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► **To cite this version:**

Laura Zattra, Nicolas Misdariis, Frank Pecquet, Nicolas Donin, David Fierro. Analysis of Sound Design Practices [ASDP]. Research Methodology. XXII Colloquio di Informatica Musicale (Congresso d'Informatica Musicale CIM), Nov 2018, Udine, Italy. hal-02003019

HAL Id: hal-02003019

<https://hal.science/hal-02003019>

Submitted on 1 Feb 2019

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ANALYSIS OF SOUND DESIGN PRACTICES [ASDP]. RESEARCH METHODOLOGY

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ABSTRACT

This contribution describes an on-going project started in March 2018 entitled “Analysis of Sound Design Practices” [ASDP]. The team comprises members from the LABEX CAP (Création, Arts et Patrimoines); the ACTE Institute (Arts Creation Theory Aesthetics); IRCAM’s APM (Analysis of Musical Practices) and PDS (Sound Perception and Design) teams.

By means of a large-scale study – based on web documentation, an online questionnaire, interviews and analytical results – the team is working towards understanding the creative process as well as the identity of Sound Design and Sound Designers in particular, in Europe. The main target concerns the development of a consistent sociological, geographical and historical knowledge of the discipline, and, consequently, to better identify the relevant issues in both artistic, technical or scientific commitment.

The purposes of this article is to describe (a) the general framework of the project; (b) the methodology of the ongoing study (collaborative tools, writing and sending a questionnaire); (c) initial developments and results - terminology and definition, translation issues, conception of a database, listing of professionals and different institutions in Europe, first feedback analysis.

1. INTRODUCTION

The pursuit of designing sounds in human activities appears to be as ancient as the human race: using automatic alarm signals and striking clocks in ancient Greece, combining a clepsydra with a water organ ([1] cited in [2]); designing the acoustics of ancient Greek and Roman theatres [3] [4]; building bell towers and using bells as earcons [30] since their introduction, according to tradition, by Paulinus, bishop of Nola - a town of Campania, Italy - during the V century AD [5]; using sound effects to evoke emotions and underscore actions during the Commedia dell’Arte performances from the XVI through the XIX century [pp.97-98: 6];

up to inhuman torture practices using sounds in ancient Chinese times [p.109: 7]. If we except the previous example, such activities are at the intersection of different disciplines: art, craftsmanship [35] [36], industry (at large) and science.

Professional practices relating to sound design come from the depths of time and they were recognized as such only on the last century. These activities are carried out in different fields: architecture and urban environment, visual and digital arts, cinema and TV, advertising, ecology and acoustic regulation, industry, communication and marketing. Such professional practices are therefore characterized by interdisciplinarity, as expressed by Murray Schafer in 1977 [10]. Sound designer must have acoustical knowledge, sound processing skills, psychological, information technology, cognitive, socio-economic know-how, musical and aesthetical talents.

In many areas, sound designers have already a recognized career path. In theatre e.g., the process of designing/creating sound and ambience has been described as earlier as 1936 by Frank Napier [8] [31]. At the same time one might consider as well Vitruve architectural conception of early theatres (Antiquity) as pertinent sound design practices, calling for specific fields of sound research/creation such as acoustics, architecture and drama (voice and noise production).

However, despite the long history of such activity and the related jobs involving sound design, the terminology of “sound design” and “sound designer” have remained puzzling and, as such, quite new and not yet clearly accepted as a specific profession in different places in Europe. As such, associating “sound” with “design” was first mentioned by David Collison (1959) [4] in theatre to describe together with stage manager audio engineering activity. In the film industry, years later, this terms appear together first in the credits of the movie *Apocalypse Now* (1979), when, with the introduction of new audio technology, Walter Murch (followed by, or at the same time of, Ben Burtt) was able to «collapse for the first time the duties of sound recordist, editor, and mixer to experiment with sound in unprecedented ways» [p.288: 9]. The discipline has also been explored and theorized by Raymond Murray Schafer during the same period, although in a totally different perspective [10].

As a field of science, research and development, sound design leads to a growing interest in academia and concerns various domains, whether it be industrial (economic) or artistic, in which innovative engineering meets artistic creation. Although sound design studies and research are caught into different fields of practices - earlier referred to as human and applied sciences, there need specific studies in order to connect sound design practices as a subdomain of the science of design.

Moreover, one may consider that sound design still concerns related domains as distinct types of vocation. As a matter of fact, on Internet, everyone may call him/herself a sound designer, although practicing different activities, when it comes to work on sounds. Being a sound designer might be even 'trendy'. The impression is that the profession of sound designer is severely compromised by the general attitude reported in the quotation by Mark Kilborn.

First, if you're seeking sound design roles, call yourself a Sound Designer. Don't obsess about your lack of shipped titles or experience. For the first year or two I was trying to get my foot in the door, I obsessed over whether it was disingenuous and/or presumptuous to call myself what I so desperately wanted to be. It was silly. If you design sound, you are a sound designer. Be confident about that [12].

Either the concept defining this word is self-evident, and does not need to be explained, or there is actually something that all the different interpretations of the term have in common, and must be clarified. We believe that Mark Kilborn's words, similarly to many others expressing doubt on the meaning of the term, bring forward to a necessary research on the topic. In other words, the question could be whether or not there is a real difference between a designer and a sound designer (beyond the specific skills). Can a designer create sound? «Sound design should not try to find any definition of itself other than within design», sound designer Louis Dandrel wrote. «There ought to be a definition of design with sound; why should we remove from sound design one of its sensory attributes?», he added (cited in [37]). Today one may simply recognize that design concerns better quality [11]. Sound has increased power in society and sound design is a matter of improvement, whether it be about environment, objects, services or communication [32].

The ASDP project is aimed at covering the serious gap in sound design research, that is to say how sound design is carried out (process and methods), who is the sound designer (practices and behaviours), what is or can be considered a sound design (artefact) [14] [17]. By adopting an approach globally inspired by design research [13] [14] (see Section 2), including socio-economic considerations of sound design practices, the ASDP project focuses on the main actors of the discipline, the sound designers, together with an investigation on their activities and according to

pertinent design contexts such as artistic, musicological, sociocultural, technical/technological or ecological domains.

By means of large-scale studies – realized through an online questionnaire and interviews – the project has different objectives: promoting the understanding of creative processes underlying sound design practices; building a consistent (historical, anthropological and methodological) knowledge about the discipline; and consequently, better evaluating how sound design impacts the artistic, technical or scientific domains.

The following sections describe the methodology, research protocol and the first phases of the project (the questionnaire), as well as the hypotheses and initial thoughts on our research topic. This article is meant to be a vehicle «to think [our] way through the research process» [p.2: 15], because our «research is not a straightforward process» (ibidem). Writing about our methodological choices and our research protocol helps us establishing a more coherent framework to our future outcomes. By sharing the protocol of this investigation, a collaborative work with a defined method, we also hope that such a learning process will bring back self-evaluation.

2. THEORETICAL FRAMEWORK AND PREVIOUS RESEARCH

The project is inspired by different design research approaches elaborated by [16] [14] and more recently [11]. From that point of view, sound design may be considered as a proper «discipline», a research object «on its own», and a specific, or «third» culture being halfway «between arts and humanities» [16]. The transposition of original paradigms established by Cross to the field of science of design [14] leads us to propose a framework for acquiring knowledge about the discipline. Inspired by Cross' framework, there should be three distinct researches 'loci' for sound design : (1) «people» (activities): status and practices of the sound designers [17]; (2) «processes» (methods): status of the sound design itself, innovative methods and tools with regards to sound prototypes (mockups, sketches, intermediary objects), creativity/fixation mechanisms; (3) «products» (artefacts): status of the designed sounds, new forms, formats, listening situations or author/listener relationships [pp.125-6: 14] [18]. The ASDP project explores one of these three sources of sound design knowledge: «people» [14].

Literature dedicated to sound design is important, and has continued to grow especially over the last three decades. One of the preliminary goals was to construct a theoretical framework based upon the bibliographical references devoted to historical, practical and epistemological issues: examples include among others [7] [19] [20] [21] [4] [22] [23] and dozens of articles and books collected over the years. This research will continue all along our project.

Moreover, the project is also (but not only) based upon literature dedicated to Sonic Interaction Design (SID), an emerging field at the intersection of interaction design, sound and music computing, auditory display, sonic arts and acoustics. For around 15 years now, SID researchers have been working actively to formalize tools, methodologies and conceptual frameworks in this scientific domain. A breakthrough advance to auditory interfaces and displays research has been the project SOb (the Sounding Object 2001-2003, IST-2000-25287 [38]) coordinated by Davide Rocchesso, followed among others by the COST Action on Sonic Interaction Design (2007-2011, ICT COST Action IC0601 [39]) and the SkAT-VG project (Sketching Audio Technologies using Vocalizations and Gestures) [40]. Those research and publishing projects (see also [41] and [42]) have helped a community of scientists and practitioners to federate.

Our project team is formed by researchers who have been working on Design, Sound Design, Semiotic of Art and Design, Collaborative Musical Creation, Music Composition, Electroacoustic Music Studies, Information Technology and Electronic Engineering.¹ This projects derives from previous studies on the «Designerly way of thinking the sound design concepts» [18], the «Collaborative environment in computer music composition» [24] and the «Meaning of Sound Design - main concepts and creative approaches [25].

3. TERMINOLOGY AND TRANSLATIONS

3.1 Qualifying Sound Design

Sound design can be considered as a field of design which consists in taking into account the *sonic dimension* of an object (matter and form) within the *designing process* - any sounding features at this stage – the term ‘object’ being able to be embedded either in the *tangible* (manufactured products), *digital* (man-machine interface) or *spatial* (environmental context) dimension. Sound Design can be seen as:

- a collective practice [26],
- reassessing the fundamentals of design practice with sound matter, answering to multiple requests (specifications),
- in case being constrained by composition rules (translation of the specifications in sonic dimensions),

- targeting a goal grounded on functional and/or aesthetic criteria (the search of the ‘best’ or the ‘beautiful’ sound),
- a practice where one’s identity (musical/artistic) is offered in the service of the project (non authoriality);
- where the (personal) search of beauty runs parallel with taking into consideration and satisfying production constraints,
- on several occasion, grounding on scientific results from disciplines such as psychoacoustics, psychology, etc. (scientific attitude).

In other words, sound design can be considered as a multidisciplinary creation, involving specific means of production, based on user targeted data, combining both function and aesthetics. When all these skills/competences/factors are gathered, although in related proportions, we may call it sound design. The latter is therefore dependent upon transversal competences that do converge all together to sound design expertise. While sound design practices are distinct and varied due to many domains of sound application, the items listed above defines its working activity.

Such a conception results from a comparative analysis of different materials : published literature, books and scientific papers, blogs, web articles, landing pages of training and master courses on sound design,² our past experiences and researches in the audio-visual production or film industry (Film, TV, Video game industry, theatre, scenography, Foley-bruitage); survey on product and services (transportation industry, medical industry, domestic electrical industry, digital industry such as auditory display / human-machine interfaces, sonic interactive devices); studies on places / spaces (architecture, soundscape, acoustic regulation, museography); communication (marketing, sound branding, radio broadcasting); and at last performing / fine arts (music, instrument making, sound art).

3.2 The Sound Designer Activity

If the sound designer professional activity links to various categories of design - space, message, product, it’s always within design competences in research (innovation), creation (imagination) and communication (industrial and marketing strategies). A non exhaustive list of sectors with related sound design practices includes: sound illustration, music composition, audio post-production, soundscaping, sound branding, acoustic and psychoacoustic experiments, audio ergonomic trends, health and ecology, engineering and signal processing, sonification and signaletic, industrial design and marketing. Our team wrote a questionnaire sent last Summer - July 2018 (section 5), to inventory sound design practices with regard to existing professional activities to highlight the social, cultural

¹ Our research team is working on behalf of LABEX CAP (Laboratory of Excellence « Creation, Arts and Heritage », <http://labexcap.fr/labex-cap/>) in Paris, an observatory and experimental research laboratory working under the auspices of the French Ministry of Culture as well as in collaboration with other French institutions: the ACTE Institute - Arts, Créations, Théories, Esthétiques - in Paris (<http://www.institut-acte.cnrs.fr/semiotics/>); the IRCAM/APM team « Analyse des Pratiques Musicales » (<https://www.ircam.fr/recherche/equipes-recherche/apm/>); the IRCAM/PDS team « Sound Perception and Design » (<https://www.ircam.fr/recherche/equipes-recherche/pds/>).

² Such as the Master option ‘mention design sonore’ des écoles ESBA, ENSCI, IRCAM lemans.esba-talm.fr/études/option-design-sonore/.

and economic profile of a sound designer, seeking different types of information in education, methods, processes, project managing, marketing issues together with scientific and artistic researches. The questionnaire aims at defining a larger profile of sound design activities throughout new sound design practices.

3.3 Translating Sound Design

Nevertheless, at this stage of the research, the project's short-term perspective is first to find the 'practitioners' in order to better qualify sound design practices. Accordingly, amongst professionals that we already know from our previous inquiries, mapping sound designers leads to searching for names in Internet. While English is the obvious language of this research project (the mother tongue, and etymologically the original terms to define this activity), we systematically sought a proper translation for the words "sound designer" in every single country being part of the European Community, since no compromise so far has been clearly made to qualify this. Such a strategy in research remains necessary to refine the investigation, integrating cultural differences on the topic and/or the profession, and applying the right keywords for search engines. Translations have been obtained through online translation software (context.reverso, linguee) and bilingual dictionaries. Translated results on sound design(er) were coupled with keywords such university, agency, master, course, project, profession, etc. Table 1 represents the different translations of the term Sound Design in the EU member states.

EUROPEAN COMMUNITY 2018	Sound Design	Sound Designer
GERMANY	Sound Design, Audiogestaltung	Sounddesigner - Klangarchitekt - Klanggärtner
AUSTRIA	Sound Design, Audiogestaltung	" " "
BELGIUM	cf. France	cf. France
BULGARIA	звук дизайн	звук дизайнер
CYPRUS	cf. grècque / turc	cf. grècque / turc
CROATIA	dizajn zvuka	dizajner zvuka
DENMARK	lyddesign	lyddesigner
SPAIN	Diseño sonoro, Diseño de Sonido	Diseñador de sonido, Sound designer
ESTONIA	heli disain	heli disainer
FINLAND	äänisuunnittelu	äänisuunnittelija
FRANCE	Design sonore	Designer sonore - Synonymes: concepteur sonore, Illustrateur sonore
GREECE	σχεδιασμό ήχου	σχεδιαστής ήχου
HUNGARY	hang design	hangtervező
IRELAND	dearadh fuaim	dearthóir fuaim
ICELAND		
ITALY	Sound design, Progettazione del Suono, Disegno del suono	Sound designer - Synonyme: Progettista del Suono, disegnatore del suono
LATVIA	skaņas dizains	skaņu dizaineris
LITHUANIA	garso dizainas	garso dizaineris
LUXEMBOURG		
MALTA	disinn tal-hoss	disinjatur tal-hoss

NETHERLANDS	Geluidsonwerp	Geluidsonwerper
POLAND	Sound design	Sound designer, operator dźwięku
PORTUGAL	Sound design, Design do som	Sound designer, Criador de efeitos sonoros
ROMANIA	Sound design	Sound designer, Designer audio, Designer de sunet
UNITED KINGDOM	sound design	sound designer
SLOVENIA	zvočna zasnova	oblikovalec zvoka
SLOVAKIA	zvukový dizajn	zvukový dizajner
SWEDEN	ljuddesign	ljuddesigner
CZECH REPUBLIC	zvukový design	Zvukový designér
SERBIA	звучни дизајн	звучни дизајнер

Table 1. Translation of the term Sound Design in the European Unity Member States (including UK).

At the same time, we have developed a terminological analysis of the term "sound design". In France for instance, the term *design* comes first before that of sound ('design sonore', 'designer sonore'). According to us, there is an apparently slight, but nevertheless eloquent, distinction with the English version, where the term sound comes first before that of design [32]. If the grammar has obviously an impact on this lexicon, it also affects epistemology. The use of an English expression (Sound Design) does not mean that it determines logically the exact same knowledge (and/or practices) in different countries, in English, according to the common sense, a sound designer is working for the film industry [34]. Otherwise in France, science and sound design have been associated only recently [32, 44]. Such an expression implies skills and knowledge in sciences of sound (computer processing, signal processing, acoustics,...) and refers to the science of design and sound, the "science of applied sound". This type of nuances is therefore necessary for epistemological reason and helps defining sound design practices.

Although rare in Italian, the expression *Progettista del suono* [33] or *disegnatore del suono* emphasizes on design methods such as planning, conceptualizing and engineering [27], which inevitably are etymologically at the foundation of design practices.

4. PROJECT CONTENT AND METHODOLOGY

During the first weeks of this project (starting date: March 2018), we used an online collaborative platform (wiki and googledocs) to better control the collected data - names of sound designers, institutions, websites, and bibliographical references. Together with this collective work such methods as brainstorming, shared communication - meetings, email, phone calls, skype calls and informal report writing, complete this investigation. While using these methods the team shares a common belief - not to mention a specific design thinking process, where technology provides an environment that embodies "social-constructivist

principles” [29] and where each member can review and update contents in a progressive co-construction knowledge.

4.1 Database: Mapping the profession of Sound Design

This section shows the results of our cartography. So far we have collected a list of more than 150 institutions - agencies, universities or academies, related to sound design production and sound design training in Europe. This survey aims at building a more precise cartography of *places* according to sound design approaches, creation, training and engineering.

This cartography shows a collection of names of sound designers in Europe, the main focus at this stage being the questionnaire elaboration and diffusion. The database of collected names results from several research paths among which personal relationships in the profession. In parallel, we have conducted an online research based on keywords, institutions, agencies, periodicals, websites and blogs (as shown in section 3.3). Finally, a ‘survey letter’ was sent to social networks (Facebook and LinkedIn), oriented mailing lists, personal contacts or other professionals (derived from conferences, associations, etc.) in order to enlarge the database, such as the ASD – Association of Sound Designers (sound designers in the UK theatre industry).

The resulting list (September 2018) comprises 708 names. However, several professionals cannot be considered as sound designers *per se*, as they rather qualify themselves, in many cases, audio engineers or acousticians. This decision depends upon choices made earlier while qualifying sound design (3.1) and defining a typical sound designer activity (3.2). All the skills/competences/facets that contribute to the conform definition need to be taken into consideration (although in different proportions).

After this ‘skimming’ process, ASDP’s data collection registered 558 professionals in sound design in Europe. This is obviously a work in process and we are still seeking professionals working in sub represented nations (bar chart 1). From the long-term perspective, our research will open to the entire world.

4.2 The ASDP online questionnaire

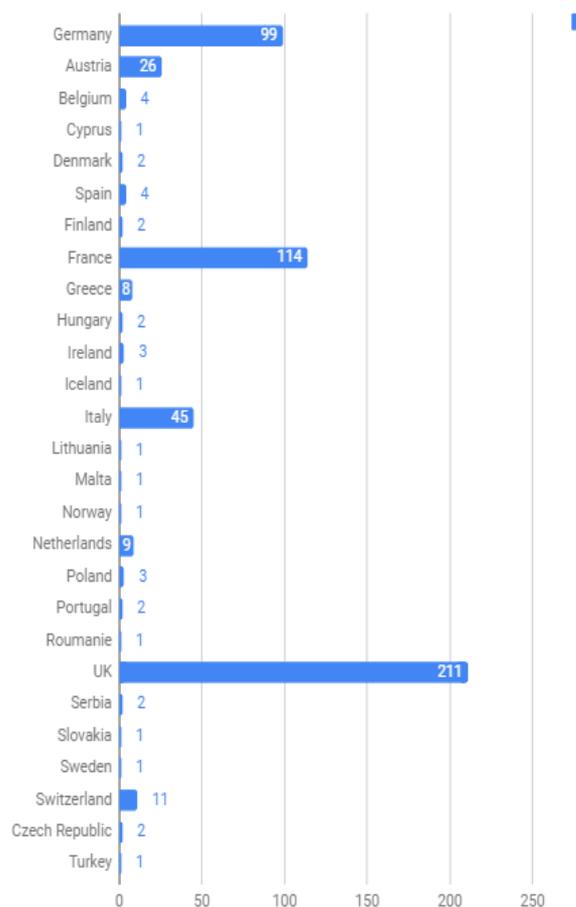
Just as a reminder, the primary purpose of this survey is to analyse and promote a better understanding of the role - identity and sound design practices - of sound designers in Europe.

An online questionnaire (section 5) was sent by email at the end of July 2018 - deadline to submission: September 30, to the above indicated list of professionals (section 4.1). Afterwards, a second reminder was sent during the second half of September.

5. THE QUESTIONNAIRE

The different questions (39 questions) result from a long process including coordination and role distribution of ASDP team members. We also based the

construction of this questionnaire on previous study or project that included interviews with professionals with regards to their methodology [43] and the use of specific techniques in sound production and prototyping [40].



Bar Chart 1. Inventory of sound designers in Europe (as of July 2018).

5.1 Questionnaire structure

The questionnaire is divided into 3 sections. The 1st section collects quantitative data. It consists of 19 questions, divided into two subsections. Part A concerns the participants’ personal profile (age, place of work, years and period of activity, background and training, areas and skills involved in each participants’ profession, work status). Part B analyses the participants’ teaching activity (if this is the case): environment, level, time dedicated to teaching, teaching methods. The second section, which is optional (17 questions, divided into two subsections), refers to ‘Methodology (Modus operandi)’ (Part C) and Technical Practice (part D). This section takes into account different criteria: working position / framework; role and recognition, timeframe and communication with stakeholders - duration of a project / phases; typical communication strategy, working methods - brainstorming, development, testing, revisions; personal archival of a project; hardware and

software environments; technical features in collecting sound. The third section (3 questions, optional) investigates general thoughts about sound design.

5.2 Preliminary results

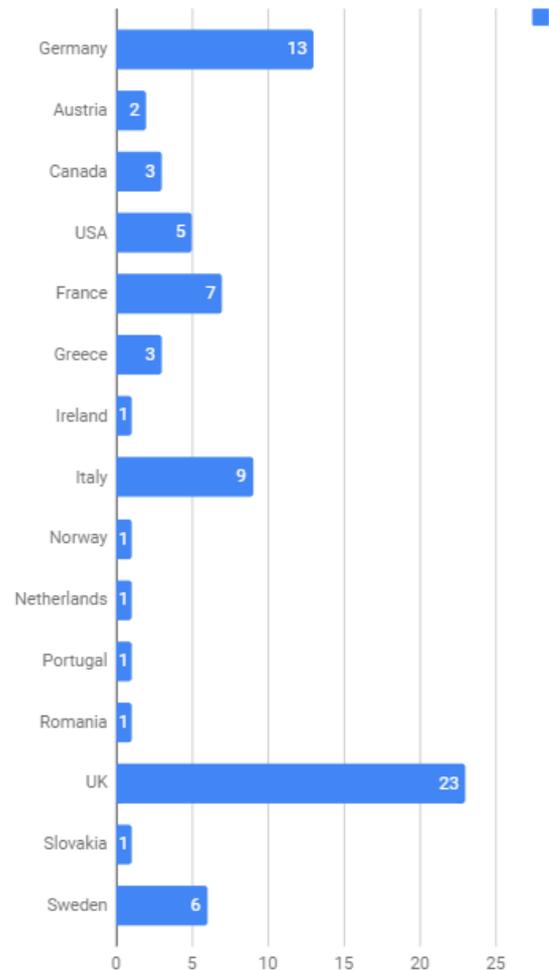
At the time this article was written (third week of September), we received 77 participations from the online questionnaire (bar chart 2). The majority comes from 3 representative countries: UK, Germany, Italy and France. This participation mirrors the number of professionals in our database. This is also due, one may think, to the presence of organized associations and recognized career paths in these nations.

So far we are able to analyse some quantitative data from the answers we've received. Bar chart 3 shows the distribution of age ranged from 18 to 25 years-old (seven respondents), 26-35 (seventeen), 36-45 (twenty-six), 46-55 (twenty), 56-65 (five). Such results already show that participants are adults well settled in their profession (36-55 years old), and also that there is a growing number of professionals among young people. Two participants are over 66 years old. If we compare these data with the increasing sound design literature over the last 15-20 years (section 2), we could easily assert that the sound design profession - working activity and related practices, has evolved and reached a new step in maturity.

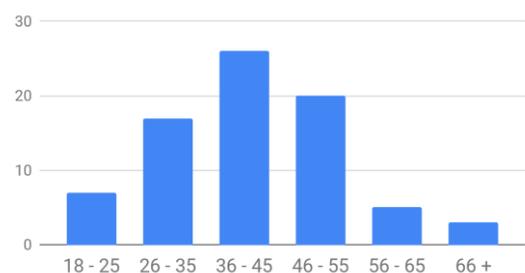
The survey data give information on the gender split (66 men vs. 9 women; 2 participants chose the 'I'd rather not answer this question' option) (pie chart 1). The sound designer profession still appears as a male profession, but there is a growing place for women (authors of [41] [42] are explicit figures in this domain).

Further analysis will involve text analysis (open questions), cross-analysis between different answers (within the same participant's thread of answers) and comparative analysis of data (and of course countries of origin). Question n.7 for example – What is your background and training? – offers insights with regard to the interdisciplinary background proper to the sound designer's profile mentioned earlier. Here is a list of skills learned during the training period (in decreasing order of occurrence): Audio engineering 19 (in which 3 are electronic engineers); Musical instrument training 14; Sound or electronic studio (electronic music courses or computer music courses, e.g. in universities or conservatories of music) 12; Music composition 11; Recording / Production 9; Film school and/or Video making 8; Self-taught in music performance (rock and popular music) 7; Sonic Interaction Design / Auditory Display 6; Arts & humanities 4; Musicology 3; Self-taught music/sound production (software) 3; Architecture and Urban Design 3; Drama School and theatre training 4; Physics 1; Psychology 1; Psychoacoustics 1; Law school 1; Biology 1; Social Communications and Advertising 1; DeeJaying 1. These preliminary data show that a combination of sound engineering and musical skills and training (instrument/composition) is common to sound designers. Such data also may be relevant to sound

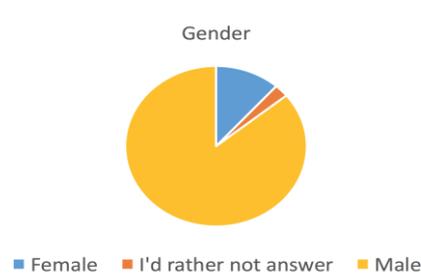
design program schools, pedagogical contents, etc



Bar Chart 2. Questionnaire participants (September 17 2018).



Bar Chart 3. Questionnaire participants (September 17 2018).



Pie Chart 1. Questionnaire participants (September 17 2018).

6. CONCLUSIONS AND PROJECTION

When this article was written (July-September 2018), the ASDP project was halfway through. The research results consist of numerical data - list of names, institutions, agencies, etc., from the European Sound Design community); an overview on “sound design” and “sound designers” translations in various languages, and preliminary results from the online questionnaire.

Semi-structured interviews will be recorded during the second half of the project October-February 2018. Face-to-face interviews will be made with professionals chosen with regards to their current work, their popularity or simply because they work in specific fields and relate to distinct practices. Academic research labs and relevant universities and/or schools are useful for epistemological purposes. We will also analyse sound design in cinema, theatre, museography, industry, sound branding and marketing.

We are planning to develop an original data search tool for dynamic cross-referenced information. This analytic procedure may allow a real time data representation based upon dynamic databases and 3D interfaces. By showing the results on a tridimensional scale (some preliminary tests has been developed during the last weeks) and by building up dynamic filters in real time, we plan to easily identify relevant connections between the overall data. Although the ASDP project is limited to the European community, the research of names and institutions we did develop is not exhaustive. It is our intention to promote our investigation in order to increase the professional network in the sound design industry. Moreover, future projects are planned for opening this research to the entire sound designers' community.

One of our first ambitions was to reach as many persons as possible. Our mailing lists, social networks and personal acquaintances have partially reached this purpose (questionnaire answers received from outside Europe, as can be seen in bar chart 2, suggest the presence of an interest among the sound design community). However, we do acknowledge that most of the work towards a decent analysis of the sound designer's practices require a tremendous effort in covering as much professionals as we can in Europe. In effect, another objective would be to attract the interest of the sound designers' community and create a network for sharing scientific, artistic and professional knowledge, setting conferences and launching events. To this regard, we are presently creating a platform - website and blog: “thesounddesignproject.com” to collect more information - data, bibliographical references, and project realisation.

REFERENCES

- [1] J.W. Humphrey, J.P. Oleson, A.N. Sherwood: *Greek and Roman technology: a sourcebook*, Routledge, 1998.
- [2] G. Dubus, R. Bresin: “A Systematic Review of Mapping Strategies for the Sonification of Physical Quantities”, *PLoS ONE*, 8 (12): e82491. doi:10.1371/journal.pone.0082491, 2013.
- [3] A. Farnetani, N. Prodi, R. Pompoli: “On the acoustics of ancient Greek and Roman theaters”, *The Journal of the Acoustical Society of America*, 124:3, pp. 1557-1567, 2008.
- [4] D. Collison: *The Sound of Theatre, A History - From the Ancient Greeks to the Modern Digital Age*, Plasa Limited, 2008.
- [5] C. Ebanista: “Paolino di Nola e l'introduzione della campana in Occidente”, *Dal fuoco all'aria. Tecniche, significati e prassi nell'uso delle campane dal Medioevo all'età Moderna* (Fabio Redi - Giovanna Petrella eds.), Pisa, pp. 325-353, 2007.
- [6] E. Quagliarini: *Costruzioni in legno nei teatri all'italiana del '700 e '800: il patrimonio nascosto dell'architettura teatrale marchigiana*, Alinea Editrice, 2008.
- [7] A. Farnell: *Designing Sound*, Cambridge, MA: MIT, 2010.
- [8] F. Napier, T. Guthrie: *Noises off: a handbook of sound effects*, Frederick Muller, London, 1936.
- [9] W. Whittington: *Sound Design and Science Fiction*, University of Texas Press, 2007.
- [10] R.M. Schafer: *The tuning of the world*, Alfred A. Knopf, 1977.
- [11] S. Vial: “Qu'est-ce que la recherche en design ? Introduction aux sciences du design”, *Sciences du Design*, (1), 2015, pp. 22-36.
- [12] M. Kilborn, “Some Advice for the Aspiring Sound Designer”, 18th 2013, www.gamasutra.com/blogs/.
- [13] L. Frankel, M. Racine: “The complex field of research: For design, through design, and about design”, *Proceedings of the Design Research Society (DRS) International Conference* (No. 043), 2010.
- [14] N. Cross: “Designerly ways of knowing: Design discipline versus design science”, *Design Issues*, 17(3), 2001, pp. 49-55.
- [15] M. Pryke, G. Rose, S. Whatmore: *Using Social Theory. Thinking Through Research*, Sage Publications – Open University, 2003.
- [16] B. Archer: “Design as a discipline”, *Design Studies*, 1(1), 1979, pp. 17-20.
- [17] N. Cross: *Designerly ways of knowing*, Springer Science & Business Media, 2007.
- [18] N. Misdariis, A. Cera, “Knowledge in Sound Design - The Silent Electric Vehicle —A Relevant Case Study”, *Proceedings of the Conference on Design and Semantics of Form and Movement - Sense and Sensitivity*, DeSForM 2017, M. Bruns Alonso and E. Ozcan eds., pp. 185-195, 2017.
- [19] H. Wyatt, T. Amyes: *Audio Post Production for Television and Film - An Introduction to Technology and Techniques*, 3d ed. Oxford, Focal Press, 2005.

- [20] T. Gibbs: *The Fundamentals of Sonic Art and Sound Design*, Lausanne, Switzerland, AVA, 2007.
- [21] D. Kaye, J. LeBrecht: *Sound and Music for the Theatre*, 3d ed. Boston, Focal Press, 2009.
- [22] R. Brown: *Sound - A Reader in Theatre Practice*, Palgrave Macmillan, 2009.
- [23] D. Dal Palù, C. De Giorgi, B. Lerma, E. Buiatti: *Frontiers of Sound in Design. A Guide for the Development of Product Identity Through Sounds*, Springer International Publishing, 2018.
- [24] L. Zattra, N. Donin: "A questionnaire-based investigation of the skills and roles of Computer Music Designers", *Musicae Scientiae*, Special Issue Tracking the creative process in music, September 2016, vol. 20 no. 3, pp. 436-456.
- [25] F. Pecquet: "Nouvel ordre sonore, écoson et design musical: réflexions autour du projet de James Murphy pour le métro de New-York, [New sound order, ecosound and musical design: thoughts around the project of James Murphy for the New York subway]", forthcoming 2018.
- [26] E. Özcan, R. Van Egmond: "Product Sound Design: An InterDisciplinary Approach?", *Undisciplined! Design Research Society Conference 2008*, Sheffield Hallam University, Sheffield, UK (16-19 July 2008), 2009.
- [27] S. Vial: *Court traité du design*, 1ère éd. PUF (Paris), 2010.
- [28] R. C. Beckett: "Use of Wiki Tools in Collaborative Research and Learning", *Journal of Technologies in Knowledge Sharing*, 11 (4), pp. 13-26, 2016.
- [29] L. Vygotsky: *Mind in Society*, London, Harvard University Press, 1978.
- [30] M. M. Blattner, D. A. Sumikawa, R. M. Greenberg: "Earcons and Icons: Their Structure and Common Design Principles", *Human-Computer Interaction*, Volume 4, 1989, pp. 11-44, Lawrence Erlbaum Associates, Inc.
- [31] L. Kendrick: *Theatre Aurality*, Springer, 2017.
- [32] F. Pecquet: "Du design sonore (about sound design)", forthcoming, 2017.
- [33] G. D'Amico: "La professione del sound designer: MioJob.it intervista sounDesign", March 3, 2009, www.sounddesign.info.
- [34] D. Sonnenschein (ed.): *Sound Design: The Expressive Power of Music, Voice, and Sound Effects in Cinema*, Michael Wiese Productions, 2001.
- [35] R. Sennett: *The Craftman*, Yale University Press, 2008.
- [36] P. Louridas: "Design as bricolage: anthropology meets design thinking", *Design Studies*, 20(6), 1999, pp. 517-535.
- [37] W. Rodriguez: *Le design sonore, naissance d'une catégorie musicale*, Mémoire de DEA, Ecole des Hautes Etudes en Sciences Sociales, EHESS, Paris. 2003.
- [38] D. Rocchesso, F. Fontata (eds.): *The sounding object*, Mondo Estremo, Firenze, 2003.
- [39] D. Rocchesso: *Explorations in Sonic Interaction Design*, Berlin, Logos Verlag, 2011.
- [40] S. Delle Monache: *SkAT-VG - Sketching Audio Technologies using Vocalizations and Gestures*, FP7-ICT-2013-C FET-Future Emerging Technologies-618067, Project Deliverable D7.7.2., <http://skatvg.iuav.it/>, 2017.
- [41] S. Pauletto (ed.): "Perspectives on Sound Design", *The new soundtrack*, Volume 4, Issue 2, September 2014.
- [42] K. Franinović, S. Serafin (eds.): *Sonic Interaction Design*, Cambridge, Massachusetts - London, England, The MIT Press, 2013.
- [43] D. Hug, N. Misdariis: "Towards a conceptual framework to integrate designerly and scientific sound design methods", *Proceedings of the 6th Audio Mostly Conference*, ACM, pp. 23-30, 2011.
- [44] P. Susini, O. Houix, N. Misdariis: "Sound design: an applied, experimental framework to study the perception of everyday sounds", *The New Soundtrack*, 4(2), pp. 103-121, 2014.