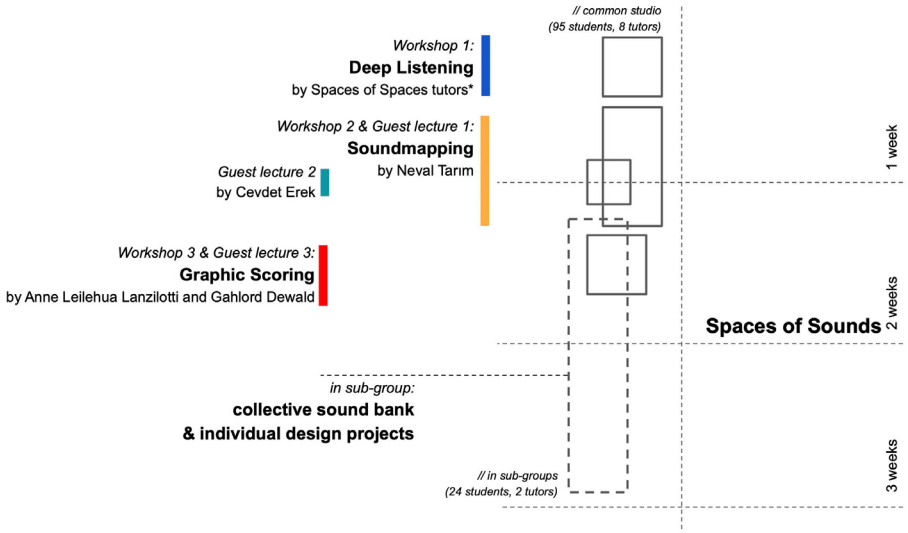

Figure 1. *Spaces of Sounds, module structure.*

cept the tutors who orchestrated the session) were asked to keep their microphones and cameras either on or off depending on the requirement of the exercise (Figure 2).[12]

Experiment 1: *All microphones off, cameras on.* The students were invited to listen to 4 short musical excerpts[13] from Youtube and make free-technique drawings while listening. This exercise drew from the tradition of synaesthetic translations between heard and imagined. As a warm-up exercise, it opened the ears and mind to the sensitivities of sound and music, while producing an expressive visual outcome to share personal and subjective experiences with the rest of the studio.

Experiment 2: *All microphones on and all cameras off.* This setting was the exact opposite of the common use of Zoom during classes, where usually all the microphones are switched off (except for the tutors and speaking student/s), all the loudspeakers and cameras on (although most students opted for keeping them off).

For the first 3 minutes, all participants quietly deep-listened to the sounds simultaneously coming from all microphones of 103 distant physical environments, reverberating, sometimes highlighting secondary environmental sounds due to Zoom's algorithm (like airplanes or sounds from other rooms). In the next 10 minutes, while still deep listening to the sound of the space, students were posed a set of questions from Oliveros' sonic meditation called "Ear Piece" (Oliveros, 2005, p.34) and asked to respond on a piece of paper by drawing or writing.

This unique experiment, drawing from Oliveros and Alvin Lucier's 1969 sound art piece "I am sitting in a room", transformed the digital space that blended our physical spaces into an electro-acoustical musical instrument. The amalgamated sound was a unique electronic, sometimes organic, for some disturbing, unprecedented, deep and constantly changing, living sound piece.

Having no clues on what to expect from this listening experience, all participants (including the tutors) developed an auditory sense of the scale, depth and complexity of the new studio environment, as well as Zoom's own sound algorithms, protocols, our choices in sound managing options (muting controls).

Experiment 3: *Dividing students into breakout rooms on Zoom in groups of 9, having one student from each group to turn microphone on and camera off.* The student with the microphone on, camera off, for five minutes, performed an auditory depiction of her/his room without any verbal communication, but only by making sounds through the sound capacity of found items,

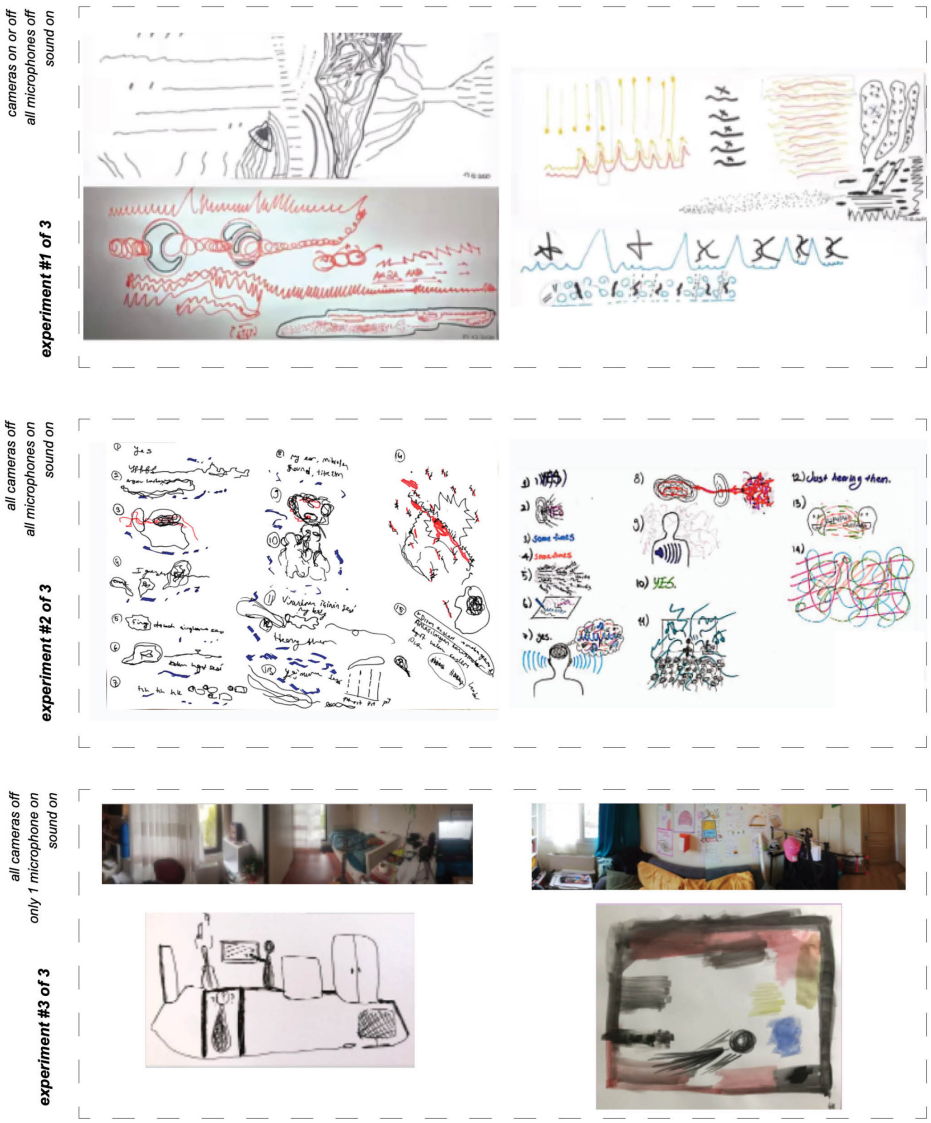

Figure 2. *Deep Listening workshop outcomes.*

walls, hard and soft surfaces and furniture etc., by hitting, scraping, tinkling, sweeping using their hands, body or other items. Meanwhile the other 8 students listened and drew a plan or perspective of their auditory perception of the room.

This, also newly formulated audio-sensory game, visualized through drawings, allowed students to engage in smaller groups, and opened a unique door into each other's personal spaces. At the final, the listeners' drawings were aligned on Mural, shared with the sound-performing room owner, compared and discussed in relation to the actual room which now could be visually perceived.

The focus on listening in the first workshop enhanced three social experiences: individual engagement with the big group, deeper audio-spatial comprehension of the shared digital space, and personal connections within a smaller group of peers. In all three experiments, writing, drawing, graphic notations and other audio-visual narratives enhanced a deeper understanding and representational expressions of the shared sound-spaces.

5.2. Workshop 2: Listening to the space, synaesthetic communications

The following workshop titled "What sound is your room?" by architect and contemporary sound-artist Neval Tarım, invited students to listen to "*the sounds of their bedrooms in 24-hour cycles and visualize their observations*

Figure 3. *Sound-mapping workshop by Neval Tarım.*

as sound-mappings through image and text" (Türkkan & Avanoğlu, 2021). Students, mostly locked-down in their living spaces, had a chance to depict the sound events in their everyday environments, routines, movements, connections, exchanges with neighbors, household, outer world and moments of silence and disconnection (Figure 3).

The two-day workshop aimed at understanding sounds in relation to their immediate surroundings, and explore various representational languages and visual expressions for the ephemeral and temporal happenings in space. This experience was also crucial for the early realization of how architectural space, hence architectural representation (as often taught in first year via technical drawing classes) doesn't only consist of the static and measurable elements, but also by movements, cycles, temporalities that transform space via experience.

5.3. Workshop 3 and final project: Designing spaces with sounds

For the final project of the module, the studio was divided into four sub-groups which developed their own design agendas to the brief. The authors' group chose to explore "*everyday objects and immediate environments as potential sound tools and design agents for creating spatial experiences*" (Türkkan & Avanoğlu, 2021). This phase entailed the making of a collective sound-bank and individual sound reenactment projects.

The design process began with building the collective sound bank. Students were asked to find everyday items at home "*to explore their sound capabilities through performative acts*" (Türkkan & Avanoğlu, 2021). Through a set of sound-abilities like 'reflecting', 'amplifying', 'absorbing', 'distributing', 'transmitting', 'diluting', 'deforming', they performed random everyday objects such as chair, carpet, glass, plastic bag, fan, hair-dryer, radiator, wall etc. and transform them into sound-tools. Via audio-visual transcriptions (text, drawing, diagram, photo) these audio-performances were stored in a "bank" (on a Mural board),[14] available for the use of the group (Figure 4).

In the third workshop, the collection of audio-visual notations in the sound bank were shared with composers and performers Anne Leilehua Lanzilotti and Gahlord Dewald, who interpreted these notations as scores and performed them with violin and bass. Students were able to listen to their own drawings, and observe their potential synesthetic expressions (Figure 5).

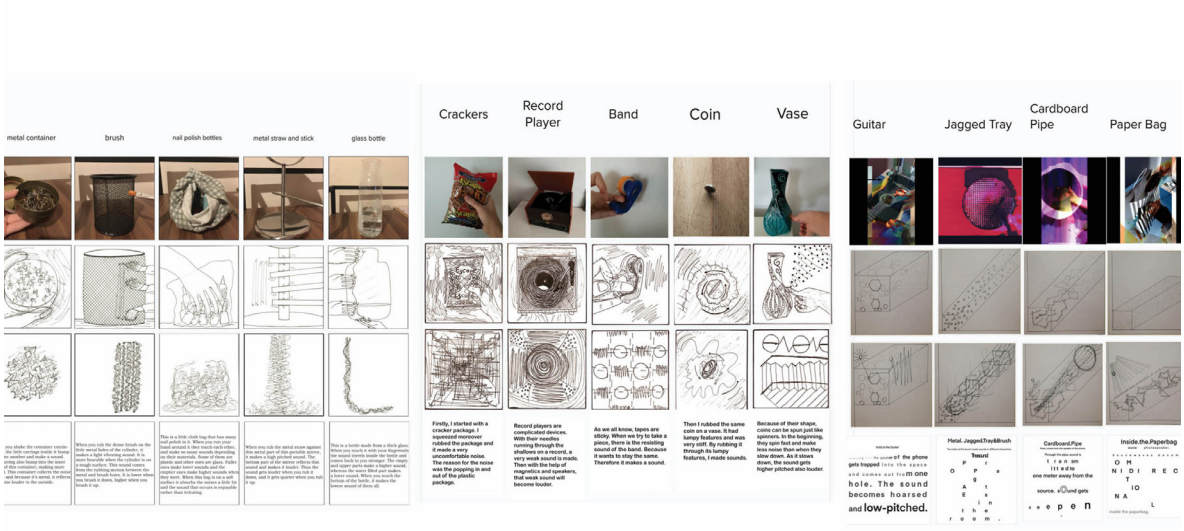

Figure 4. *The collective 'sound bank' items found at home recreated as sound tools.*

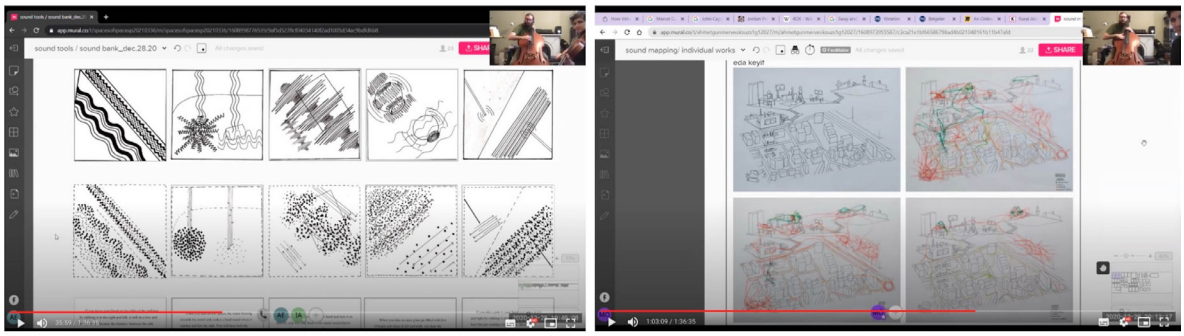

Figure 5. *A.L. Lanzilotti and G. Dewald performing students' works during the workshop. December 28th, 2020, via Zoom.*

Providing a wide variety of sound-tools accessible at home, the collective sound-bank was moved to the next stage; the "individual sound reenactment project". At this point, students were asked to "*recall an auditory experience they missed the most during the lock-down*." (Türkkan & Avanoğlu, 2021). Answers included being on a crowded street, a loud bar, in a football stadium, on a beach, etc. The brief invited students to re-use the tools in the sound bank and individually "*create a sound-space setting which reenacts that particular audio-spatial experience within their homes*" (Türkkan & Avanoğlu, 2021) (Figure 6). These audio-spatial reenactments were eventually articulated into programs of leisure, dialogue, self-expression, socialization and isolation for their own use.

Most projects designed a physical setting manipulating the spaces, items and sounds available in their immediate environments (Figure 7). Proposals included: "*mechanisms attached to the room, performed by the body to reenact the sound of a crowded street*"; "*an audio-spatial construction made by coat hangers to reenact the sound of a road trip to the bay*", "*a table-setting proposing sound therapy*"; "*a bodily experience of being in a bathroom during a party*"; "*a social game-design to discover sound as a tool to interact with others*"; "*an apparatus for the need to self-isolate during pandemic*" (Türkkan & Avanoğlu, 2021) (Figures 8-10). Via drawings, diagrams, collages and gifs, students also developed the audio-visual representations of these designed settings within their living spaces.

This final project emphasized the capacity of sound and listening in shaping and characterizing spatial experiences, as well as promoting them as architectural tools for spatial imagination and creativity, even with limited resources, tools and mobility.

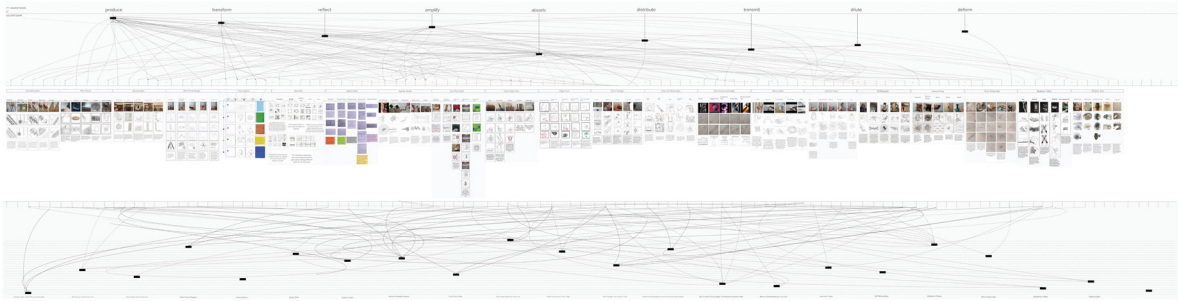

Figure 6. *'Sound bank' organized items according to their abilities, to be used in individual design projects.*

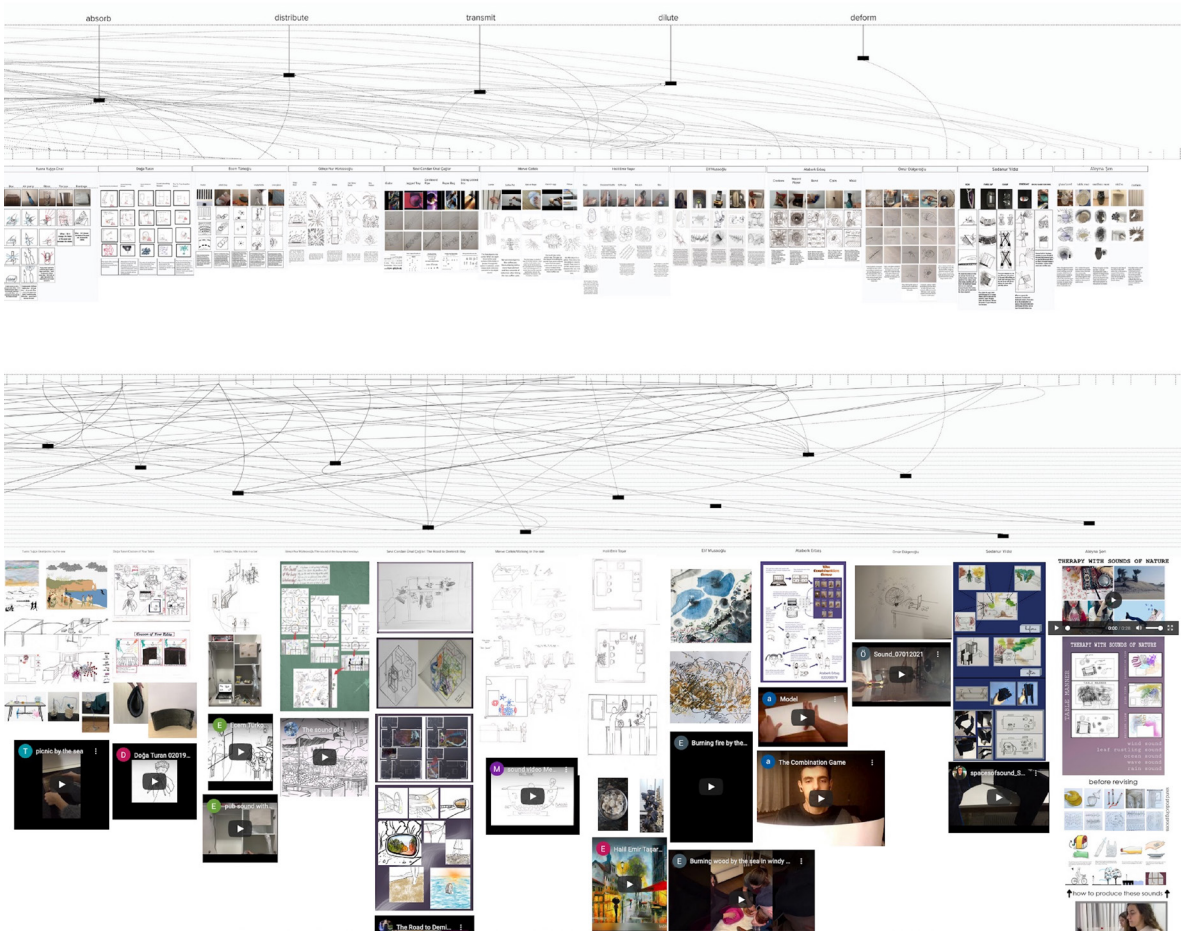

Figure 7. *Individual design projects in their relationship to the 'sound bank'.*

6. Evaluation and discussion of the listening (presence) in online architectural design studio

While fulfilling most learning requirements for the first year within the conditions of online education, this pedagogical exploration also established a type of presence that is often overlooked in the conventional design studio education: listening. Resorting to the "*sensual realm of sound*" (Türkkan & Avanoğlu, 2021) reinforced students' active presence in the studio, while bridging the socio-physical gap among our private houses, computer screens and the world through unique listening experiences.

Working with listening had twofold inputs into the process: in designing an online curriculum and prompt audio-spatial awareness in architectural learning.

Designing the curriculum around sonic-based experiences and tasks

Figure 8. *'Crowded' by Aybüke Akdağ, 'The Road to Demircii Bay' by Sevi Candan Ünal Çağlar.*

played a crucial role in constructing the social, cultural and pedagogic foundations much needed in beginning architectural education in the absence of direct encounters in physical space. Emphasis on listening significantly increased the opportunities for students' presence and engagement on various levels: with their own surroundings as part of their architectural learning journey (their immediate lock-down spaces, homes, neighborhoods, rural or urban landscapes and living companions), amongst peers (getting to know each other, exchange experiences and collaborate from a distance), and lastly with the tutors in a nurturing, non-hierarchical dialogue.

As previously reviewed, listening can play a significant role in enabling peculiar forms of relationality, agency, and interaction. This was observed in the process of the first-year studio, despite the difficulties and restrictions of physical isolation. Some of the pedagogical qualities that were aimed and observed in the learning outcomes were:

- Realization that listening is a state of action, a set of choices, therefore a relational and political attitude
- Understanding that space is a dynamic, temporal, multi-layered entity of complex interactions rather than a static image
- Emphasizing interconnectedness and the role of sound in establishing relationality (between body, built environment and geographical scales, between electronic, digital, analog sound mediums)
- Exploring representational media (drawing, mapping, sketching, nota-

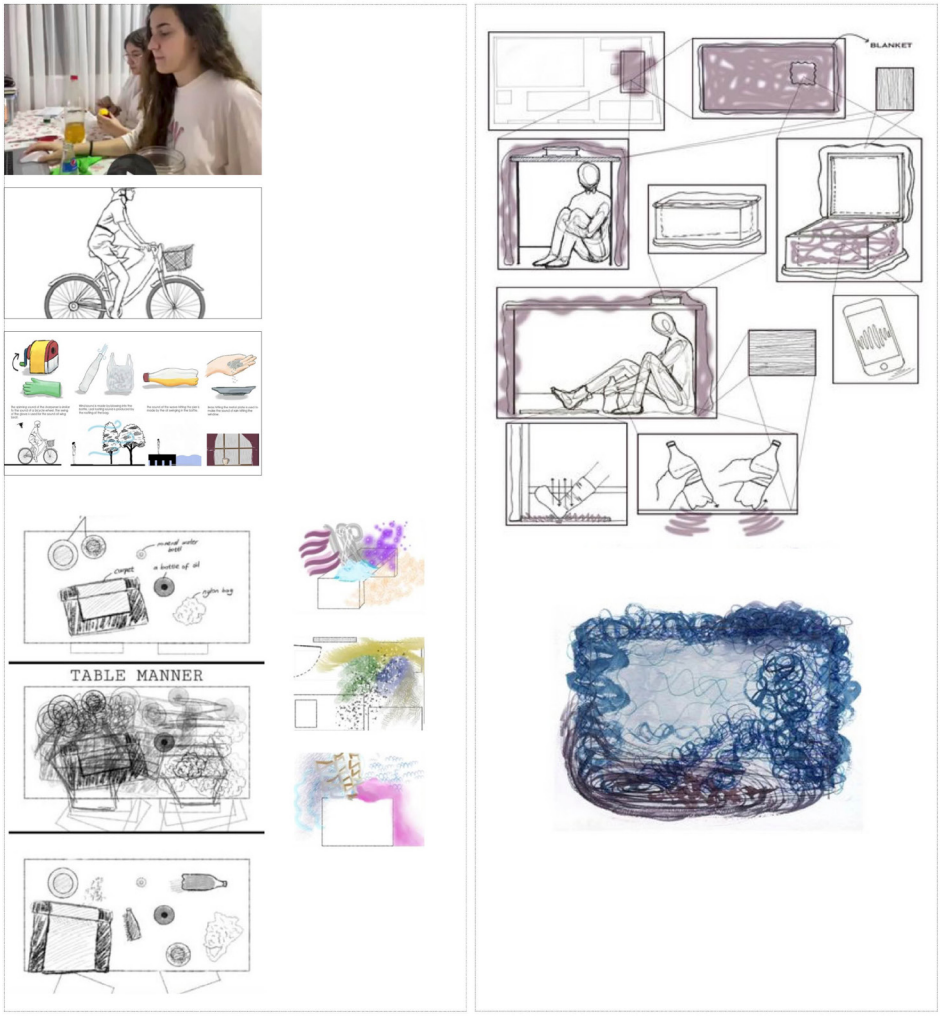

Figure 9. *'Therapy with Sounds of Nature' by Aleyna Şen, 'In a Bathroom at a Party' by Zeynep Aslan.*

tion) to decipher spatial information that is not only visual
- Discovering the specific sound characters of spaces (aural architecture of stadiums, schools, supermarkets, beach, everyday spaces and objects) and working with them as design tools
- Understanding the agency of bodily movements, intensities, positions as sound potentials contributing to spatial design
- Through design process, exploring potentials of spaces, materials, bodies, actions to create new audio-spatial experiences, testing ideas and developing architectural programs

Additionally, this experience created an opportunity that would not have occurred in a conventional design studio setting. Due to the differences in each students' location and surroundings, their remote yet synchronous acts of listening to each other's environment added an extremely rich spectrum of found, studied and documented audio-spatial scenarios and as many design potentials. The knowledge pool of the design studio expanded with the auditory knowledge and experiences coming from a wide range of indoor and outdoor spatial settings, geographies across Turkey and abroad. This also marked a significant divergence from the often problematized isolated, self-validating, studio-centric tradition of the design studio culture.

7. Reflections on the new architectural learning environments and listening for architectural pedagogy

In an article published before the pandemic, Brady (2017) already

Figure 10. *'The Combination Game' by Ataberk Erbaş, 'Sound Isolation' by Sedanur Yıldız.*

discusses how it is extremely likely that architectural education, and design studio, will be conducted primarily online in the relatively near future. He rightfully points out the need to address the potential benefits and pitfalls before an online version of that culture "acquires its own bad habits" (Brady, 2017).

This might already be the case for some online design studios, which automatically followed the given use of the interfaces, and already developed unconscious new habits, norms and procedures for listening that perpetuate the problematic conventions of design studio culture.

However, the advancements in information communication technologies enables further opportunities to leverage the capabilities of digital/ remote education platforms with pedagogies that promote a more emancipated agenda and studio dynamic for architectural learning.

Harvey (2008), underpins this point by stating "contemporary convergence of electroacoustic practices with spatial studies might be the catalyst to generate new concepts of spatial design and experiences in built and digital space". He suggests "for such a renegotiation of spatial concepts to occur, design pedagogy must embrace the unique needs of an aural training for architects" (Harvey, 2008, p.63).

He asks: "*If the research into the acoustic environment, auditory spatial awareness and electroacoustic music are ways of thinking about the sounding world, then why are they not formally part of schools of spatial studies?*" (Harvey, 2008, p. 63)

Hereby, the article concludes by

addressing listening as an underdeveloped pedagogical opportunity, and underlines its potentials for critical pedagogic practices in architectural education.

It is on the curriculum designers and studio tutors to creatively and critically guide new architectural learning scenarios by blending existing and emerging online, virtual, augmented environments and technologies with direct experiences of immediate physical spaces and personal encounters. Such an effort could benefit from inter, multi and transdisciplinary expertise, as well as the range of critical discourses and practices on listening, as briefly presented in this article. Educational experiments can multiply pedagogies that "*embody the experience of auditory space; include critical exercises through which to understand the scope of auditory perception and its relation to other sensory systems, the development and application of aural memory, and the discovery of generative acoustic design methods*" (Harvey, 2008, p. 66).

Listening practices that are critical, deep, ethical, feminist, etc. could trigger emancipatory transformations in the historically assertive and dominant architect-stereotype. They can help construct novel and authentic "acoustic communities" in and for architectural learning through digital, physical or hybrid mediums.

Architectural education today is confronted by an unprecedented set of social, environmental, technological disruptions (Türkkan, 2023). Hence new horizons that will tackle the political, ethical and systematic issues in architectural education cannot be merely characterized by technological improvement or changing medium. It is only through critical eyes and ears that these technologies and communication models can propagate new protocols, ethics and means of listening between architects, non-architects and the environment.

Endnotes

[1] Pivot to Online Learning, Discussion Sessions + Videos https://www.acsa-arch.org/2020/03/13/pivot-to-online-learning-discussion-sessions/?fbclid=IwAR2bAxq8UCPD0_zWB9ctEZQyOBOpB1CqXZv_6nQPCKkUDTIuVjr6Wg4TEXs, also available at "Pivot to Online Learning, ACSA Conference Series: https://www.youtube.com/playlist?list=PLI234IEo5Aw9G9KuuYVbDNcMPdq84_Vz6 (retrieved on 10.03.2022)

[2] With the contribution of Robert Rauschenberg, composer David Tudor, poets Charles Olson and M.C. Richards, and the choreographer/dancer Merce Cunningham.

[3] The footage titled "ODTÜ Mimarlık Fakültesi'nde Bir Ders (1968) – BELLEK 65" can be viewed at the following link shared by ODTÜ GİSAM (2021): https://www.youtube.com/watch?v=cdP4PQjb_vk

[4] Milo (2019) provides an extensive list of sound-based studies within schools of architecture and design around the world and acoustics research groups collaborating with architecture schools.

[5] Some examples of sound studies in architectural design studio can be cited as: soundscape studies (Harvey, 2005, Cerwén, 2016; Llorca Bofí, 2018; Kandemir & Özçevik Bilen, 2020; Al-Ibrashy & Gaber, 2010; Fowler, 2013a; Hong & Chong, 2023), auditory awareness (Sheridan & van Lengen 2003; Ham, 2003; Harvey, 2005; Fowler, 2010, Llorca Bofí, 2018;), Sonic-based form generators (Harvey, 2005), virtual acoustic spaces (Llorca Bofí, 2018).

[6] A detailed review of listening related research from 1940's onward can be found in the work of Bodie et al. (2008) in three primary areas - information processing, competent behavior, and individual differences perspectives from the "cognitive revolution" to the rise of human information processing models.

[7] Schafer was the first to coin "soundscape" and founded the influential research and education group in Simon Fraser University called the World Soundscape Project (WSP).

[8] Truax (1984) made a nuanced interpretation of a communication model via soundscape by pointing to the factors such as the type of sound, human sensitivity, physiology, psychology and other measures that sophisticate "our relationship with sound and the environment through sound", as

opposed to sound being perceived as an isolated object in the environment for the human listener to receive.

[9] Fowler (2013b, p.171) offers to use critical listening as a design method and an analytical framework to bind closer the already symbiotic relationship between the designing of sound and the designing of space by promoting new design methods, technological adaptations to form-making, and bringing a range of innovative tools.

[10] 'Spaces of Spaces' project series include 'Spaces of Scales', 'Spaces of Sound' and 'Spaces of Light'. The studio is led by eight tutors in four subgroups: Sevgi Türkkan & İpek Avanoğlu, Çiğdem Eren & Buse Özçelik, Ahmet Gün & Merve Öksüz, Deniz Leblebici Başar & Tarık Çelik, in ITU Faculty of Architecture in 2020-2021 Fall term.

[11] Three guest lectures were held in alignment with the workshops: first lecture was given by architect and contemporary sound-artist Neval Tarım on sound-mappings, the second lecture was given by contemporary artist, musician and architect Cevdet Erek on his personal experiences and explorations in the intersectional field of sound and architectural space. Third lecture was given by composer and performer Anne Leilehua Lanzilotti on graphic scores through the relations between music and architecture. The lectures guided and inspired students to further engage with the topic.

[12] During all experiments students' and tutors' loudspeakers and screens were on. Whether anyone used loudspeaker or screens in addition to their pc's or laptops was not controlled or relevant for the execution of the experiments.

[13] Music pieces listened to: 1- Brutal Ardour (Variation On 'The Canon In D Major' By Johann Pachelbel); 2- John Coltrane - Resolution; 3- Erkki Kurenniemi - Inventio / Outventio; 4- Ergo - Yet but.

[14] The sound bank and the student works can be visited at the 'Spaces of Sounds' website link: https://soundtools2021.hotglue.me/

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