

tune your study up

UNCERTAIN TIMES 2037 I SAHA

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SOUNDFLOW

tune your study up

UNCERTAIN TIMES 2037 | SAHA

Table of contents





Uncertain Times 2037 #HIGHEREDUCATION Innovation Studio – A.Y. 2021/2022 Master Degree Course in PSSD

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"New environments for learning may need more radical solutions. We will provide a scenario for the future that describes a higher education system that is highly decentralised, digital, focused on local participation and solving the big climate challenges, where students are never alone in their learning."

– Innovation studio syllabus



Our scenario	8
Sensory Overload	9
Ambient noise	10
The Flow State	11

It's 2037

Imagine if we have a different relation to our environment. Everything around us is a resource. We can be nurtured and boosted with the most unexpected things, we just need to stop and listen.

Our vision for the future is this: transforming an overcrowded world of stimuli from disturbing surroundings to inspiring surroundings.

Sensory overload

One of the inevitable scenarios of the future is the overload of information, in its various types. From data that we perceive by our senses to information that we process with our minds, the human being can reach an overstimulation that will reside in a lack of creativity, a shorter attention span, difficulties to concentrate.

To no exception, the educational spaces are one of the environments that are highly connected, vibrating while nurturing the minds and souls of students and evidently overflowing with stimuli.

In 2037 life will offer students fast-paced rhythms and a lot of stimuli that will distract them. As a consequence, their attention rate will suffer from distraction and will require help to keep it for long.

Our concept aims to help them studying with their best attention and productivity rate by helping them concentrate with noise and tailored techniques. Fig. 11 Amount of data created, consumed and stored 2010-2025. Published by Arne Holst, Jun 7, 2021, on Statista.



Ambient noise for coping with sensory overload

The market is already full of products and devices that isolate students, absorb noises and put visual walls in the ambient they are studying in. However, there are still few solutions for using noise as a tool for concentration. Indeed, surprisingly, studying with moderate levels of noise (70db) improves students' creativity and attention.

In fact, experiments have been conducted in order to understand the effects of ambient noise on creative cognition. A study exploring the effects of ambient noise on creative cognition showed that moderate levels of ambient noise enhance abstract thinking which leads to increasing creativity and productivity.



In this sense, moderate noise has a lot of potentialities to help students deal with the oveload of stimuli and enhance their capabilities to focus. White, pink or brown noise, all have the feature to absorb noises and drown them out, reducing that way further distractions.

+ Fig. 1.2, 1.3 Creativity

measure & processing difluency as a function of noise level and timing of task. Published by Ravi Mehta, Rui (Juliet) Zhu and Amar Cheema, dec 2021, Journal of consumer research.

Time of measure

Immediate

Delay

The flow state and overcoming distractions

To manage studying in a world full of stimuli, students have three different techniques they can use to overcome distraction and train their concentration, in order to improve in keeping focus and enter into a state of flow.



The flow state is the mental state in which someone is fully immersed in the activity s/he is doing. The feelings associated with this state are: energized focus, full involvement, and enjoyment in the process of the activity. Complete absorption in what one does, and a resulting transformation in one's sense of time are the key aspects of this state. Therefore, it is what students are aiming for.

Reference:

Mihaly Csikszentmihalyi, *Flow: The Psychology of Optimal Experience*, Harper & Row, 1990



Product definition	14
Functions	18
How it works	19
Sound	21
Techniques	22
Mechanisms	23
Lights	24
Shape and materials	25

What is the product?

Soundflow is not a mere sound machine. It is much more. Soundflow helps students to concentrate and to keep the focus while studying.

Soundflow follows and guides the users through their study path. This is done by proposing different studying techniques to avoid procrastination and by managing the time and concentration based on the initial level of the user. To keep the flow over the study sessions, Soundflow makes a pleasant ambient noise formerly chosen by the student.

Fig. 2.1 Soundflow first prototype

To manage

Soundflow helps to better manage the time with the offered methods. There are buttons for three recommended techniques and one for an own technique.

To support

Soundflow generates white noise that helps to focus by creating a background sound and cancelling the occasional distractions.

To inform

Soundflow informs when it is time to work and when it is time to rest. With the LEDs, the progress in time can be kept track of.







Functions

Students are assisted and guided by *Soundflow* throughout the study session.

The product has three main functions:

1. creating a sound that helps students to concentrate;

2. giving four different options to arrange study sessions according to four different techniques;

3. giving a visual feedback of the progress during the study session.

Fig. 2.2, 2.3, 2.4 The three functions of Soundflow



1. Creation of the sound

2. Four different techniques

3. Visual feedback of the progress

How it works

The users pick the most suitable time setting for the tasks they wish to accomplish over the study session. They then push one of the four buttons, based on the chosen technique, to activate the device. Each button switches the product on and off. As soon as the study session starts, the background noise starts.







When it is time for a break, the noise stops and the users can check the progress from the top of the amplifier. The lights pulse to indicate that the study session may be stopped for a while. When the break is about to finish, the lights pulse faster. They will go back to static light over the single session time span.



• Fig. 2.8 Appearance of the LEDs at the end of the first cycle of four units of the *Pomodoro* technique

At the end of the planned study session, students can switch the product off by pushing the button. Alternatively, they can keep it on to do other tasks.

Sound

The ambient noise is created in the internal mechanism of the product. The sound is made by rotating certain materials in a circular box that is mounted inside the *Soundflow*, right underneath the amplifier. The box has holes for the sound to escape and resonate in the body of the product before it reaches the amplifier. This "sound box" is incorporated into the product, and can only be changed by the company. The sound is on for the duration of the study sessions. During the breaks it is not operating, thus not creating any noise. When the sound is on, it helps to focus and is beneficial for the users.

The amplifier consists of five layers of cut circles that create a sort of a funnel through which the sound travels outside. It is estimated to increase the volume of the sound by 25dB.



† Fig. 2.9 Mechanism inside that produces sound

Techniques

Soundflow offers the users four techniques to manage their study time at their best. Its use is supposed to be assisted throughout the service and the path that the users will do to enhance their flow state, productivity and focus.



Pomodoro technique

The technique consists of 25 minutes of work and 5 minutes rest. At the end of the fourth cycle, the break is 30 minutes. After each quarter of an hour the white noise production stops, a dot lights up and starts pulsing on the top of the product. This is to indicate the break time. Once the white noise is back on and the light is no longer pulsing, it is time to get focused.

Melon technique

This method is 90 minutes work 20 minutes break. After one and half hours has passed, the white noise will stop, and a quarter of a circle (three dots) will light up to inform about a 20-minute pause. When the sound is back on, it is time to focus again.



Flowtime technique

With this method, the users manage the working and break times according to their developed skills. When the working mode is on the light ring is full. To have a break and recharge the batteries, the button is pressed to turn the product off. Once the users are ready to get back to work, they press the button again.



Your own technique

The users can decide to use a tailored technique based on their focus and break span habits by creating their own operating instructions. The product is connected to the app via *Bluetooth*.

Mechanisms

Soundflow is a simple product relying on simple technology where a plain rotation is the mechanism behind the sound. With a DC motor (6300 tours/min) the materials inside the box create the sound by moving in circles.

A programmable circuit board (Arduino) is used to code the *Soundflow* to create white noise during the focus time and no sound during the breaks. Together with a 2000 mAh battery, this product can be left on for ten hours straight.

The fourth button for the personal technique is set via Bluetooth that connects the product to the mobile app.





← Fig. 2.10, 2.11, 2.12 Functioning of the internal mechanism

Lights

Lights are an important feature of the product to give feedbacks to the users. In the amplifier's part, they inform the user that the product is on and that they are currently using that technique.

On the top of *Soundflow*, a 16-LEDs round strip creates a relaxing yet clear sequence of dots that informs the progression of study sessions. Each light combination embraces affordance: once the students know what each pattern stands for, it is very easy and intuitive to keep track of one's own progress.

Fig. 2.13, 2.14, 2.15, 2.16 Disposition of the LEDs for the three modes: Pomodoro technique, Melon technique, Flowtime technique



Shape and materials

Soundflow has a minimalist cylindrical shape. The organic shape is inspired by both functionality and the Soundflow philosophy to express calmness, smoothness, and undistracted appearance.

The cylindrical shape is easy to handle, and the size makes it a convenient product to take with and carry in a backpack.

It is composed of two parts: the upper part (the main wooden body) is related to the sound and the progress of the study session, while the lower part is related to the product interactions and the buttons.

The main body is made of laser cut plywood disks that are glued together. Its rusty appearance keeps the attention on the amplifier and the exterior. The contrast between the burnt body and the top disk with LEDs leads the users to focus on the light feedback.

Plywood is used as the main material for its easiness, moldability, low price and the power of reducing stress levels and therefore enhancing concentration. The latter is also supported by another sensorial factor, the essence of a burnt plywood.



The bottom part consists of a wider disk made of a dark brown, high-density polyurethane foam. The colour is coherent with the upper body. The main function of the disk is the four buttons.

These buttons are not directly visible, sit inside the foam disk in small insets, and they are activated by pressing. The buttons are covered with various textiles. This emphasises the importance of the touch in the interaction with buttons that can be argued to have been forgotten with the smartphone era. The pleasant haptic feeling of fingers on soft, woollen textiles makes the study session start with a renewed sensation of calm, relax and focus.

The colours of the textiles are warm, sandy, and muddy, evoking relaxing feeling and consistent with the main colours of *Soundflow*.

Fig. 2.17 Soundflow
Fig. 2.18 Focus on the buttons





↑ Fig. 2.19, 2.20, 2.21, 2.22 Product handling
 → Fig. 2.23 Soundflow









Fig. 2.25, 2.26, 2.27 Context of use





Fig. 2.28, 2.29, 2.30 Soundflow and its context of use







Service definition	38
Value proposition	39
Offering map	44
Our stakeholders	46
Personas	48
Customer Journey Maps	52

The service

Soundflow is a product-service system that assists students in enhancing their concentration capabilities. It offers a set of time management techniques embodied in a simple display that accompanies the students by generating ambient noise. This ensures having a static background noise that stimulates concentration by preventing distractions.

With the product-service system, *Soundflow* helps students with maintaining the focus and productivity. In addition, the system aims to help the students to find their own techniques by raising the awareness of their individual studying habits.

Value proposition

Maintain the focus and productivity

Simple methods to balance the focus and deliberate breaks, with time management and mental fatigue prevention techniques. A combination of techniques that help keeping the productivity high in an efficient way.



↑ Fig. 3.2 Soundflow app: icon
 ↓ Fig. 3.3 Soundflow app: download interface





Become aware and improve

Auditing, reviewing and improving the performance is the process offered to students in order to find their own technique. Habits and trends help define the technique that is the best for maintaining focus and productivity.





Fig. 3.4 Soundflow app:

Statistics

Find a community and support

Group sessions tend to increase productivity. It is with mirroring that students feel engaged and supported by others. At the same time, sharing the same technique offers a space where all flows are in sync. ↑ Fig. 3.5 Soundflow app: Community





Fig. 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13 *Soundflow* app: Techniques and Instructions



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Offering map

The aim of the service is to provide students with a space where they can enhance their concentration capabilities. The offerings are divided into two categories: the main or the primary and the secondary offerings.

The main offering is supporting students to maintain the flow and focus during their study sessions and helping with finding their own technique. To plan the most suitable and successful study sessions, the service offers a variety of ambient noises to choose from as well as a set of techniques that have been proven to be efficient. The choices are informed by and supported with the advice and tips. The system also provides feedback in terms of statistics to help the students to assess and keep track of their performance, and eventually find their own technique.

The secondary offering consists of having a community around *Soundflow*. The members of the community share the same purpose: having a productive study session. They can plan and organise study sessions where all flows are in sync.



1. Supporting students in focusing

- Providing a sound library
- Providing a description and instructions for each technique
- Providing tips and advice for each technique

2. Supporting students in setting the technique

- Auditing the perfomance
- Suggesting techniques based on the analytics
- Offering educational material (articles/videos...)

3. Supporting students with a community

- Planning group sessions with students with matching techniques
- Building a community around personal development and growth

Our stakeholders

By partnering with universities, libraries, and co-working spaces, the *Soundflow* students are offered an exclusive access to the product with a limited time-of-use. Students can have a long-term product-service subscription for their whole university career and returned to the company at the end of the contract. Alternatively, the device can be booked for a collective use via *Soundflow* app. In this case, a relevant library or co-working space will provide students with the product. Soundflow can also be purchased from retailers in case a student wishes to have access to the product-service for an unlimited set of time.

The components of the *Soundflow* ecosystem, the actors, and the interactions are illustrated in the following map.



Legend





DAVID The disoriented student

"All your efforts will pay off soon. Never give up."

Age 19 Occupation STUDENT Nationality AUSTRALIAN Hobby SPORTS

David is a young student from Australia. After graduating from high school, he decided to study architecture at Politecnico di Milano. He has been discovering the new country for a few months now, but still feels very disoriented. David is very stressed for the big amount of work and does not know how to pass the exams. During the little free time that David has he often goes running. He misses playing a competitive sport. For this reason, he would like to better manage his time to dedicate it to physical activity.

Goals:

- To pass the semester exams
- To find own study method
- To have more free time to spend on the hobbies
- To meet new friends

Frustrations:

- Getting too easily distracted and not knowing how to improve
- Not getting good grades
- Having concerns of not being good enough for the architecture field

Personality





LAURA The experienced student

"How to study when you are not in the mood to study..."

Age 26 Occupation PhD STUDENT Nationality FRENCH Hobby COOKING

Laura is a PhD student in the field of Design. She is very curious and passionate about research. Struggling with deadlines, she is always looking for techniques and methods to help her increase the productivity. Laura is very self-aware and tries to work according to her state of mind and mood. She lives with two noisy flatmates. This causes a lot of distraction, and Laura struggles with her reading. Cooking is the activity she enjoys doing the most. Whenever Laura feels overwhelmed by the work, she cooks a meal as a way to recharge the batteries.

Goals:

- To present high-quality work
- To master the workflow
- To feel more comfortable while studying
- To participate in cooking classes

Frustrations:

- · Getting easily distracted
- Inability to create own atmosphere for focusing
- Dependant on the mood when studying

Personality



Customer journey map – David

		Pre se	ervice				Service			Service			Post service	
	Awareness	Exploring	Getting	Sign up	Learning	Using	Focusing	Tracking	Proposition	Searching	Going	Joining	Proposing	Returning
Actions	David becomes aware of a product-service system that helps to be more productive from the school's website.	He discovers how it works and explores the available products in the sound library.	David borrows the product from the university by paying a fee.	He creates his personal account by connecting it to the product.	He can explore and read about the various techniques offered in the product so that he can then use them consciously.	David follows the rules and tips, divides the tasks and turns on the product. It starts producing a sound.	Thanks to it, he is able to stay focused and be more productive while studying.	After finishing the study session, David enters some data required in the application on the session itself.	After a certain amount of data inserted, the service is able to understand his habits and propose a customised technique for him.	By using some filters (time, technique) David can see where the co-study session events closest to him are located.	Thanks to the satellite map included in the application, he is guided to the destination.	David joins the co-study session where he can study with other people and be more productive by respecting the shared technique.	He was very pleased to join the co-study session event and thus decides to create one for the next day too.	At the end of the lending time David returns the product to the university.
Touchpoints	Computer School's website	Computer Soundflow's website	University	Phone Application	Application manual/ instructions	Product	Product	Application	Application	Application 'Community' section	Application 'Map public transports' section	Product	Application 'Community' section	University
Emotions	Curious "Interesting! Let's try!"	Surprised "Wow, there is a huge choice!"	Sceptical "Hmm let's see if it's money well spent."	Thrilled "Finally, a place where I can keep my data!"	Interested "I had never heard of these techniques, they seem to be very effective."	Hopeful "I hope these efforts will lead to a better productivity."	Relieved "I'm working so well! I have already completed two tasks!"	Reflective " would have never thought that so many factors can affect my study session."	Pleased "I'm so happy, this data allows me to be aware of my study method!"	Surprised "Wow, there are a lot of co-study sessions here in Milan!"	Satisfied "How practical it is!"	Happy "It is so stimulating and nice to study with other people!"	Excited "I can hardly wait for the next co-study session! Who knows how many people will participate!"	Satisfied "This tool has helped me a lot! It's time to take it back now and work with my flow."
Insights		The first contact with the service can be a determining factor in the success or failure of the purchase.	A complicated process may discourage the user from purchasing or subsrcibing to the product.		Too long texts can discourage the user from reading.		Sounds may enhance the concentration of some users.	The process of entering some information can be boring.		Students with the same studying methods should meet with each other.	Sound can be unrecognisable in a big space.	The break time can be an opportunity for students to socialise.		
Opportunities		How may we design the first interface of the application to be appealing and simple at the same time?	How may we create a very simple and effortless system?		How might we visualise the content in an efficient way?		How might we provide a sound that matches them the best?	How might we design a concise and efficient tracking interface?		How might we display the co- study sessions?	How might we ensure that the product is sufficient for the place?	How might we encourge students to take advantage of the break time?		

Customer journey map – Laura

	Pre service				Service				Post service	
	Awareness	Exploring	Getting	Sign up	Exploring	Using	Auditing	Suggestion	Returning	
Actions	Laura becomes aware of a product-service system that helps adapting productivity to the state of mind from the school's website.	She downloads the application, discovers how it works and explores the available products in the sound library.	Laura borrows the product from the university by paying a fee.	She creates a personal account by connecting it to the product.	She assesses how she is feeling at the moment and what will work best for her.	Laura chooses one of the proposed techniques or sets her own one and starts working.	She assesses her performance by ticking the tasks on her notebook. From time to time, she fills in the review rubric.	Laura checks the app's suggestions and compares them to her own techniques.	At the end of the lending time she decides to end her subscription with the university and buy her own product from a bookstore.	
Touchpoints	Computer School's website	Phone Application	University	Phone Application	Product	Product	Application Notebook	Application	Bookstore	
Emotions	Curious "Interesting! Let's try!"	Surprised "Wow, there is a huge choice!"	Sceptical "Hmm let's see if it's money well spent."	Casual "It's easy to figure out."	Comfortable "Let's just go with the flow."	Proud "Yay! I'm getting things done!"	Curious "I wonder what it will tell me."	Surprised "This is quite helpful!"	Satisfied "I've really enjoyed working with Soundflow."	
Insights		The first contact with the service can be a determining factor in the success or failure of the purchase.	A complicated process may discourage the user from purchasing or subsrcibing to the product.			Sounds may enhance the concentration of some users.	The analytics of her performance can be both useful and useless.			
Opportunities		How may we design the first interface of the application to be appealing and simple at the same time?	How may we create a very simple and effortless system?			How may we provide a sound that matches them the best?	How may we show an overview of the overall performance?			

Chapter Brand identity

Mission and vision	58
Payoff	59
Name	60
Fonts	60
Colour palette	62
Logo	64

Mission

To help students – especially those who have difficulties in concentrating – to stay in the flow, through the production of white noise and by helping to keep their distance from electronic devices, such as smartphones.

Vision

To improve the learning experience of all students and reduce the negative effects of a fast-paced society.

Payoff

Tune your study up

Tune sth up – phrasal verb with tune verb [T]

to make small improvements to something so that it is as good as possible *Definition of tune (sth) up from Cambridge Business English

Dictionary © Cambridge University Press

Name

The brand is called Soundflow. The evocative name combines two main aspects of the product-service concept: the sound (the ambient noise) and staying in the flow, especially while completing tasks related to studying.

Fonts and alignments

For the typefaces there are two different ones used. One is a serif font, Suisse Works, which is only used in the Bold weight. The feet of the letters are not too pronounced, thus giving the elegance to the visual identity while maintaining a reference to the concept of flow.

Suisse Works Bold – 15 pt

The Quick Brown Fox Jumps Over The Lazy Dog

Suisse Works Bold Italic – 15 pt *The Quick Brown Fox Jumps Over The Lazy Dog*

Suisse Works Bold – 12 pt The Quick Brown Fox Jumps Over The Lazy Dog

Suisse Works Bold Italic – 12 pt *The Quick Brown Fox Jumps Over The Lazy Dog*



+ Fig. 4.1 Details of the characters (Suisse Works)

The second one, Proxima Nova is used as the typeface for text for its readability and variety of fontweights, making it very versatile. The font is mainly used in the Regular weight, while the Medium weight is used to highlight specific words and the Light weight for the captions.

Both typefaces are used in small to medium body with a left flag alignment. Exceptionally, in case of a very short text, the fonts are centre aligned.

Proxima Nova Regular and Medium - 10 / 12 pt $\,$

Proxima Nova Italic and Medium Italic – 10 / 12 pt

Et ut et debita vendenimi, aut volorum et reperuptas ea experibus restio. Imincienis est, quiatus, et lam resequi te moluptatur, sitatur, qui quasimin res volorit emquiae abore renis rerupta cus endio. Nam dion est, que dernate arum explabo. Et event que soluptam.

Proxima Nova Light – 8 / 9 pt

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Proxima Nova Light Italic – 8 / 9 pt

Tore, velis illuptat. Net aut dolore dolore consecab iur maionsedis exceat officto tatioresenda vollab int eaque non pro beatem.

J C A J K C

✤ Fig. 4.2 Details of the characters (Proxima Nova)

Example

Edioria sitiisq uatiore acerruptat volorum fugit aspiciuntiis rem quia quam qui quamus sam que sunt inis aut fugia voluptate im voleseque corem liquatiam la sunt magnienia voluptis aut quas et officte doloreped quamendandam con est et, esti ate dolor aut facea est, elendandi offictu riorit qui.



Fig. x.x Image with a caption



Colour palette

Opting for rather neutral colours, the colour palette is a reminiscent of the natural environment with its dim and faint tones for the least distractive outcome. The colours are also in accordance with the material the product is made of.

These four colours in shades of brown – 'Focus', 'Idea!', 'Break time' and 'Into the flow' – are elegant and refined, yet simple at the same time.

'Focus' is used for small details, 'Ideal' for components on dark backgrounds and sometimes for backgrounds, and the last two tones for everything else. However, for the backgrounds in general, an optical white is preferred, as it makes the page lighter. Finally, "Deep focus" is used for texts and as a contrasting colour to the lighter ones.

Logo

The logo created for Soundflow is more properly a logotype with the letter 'O' redesigned. It suggests two features of the product: the circular shape and the contrast between the colours of the product – the lighter inside and the darker outside. In addition, the shape reminds of a loudspeaker, a common symbol for sound, another key aspect of Soundflow.

The legibility of the logotype is maintained up to the size of 2 cm. Below that only the pictogram forming the letter 'O' is used. This is also the case if the logo is to be printed in a small size on a very rough-textured paper.

Logo – coloured background

SOUNDFLOW



SOUNDFLOW

Logo



Our process	68
Colours of noise	74
Time management techniques	80
Components	89
Technical drawing	90

Our process: From stimuli overload to colours of noise

The research we conducted in the area of stimuli overload led us to the conclusion that there are two major issues in this field: information overload and sensory overload.

After extensive research within this area, the second option proved to be the most promising, as it offers more design opportunities. Indeed, the overload of information is mainly affected by one's own way of filtering and processing information and it is quite difficult to provide a tool that can help every single individual in overcoming the problem. Moreover, it is an inherent problem in the human nature. Since humans are finite entities, thus by nature they are not able to process an infinite amount of information. The sensory overload has approximately the same causes and symptoms as information overload, the only difference being, of course, that it involves an overabundance of stimuli for the five senses. In addition, these two concepts are strictly linked: the information abundance, like urbanisation, crowding or the use of new media, actually, drove us to an abundance of stimuli. Also, a constant exposure to noise and light pollution for visual or verbal information represents a barrier to efficiently overcoming these stimuli.

Having said that, it was then observed how sensory overload influences the school activity and, in particular, university students. In fact, in the context of higher education, this sensation of being overwhelmed by stimuli occurs both over lectures and while studying.



Fig. 5.1 SAHA process

A city crowded with stimuli will bring it even inside the buildings. Being so constantly and ubiquitously present, the stimuli become a societal constant in time and space. Moreover, lessons involve the use of senses due to communicating new future knowledge with progressively different and complex media. Those involve the use of sense, as well as digital platforms, devices and products that support the learning experience over the lecture.

Almost an unlimited accessibility to data and information has led to a new approach to learning: gaining knowledge is not connected to the traditional institutions anymore. MOOCs (Massive Open Online Courses) are replacing traditional Master's programmes and University curricula. After these considerations, it was questioned whether to work on sensory overload in general or to focus on one sense in particular. Before proceeding with the desk research, as a group we decided to reflect on our university life as design students. From this reflection it emerged that the main problems have to do mainly with two senses: sight and hearing. With regard to the first – sight – it was noted that people often misuse the internet to seek inspiration, and in particular sites such as Pinterest, which provide a wealth of input, while ignoring their surroundings.

Turning to hearing, on the other hand, we tried to classify the problems encountered in a more schematic way, since there were many. First, we defined what the school (university) activity consists of: lessons, individual study, study in company, group work, etc. Subsequently, the question was raised as to what the sensory overload represents in the daily life of a student at the above-mentioned moments. If during the lessons the "noise overload" can be roughly controlled, since it is the lecturer who speaks, while the students are usually silent or, at most, interact when called upon, the real problem occurs in the moments outside the lessons, such as group meetings or moments of study.



Therefore, within this framework the opportunities were many and the decision was taken not only to focus on sensory overload, but to do so in particular on one sense only: hearing and, consequently, sound.

This choice was dictated by the fact that, at present, there is a wide range of products focused on sound, but mainly concerned with isolating from surrounding noise. In the field of product design, sound has so far mainly been seen as an obstacle to concentration, so this research sought to prove how sound can promote concentration and help to perform better. The starting point of the research focused on meditation, as a practice that allows to train concentration, through specific techniques, in order to reach a state of peace and inner calmness. From here, the research was then extended, analysing the so-called ASMR videos – also known as Autonomous Sensory Meridian Response – that are videos that provoke a pleasant and calm reaction in the back of the brain (see https://theness.com/ neurologicablog/index.php/asmr/). The ASMR sounds in particular are said to allow the listener to relax, providing the ideal conditions for staying in the flow and working optimally. From this specific type of content, a long phase of research then began into existing products that exploited this type of sound or other sounds to aid concentration during studying.



Background sounds and noise

The brain responds to sound in a variety of ways. Some noise frequencies might cause brain function to be disrupted, while others can assist the brain focus. Scientists believe that our surroundings, particularly the sounds we hear, influence how we focus, sleep, and perceive the world. Sound waves at different levels can have different effects.

Background noise can be either positive and soothing for the brain or unpleasant and stressful. Ambient noises and sounds can raise stress levels and impair the brain's ability to manage information. Different frequencies offered by white, pink, and brown noise can aid cognitive capacities; one we are interested particularly in is boosting focus.

Ambient noise and creativity

A study¹ conducted by cognitive researchers has shown that there is a link between ambient noise and creativity. Furthermore, the study has shown that moderate noise helps with creativity more than low and loud noises. In fact, moderate noise is expected to distract people without significantly affecting the extent of processing. It induces processing disfluency, which leads to abstract thinking and consequently enhances creativity.



 Fig. 5.2 Spectrograms of the different types of noise: white, pink and brown

In these spectrograms, low frequencies are at the bottom, high frequencies are at the top, and the brighter colours represent more intensity. In "white noise" (left) the intensity of signals is roughly equal at all frequencies. In pink noise (center), the intensity drops at the higher frequencies at a certain rate. In "brown noise" (right), the drop-off in intensity is much steeper.

 Thomas Donoghue, a researcher in cognitive and computational neurosciences

[1] Toplyn, G. and Maguire, W. (1991) The Differential Effect of Noise on Creative Task Performance

White noise

White noise is a type of random background noise that includes all audible frequencies. In white noise, all the frequencies have similar power. The lower and higher pitches in white noise are almost the same volume. Since it includes all audible frequencies, white noise is helpful for masking many types of sounds, like noisy traffic, loud neighbours, or hallway chatter. White noise often sounds like a steady hum, similar to a television static, a running fan, or an air conditioning.



✤ Fig. 5.3 White noise spectral diagram Warrakkk - Own work, CC BY-SA 3.0

Pink noise

Pink noise is another sort of background noise that comes in a variety of frequencies, with the lower frequencies having more power than the higher frequencies. The lower pitches are therefore louder than higher pitches. It is softer and deeper than the white noise. Rainfall, ocean waves, and rustling leaves are all examples of pink noise patterns seen in the nature.



Fig. 5.4 Pink noise spectral diagram
 Warrakkk - Own work, CC BY-SA 3.0

Brown noise (or red noise)

Brown noise is deeper and stronger at the low end of the sound spectrum. Brown noise lowers the higher frequencies even more. Unlike pink and white noise, it does not contain any high-frequency sounds. It is a bit "rougher" than pink noise. Roaring river rapids, intense rains, and distant rumbling thunder are examples of natural brown noises.



[†] Fig. 5.5 Brown noise spectral diagram Warrakkk - Own work, CC BY-SA 3.0

Conclusion

The sound inconsistency (noises going from loud to soft or vice versa) is what tends to cause distractions and consequently disturbing focus and creativity. White, pink, and brown noise create a blanket of sounds that conceal this inconsistency. The deepness and softness of the blanket differ from a colour to another.

The effects of white, pink, and brown noises remain subjective. For this reason, we have come to the decision of providing a sound library for students with different colours of sound, so they may choose what they like the most.

Pomodoro technique



Time management techniques

Pomodoro, Melon and Flowtime techniques are the most relevant and most popular techniques. Balancing break time and focus is a way of enhancing productivity in an efficient way.

Melon technique



Flowtime technique



Pomodoro technique

The Pomodoro technique is a method for time management developed by Francesco Cirillo in the late 1980's. The technique is based around the idea that working for 25 minutes straight – a small amount of time – without any distractions decreases procrastination and enhances doing things faster and more efficiently even though taking frequent breaks.

It suggests breaking the work into 25-minute chunks followed by a 5-minute breaks. These short regular breaks are intended to enhance assimilation. Each 25-minute session is called 'pomodoro' and after finishing four pomodoros in a row it is suggested to take a longer break of 30 minutes.

If students are facing procrastination or dealing with tasks that require mechanical effort, the Pomodoro technique can be a great tool for helping them being productive. As a matter of fact, the short duration of work and the promise of a break encourage to start performing. Working in blocks of time is an effective strategy for using time efficiently and having results. This technique allows students to focus on one task at a time and limit distractions and procrastination.

Instructions for users:

 CHOOSE YOUR TASK(S) - Choose a task or a series of tasks that need to be accomplished. The Pomodoro technique is more efficient when the pomodoros are planned out in advance.
 SET THE TIMER TO 25 MINUTES - Continue to work on the task until the timer goes off.
 WORK!/ FOCUS - AVOID CHECKING THE REMAINING ON TIMER
 TIMER GOES OFF - TAKE A 5 MINUTE BREAK AWAY FROM STUDY AREA, i.e. have a good stretch, drink some water.
 REPEAT - for three times.
 TAKE A LONGER BREAK OF 30 MINUTES after four pomodoros.
 REPEAT

DISADVANDAGES

- The timer might interrupt the workflow.
- The timer inhibits the ability to get into the flow state.

• The users of this technique cannot set the time in relation to their workflow habits.

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Melon technique

The Melon technique can be considered as a more advanced version of the Pomodoro technique, but the principle is still the same: setting the timer and trying to stay focused for that time. The only thing that differs is the workflow time. One time slot is 90 minutes instead of 25 minutes. This is quite a long and challenging time slot, so it is recommended to start with the Pomodoro technique and then move on to the Melon technique.

According to some researchers, following the cycle of 90 minutes work - 20 minutes break (ultradian cycle) means respecting the natural needs of our organism. Daily ultradian cycles are characterised by alternating periods of high-frequency brain activity (about 90 minutes) followed by low-frequency brain activity (about 20 minutes).

Ultradian Performance Rythm



Course of Day

Instructions for users:

CHOOSE YOUR TASK(S)
 SET THE TIMER TO 90 MINUTES - Continue to

work on the task until the timer goes off.
WORK AND FOCUS
WHEN THE TIMER GOES OFF (TAKE A 20 MINUTE BREAK)

5. REPEAT

Flowtime technique

The Flowtime technique is a tool created by Zoe Read-Bivens. It can be used to replace the Pomodoro Technique by those who dislike the consistent alarms of the latter one. The Flowtime technique solves these interruptions by allowing students to choose their own working and resting times making sure the structure matches their workflow. This technique exploits those moments when users are completely immersed in the workflow. The productivity is increased by stimulating the users to stay in the flow and allowing to rest when needed.

Instructions for users:

1. CHOOSE YOUR TASK(S)

2. WRITE DOWN THE TIME WHEN YOU START WORKING - Track how long it takes to complete a task, including the starting time, finishing time and interruptions.

3. WORK UNTIL YOU START LOSING FOCUS AND FEEL TIRED

- 4. TAKE A BREAK
- 5. REPEAT

Tips about the lengths of the breaks:

- For 25 minutes of work or less, take a 5-minute break.
- For 25-50 minutes of work, take an 8-minute break.
- For 50-90 minutes of work, take a 10-minute break.
- For more than 90 minutes of work, take a 15-minute break.

Take a break when you start feeling tired, for example, if you feel like you have been sitting still for too long; if you have finished a big and long task; if you are having trouble with concentrating; or if you cannot find the right solution to something you have been working on for hours.

DISADVANTAGES

- NOT WORKING FOR UNPREDICTABLE SCHEDULES - Unpredictable happenings may occur. Flexibility is needed in order to adapt to the work schedule.
- SELF-CONSCIOUSNESS This technique requires knowing how much time is needed to complete the planned tasks or the length of breaks in advance.

• KNOWING HOW TO MANAGE TIME - Practice makes perfect. It takes time to understand one's personal way to time management.

Pomodoro vs Flowtime techniques



Components

• Upper body 12 poplar plywood parts, laser cut external ones n° 11: $ø90 \times 8 \text{ mm}$ internal one n° 1: $ø66 \times 8 \text{ mm}$

• Lower body polyurethane foam ø90 x 50 mm

4 Woollen textiles

• 16 LEDs white colour, 3 mm

• Matrix for LEDs Adafruit 0.8" 8x16 LED Matrix FeatherWing Display Kit 51mm x 23mm x 5mm

Rechargeable battery
Lithium ion Polymer Battery 2000mAh

 $\,$ $\,$ Bluetooth Microchip's RN4020 Bluetooth Low Energy Module 11.5 x 19.5 x 2.5 mm

• Sound disk pla, 3d printed ø60 x 20 mm

Electrical motor for sound - mechanism
 ø28 x 21mm
 5 Volt

Buttons







Conclusions

Through our project, we have established a critical vision for the learning environments today and have developed our own vision for the future. 2037 is a date where we will be transitioning from the actual circumstances to the future we want.

Our biggest challenge was designing new artifacts for the learning environments without overloading the existing landscapes with material or immaterial products. During our process, we have developed and iterated multiple ideas, with a perpetual questioning: "does the world really need this?"

We ended up designing a product that will help us cope with the overcrowded world, trying to transform the unpleasant elements to resourceful ones, such as, for example, sound. In addition, it enables every student to use this product consistently, as it adapts perfectly to their needs.

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