

Presentation

OPEN SoundS: the school of the future

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As a Responsible of the ITCG Deffenu of Olbia, that played, in the last ten years, a prominent role in the realization of many European Projects in the field of VET and ICT, I'm particularly proud in presenting here the results of this last project, OPEN SoundS. A two-year Leonardo da Vinci project that started in 2011.

The screenshot displays the OPEN SoundS website. At the top, there is a navigation menu with 'Home', 'Progetto', 'Community', 'Collabora', and 'KnowHow'. Below this is a blue header with the 'opensounds' logo and a 'Login' button. The main content area features a large image of a music studio. To the right, the 'OPEN SoundS' section includes the text: 'Peer education on the internet for social sounds. Il progetto Leonardo Da Vinci (LVC) OPEN SoundS propone una nuova dimensione della formazione in Rete: la possibilità di produrre e condividere musica in remoto all'interno di comunità di studio virtuali e transnazionali. Attraverso il portale di Open Sounds studenti e docenti potranno: - accedere ad un archivio di apprendimento virtuale dedicato alla produzione di musica in chiave collaborativa, senza le barriere orali; - collaborare con la prima Rete di studenti Europei costituita per creare e condividere musica in remoto all'interno del sistema educativo; - accedere a materiali formativi e informativi per l'impiego consapevole e strategico delle tecnologie digitali musicali e della rete in prospettiva educativa e professionalizzante.' Below this is a 'Social Media' section with Facebook and Twitter icons. The 'Ultimi Progetti' section at the bottom shows two video thumbnails: 'Efterår' by Steen M. Bregner and 'Famous Italian Romantic Songs (02. Viero)'. A 'Meeting di Londra' news item is also visible on the right side.

Starting from the name and acronym, OPEN SoundS stresses the desire of innovation that inspires its program. Innovation that can be found at different levels.

- a) Research on innovation in the current, formal and informal practices, to be able to intercept and study it, to understand its innovative potential, and eventually to formalize it for pedagogical purpose.
- b) Production of innovation, to improve the formal and informal practices in the European school systems, producing innovative practices of the music teaching and learning through the digital and information technologies and also finally driving the school music world into the modernity.
- c) Diffusion of innovation, to rise awareness that the future is already here, ready to be usable, practicable, transferable to every level of pedagogical experience, from primary schools to secondary schools and from these the Conservatories, the University and / or the system from VET.

These three areas of action represent the core of the OPEN SoundS project. The first two came directly from previous projects (MUSINET, MODEM, NET Music and NET Sounds) and found their natural conclusion and realization in OPEN SoundS in terms of their technological development and pedagogical goals but, above all, in terms of their alignment to Web 2.0 methodologies and practices, namely interactive and collaborative in the logic of Social Network, practices composed by Internet plus a whole range of contemporary software tools and typical behaviors.

Therefore communicating, acting and learning on the Web 2.0 means to be present in the most advanced sector of today's knowledge, to be projected within a universe of actors who create music creative projects among peers, spreading new practices, broaden their horizons, increase knowledge, and acts unexplored experiments with shared management of ideas and knowledge.

Music is the most exciting area of this new world of computer and human communication. Internet is a Social Network and the most famous technological tools of the actual evolution of internet (MySpace, Facebook, YouTube, Flickr, Twitter and others) would not be there today if an irrepensible need to navigate on line and create music had not been present, in the last generations and in the last decade.

The most rigid technologies have had to bend to this need, the communication protocols opened to the peer to peer exchanges and to forums, web based services and online communities have made the rest. The open source software (within the Windows environment but first of all in Linux, the open source operating system for excellence) has filled the need of creative necessary tools to whom was not able or did not want to purchase expensive technologies, giving therefore the means to each consumer and to each institution to create, to learn and to teach.

Digital Music and net, core of OPEN SoundS, have been the driving force of innovation.

The school as primary agent of the education knows well that Web 2.0 is the ground where to modernize and innovate. And our project wanted to be, somehow, a sort of probe launched into the future, to start to understand it, to explore it and, perhaps, to discover and propose some possible strategies.

In this book you will find the presentation of the project, the most significant results of testing activities and the contribution, of deepening and analysis, developed by our experts.

Here I wish to thanks all the partners, the stakeholders and the educational institution, students and teachers participants to the European networks that made possible this project, guided in this effort in doing so by the scientific coordinator, prof.ssa Gemma Fiocchetta of the Italian Ministry of Education (MIUR).

Thanks everybody involved in OPEN SoundS. I sincerely hope that my enthusiasm for the achieved results will be shared by you all.

Olbia, October 2013

Introduction

Interconnected knowledge: to learn and to be a musician on the Net

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“...and the angel is amazed of how happy and innocent an earthly thing can be, of how things can believe in us, the most transient of all the creation”¹.

Partially existing sound objects. Sound samples, as molecules of a whole, waiting to belong to meaningful structures. Music composition environments on the Net. Archives of pure sounds, dust of a sound universe still abstract, inarticulate, yet coming to life. Archives of music compositions whose inner structures can be accessed, living scores made of sounds, dynamics, fully editable parts – almost a projection of the composer’s mind.

Digital music permits similar magic, whether created through a computer, composed on a computer or recorded with a computer. It allows thousands of musicians, music graduates, non-graduates, professionals and amateurs, to experiment with music and play it in a way unheard of before, hence returning to the original meaning of “*playing with music*”, preserved in the French and English terms *jouer* and *play*. Anyone with even the slightest musical sensitivity can access thousands of creative paths available through computers, the Net and, more recently, mobile phones.

The fracture between composing and performing, the basis of Western musical skills leading to the birth of classical music (from Renaissance to mid-twentieth century), was healed with the decline of classical music at the end of the last century, when two distinct but complimentary events – the growth of global

1 Cacciari, M. (1994). *L'Angelo Necessario*, Adelphi, Milano, p.33.

networks and the globalization of humanity, trade and culture – restructured the planet, at the end of the twentieth century, by re-territorializing humankind and its culture with new virtual environments, digital networks and never ending binary spaces.

Two main outcomes can be detected after such far reaching changes:

1. the presence of technology in music creation and performance;
2. the return of the musician-composer to a primary, direct relationship with sonic material.

In the Thirties issues regarding technology were raised, as to the major shifts it led to and its impact on humankind. Technology was defined in conflicting ways: a second nature, a new environment to live in, a cage, a prison, it was judged positively by Brecht but negatively by Adorno, pursued by Heidegger and accepted by the philosophers of science because inevitable. However, in spite of its meaning, technology is unfolding new horizons for contemporary musicians. In the same way as Pythagoras, the electronic and digital music composer has to confront the four components of the physical matter of sound: height, intensity, timbre and duration. Once again the paths of scientists and musicians run in parallel, albeit briefly, with sound analysis, timbre production, their synthesis and combination. Naturally their paths will split and interact with the world of sound on different plans.

Indeed the musician-composer can once again access music's original features, its physical flow and substance, without the mediation, as with traditional instruments, of a partial generation through natural elements – wood, metal, strings, skin, etc. The primary synthesis of a sine wave brings the musician closer as ever to the birth of sound, its vibrations in time and space; this synthesis – whether produced with analog oscillators or software-generated – is the closest technology can achieve to spontaneous natural sound phenomena. All the infinite alterations of sound are now limitlessly available in all their possible combinations. Technology unleashes art, rather than confining it in a cage, leading the musician back to nature. Today any sound can be artificially generated, even beyond the audible range of human hearing.

Aleatory innovation and future changes

In electronic and digital music artistic experimentation – as well as in aleatory innovation, based on new equipment and environments provided at an accelerating pace by the parallel advancements of computers and networks – a series of meaningful and very significant events can be observed, signs of ever changing times, likely to be subject to political and cultural scrutiny and to prompt further shifts in the years to come. Here are the most remarkable ones:

- introduction of machines in music removed the separation between creator, performer and listener;
- digital technology civilization turns primitive again, in its ethnomusicological meaning (implying a redefinition of education paradigms);
- the computer-network sound machine draws music back to a form which was typical in primitive oral culture (creation-performance-listening are a contemporary and undefined phenomenon);
- the sound machine provides durability (recording) and infinite reproductions of a phenomenon (sound) that used to be unique and isolated, an exception rather than the rule;
- digital environments allow other people to access the score, to re-arrange and modify it, leaving the original intact: this expertise, once reserved to an elite of geniuses (Bach's *Goldberg Variations*, Beethoven's *Diabelli Variations*, etc.), is now available to anybody;
- networks allow access to single parts in a music recording and many artists ask their fans to remix their own songs/compositions: the divide between the sacredness of the original version and the possible alternative versions is removed. The same could be said of the barriers between artist and audience, evoking an idea of community; it might be called the fall of the altar-stage, the end of the ritual celebration, the return (once again) to the collective dimension of the "circle of peers", typical in oral culture;
- network communities self-create around simple ideas and complex behaviours: it's easy to exchange music, whereas the organization of technical forums to manage and act in advanced music environments is culturally and technically complex and puts forward several issues to be addressed.

Moreover, some traditional views are questioned:

1. sacred observance of the original text (Glenn Gould had already leaped beyond this, bringing the strictness of a score reading-performance back to the joyful performance freedom, typical of the Renaissance, resuming the idea of real-time composition characterizing jazz and, later, rock music);
2. rigorously faithful interpretation of a score (in this lies the financial success of performers and recording companies, bound by status quo-preserving production agreements that tend to oppose changing times, through an impossible standardizing rigidity);
3. respect for intellectual property and/or copyright (nowadays, the great Western democracies are struggling over this trend, influenced as they are by the diktats of a cultural industry striving to oppose the full force of the global cultural shifts triggered by networking technologies).

With present cultural globalization positively impacting on mass society, the foundations of communication and art have to be debated and renewed. In fact, the communication of art is an implicit aspect of art itself. Art is public by nature. Painting would not be such – namely a representational art – if it were not viewed, if it did not communicate itself by appearing before onlookers. Music would not be music, and therefore art, if it were not played, communicated, and thus listened to.

Today's worldwide communication through networks only amplifies a phenomenon already known both to McLuhan and Moles: every media is defined by its content and every art is communication. The technological factor becomes transparent and invisible, as Boldrin observed and as Lev Manovich would approve: so the network is immaterial – only the communication passing through it exists.

The cultural outcome is of paramount importance. *The implication is to finally abandon any consideration and hesitancy of the past twenty years about the “nature of the Internet” and to focus once again on contents and methodologies, on the learning and teaching of knowledge, on how to transmit knowledge by using new digital technologies, also in the field of music.*

Cultural institutions ought to study these phenomena, as we have to live them and relate ourselves to them. Manufacturers and industry, and pedagogy as well, should engage in research and production of new technologies and should create environments working on comprehension and accessibility, to encourage students using them. National and supranational policies should steer such far reaching changes in the interest of individuals and society as a whole.

By sensing this wave of change, the OPEN SoundS project sprung from these needs and considerations and took the only possible direction: *to understand present day phenomena and generate positive institutional practices, and impact the models of access to music knowledge and skills in the private/public education and training systems, meeting real world expectations.*

From MODEM to OPEN SoundS

The Leonardo da Vinci MODEM project, completed in 2008, offered the European vocational system (IFP) a new training dimension on the Net: the possibility to produce and share music remotely within communities of transnational virtual studios. The OPEN SoundS project was designed and implemented to reorganize and transfer MODEM's potentiality to students across Europe, employing digital technologies in diverse educational and training systems, as a support to music education and/or towards new professional profiles in music production.

The working plan, the transfer and test actions performed by the OPEN SoundS project were therefore addressed to music students from the various training levels in the European countries of the partnership, in particular:

- to the Italian education and training system, with particular reference to the secondary school system (*Licei Musicali*), to vocational training (IFP), and to public and private regional vocational training (*agenzie formative territoriali*), especially in the Lazio region;
- to the secondary school and VET systems in England and Denmark, partner countries in the project.

OPEN SoundS's objective was to transfer to the students from these different countries the tools, the practices and the processes implemented in collaborative, remote and transnational use of digital music technology. It created the technical conditions to test the extension of informal learning models into music educational practices and its integration, in a creative key, with educational pathways/processes meeting the expectations of the societies of knowledge and of information, as well as the student's individual educational and vocational requirements.

In terms of **expected outcomes**, the goal is to allow the students attending schools and vocational training in our country:

- to build first structured European training network employing digital technologies in a creative key;
- to develop digital and technological skills;
- to consolidate a sense of active citizenship through collaborative practices involving a significant number of young music enthusiasts in the partner countries;
- to have more possibilities, higher quality, more opportunities and areas of transition.

The contribution OPEN SoundS

OPEN SoundS was created to promote innovation in the educational processes by developing, in a collaborative, remote and transnational key, the practices used with digital music technology and networks.

Innovation is envisioned by OPEN SoundS as a collaborative music-production scenario, accessible online from different countries and continents. Think of professional Virtual Studio Recording networks, or of advanced resource-sharing systems for network management. Or think of projects of knowledge archives, like the sound databases built with the contribution of worldwide users. Look at today's and think of tomorrow's online interaction as a largely widespread way of creating and working.

OPEN SoundS main goal was to re-organize, transfer and test a learning environment for remote music production within the education systems through virtual and transnational teamwork and to equip young users with the necessary educational tools to use it.

OPEN SoundS's working dimension and project are, therefore, a virtual environment designed for creative expression mediated by the use of dedicated technology and by the transnational peer communities set up to develop more proficient learning processes through music production teamwork.

The development and use in schools of a virtual learning environment, such as the OPEN SoundS platform, also allow to test the merging of formal training – based on common, measurable, assessable and acknowledged practices – with a system of informal practices which in any case, though heuristically relevant, have to be redefined and repositioned in a specifically designed education system, so as to enhance their dissimilar training and pedagogical value.

OPEN SoundS's aim was to supply the European music education systems and the various public and private players – in the sectors of research, musical training and production – with the tools and knowledge to handle the potential of musical and technological interaction in learning processes or, in other words, virtual environments and strategic models to teach how to approach and access the digital world, its tools, practices, codes, alongside a conscious use of them when learning. In this regard, aims are:

- to promote the development of key competences for lifelong learning;
- to innovate music education methods and how music knowledge is accessed, and to implement new learning environments, working practices and learning objectives;
- to promote links between the worlds of education and work;
- to encourage the ability to share the common construction of knowledge and project-making processes, within virtual and real-world educational environments;
- to test new integration processes between the formal and informal systems of knowledge access and construction;
- to test new evaluation procedures of products/processes created by collaborative virtual teamwork;
- to foster the meaning fullness and value of the emotional and “vocational” aspects of experience, key to active participation in virtual teamwork;
- to encourage student engagement in study, as well as enhancing self-awareness and motivation.

OPEN SoundS: products and processes

As scheduled by the work plan, the project was developed in two years. OPEN SoundS's main phase-products were:

1. **Tools to survey other collaborative music portals found on the Internet at an international level:** criteria, method plans and search tools. A **final report on the survey** and the **development of an interactive database**, accessible from the project's portal where information about other portals can be retrieved and their geographic position is showed through Google Maps.
2. **Creation of the project's portal**, designed and developed to be a meeting and interaction point for the European network of students and teachers involved in the project, for the partners and any other institution or organization interested in the outcome. Based on CMF technical support (by Drupal) and a solid structure conceived to support horizontal and vertical processes/levels of interactivity, the portal allows users to access any information about the development of the project, main documentation about the partnership's work, Facebook and Twitter pages dedicated to the project, the collaborative platform and its products, and any other shared content – www.opensounds.eu .
3. **Development of the collaborative platform of OPEN SoundS** where teachers and students of the project's European network can **create projects through a two-step process** (in a multilingual environment, as the platform is developed in Italian, English, Danish, French and Spanish), which allows:
 - First - the creation of a **content of type "idea"** which illustrates the initial idea of a teamwork project, giving way to other students of the European network to intervene in the discussion and form a project team;
 - Second - the group formed around an idea starts to create a **content type "project"**, i.e. a collaborative music production in a dedicated environment that allows to: describe every cultural and technical aspect of the musical project; upload any type of music files necessary for music-making; view the tracking of the contributions to the final production provided by each student of the team; post and view comments about the creative productions.

In the Create Project environment **any type of music files – more precisely all types of audio and MIDI files, samples, as well as Scores, Patches and Schemes of composition** – can be uploaded.

Every aspect of the project can be viewed: **description, specifications, files used, individual contributions, final product and posts**, by clicking **Browse Projects** in the Project navigation menu.

The platform was **built with Drupal 7** and is available in five languages: Italian, English, Danish, French and Spanish. In addition to the basic Drupal system, modules available with an Open Source license were integrated and custom functionality has been included for management of registrations to the portal and the Drupal user interface was improved to better suit an educational environment.

- 4 **Creation of a significant European network of students.** During the test, the European network of OPEN SoundS involved about **one thousand students and teachers** from schools, music academies or *conservatori*, universities, and from the public and private vocational systems of Italy, Denmark, Great Britain and Spain – a network bound to grow exponentially in the near future, as soon as the OPEN SoundS platform is systematically used in the Italian secondary schools or any other music education institutions part of the European network already in the project (<http://www.opensounds.eu/live/members-full>).
- 5 **Constant action for dissemination and valorization**, realized in a number of ways and contexts, in particular:
 - *Seminars and workshops organized at a national or European level*, to enhance the engagement and involvement of interest-based networks and of the main stakeholders, as regards relevant issues and results achieved;
 - *Development and animation of pages dedicated to the project in social networks such as Facebook or Twitter* to keep interest alive, plus active interaction with web 2.0 environments;
 - Further dissemination and valorization actions, e.g. through the press, the Internet, presentations during events or sectorial conferences, etc.
- 6 **Detailed planning** of the phase activities as scheduled in the different work Plans of the project for Research, Transfer, Dissemination and Test.
- 7 The organization of both the restricted and the extended **testing activities** and the **evaluation of the outcomes achieved** by the main target groups of students and teachers involved in the evaluation of the effectiveness of the music education model designed in the framework of OPEN SoundS and based on creative and transnational collaboration. **Preparation of the evaluation Report on the outcomes achieved.**

The project's activities were backed by the operational support and cultural scope of the partnership and of the main European key players involved in the project: schools, universities, research centres, music academies (*Conservatori* in Italy), business companies, vocational schools, artists, recording industry, magazines, etc.

The products and processes developed in the two-year implementation of OPEN SoundS led to the setup of a very innovative learning environment and

a vast, extended network of users formed by students and teachers attending the various levels of music-related education in the European countries of the partnership.

On the OPEN SoundS platform an idea can be shared and a music project can be developed with any other user of the community, whether of the same team or country, or from another European country, or, for this purpose, from any place worldwide, as long as there is an Internet access.

Projects can be developed on the platform in any of the five languages adopted (Italian, English, French, Danish and Spanish), and all the ideas and music creations proposed can be viewed throughout.

Information about a project can be read in the dedicated page: the idea, the team, the original file proposed (audio or MIDI files, samples, or Scores, Patches and Schemes of composition, etc.), the final product and all the contributions the team leader chose in order to complete the work. All contributions – whether strictly musical or not – and relevant comments or posts by team members appear in the same page.

The final version of any project can be listened to and its tracks can be auditioned singularly, to follow all compositional steps, from the first to the last one. The whole creative steps or paths, whether of the team leader or a team member, are tracked. In addition, student profiles report a progressive and structured list of all contributions he/she uploaded on the platform, whatever the type.

Since music-making in the OPEN SoundS environment is collaboratively developed, the single contributions by any team member to the finished project can be assessed. This learning environment, based on practices commonly used on the Net, allows access and view of the development steps of a collaborative musical creation, in every stage of its development; therefore, the teachers, or the students themselves, can appreciate the kind of impact of each contribution and their importance in the accomplishment of a final result.

In fact, teachers or students can view with a few clicks a complete and detailed portfolio of the experience and creative dimension developed through time on the platform, as they are able to read and build the narration of a space, a sensitivity of a view as musical creativity, typically hard to represent or understand

Key element in OPEN SoundS is the pedagogical scope, appropriated and negotiated, built on models promoting a constructive and reflective learning: students can structure it on different levels and, therefore, benefit from authentic learning experiences and align it with personal interest. These models take into account the authentic learning characters described by J. Herrington², and

² Herrington, J., Oliver, R. & Reeves, T. (2002). *Patterns of engagement in authentic online learning environments*, in A. Williamson, C. Gunn, A. Young & T. Clear (eds) *Winds of Change in the Sea*

integrate them with educational and learning pathways, mainly as follows: a connection to realistic scenarios and activities; interaction with other students, albeit with diverse experience or cultural background; ease of access to appropriate support and resources; opportunity for the learner to play multiple roles and examine from different perspectives; collaborative construction of knowledge; opportunity to reflect and continuous engagement in deep learning and practical activities during the learning process.

As the test results highlight, all the above aspects/potentialities of the learning environment developed produce significant benefits on the path ways of access to music knowledge supported by digital technology, as well as in the acquisition of cross-disciplinary competence, in compliance with the “European Framework of key competences for lifelong learning” and in the evaluation of the learning processes, particularly the formal and non-formal ones.

Therefore, the transfer to the vocational training system of pedagogically assessed and technologically supported practices, designed for peer education, allows students in the training initial phase to easily and immediately access pathways, practices and processes that assist personalized learning, value informal knowledge, recognize and define their own vocational profiles and enhance transition opportunities in the labour market.

Many people worked on the project with care, passion and commitment: this and, above all, OPEN SoundS’ overall impact and innovative features, are faithfully reflected by the products and processes available in it.

The conceptual Framework of the Project

The training model that guided the development of the OPEN SoundS learning environment is reflected in the portal’s structure, in the public section (institutional and general information) as well as in the operational one – the actual multilingual platform. This is the area where ideas are proposed, projects are shared and developed, and support resources (tutorials, educational material, web resources, access to sound databases) are available to students and teachers of the network. The collaborative platform, with focused contents and technology, is the main strength of the project and the fundamental outcome of the project. The novelty and importance of the platform are to be found in the cultural, technological and functional consistency, and in the worldwide online-accessible environment for collaborative work.

With reference to the project’s aims, the most significant and demanding task in developing the environment required:

1. to analyze the portals and models of shared music creation found on the Internet and select the technological model and educational framework that could be transferred/adapted to another learning environment;
2. to develop a new learning environment and progressively merge **the technological model with the educational framework, based on an established framework** of educational objectives and competences potentially acquirable by students through the collaborative practices they would be using in it³.

Therefore, the outcomes from students platform users, were at the foundation of the conceptual framework that produced the platform itself, both from a technical viewpoint (structure, configuration) and an operational and educational standpoint (contents, practices, processes).

The main results and their connection with the skills, proposed and expected when the project was launched, will be processed in the structured synthesis of the evaluation report inside this paper.

Meanwhile, regarding the experience produced and performed by the European network of students and teachers created with OPEN SoundS, it is possible to introduce some initial considerations about a few conceptual and operational topics related to the implementation of digital music and networking technology in schools.

Networks, technologies, learning

The new forms of online community aggregation could be described as networks of individuals who adhere to determined values and assert their “membership” by engaging their passions. These can also be considered as the “place” where people, sharing common interests and values, inevitably end up meeting and recognizing one another, thus developing new communities.

Such a community-universe *gradually turned*, through the Internet, into a “parallel” relational universe, interacting, yet distinct, from the “physical” one: every day communities aggregate in new forms and connect individuals whose “identity” is modelled especially through the Web.

In such a fluid “membership system” – mildly hierarchized at first glance – the construction, acquisition and re-transmission of a native “knowledge” is perceived as a primary good, as an important instrument used by the individual to show personal interests and, in turn, state how much he/she feels involved in the community.

3 Conceptual framework of OPEN SoundS, <http://www.opensounds.eu/node/154>

«Moreover, a “model” of knowledge construction/transmission freely referable to any kind of community cannot be found; in fact, it could be said that each community tries to define an “original” model of its own, depending on its openness towards the outside world, on interests shared within, on how it relates with the Net, and a number of other factors.

...The dynamics governing the system follow unprecedented patterns. Again, it could be said we are in the presence of a *continuously learning community*, where the knowledge forming the connective tissue of the entire community is the fruit of an uninterrupted re-elaboration process open to all community members and, although carried out differently every time, favours the collective, playful and voluntary features of the learning process, as well as the experience achieved from it»⁴.

Communities animating platforms designed for shared and remote music production use these very processes of knowledge construction/transmission and, with their appeal, fed the creation of the environment for team work and project-making in OPEN SoundS.

In the first stage of the project’s development these communities were scrutinized and analyzed through a research that surveyed the major platforms dedicated to remote collaboration, from two viewpoints. The first considered *functionality*, i.e. available resources and tools, while the second, focusing on the conceptual and operational aspects experienced, examined *relations, interactions and practices produced by the communities of musicians animating the platforms*.

From an educational point of view, the most interesting findings, highlighted by the analysis of the practices developed by communities acting in the surveyed music-oriented portals, are here listed:

- Work teams, and the communities built around them, are in constant change.
- Learning processes continuously evolve.
- The creative ingredient is fundamental in the process.
- Teams sharing work or projects can only be defined based on something related to music: a content, a genre, a subject, an interest or a problem.
- The environments promote and foster collaboration.
- Motivation prevails over technology.
- Motivation is justified and dealt with by the authors focusing on the quality of the product.
- An individual and his/her skills in teamwork are valued essentially based on the ability to contribute in terms of creativity and quality.

4 Pollarini, A. (2007). Finalità e metodi di costruzione e di trasmissione del sapere nella “società del loisir” in PRAXIS Pratiche per l’innovazione di sistema, a cura di Fiocchetta, G., Maragliano, R., Pireddu, M., Anicia.

- Communication aims to the meeting of minds.
- Individuals and teams use their own resources.
- The construction of competence and knowledge is based on the ability to develop creative projects through virtual teamwork.

These changes in learning processes are the living foundation of the “interactivity paradigm” which, with the advent of digital technology and networks thirty years ago, gradually developed beside more traditional education methods based on the *text paradigm* (knowledge through a physical object) and the *flow paradigm* (knowledge through immersion).

Different behaviours spread in this new educational scenario and individuals merge with the community; they establish connections between worlds where knowledge is a construction or a production performed by an individual, or between individuals: creative expression - until now compressed and hampered - materializes and passes across the blocks of traditional knowledge.

The new interactive roles and the new subjectivity they express are cogent in that the connection practices (among subjects, among objects, and between subjects and objects), which in our time provide the perceptive sense of the globalized world, can't be kept off the educational pathways of the near future, including more conventional ones. Given the above, the goal is to confer pedagogical legitimacy to newer forms of expression and practical approaches, typical of communities (real and virtual), yet lacking the traits of individualism or of a “mass”: also new operational support has to be supplied to the education system, because completely new and unexplored dimensions can already be seen, signs of a “connecting and communitarian subjectivity”.

The idea to supply operational support and pedagogical legitimacy to unexplored educational spaces and dimensions recurrent in communities – chiefly music-oriented ones – showed the way to OPEN SoundS, shaped its educational features and led to the setup of a framework consistent with the educational objectives and competences acquirable through musical training in a virtual environment dedicated to online creative expression.

In the case of OPEN SoundS, sounds, music software, network resources and practices shared in virtual and transnational teamwork are the key ingredients used with coherence and cognitive consistency by the education system to nourish this new kind of collective sensitivity, which is already untying its bonds with the physical territory while connecting with the borderless one of the Internet.

Therefore, a number of *educational outcomes* can be considered after the major conceptual and operational innovation introduced by the community-customized practices, accomplished in compliance with the project's goals and achieved by implementing in the schools an environment dedicated to music production, as reflected in OPEN SoundS.

Digital Music Technology and IT, mathematics and physics

Online creation of music projects through virtual and transnational teamwork using digital music technology leads firstly to the acquisition and development of increasingly complex **digital and technological competences and to a progressive new media awareness and literacy**. Today any student having adequate technological and musical skills, equipped with basic software and hardware and regardless of the music genre, can self-manage complicated professional productions which some time ago would have implied addressing a number of issues, besides requiring proficient contributions from others. Even when specialized competence and creativity are needed, teams comprise only a few people, anyway less than in the past, and, as in OPEN Sounds, users typically live very far from each other. Collaborative remote music production entails the handling and editing of sound sequences by the means of a skillful management of very complex and ever evolving technology. Moreover, users are expected to be familiar with the Internet, to know how to search and choose from huge databases the sounds needed for music production, maybe blending them with self-tailored ones. Finally, all the steps of the production process need to be managed, from the initial project idea up to the delivery of the finished work for online presentation and commercialization. In this regard, technological knowledge and expertise – ever advancing and adapting to new operational or educational contexts and processes – are generated and bred by the creative or functional practices/processes implementing innovative environments for shared teamwork and cutting-edge technology, according to and based on the experience acquired on the Net or inside a network.

The deep and numerous links between **digital music, information technology (IT), mathematics and physics** (especially acoustics and psychoacoustics) represent another important factor in terms of competences developed through digital music production practices. With the spread of computers and evolution of digital technology, electric tension – used in the past to generate electronic sounds – has been encoded into numbers (digital sounds), hence transforming the sound waves in a sequence of numbers (digital sound) which allows a more compact, precise and efficient representation of the sound itself. Besides the practical advantages obtained from this encoding technique, it is truly fascinating to think that the essence of sound, a sensorial experience, a musical idea yet complex, can be expressed with numbers, possibly with an algorithm or a mathematical formula. “Thanks to digital technology, the link between numbers and sounds dating back to Pythagoras’s first experiments and followed by the studies of many theorists, scientists and musicians, is finally completed. It should also be pointed out that to generate sound through synthesis allows deeper research and comprehension of natural sounds and a fuller awareness of

their complexity, thus paving the way to further classification criteria, rather than basing them on the mere detection of the sound source”⁵.

This approach to sound and music shows a range of possible educational uses, only partially investigated and valued – an inter-disciplinary approach, encouraging an exchange of knowledge between humanities and sciences on which to plan integrated educational pathways. Therefore, music education mediated by digital technology will clearly sooner or later require that students, wishing to enrich the expressive wealth of their music, have a solid theoretical basis and thoroughly understand the principles of sound composition, generation, elaboration and hearing.

This is one of the most interesting challenges: music training through creative practices designed to cross over and integrate the technological and scientific universe at different levels, and thus step-by-step forge musicians who feel comfortable and familiar with digital music, IT, mathematics, physics (chiefly acoustics and psychoacoustics) thanks to a solid theoretical training received. Only with such complete an education will musicians be able to overcome changes, assimilate new ideas, create new sounds in renewed forms of musical expression.

In its original structure, musical language is basically mathematical. All the elements of sound and musical information are physical, acoustic substance. In a scientific debate on “musical matters” it would be almost impossible not to refer to mathematics or physics. Clearly, music colleges and academies essentially train musicians, whereas universities graduate technical experts. However, curious minds open to interdisciplinarity develop earlier, in primary and secondary schools where children and teenagers get closer to music and computers: school age is the right moment to teach that the former can be the gateway to the latter, and vice versa. Future developments in this direction hold great, promising potentialities and new outcomes for music education, as envisioned in the scope of OPEN SoundS.

Equity, social cohesion and active citizenship

Only few entities are more interconnected than “virtual” ones created by making music together in a real lab, or, even more, in a series of real labs linked together through the Net. In the digital world, music is created and manipulated, music is made from music. Every element of this universe, including performers or composers, be it just sound or a song, becomes a node in a network and, in turn, may generate other networks, possibly integrating with other ones.

5 Vidolin, A. (2010). *La conquista del suono in Musica e tecnologia digitale nella scuola italiana*. Rapporto 2010 Annali della pubblica istruzione numero 3-4, Le Monnier.

The European network setup with OPEN SoundS acts and develops within this technical and cultural dimension of the virtual universe. It's a vocational network operating, to date, in four European countries (Italy, Great Britain, Denmark and Spain); however, thanks to its multilingual configuration, it is destined to spread everywhere. As a first immediate step in the development of the project, the implementation of Internet connections lacking in Mediterranean countries is recommended to involve more students using music technology.

OPEN SoundS – designed as a space for online collaborative work and projects, multiplying and merging inside other project-making networks – plays a role in the conceptual and operational innovation springing from practices typical of social communitarian relationship. As a peer education environment OPEN SoundS gradually translates these constant practices in specific competences, beneficial for lifelong learning. It is especially evident that these practices stimulate consideration of feelings and encourage new awareness on **equity, social cohesion and active citizenship**.

Furthermore, the collaborative paths deployed in the OPEN SoundS environment permit users to acquire awareness on the *provisional and perfectible nature* of creative production. Ever-changing software, multiple contributions, the possibility to manipulate and re-elaborate again and again any creative production, naturally prize change rather than “elaboration-and-conclusion”. Collaborative paths of this kind match with the cultural imprinting and creative mindset of people prone to research and to quick acceptance of shifts or changes as resources. This approach to work implies taking risks and facing uncertainty (self-exposure to others), the unexpected (ability to develop a project) and the unpredictable (quality of outcome) – to sail, as in E. Morin’s metaphor, “in an ocean of uncertainties through archipelagos of certainties”⁶.

Moreover, teamwork gives the opportunity to acquire *listening and production methods that stimulate a variety and array* of emotions, sentiments, values, perceptive spectra, textures, creative urge, etc., which, due to their virtual nature, provide an almost endless range of creative means of collaboration. Shared practices thus provide the opportunity to learn how to recognize and appreciate the variety of emotions and sentiments inspiring every human creation, as well as supplying the aptitude to relate to the “things” of the world as an integrated universe. Moreover, shared practices “develop the natural aptitude of the human mind to place information within a context and an entity” and teach “work methods that allow to grasp mutual relations and reciprocal influences between parts and the whole in a complex world”⁷.

6 Morin, E. (2001). *I sette saperi necessari all'educazione del futuro*, Raffaello Cortina editore.

7 Morin, E., op citata, p.11.

No less relevant is the possibility to learn to see the *identity and autonomy of creation* as a priority parameter, as the result of collective action, and accept the notion that *every personal contribution in the production is a common asset*. In such context, every creation is the fruit of collective work, of a common experience along the steps of the project's progression: creation thus assumes a hybrid and de-territorialized identity and can be listened to within exactly the same listening plurality producing it. Furthermore, awareness is acquired that nothing is "lost" when engaged in creating something that will eventually not personally belong. In teamwork, in online communities, in participatory learning networks, every "connecting" work belongs to everybody, it is a common good. In other words, people understand the sentiment and cultural relevance of a community that is connected, and which, by connecting, generates knowledge and social values, the character of the collective intelligence incessantly emerging from multitudes of free relationships forming within it.

In addition, to dispute the legitimacy of *authorship* substantially aims at redefining the concepts of "*paternity*" and "*property*". In team production of a creative work, each contributing individual becomes a producer-user, in a continuous role interaction, which in time might change the present idea of cultural development and production, with a radical impact on consolidated values.

Also important is the given possibility to learn how to *adopt dissimilar points of view on the possible different sound articulations* of a musical creation and how to *acknowledge the validity of points of view differing from ours*. This is a fundamental process when a common musical experience is built: along it, new pathways teach how to recognize and appreciate the importance of diversity and how to identify, and assert as values, different sentiments, viewpoints, attitudes, ways to represent reality, etc.

Finally, students involved in these practices, can learn how to enter in a *logic of time and space dilation in the making of a creative musical product, always dilatable further*. There is no timetable to keep: work can be done anytime and according with personal psychological, emotional or physical disposition.

Even space is dilated in the virtual production environment, since the pages on a screen are virtually endless – similarly to online sound databases, which can drive creativity towards new musical ideas. Along the learning pathway, a new relationship with space and time comes into play: space and time open, modify and pursue each other in infinite forms of musical creation, as in people's emotional, cognitive, affective and social life. And in this universe, finally wide open, "...every new increase of qualitative diversity reinforces everybody's eagerness to continue personal adventure: the more the many members of a community are involved in its permanent re-creation, the more the dynamics of

expression favour the modes of existence and every mode of freedom blossoms again in a positive spiral”⁸.

As P. Lévy suggests, “as to collective intelligence comprehension, the latter resides still, and always will, in experience, in learning and in the mental gestures of its individual members, joining together paths, negotiations, contacts, decisions, the actual actions of the people involved in the continuous creation of the common world. (...) Because, it should be stressed, the virtual world is nothing else but a support to the cognitive, social and emotional paths living in the real bodies of people. The virtual world is no doubt a medium for the collective intelligence – it is not its exclusive place, nor its source or scope”⁹.

This kind of education, this kind of knowledge, this idea of growing through common improvement through the exercise of shared musical production, was in our intentions and is what we intend to foster and could be called, as J. Hillman said, “*the making of the soul*”¹⁰.

All the above mentioned ways of learning and educational processes address an ethical kind of approach to knowledge whose natural scope is to promote open mindedness, solidarity, acceptance, membership, self-respect and respect for others, moral awareness, social cohesion, active citizenship and intercultural dialogue, as prospected by the European Union’s objectives for lifelong learning.

Transversal competences available to students in any educational or research context, as well as in their future professional careers or in the various spheres of action they will take up commitment. This kind of education is achieved through practices supported by network and digital music technology. Such practices require basic skills. Persistent use of them leads to their constant, inevitable and progressive development: they are sustained by a desire to experience and share a clear creative, emotional and vocational dimension and are employed in virtual and transnational teamwork. Hence, these practices strictly comply with the strategic objectives set down in the framework for European cooperation in the area of education and vocational training (ET 2020), and are able to support the achievement of said objectives through congruent and regenerating experiences and educational pathways of our times.

8 Lévy, P. (1995). *Coreografia dei Corpi Angelici*. Una (a) teologia dell’intelligenza collettiva per il buon uso dei mondi virtuali in *Tecnologia, comunicazione, democrazia* a cura di Franco Berardi, Castelvecchi, p.47.

9 Pierre Lévy, op.cit., p.45.

10 Hillman, J. (2002). *Il Potere*, Rizzoli, Milano.

Digital music market and new professions

The annual Digital Music Report of IFPI (*International Federation of the Phonographic Industry*)¹¹ contains most interesting data to understand the current state of the world's recording industry and its business: the 2012 report shows a digital music market now spanning the entire globe.

The major international services are present in about 60 countries – more than twice compared to a year ago. The consumers' choice underwent a revolution after the introduction, both in emerging and pre-existing markets, of new consumption models and forms of access to music. Subscribers of services, such as Spotify and Deezer, rose in a year from 9 to about 13 millions.

Moreover, cloud-based services, such as iTunes Match, are now a fully consolidated portion of the recorded music market, powered by the increasing popularity of music download.

Furthermore, a +8% surge of digital revenues in 2011 seems to imply that, after the revolutionary impact of digital technology and, to some extent, the serious problem of piracy, the troubled times of the recording industry are over at last.

Despite the challenges that have to be faced in such an innovative sector, optimism seems fully justified as to a further expansion of digital music in the years to come. In the digital economy the recording industry is seizing market opportunities to a larger extent than other industrial sectors. Digital revenues, accounting for more than a third of total industry revenues (today over 50% in the United States), are far higher than in the film-production or publishing industries.

As business models are expanding and reaching new users worldwide, the development of digital music brings more choice to consumers than ever before. In the US, the largest market in the world, all digital sale channels overtook the "traditional" physical format sales, becoming the industry's main source of revenue.

In 2012 digital music spread even further worldwide. Today download services enjoy a huge number of requests and keep expanding their consumer base, especially in growing markets. In addition, the number of consumers using subscription services and newer models of subscription is multiplying. Many competing platforms are racing to move into all the markets and dominate new areas. Most of these services are producing growth plus, given the many hours spent by users browsing their websites, income and strong consumer engagement.

11 Digital Music Report (IFPI) 2012, Italian version. All data here presented were repurposed and summarized from data found in this last IFPI report.

In 2011 worldwide digital music revenues increased by 8.5% reaching an estimated value of US\$ 5.2 billion. Considering the 5.5% increment registered in 2010, this figure represents the first increase of the annual growth rate since IFPI began monitoring digital revenues in 2004. Today digital sale channels absorb about 32% of the recording industry's worldwide income, compared to 29% in 2010: in some markets, as in the US (52%), South Korea (53%) and China (71%), more than half collected is from digital platforms.

Country	Percentage of the recording industry's digital revenues
China	71%
South Korea	53%
USA	52%

Source: IFPI estimate for 2011

According to IFPI estimates, a total of 3.6 billion downloads were purchased (considering singles and albums) in 2011, with a 17% increase over the previous year.

The degree of digital penetration in the music industry still appears clearly higher than in other similar sectors, except for the videogame industry: in fact, other creative industries, in particular cinema, newspaper and book publishing, only recently started converting rapidly to online and mobile phone distribution channels.

Digital music revenues: 2009-2011			
	2009	2010	2011
Revenues (US\$)	4.6 billion	4.8 billion	5.2 billion
Growth	10%	5%	8%

Source: IFPI estimate for 2011

The issues of sustainable growth and jobs in the digital music field appear remarkably interesting when viewed in the general perspective of OPEN SoundS.

Both professional as well as creative sectors are at the heart of digital music, which requires a tight interaction with machines. Ideas, often complex, give rise to difficult technical issues and technology finds solutions. The MIDI protocol or the handling of sound objects by the means of software, not to mention all the music recording and production environments running on UNIX or Windows, are typical examples of technical answers to issues arising in the creation process.

Cloud-based services, as iTunes Match for instance, or subscription to services or to other emerging models, are further novelties consumers are enjoying more and more.

The world of music is based on fruition and entertainment, thus representation of music, whether live, broadcasted or online. Therefore, music has to be transformed into communication: specific technical issues arise in each stage of this process and have to be dealt with by professionals.

Hence, professional training in this sector is the answer to continuously shifting practical needs. Yesterday, music was carried on CDs or videocassettes, then came through satellite TV and DVDs, today through the Internet, mobile phones, cable TV, besides DVDs, radio and MP3s. All technological means and devices imply technical issues that need to be worked out through specific projects and highly specialized professional profiles.

OPEN SoundS sets out to be a key of access to the knowledge and basic skills required to enter, alongside successive specialization, the varied and interesting professional world connected to Digital Music: a sector undergoing fast growth and of great strategic relevance, as confirmed by the data from the above mentioned IFPI Report.

The purpose of OPEN SoundS is to address various aspects and issues concerning different levels of digital music professional training, a potential that could be summarized as follows:

- transfer of operational, technological and scientific-cultural methods into learning experiences and pathways to be acknowledged and adopted by formal vocational education;
- transfer experiences – quite often impulse-driven or aesthetical – into a structured education system referable to an established and formal scientific and technological framework.

A major challenge for OPEN SoundS was to open the door and permit access to the vast and innovative areas of digital music research and development, through the setup of experiences and educational pathways consistent with the numerous, complex and ever evolving/changing possibilities/needs that characterize and fuel the digital music market worldwide. Such challenge is successful in the goals set, yet nevertheless will have to be supported and expanded through new research and projects.

OPEN SoundS's European dimension: objectives and outcomes

The synthesis of the evaluation report presented in this paper summarizes the results found by analyzing the data collected during the test: information was necessary to verify how much the learning environment and the tools in OPEN

SoundS contributed to the development of specific knowledge and competence. The statistical evidence and structure of the students' and teachers' answers allowed a very consistent picture of the “*cognitive*”, “*functional*”, “*personal*” and “*ethical*” knowledge and of the competences achieved or achievable by students through creative experience produced inside a learning environment such as OPEN SoundS.

A high proportion of students and teachers was involved in the test, all from the four European countries considered. They confirmed the music creation practices developed in virtual and transnational teamwork allowed them to acquire higher skills in the new languages and codes of the Internet, with teamwork tools and digital technology. They also underlined a higher self-confidence in the promotion and management of ideas and creative projects, albeit complex, needing shared approach. It was furthermore observed that they improved their ability to adapt, take responsibility and solve problems, along with increased interest in innovation and intellectual autonomy. Also, the learning of notions, such as the importance of diversity, understanding, membership and multiculturalism, through collaborative and transnational practices was described by students as meaningful.

The proposed learning environment and the students' learning outcome address the idea of transversal approach to knowledge, crucial in any further educational or research context, as well as in students' future jobs or professional careers. This knowledge, developed through virtual and transnational teamwork, was achieved during practices supported by the conscious and competent use of digital music and networking technology which require skillful use of foreign languages and familiarity with a creative, emotional and vocational dimension. This learning environment complies with the strategic objectives for the development of education and vocational training established in the recommendations of the European Parliament and of the Council of 2006 and 2008¹² and in the 2009 conclusions of the European Council on a strategic framework for European cooperation in education and training¹³.

The development of the OPEN SoundS platform met the objectives that previously had been merely outlined by the virtual learning environment created with MODEM. The various European networks created for teams and/or users, school networks, professional networks, university students networks, training operators networks – hence all the subjects involved in the project's development with different modalities and at different levels, especially in the test and product-

12 Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning and Recommendation of the European Parliament and of the Council of 23 April 2008 on establishment of the European Qualifications Framework for lifelong learning.

13 Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET 2020).

validation step –, all found training tools and support in the OPEN SoundS platform perfectly matching their interests, and suitable for performing creative activities and online exchange of music projects.

The environment and work model proposed in OPEN SoundS facilitates musical creative expression and, with it, the crossing of the new frontiers of digital music and networking technology.

EU support to *Leonardo da Vinci TOI Projects*, like OPEN SoundS, was granted for the finalizing, transfer to system, test, evaluation and dissemination of innovative practices in terms of methods, contents, training products and vocational guidance. OPEN SoundS is fully in line with the European strategy for the integration and innovation of the educational and training systems, because the project:

- develops highly innovative contents, relevant for e-learning applications;
- builds a space dedicated to creative expression mediated by the use of the Net and digital technology, unique in the European education system;
- through collaborative practices, people with different cultural backgrounds get closer, led by common interests in music and technology;
- encourages students' interest in technological culture and supports them in the development of very advanced competences;
- significantly innovates training processes and work methods in schools by acquiring them from the Internet, particularly from the worlds of social networks or open sources, and of entrepreneurship and creative arts;
- develops ICT-based contents, and further services and practices for a lifelong learning;
- allows the acquisition of transversal competences (communication skills, transnational team work, project development, creative expression, etc.) that facilitate entering the labour market;
- allows the linking of creative and technological knowledge in accordance with the latest cognitive theories.

Moreover, the goals achieved by OPEN SoundS are closely connected to European policies for growth and for education and vocational training, in particular with reference to the strategic objectives set for 2020, included in the Council Conclusions on a strategic framework for European cooperation: they are, therefore, anchored to the idea of lifelong learning as delineated in the above framework, namely to strategic objective 3 - *Promoting equity, social cohesion and active citizenship* – and strategic objective 4 - *Enhancing creativity and innovation, including entrepreneurship, at all levels of education and training*¹⁴.

14 Council Conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET 2020).

In the transnational outlook of Leonardo, the OPEN SoundS platform represents a source of innovation in vocational training – in the area of digital music – and a space to amplify and enhance both the outcomes of the test and the environment’s potential in the European education system. The training model, the pathways associated with the model and the platform for remote music production, will be able to support innovation in digital music production training practices, not only in Italy but also in other European countries, as well as in a broader transnational context.

The participation of the major European business companies, universities, research centres and software developers in the project helps smooth out the process. The European digital music networks, for instance, could soon benefit from a training superior in quality and amount. It will be possible to supply a significant degree of self-training, in addition to participatory training performed in music labs of schools, universities, music academies (*Conservatori* in Italy) and in vocational schools. To do this, all the students will need is a normal Internet connection to enter the OPEN SoundS platform and join, through the development of ideas and projects, the work of a national or transnational team – formed depending on the type of shared project proposed.

It should be pointed out that Italy is at a disadvantage due to significant delays in the implementation of technology in music teaching. Through OPEN SoundS the testing and dissemination of innovative models and practices in the training system is expected to integrate, complete and value the setup of dedicated learning pathways, e.g. in secondary schools, internship experience and other kinds of vocational training schools, within structured pathways of supplementary training. In Italy the testing of OPEN SoundS has been the starting line, the actual opportunity to begin a long and creative phase leading to innovation in the national music training system. All the educational chain is involved, especially *licei musicali* (music secondary school), *Conservatori* (music academies), vocational schools (*agenzie formative regionali*). The launch in Autumn 2011 of the National Network “Quality and development in Italian music and coreutica schools” (*Rete Nazionale “Qualità e Sviluppo dei Licei Musicali e coreutici Italiani”*) paved the way and added momentum to this process.

Among the activities, involving all the Italian music secondary schools (*licei musicali*) and the MIUR (*Ministry of Education, University and Research*), support action was planned to expand the Network: the latter eventually joined and was integrated with OPEN SoundS, merging with the transfer to system action. A close relationship has been set up with many Italian music secondary schools during the test – the homepage of the Italian music and coreutica schools’ portal has a link to the platform (www.liceimusicalicoreutici.org). OPEN SoundS will be transferred to system in Autumn 2013 and, by virtue of this, the entire network of about 7.000 Italian music secondary school students will be involved in OPEN SoundS activities for shared music production. The detailed and extensive

transfer action had been directly addressed, during the test, to 29 out of the 80 Italian music secondary schools: it is foreseen that in the school year 2013/14, when the project will be fully transferred to the system, *not just 10% but all Italian music school students*, wishing to participate in creative collaboration, will be using the *OPEN SoundS platform*, well beyond the rosier forecasts.

Furthermore, in Italy it is expected that access to the network activities will be possible for many students among the 18,186¹⁵ who attended music learning/training practices in secondary school through digital and networking technology, generally within a supplementary training context.

In a transnational perspective, the testing and validation of the products created with OPEN SoundS proved absolutely remarkable instruments, and, since the beginning of the project, interest-based national networks have been set up in all the countries of the partnership for this purpose.

The platform was tested in vast, differentiated European networks operating in Great Britain, Spain, Denmark and Italy, all strategic countries in the music sector. **64 vocational institutions and a total of 86 teachers and 807 students were** involved in the actual testing phase. The following process of dissemination and valorization of the results was performed on a very large scale, both geographically and for the number and categories of participants (school, university, business companies, vocational training system, creative producers, alternative culture organizations, etc.). This should be considered an added value as to the effectiveness of the results dissemination and in the equally relevant perspective of a use of the common working and project-making model accomplished through OPEN SoundS.

Powered on a multilingual platform, the networks are expected to expand all over Europe. In a broader transnational context, the relationship set up with the network of the Italian secondary school will also allow collaboration and exchange with students from any other part of the world. Indeed, many secondary schools have already established a relationship based on exchange and training, and China, Russia, Argentina and Brazil potentially may already be involved. Other further developments should not be overlooked, e.g. the perspective of involving in collaboration activities the network of music schools worldwide connected to EarMaster.snc, the Danish project partner, as well as the networks of music academies and universities linked to the research centres of the DEI (*Department of Information Engineering*) - University of Padua, and of the International Music Education Research Centre (iMERC) in London. Such prospect of expanding and integrating with interest-based or project-making networks aims to strengthen

¹⁵ Students who had access to digital music production practices in the various schools are distributed as follows: secondary school, 4,938; technical institutes, 921; vocational training institutes, 438; art schools, 600. Data from "Musica e tecnologia digitale nella scuola italiana. Rapporto 2010", editor Gemma Fiocchetta, *Annali della pubblica Istruzione* n 3-4, Le Monnier 2010.

and develop creative focus, sense of membership, interaction between creative and operational identities in teamwork, in all directions – i.e. technological, cultural or artistic. This can only improve and enhance, to the benefit of students animating European network, all the outcomes of the OPEN SoundS project, be they technological, operational, creative educational or vocational.

Conclusions

The profound logic of the Net lies in the database, the archive. Potentially all elements of human culture could be stored in it, although in the form of a database, therefore not in a narrative or communicable form. Interaction between database users allows the use of the Net in a narrative, alias cultural form – the users “speak” to the Net, turning it into dialogue, culture and cultural products.

An illuminating comparison can be made with language, whether verbal/ alphabetical or music/sound-related. The database is the alphabet and all its infinite combinations produce millions of words in all the languages. However, all the narrative articulations the words are able to convey ultimately depend on those who speak, that is those who, by reciprocally connecting, pick from the database the combinations that appear most significant.

Likewise in music, musicians draw out from an abstract database of potential melodies just the ones appearing as meaningful, according to their cultural context. They “play” only those and give life to the content of sound database. The database is essentially a collection of possible narrations, but lacking narration al features. The engine of narration is outside the database. Yet, to be able to narrate, interface with the database is unavoidable.

Cultural products embody this logic: similarly, it is the logic of the Internet and of the communities of music enthusiasts and users interacting on the Net.

The traditional world and the environments, where creative freedom is experiencing new structures and new practices, are contaminating each other and are engendering a collective medium, feeding on all these contributions in a gigantic kaleidoscope of voices and thoughts which depict, not only in the music field, the real portrait and evolutionary prospects of humankind.

It appears that a new participatory culture is forming at the crossroad of some fundamental trends:

1. technology and connecting tools allow consumers to archive, annotate, appropriate, and recirculate media contents;
2. a range of subcultures promotes DIY media production, an approach that explains how some Internet users are exploiting technology;
3. economic trends that favour horizontal media conglomerates encourage the flow of those contents, sounds, pictures, ideas and narration that

are capable of covering multiple channels and implement more efficient modalities for the network users and its communities.

These new voluntary, momentary communities, based on a tactical membership and defined according to common intellectual activity or emotional investment, allow the exchange of shared resources and, thus, the continuous creation and re-vitalization of new social interaction.

Moreover, whereas competence was once acquired and displayed through isolated disciplines, the new collective intelligence is a patchwork woven by many sources and eventually generates something bigger and more powerful than the sum of its parts.

As H. Jenkins¹⁶ pointed out, these shifts meet the idea of “media convergence defined as a continuous, intersecting process between technology, industry, contents and audience”. In addition, again according to H. Jenkins, “thanks to the proliferation of channels and a wider use of information technology and telecommunications, we are entering an era when media will be everywhere and we’ll use all types of media combined. We’ll have to find new skills in the management of this kind of information, new structures to transmit it through different channels, new creative genres exploiting the potential of the future information structures, new educational methods to help students understand the impact these have on the world.

Media convergence is more than just a digital revolution: it means the appearance of a larger range of new media technology allowing users to archive, annotate, transform and circulate contents. Media convergence is more than just a technological shift: it affects the interaction between present technologies, industries, markets, genres and audiences. Media convergence is encouraging creative innovation in every area of popular culture: our current media environment is crossed by the proliferation of diversities, by what Gran McCracken called a *plenitude*”.

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¹⁶ Jenkins, H. (2008). *Fan, blogger e videogamers. L'emergere della culture partecipative nell'era digitale*, Franco Angeli Editore, Milano, pp.183.184.

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Part One

Network, testing, results



Part One | Network, testing, results

OPEN SoundS: main results of the testing activities

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1. European network, testing process and research tools in OPEN SoundS

1.1 Description of the Network

The European Network of students and teachers born with OPEN SoundS represents the starting point and the real possibility of opening a long and creative phase of innovation and research within the VET system, particularly in fields related to music, through practices of shared, remote and transnational creation of musical projects.

The networks of interest built with the project are currently operating in four countries, Italy, Great Britain, Denmark and Spain; they involve and integrate all the training sectors in the musical field with particular reference to the secondary school level, with the music and dance high schools, the music conservatories, the research centres, the universities and the vocational training system (regional education agencies) and, due to their nature, the wealth of contributions and the clear and widespread interests in the start-up phase, they are designed to expand at a European and transnational level.

The OPEN SoundS network is therefore very extensive and articulated, both geographically and as concern the number and categories of participants; it is differentiated by sectors and is present in four countries of strategic importance in the music field. A network that, as shown in detail in the following pages, involved, only in the preparatory phase of the trial, a very significant number of educational institutions, teachers and students. The consistency of the network is summarized in the figure below (Fig. 1):

	Students	Teachers	Educative Institutions
Italy	2.000	180	29 Music high schools 1 Technical school
Italy	250	20	15 VET (regional)
Italy	100	12	6 Music conservatories 1 University
Denmark	270	8	7 Musikalsk Grundkursus 1 Produktionskolen
Great Britain	600	15	2 International School 1 University
Spain	16	4	1 University
	3.186	239	64

Figure 1: network of educative institutions, teachers, and students involved in the preparatory phase of the trial

From the subjects involved in the preparatory activities, the following ones have been selected and have actively participated to the trial phase: 64 educational institutions, 86 teachers and 807 students.

The practice of collaborative production within the OPEN SoundS platform required indeed that:

- students demonstrate a clear mastery of various and specific basic skills;
- partners and teachers tutor of the project would be able to control and manage continuously and in detail the activities of shared construction of the projects carried out by the students (project ideas, creative choices, comments, shared files, etc.).

So it was necessary to support and secure the consistent and congruent development of the activities and their success.

Thanks to the careful dissemination work carried out by the partners during the entire duration of the project, to the valorisation actions planned within a framework of quality assurance for the next stage in its life cycle and thanks to the accessibility and the multilingual structure of the platform, the working networks connected to OPEN SoundS will be progressively extended to the whole of Europe, the Mediterranean area and in a wider transnational context.

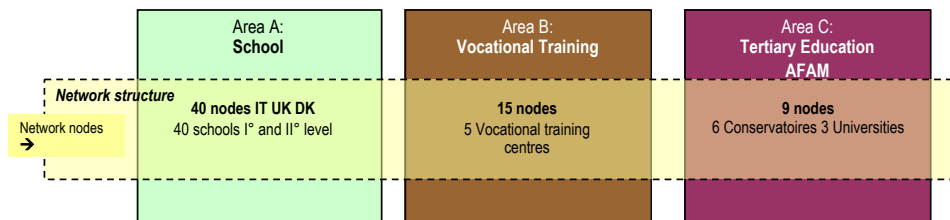
The structured relationship with the network of the Italian music and dance high schools will be the driving force to initiate collaborations and exchanges

with students from other international reality connected to music and no less relevant in this direction will be the solid networks of schools, companies, research centres, and music conservatories connected to the project partners as Earmaster Snc, Midware, DEI - University of Padova and of the International Music Education Research Centre (IMERC) in London.

The prospect of building an authentic and dynamic European space for the collaborative and creative practice connected to the music within the school, in addition to providing strength and enhance the creative base, the sense of union, the operational possibility of the working teams, is the most important result in view of a scholastic use of digital technologies and Internet that is really productive and consistent with the educational and training requirements of the knowledge and information society.

1.2 Transmission networks and protocols

In the partner countries, involved in testing activities, *transfer networks* were located in each sector and their **nodes** worked adequately for a period, during the testing phase:



These networks, and their related **nodes**, had the role of vectors/catalysts guaranteeing the success of the transfer action from the start.

Their **performance has been determined/defined as follows**:

- partly by a series of **tasks/functions** they are entrusted with (depending on the *target group* the user belongs to) and as established in the protocols;
- partly according to **network agreements**;
- finally by **support action**, through dedicated presentation seminars (introduction and support to the project) arranged by the partners responsible for each area.

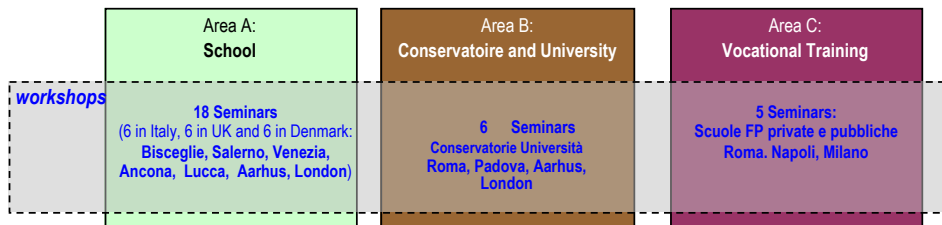
The networks have been also organised and structured to ensure the coordination **of the tutors**, contacted and trained during the seminars with the purpose not only of supporting the testing phase, but also to consolidate in the course of time potential **“system keystones”** for dissemination and valorisation activities that could develop successfully beyond the project’s lifespan.

The mentioned meetings established/realized the following:

- preliminary **information activity** about the project;
- **shared** and commented/illustrated **access** to the platform, beginning collaborative and creative activity on the platform;
- **workshops** with experts in the field to spur interest among potential users and participants.

The seminars that actually took place, in the different European countries, with networks of students and teachers were:

- **18 for the school sector**;
- **6 for the University and Academies sector**;
- **5 for public and private vocational training institutions.**



Most of the above meetings/seminars were held with an audience, while other activities supporting the test network were performed via mail, phone or videoconference.

As to the **procedures** set up for the transfer testing, they were similar with all the networks referring to the three sectors:

- **branch planning** of the **network nodes**;
- entering necessary **network contracts** with the third parties backing the project;
- **choosing** for each network node at least **one teacher user** for a **tutor** post;
- **access to the tools** supporting the transfer (based on specific purposes, which take in account the “vocational” training of the *target groups*);
- **submitting an entry form** to access the test and the collaborative activities found on the platform;
- **submitting an exit form** at the end of the test activity;
- mailing of a **handbook** to support activities (structured differently for each sector);
- availability of all **supporting material** deemed useful for a successful transfer action.

1.3 Questionnaires and other materials supporting the test

The entry and exit assessment questionnaires, have been implemented on the OPEN SoundS platform and made accessible directly from the user profile of every student and teacher participating in the test. These questionnaires were adopted for:

- a) entry and exit registration of the users;
- b) a collection of the results of the test as to remarks and evaluations.

More in particular

- Part of the **entry form**, most of it required to be completed, asks for *general information*, fundamental for the user management, whereas another part was conceived to collect quality/quantity data, e.g. those regarding entry skills and expectancies, also helpful for statistical purposes.
- The **entry form** asks for *general information*, fundamental for the user management, whereas a second part collects data that allow to evaluate the role of the testing activities performed and to suggest improvements to the platform (accessibility, functionality), as well as about the practical usability of products and the working or training processes within the personal sphere of action. Another key item found in this form is an exit skills assessment (see appendix).

The **forms**, excluding the general part in common for everybody, were arranged according to the peculiarities of each *target group* and its sector.

Evaluation with presence

The testing activities beyond that through the quantitative analysis performed using the entry and exit assessment forms was also carried out through qualitative tools.

Experiences were in fact documented and evaluated through a direct and personal observation carried out, in particular, through interviews and audio visual material which were an integral part of the validation process and of the final evaluation report.

Validation of the results

The following procedures were planned for the validation of the results:

- a. planning beforehand the criteria to collect information about platform access, by implementing entry and exit questionnaires suitable for an organised collection of the data submitted on a voluntary basis by the user through assessment and self-assessment forms (see the draft in the appendix, which will be finalized after the restricted test's first phase);
- b. systematic collection of the data relating to platform accesses (number

- of accesses to the single areas and pages, produced material, number of opened forums and of registered interventions, etc.);
- c. qualitative/quantitative analysis of accesses and information drawn from the questionnaires, also with the assistance of external experts;
- d. publication and dissemination of the results for the definitive transfer to system.

2. Conceptual framework of the learning environment

2.1 Learning environment of OPEN SoundS: learning objectives

The general aims of OPEN SoundS is the re-organization and transfer to system of a virtual learning environment able to supply its young users with the tools needed to develop music production activities on the web within working groups located in different places and allow to have maximum benefit in terms of education and training.

Thanks to highly innovative and creative practices, the project sets out to be an encouraging and supportive tool for the:

- a. development of key skills for the initial and continuous training;
- b. more realistic opportunities of transition to the labour market.

All the above is accomplished through development and management awareness in the creative practices and processes involving digital music and web technologies, within a learning environment specifically planned for this purpose.

According to the project objectives, therefore, a significant and complex aspect was the integration between technological model and pedagogical framework in relation to a defined framework of training objectives and skills realistically achievable by the learners through the use of the designed remote collaboration environment.

The designed environment aims at promoting learning processes and the setting up of activities which can drive innovation in the educational processes of the formal systems. and to facilitate students in the achievement of precise knowledge, skills and competence.

The framework of the outcomes expected by the students, as users of the environment, is thus at the foundation of the more general conceptual framework and, besides guiding the aims of project, **has determined the structure, the shape, the contents and the functioning of the actions and the products to be developed.**

This framework was built starting from and complying with: a) the descriptors defining the **European Qualifications Framework (EQF)** and the respective

8 levels¹, in which is divided (Recommendation of the European Parliament and of the Council on the establishment of the European Qualifications of the **European Qualifications Framework for lifelong learning** – of April 23rd, 2008) and complying with the European Framework reference on key competences for lifelong learning as defined by the Recommendation of the European Parliament and of the Council of 18 December 2006.

of the European Qualifications Framework for lifelong learning – of April 23rd, 2008 –) and in compliance with the European Reference Framework of Key Competences for lifelong learning as defined in the “Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for lifelong learning”.

More into detail, in the definition and creation of the framework:

1. **A series of learning outcomes was selected**, as to the use of environments dedicated to music production made by virtual and transnational working teams, as is the case of the OPEN SoundS platform.
2. The selected learning were formulated complying with:
 - **the European qualifications framework of key competences for lifelong learning;**
 - **the descriptors of the outcomes and skills established for the qualifications/academic degrees representing levels 6, 7 and 8, and the relative education cycles, in the European Qualifications Framework.**
3. The learning framework was articulated complying **with the descriptors of the three different levels established by the framework (EQF)**, because in the test, besides students attending the second education cycle (descriptors of level 7) and the public and private vocational training system (eligible target), students present in the first cycle (descriptors of level 6) **and from Music Academies (Conservatories)** (descriptors of level 7) **shall also be involved**, in order to check and verify, in the entire vertical chain of musical training and educational potentialities of the use of collaborative learning environments, as in the case of the OPEN SoundS platform.

1 The European Qualifications Framework establishes eight levels, each of them defined by a series of descriptors which indicate the outcomes of the learning, relative to the qualifications of each level in any European qualifications system.

Learning targets²

Framework of knowledge, skills and competences in relation to music and technology

KNOWLEDGE* In the context of EQF, knowledge is described as theoretical and/or factual.	SKILL** In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).	COMPETENCES*** In the context of EQF, competence is described in terms of responsibility and autonomy.
<ul style="list-style-type: none"> • Know the new languages and new codes of the music, information and communication world, on the Internet. • Know the tools for the cooperative team work. • Know the use of the network process. • Know the procedures and tools for the creation shared of music by digital technologies. 	<ul style="list-style-type: none"> • Ability to ménage new information and communication languages and codes on the Internet. • Ability to use with autonomy tools and collaborative environments on the net. • Ability to use procedures and tools in music creation and sharing by digital technologies. • Ability to search, understand, select, manipulate and create data and information. 	<ul style="list-style-type: none"> • Work, study and plan with some autonomy • Take responsibility for completing tasks in work or study. • Adapt personal behaviour to circumstances in solving problems. • Develop a project with some autonomy. • Manage professional activity or complex projects, take responsibility for decision making in work or study contexts. • Show the skill to lead its own learning and understand the learning processes.

² The “**Learning targets**” are declarations of what a learner knows, understands and is able to do at the conclusion of a learning process, which is defined in terms of knowledge, skills and competences.

* “**Knowledge**” means the outcome of the assimilation of information through teaching. Knowledge is the whole of the facts, principles, theories and practices connected to a working or studying field. In the context of the EQF, knowledge is described as either theoretical or factual.

** “**Skill**” means the ability to apply knowledge and to use know-how to complete tasks and solve problems. In the context of EQF, the skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).

*** “**Competence**” means the proved ability to use knowledge, social and/or method skills, in working or studying activities, in professional or personal improvement.

<ul style="list-style-type: none"> • Develop of contextualized, integrated and useful musical knowledge. • Access, recognition and valorisation of own curiosity, critical attention, interest to studies and carried out projects. • Know the relevance of the development of the creative skill. • Know the value of communication, cooperation and negotiation. • Access to collaborative learning processes that valorise the diversity of points of view and approaches. • Knowledge of processes / learning environments welcoming, motivating and able to strengthen interests and develop vocations. • Know the importance of diversity, understanding, membership and multiculturalism. 	<ul style="list-style-type: none"> • Ability to use personal aesthetics, expressive and creative skills. • Ability to create and give a real contribution to a shared project development. • Ability to integrate accepted knowledge in an informal environment with knowledge learnt in formal contexts. • Ability to analyze and suggest solutions to solve problems. • Knowledge of personal learning strategies activated in different situations in the proper way. • Ability to interact in a critical, positive and constructive way with other people. • Ability of Self analysis and self evaluation. • Ability to Communicate, cooperate and negotiate. • Ability to manage the change and complexity. • Ability to express a personal vision of the world showing understanding and respect for diversity. 	<ul style="list-style-type: none"> • Review and develop performance of self and others. • Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts. • Take responsibility for managing professional and creative development of individuals and groups. • Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches • Develop strategic approaches applying specialist knowledge and creative responses. • Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams. • Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research. • Demonstrate knowledge of the importance of diversity, understanding, membership, and multiculturality.
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Compatibility with the Framework for Qualifications of the European Higher Education Area

- The descriptor for the higher education short cycle (within or linked to the first cycle), developed by the Joint Quality Initiative as part of the Bologna

process, corresponding to the learning outcomes expected for level 5 of the European Qualification Framework.

- The descriptor for the first cycle in the Framework for Qualifications of the European Higher Education Area agreed by the ministers responsible for higher education at their meeting in Bergen in May 2005 in the framework of the Bologna process corresponding to the learning outcomes expected for level 6 of the European Qualification Framework.
- The descriptor for the second cycle in the Framework for Qualifications of the European Higher Education Area agreed by the ministers responsible for higher education at their meeting in Bergen in May 2005 in the framework of the Bologna process corresponding to the learning outcomes expected for level 7 of the European Qualification Framework.
- The descriptor for the third cycle in the Framework for Qualifications of the European Higher Education Area agreed by the ministers responsible for higher education at their meeting in Bergen in May 2005 in the framework of the Bologna process corresponding to the learning outcomes expected for level 8 of the European Qualification Framework for lifelong learning.

3. Results of the testing activities

3.1 The European Network of OPEN Sounds

The overview of the phases and of the numbers of users involved in the testing activities, in different fields/areas of intervention, can show the articulation and the richness of the activities carried out, and the effective use of the OPEN SoundS platform.

To this end, the following is the detailed framework: areas, phases, the number of network nodes by sector and by stage, the number and the typology of involved users, in the three main sectors of intervention and in the three countries participating in the testing activities.

	Settore A: Scuola	Settore B: Formazione Professionale	Settore C: Formazione Terziaria (Conservatori)
Organizzazione delle reti Nodi di rete →	40 nodi in IT DK e UK I ciclo e II ciclo d'istruzione	15 nodi 15 centri di Formazione professionale	9 nodi 6 Conservatori + 3 Università
Sperimentazione ristretta Gruppi pilota →	12 docenti +100 studenti di ogni ordine e grado	5 docenti + 80 studenti di centri di Formazione Professionale	6 Docenti + 50 studenti di Conservatorio e di Università
Sperimentazione allargata Target groups →!	60 docenti + 557 studenti in IT DK UK ES Scuola secondaria di 2°	15 docenti+ 150 studenti in IT, DK, UK, ES (Formazione professionale)	11 docenti + 100 studenti in IT, DK, UK ES Conservatori e Università Docenti Musica Elettronica 200 studenti
Trasferimento a sistema Utenti finali →	10.000 studenti e i loro docenti Tre il 5% e il 10 % degli studenti e dei docenti coinvolti nell'insegnamento della musica attraverso le TD nei tre paesi IT DK UK	Formazione professionale 131 formatori (100% dei formatori certificati) 970 studenti (100% degli iscritti all'a.a. 2012/13) (10% ca di 2890 studenti formati in anni precedenti)	Conservatori, Università: docenti (10% dei docenti di Didattica della Musica e di Musica Elettronica presenti nei conservatori) studenti (10 % degli studenti di Didattica della Musica e di Musica Elettronica presenti nei Conservatori)

More in detail and very briefly, as shown in the previous table, the testing phase is enlarged in the three European countries part of the OPEN SoundS Consortium took the following configuration in terms of:

- The structure and profile of the network testing.
- Expectations and knowledge incoming.
- Learning process and results.

3.2 Data collection and results processing

The evaluation phase of the OPEN SoundS project was conducted in two distinct steps, the first one aims to provide a learning environment fully operational and functional, the second focuses to collect data from users who took part in the testing activities. The approach (based on social networking) and the particular field of action (the shared production of digital music) has required the adoption of a multi-layered approach, focused on gathering data both within formal contexts (such as those collected in the workshops) and on the Web (via web-based access to the survey questionnaires) in order to ensure the opening of the piloting activities to a wider audience, outside the school context.

As explained in 3.1.5 the results of the testing phase were detected in particular through two questionnaires (input and output):

- The **input questionnaire**, the compilation of which was mandatory for most of the fields, has led to the recognition of the *General Data* for each user finalized to basic user management, data and qualitative/quantitative such as those related to the knowledge, skills and expectations incoming.
- The output questionnaire aims to collect that part of the information needed to evaluate the results of the experimental activities carried out in terms of: a) technological functionality of the platform (accessibility, usability, usability); b) education and training of potential learning environment experienced; c) quality of products and processes experienced; d) recognition of the users' skills after the testing activities. It was also possible, through open-ended questions, to make assessments made general experience and suggestions for the improvement of the platform.

The process of the significant amount of data collected, more than **540 questionnaires in incoming and 450 in outgoing**, compiled by many teachers and students in the three countries, has allowed a detailed analysis of the processes involved and the results obtained and to evaluate and validate the learning environment and creative experiences made in it by the European network of students and teachers built in Italy, Denmark and Great Britain by the OPEN SoundS Consortium.

In following, search results obtained through experimental activities in Italy, Denmark and Great Britain are described in detail, and more precisely:

- the structure and profile of the network of experimentation in the three partner countries of the project and in the three sectors involved: schools, conservatories, VET;
- expectations and knowledge of students and teachers in entry into IT, DK and UK;
- the learning process experienced and results achieved in the three countries.

3.3 The research results obtained through testing activities in IT

In Italy the OPEN SoundS testing activities was the starting point, the actual possibility of a long and creative phase of innovation within the national training system connected to the music, which involves all its training sectors, with particular reference to high schools of music, to Conservatories, to the system of vocational training.

The establishment of the National Network in the fall of 2011 “Quality and Development of the Italian music and dance high school” has facilitated and given impetus to this process.

The activities of OPEN SoundS aim in supporting the growth of the network match with all the objectives of the Italian Ministry of Education, that planned a

series of actions, first of all the development of the web portal of the Network of Music and Dance Italian high schools.

The actions of network construction experimentation platform OPEN SoundS matched with the actions of seminars promotion, sharing and development of the portal network of musical high schools. **In this way, the platform OPEN SoundS was greeted by this national network and presented in the 6 seminars**, aimed to teachers of music high schools and dedicated to the validation of the web portal of the network, as a **virtual real space** to be made available to all students and teachers of Italian music High School for creative expression mediated by both the use of music digital technologies and network.

A unique opportunity for growth in the Italian school: the teaching of music mediated by the use of digital technologies; the first European network of students within the education system aims to produce music in virtual and transnational teamwork; the students are able to acquire, through creative process, key competences for the permanent learning and for the possibility to entry into the work market.

3.3.1 Structure and profile of European networks in IT: Schools, Conservatories, Professional training

The structure and the profile of the network for the testing activities in Italy has complied with that provided in the Plans and Experimentation: the fields, the number of network nodes by sector and by stage, the number and type of users involved in the three main sectors or intervention: School, Conservatories and Professional training.

A) Schools Sector

In this field, in Italy, students and teachers involved in secondary school were those of high schools musical and technical institutes in particular in this area have been directly involved in the activities of music production within the platform:

- 29 schools (music and dance high school and technical institutes);
- in these 29 schools were about 2.000 students in which it was presented the platform (students 1, 2 and 3 class of high school musical) and about 500 students that they do actually developed musical projects the virtual teamwork to the OPEN SoundS web platform;
- students which has been authorized to enter into the platform were selected by their teachers based on the level of their competences in the use of software for music production. The trial forced to make a selection in this sense;
- 30 teachers were instead involved in the management of creative processes in collaborative platform OPEN SoundS with particular reference to: a) the

management of access of students b) the support to the development of collaborative projects.

All the objectives included in the plan of the testing phase plan are completely achieved, in terms of: areas, numbers and types of users involved.

In relation with the phase dedicated to put in the system the transfer and the testing plans, OPEN SoundS predicted that the number of potential future users of the transfer activities in the education sector could be at least 10% of these students and their teachers:

- currently approximately 7.000 students are in musical high school (data from Information System MIUR, 2013);
- more in general, 18.186 students in the high school – 4.938 in the High Schools, 921 in the Technical Schools, 438 in Professional Institutes, 600 in the Institutes of Arts – thanks to the provision of additional formation, were given additional access to practical teaching/learning music through digital technologies and the network (data from “Music and Digital Technology in the Italian school”, 2010 Report).

It should be pointed out that thank to the direct and very constructive relationship between the OPEN SoundS project and the Italian music and dance high schools network, and the direct link on the musical high school web portal Home Page (www.liceimusicalecoreutici.org) to the OPEN SoundS web platform, the entire network of about 7.000 Italian students in the music in high schools starting in autumn, will be involved in production activities within shared music OPEN SoundS. So the action of capillary transfer which saw being tested the direct involvement in the activities of 29 of the 80 high school musical Italians, from the new school year 2013/14, could involve in the use of the OPEN SoundS web platform all the students present in the Italian music high school, surpassing even the most optimistic prevision.

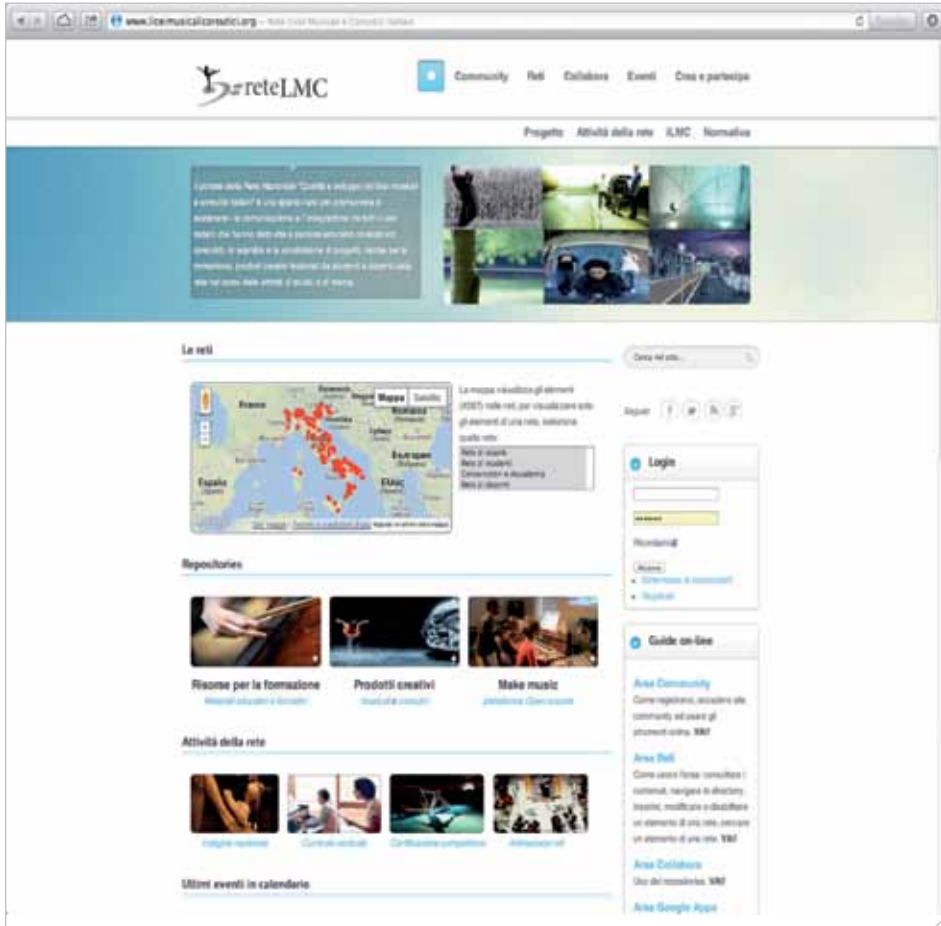


Figure 1. Web portal Home page of the “Licei musicali e coreutici italiani”

Country
Italia

Type
Istituzione educativa

Applica

Name	Country	Modifica Istituzione Educativa
CSC - Music Informatics	Italia	modifica
Liceo Musicale e Coreutico Alfano I Salerno	Italia	modifica
Liceo Musicale "D.A. Azuni" - Sassari	Italia	modifica
Liceo Musicale "A. Bertolucci" - Parma	Italia	modifica
Liceo Musicale "A. Passaglia" - Lucca	Italia	modifica
Liceo Musicale "Farnesina" - Roma	Italia	modifica
Liceo Artistico e Musicale - Potenza	Italia	modifica
Liceo Musicale "S. Satta" - Nuoro	Italia	modifica
Liceo Musicale "V. Gambaro" - Brescia	Italia	modifica
I.T.I.S. "Enrico Fermi" - Roma	Italia	modifica
Liceo Musicale "Marco Polo" - Venezia	Italia	modifica
Liceo Musicale "Collegio Vescovile Barbarigo" - Padova	Italia	modifica
Liceo Musicale "Caterina Percoto" - Udine	Italia	modifica
Liceo Musicale "F.A. Bonporti" - Trento	Italia	modifica
Liceo Scientifico e Musicale "G. Marconi" - Pesaro	Italia	modifica
Liceo Musicale "Carlo Rinaldini" - Ancona	Italia	modifica
Liceo Musicale "T. Stigliani" - Matera	Italia	modifica
IIS Bianchi - Virginio	Italia	modifica
Liceo "Giorgione"	Italia	modifica
Liceo Musicale "Regina Margherita" - Palermo	Italia	modifica
Liceo Musicale "Canducci-Dante" - Trieste	Italia	modifica
Liceo "Pigafetta" - Vicenza	Italia	modifica
Liceo "Montanari" - Verona	Italia	modifica
Liceo Musicale "Carlo Tenca" - Milano	Italia	modifica
Liceo Musicale Statale "A. Manzoni" - Varese	Italia	modifica
Collegio Vescovile Opera Sant'Alessandro - Bergamo	Italia	modifica
Liceo Musicale Statale "P. Secco - Suardo" - Bergamo	Italia	modifica
Liceo Musicale "Carlo Sigonio" - Modena	Italia	modifica
Liceo Musicale "G. Moscati" - Sant'Antimo (NA)	Italia	modifica
Liceo Musicale "P.E. Imbriani" di Avellino	Italia	modifica

Figure 2. List of the schools involved in the Italian testing phase

B) Conservatories sector

The structure and the potential educational and training of the learning environment of OPEN SoundS have received particular interest in the educational segment of the tertiary sector.

For the European Conservatories to have a collaborative environment with the characteristics of OPEN SoundS allows you to develop collaborative projects between a conservatory and the other and continue to open a channel of communication and exchange unusual for educational institutions such as those represented by the Conservatories. The use of the platform allows students OPEN SoundS of diplomas The academic level of Electronic Music (related to both addresses: compositional and technical recording studio), to deepen their analytical methods, including the history of technologies applied to music. In addition, the collaborative environment fosters the acquisition by students of appropriate skills concerning the use of electro-acoustic instrumentation and computer.

In this field as well as in that of the school is therefore counts to develop significantly access to the platform. It should also be pointed out that in the portal of the network of Italian music and dance high schools as well as the presence of integrated high schools of teachers and students there is also the presence of the Network of Conservatories. There are many opportunities for growth and therefore the integration of experiences and collaborative activities which involve the different educational sectors related to music in our country.

More specifically in the field of tertiary education (Conservatories) have been involved in testing activities 6 Conservatories, 12 teachers in Music Education and in Electronic Music and 100 students.

In advanced transfer system in this area we expect to achieve:

- 10% of teachers in Music Education and in Electronic Music present in conservatories;
- 10% of students in Music Education and in Electronic Music present in conservatories.

Italia		
Type		
Conservatorio		
Applica		
Name	Country	ModificaIstituzioneEducativa
Conservatory of Music "CesarePollini"	Italia	modifica
Conservatory of Music "Luca Marenzio"	Italia	modifica
Conservatory of Music "Benedetto Marcello"	Italia	modifica
Conservatory of Music "F. A. Bonporti"	Italia	modifica
Conservatory of Music "G. Verdi"	Italia	modifica
Conservatory of Music "N. Paganini"	Italia	modifica

Figure 3. List of the Conservatories involved in the Italian testing phase

C) Professional Education System

In this context, the testing activities involving students and teachers of the vocational training system with particular reference to Lazio region. The Lazio Region promotes every year the three-year vocational education and training (leFP) that are characterized as less theoretical training school and adhere to those aspects of the working world, providing adequate basic cultural education. With the current integrated training system of vocational education and training, the Lazio Region aims to meet the choices of boys responding with an education more and more innovative and in line with the demands of the labor market. Students leaving the school first degree, can fulfil their compulsory education (Legislative Decree no. N.226/2005) as an alternative to the paths of five-year high school education, technical or professional, they can choose a three-years path, leFP, in order to achieve a vocational qualification.

At the end of three years, students are awarded a professional qualification recognized nationally and matching the levels in the EQF (European Qualifications Framework), including in the field of 21 professionals and addresses to which the Agreement State Regions of 29 April 2010. As expected from the integrated leFP, students can choose to transit through the system to that state leFP of Professional Institutes, and vice versa, also in the pipeline and possibly continue until graduation five years.

In this new role, the three-year courses more effectively combine education with specific training and are a valuable tool for the completion of the educational cycle.

In the school year 2010/2011, the students of the Lazio Region enrolled in the first of the three-year annuity leFP were 2.947.

Thanks to the new formative offer of leFP, for the school year 2011/2012, if

the data of the registrations will be confirmed by the actual attendance, more than 2.964 students enrolled in July, it will be possible to satisfy requests for additional 600 children enrolled in September.

In addition to these 3,375 students who are enrolled in the first year of vocational schools offer participants a subsidiary of State Accounts.

So, in the school year 2011/2012, the educational offer of the Lazio Region will reach a total of around 6.939 young people who have chosen to achieve a regional vocational qualification foreseen by the National Directory.

The figure/professional qualifications required in the context of interest of the OPEN SoundS project is the *Electronic Operator in Multimedia Address* to which also provides the technical and professional skills that characterize the profile out of the three-year course the ability to use software and basic tools for mounting multimedia applications and techniques of digital audio and video processing.

In the area of public and private vocational training were involved in testing 15 of the most relevant vocational training centres of our country of which 3 are located in the Lazio region (consistent with the project guidelines).

The most important structures currently present in Italy in this sector are involved, effectively allowing us to create a network of hundreds of contacts among teachers, current students and students who have attended in past years the structures of vocational training.

In the experimental activities have been involved 20 teachers of subjects such as Science of Sound, Multimedia Communication, etc., and 250 students.

It is estimated that during the transferring to system 100% of the certified trainers in these schools and 100% of the 970 students enrolled in schools years 2012/13 and about 10% of the 2.890 students trained in the same school in previous years will be involved in the knowledge and use of the OPEN SoundS platform.

Country
Italia

Type
Formazione professionale

Applica

Name	Country	ModificaIstituzioneEducativa
FonderieSonore	Italia	modifica
Percorsi Audio	Italia	modifica
Saint Louis College of Music	Italia	modifica
Nut Academy	Italia	modifica
RE.CREATIVE 12.0	Italia	modifica
NAM Milano	Italia	modifica
Sonus Factory	Italia	modifica
Soundville	Italia	modifica
IITM	Italia	modifica
LatenzaZero	Italia	modifica
IED	Italia	modifica
Accademia di MusicaNomos	Italia	modifica
Scuola Alto Perfezionamento Musicale	Italia	modifica
SAE Institute	Italia	modifica

Figure 4. List of the Professional training centres involved in the Italian testing phase

3.3.2 Knowledge and Expectations

The processing of the data collected in Italy, following the completion of the pre-questionnaire from students and teachers who took part in the activities of experimentation, is summarized in this section of the report.

As widely pointed out the questionnaire input has allowed the recognition of the general data of each individual user data and qualitative/quantitative concerning the knowledge, skills and expectations on entry.

Let's look in detail the results of the processing of these data.

Composition of the sample group

248 students and teachers aged between **15 and 59** years have participated in the survey and have responded to questions on a voluntary basis.

The average age is **20,1 years**.

The age distribution is shown in the figure.

Only **18,1%** of students who responded to the questionnaire are female.

53,1% come from the school system of high schools, **30,5%** of the system of vocational training, **16,5%** from music conservatories.

The sample represents slightly less than 50% of the students who participated in the trial. In addition, the distributions by age, gender and school system are consistent with those of the entire set of students who participated in the OPEN SoundS testing activities.

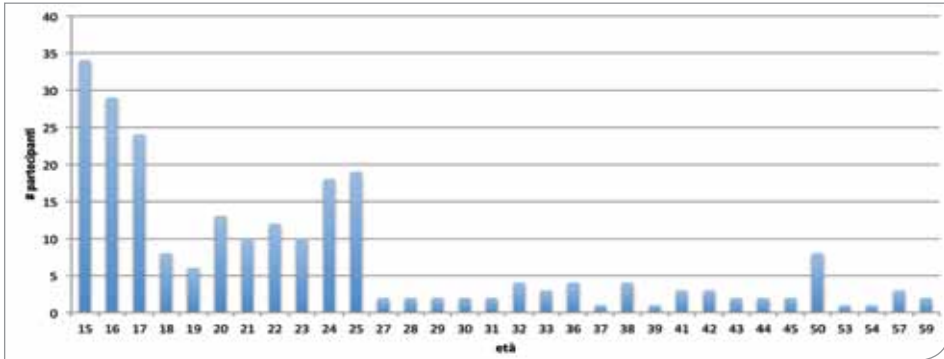


Figure 5. Distribution by age of the participants in the evaluation questionnaire

Total		Total	
F	45	F	18,1%
M	203	M	81,9%
248		100,0%	

Table 1. Breakdown by gender of the participants in the evaluation questions

Total		Total	
Conservatory	40	Conservatory	16,5%
School	129	School	53,1%
Vocational Training	74	Vocational Training	30,5%
243		100,0%	

Table 2. Distribution of participants in the evaluation questionnaire on the basis of belonging to the school system (the music conservatories, high schools and vocational technical schools, vocational training)

Previous knowledge

The first part of the questionnaire, among other objectives, had that of assessing what were the initial knowledge of the students who participated in the testing, in the two OPEN SoundS fields of interest: music and web 2.0 technologies.

An analysis of the processed data showed that all participants in the trial have good musical skills. Over 90% of the sample plays a musical instrument. Of these about 65% declares to play it at the intermediate level, 12,6% at the grassroots level and 22,6% at the advanced level. Almost 94% of participants use social networking tools, e.g., Facebook, Twitter, My Space, demonstrating the wide dissemination of these tools among the new generations. However, less than half (48,9%) used them to school, as a support for educational activities.

	Total		Total
No	20	No	8,9%
Si	204	Si	91,1%
	224		100,0%

Table 3. Number of students who play a musical instrument



Figure 6. Distribution of participants according to the level of musical competence

	Total		Total
livello avanzato	45	livello avanzato	22,6%
livello di base	25	livello di base	12,6%
livello intermedio	129	livello intermedio	64,8%
	199		100,0%

Table 4. Distribution of participants according to the level of musical competence

	Total		Total
No	14	No	6,2%
Si	213	Si	93,8%
	227		100,0%

Table 5. Participants who use social networking tools

Total		Total	
No	113	No	51,1%
Si	108	Si	48,9%
221		100,0%	

Table 6. Students who have used social networking tools in supporting school activities

Expectations

The most important evaluation entry was the attention paid to expectations, defined as “images” and “meanings” evoked by the ability to create music together in a dedicated environment and within a team of virtual work and transnational. Expectations arrangements, in short, as the constituent material of “representation” of the experience, the act by which he was transferred “from outside to inside, from one space away to a neighbor, what was not known, and it is been integrated in the physical and mental universe of participants in the trial that has resulted thus enriched and transformed”³.

The expectations, therefore, and their collection in our valuation model have formed a central aspect as part of the social process where they are gradually made the “features” that motivated the experience itself connected to OPEN SoundS.

To the question: *What do you expect from participating in the testing phase of OPEN SoundS?* The framework of the answers given by students and teachers interviewed appears very consistent (Tab. 7): With a severe under-representation of answers 1 and 2 (*Very little*) of the scale of liking and with a significant presence of answers focused on the values 4 and 5 (much and very much) of favourability scale from 1 to 5 and an average attendance of responses focused on the value of 3 (satisfactory) on the scale of satisfaction.

Being able to having the opportunity to meet other students, with the same interests and vocations is the expectation that in the favourability scale present the highest percentage of answers very much (48,8%) and the average percentage of appreciation of 31,6%. Very encouraging if we think that the vocational aspect of the experience is the element considered central to the success of a virtual learning community, as these communities, before anything else, defined as “vocational communities”.

And the fact that OPEN SoundS is recognized and represented by its users primarily as vocational community improves his chances of success and future development of those to concretely support every day, in the European School, the purposes of education and training project.

³ Moscoviti, S. (1989). *Il fenomeno delle rappresentazioni sociali*, in Rappresentazioni Sociali by Farr, R.M. and Moscovici, S. Bologna, Il Mulino.

	1	2	3	4	5	Average much/very much
Modality	Very little	Little	Average	Much	Very Much	
Having the opportunity to create music online with people from other countries	0,5%	1,8%	14,2%	42,2%	41,35%	32,56%
Having the opportunity to live a new and stimulating educational experience	0,9%	1,8%	12,8%	56,9%	27,5%	32,4%
Having the opportunity to meet other students, with the same interests and vocalion	1,4%	3,7%	10,7%	35,3%	48,8%	31,6%
Having the opportunity to learn knowledge in the field of musical production by means of digital technologies	1,4%	3,7%	22,0%	55,0%	17,9%	31,6%
Having the opportunity to learn knowledge in digital technologies and web 2.0 collaborative environment	1,4%	6,5%	22,6%	51,6%	18,0%	30,73%
Having the opportunity to acquire real-life skills that will expand my future employment opportunities	1,9%	11,2%	22,4%	39,3%	25,2%	29,9%
Having the opportunity to strengthen the sense of belonging to a group and citizenship	8,8%	14,7%	27,2%	30,0%	19,4%	25,53%

Table 7. The expectations of participants in the trial of OPEN Sounds

Other widely shared expectations are: a) *to have the opportunity to collectively develop musical projects with students from different countries and contexts*, with percentages much of 42,2% and very much of 41,35% (average 32,56%)

which underlines the aspiration of students to broaden their contacts outside the national borders; b) *to be able to live an experience in education and training new and exciting* (much 56,9% e very much 27,5%) that instead emphasizes the need to live within the school experiences that will enhance the overall attractiveness and that stimulate in them the desire to create and learn.

In terms of expectations are immediately past, with rates very close, the desire: to acquire knowledge in the field of music production through digital technologies (much 35,3% very much 48,8% and an average of 31,6%) and to acquire new skills in the use of digital technologies and web 2.0 collaborative environment (51,6% much, 18% very much and an average of 30,73%).

Being able to acquire knowledge and skills more realistic capable of creating an employment perspective with 39,3% answer much and 25,5% very much (average 29,9%) had a high level of interest, however, and very close to the previous one.

In apparent contradiction with other results, it should be noted that one of the expectations is not shared to strengthen the sense of belonging to a group and citizenship. This figure can make us reflect on the concept of citizenship as conceived by the younger generation, inclined to favor informal contacts rather than sharing a set of rights and duties (Tab. 7).

3.3.3 Learning process and achievements

In this section the results of the data collected through the questionnaire output are presented.

As already pointed out the questionnaire made it possible to collect and analyze that part of the information needed to evaluate the results of the testing activities concerning:

- a) the technological functionality of the platform (accessibility, usability, usability);
- b) the potential educational and training the learning environment experienced;
- c) the quality of products and processes experienced; d) the recognition of the skills after the testing phase.

It was also possible through the analysis of open-ended questions about the project to acquire feedback and suggestions for the future improvement of the platform.

The analysis of the collected data through 208 questionnaires filled out by students and teachers who inspired the testing activities has allowed us to access a variety of constituent elements of the learning process related to the use of OPEN SoundS and assess the platform's ability to support the technological and educational training objectives of the project the main results achieved in terms of knowledge and skills.

Composition of the sample group

Let us examine in more detail the results of these data processing.

208 between students and teachers aged 15 to 57 years old filled out the exit questionnaires.

The average age is 22,6 years. The age distribution is shown in the graph below (Fig. 7).

Only 24% of users who responded to the questionnaire are female.

51.3% come from the school system of high schools, 32,8% of the system of vocational training, 15,9% from music conservatories.

In addition, the distributions by age, gender and school system are consistent with those of the entire set of students who participated in the OPEN Sounds testing.

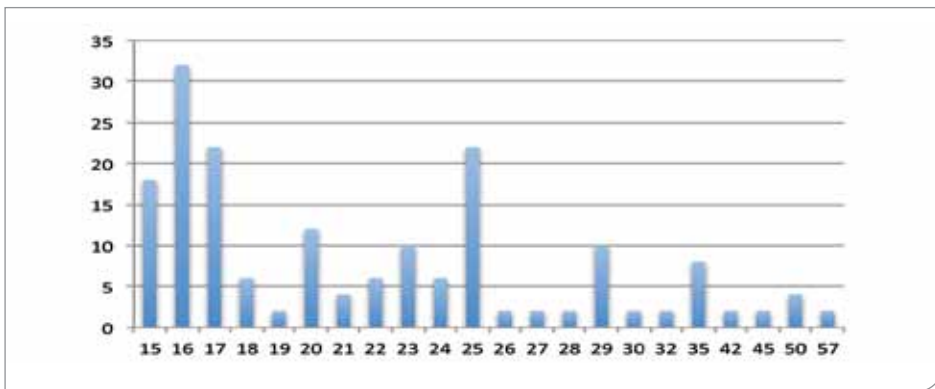


Figure 7. Distribution by age of participants in the post-questionnaire

Total		Total	
F	50	F	24,0%
M	158	M	76,0%
	208		100,0%

Table 8. Breakdown by gender of participants in the post-questionnaire



Figure 8. Distribution of participants in the post-questionnaire on the basis of belonging to the school system (the music conservatories, high schools and technical institutes, vocational training)

Previous knowledge

The first part of the post-questionnaire on the functionality of the learning environment, on the practices and results related to the testing of OPEN SoundS provides some useful information about:

1. the use of tools / social networking sites such as facebook, twitter, myspace, etc.;
2. competence in the use of Web 2.0 technologies specialized in the presentation and exchange of music (eg SoundCloud, Myspace, Indaba Music, etc.);
3. competence in the use of Web 2.0 technologies dedicated to producing music in a collaborative and remote way (e.g., ccMixer etc.);
4. the use of tools such as those mentioned above during school activities to support the teaching.

In particular, the analysis of the answers given to the question *What is your experience/expertise using Web 2.0 technologies specializing in the presentation and exchange of music (e.g., SoundCloud, Myspace, Indaba Music, etc.)* show that only 15,1% are an advanced user, 48,0% is an intermediate user and 36,9% are beginner (Table 9).

	Total		Total
Utente esperto	27	Utente esperto	15,1%
Utente intermedio	86	Utente intermedio	48,0%
Utente principiante	66	Utente principiante	36,9%
	179		100,0%

Table 9. Competence in the use of Web 2.0 technologies specialized in the presentation and exchange of music

To the question of the competence in the use of Web 2.0 environments dedicated to the production of music in a collaborative and remote (e.g., ccMixer, etc.), 59,9% of users responded that they be beginners (106 of 177) and only 4 users out of 177 declare themselves experts.

	Total		Total
Utente esperto	4	Utente esperto	2,3%
Utente intermedio	67	Utente intermedio	37,9%
Utente principiante	106	Utente principiante	59,9%
	177		100,0%

Table 10. Competence in the use of Web 2.0 technologies dedicated to the music production in a collaborative and remote

Finally, 48,6%, 87 out of 179 users claim to use web 2.0 tools connected to the music in support of educational activities.

Total		Total	
No	92	No	51,4%
SI	87	SI	48,6%
179		100,0%	

Table 11. Use of web 2.0 tools related to music in support of educational activities

Learning processes

To the question “*Below are different ways of learning. In your opinion, what is more useful for your successful learning*”, the learning may widely preferred by the participants in the testing (51,7% response rate *much* and 42% *very much*) of the consensus appears to be that of “*put in place*”. The answer assumes interest associated with the second mode chosen being able “*to discover and explore*” (42,7% *much* and 47,8% *very much*). Two other modes considered very much motivating and useful are the “*feel involved*” (50,0% and 38,2%) and the possibility of being able “*to compare with other*” (51,1% *very* and 30,6%) (Tab. 12).

So we find in the foreground elements of making concrete, exploration and discovery, emotional involvement, the comparison with others. The autonomy in access to and knowledge management, the ability to express their vocation, experience sharing for students part of the network of OPEN SoundsS are aspects of the relationship and the educational practice really capable of making accessible, motivating and engaging the learning process.

Other ways considered suitable and useful to motivation are those of being able “*to enjoy yourself*” (25% and 55,1%), “*to working within a group*” (51,5% and 23,9%) and the possibility of “*knowing exactly what to do*” (53,9% and 25,3%) (Tab. 12).

The prevalence in the responses related to these aspects point out two other key elements of the project OPEN SoundsS, consisting of the involvement of the student as the main actor of the learning process and collaboration with other students as a key element of training peer.

The analysis of data related to this question is of particular importance because they anticipate and show that the key to the success of the platform OPEN SoundsS and the potential of its use in the educational environment are closely correlated with its educational system.

In fact, the structure and goals of the learning environment of OPEN SoundsS are highly consistent with the mode of learning held by the students and are suitable to their educational growth. And in this correspondence we can state

lies the key to its success from the network of European students that gave rise to experimentation.

All aspects highlighted by the students describe very precisely, even if indirectly, the reasons for the importance of using an integrated learning environment capable of supporting creative autonomy and planning, teamwork, respect for the values emotional experience, calibrated and integrated use of digital technologies in the musical life, in the network and in particular in the school.

	Very little	Little	Average	Much	Very Much	Average much/very much
Practice	0,0%	0,0%	5,6%	51,7%	42,7%	47,2%
Receiving immediate feedback	0,0%	5,6%	25,8%	44,9%	23,6%	34,25%
Learning on your own/ alone	3,9%	7,3%	32,6%	42,1%	14,0%	28,05%
Reading	1,7%	7,4%	18,3%	56,0%	16,6%	33,3%
Working within a group	0,0%	2,3%	18,8%	55,1%	23,9%	39,5%
Being allowed to make mistakes without being penalised for that	2,2%	11,8%	19,7%	41,0%	25,3%	33,15%
Being able to enjoy yourself	0,0%	2,3%	17,6%	25,0%	55,1%	40,05%
Being able to observe other people	0,6%	2,3%	25,0%	45,5%	26,7%	36,1%
Being able to confront other people	0,0%	0,0%	12,9%	51,1%	36,0%	43,55%
Being told what to learn	6,7%	5,1%	33,7%	30,3%	24,2%	27,25%
How engaged you are	0,0%	1,1%	10,7%	50,0%	38,2%	44,1%
Being able to discover and explore	0,0%	0,0%	9,6%	42,7%	47,8%	45,25%
Knowing exactly what to do	0,0%	5,6%	15,2%	53,9%	25,3%	39,6%
Keing under pressure	30,3%	16,9%	20,2%	23,6%	9,0%	16,3%

Table 12. Learning modes considered suitable and useful for the participants in the testing

Educational and training impact of the OPEN SoundS platform

To the question *“By participating in the testing of OPEN SoundS, I found interesting and useful for my growth in education and training...”* with a severe under-representation of answers 1 and 2 (very little and little) of the favorability scale from 1 to 5 and **a significant number of responses focused on the values 4, 5 (much and very much) on the same scale**, including aspects/tools judged to be more interesting and useful by the participants are in the first place *“having the opportunity to create music collaboratively”*. Other aspects considered are the relevant *“being able to select the members of my team and start a new creative idea with them”*, *“having the opportunity to create music online with people from other countries”*, *“having the opportunity to meet other students, with the same interests”*, *“having the opportunity to work in an integrated and supportive educational environment that provides access to a plethora of tutorials, guides and databases”* (Tab. 13, Fig. 9). Less central, though significant, are the aspects related to the strengthening of the sense of citizenship and employment prospects.

Therefore, students and teachers involved in the testing activities are totally in tune with the goals from the experienced, are able to recognize and appreciate the potential of education and training and, indirectly, the importance of its use in teaching practice fielding of the school.

The percentages reveal a framework of expectations fairly well outlined, in which users seem to want to leave little to chance. **The higher expectations** in the approach to creating a shared network, transnational and mediated by sound technologies, connect with those associated with the **purchase of new instruments, working methods, approaches to knowledge and musical skills and teaching**.

In line with the reading of the data to follow, you can also see how much the aspect of **sharing** as that of **the development of collective projects** represent the frontiers of evolutionary relationship with the technologies of considerable strategic importance and now in the clear way of acquisition.

	Very little	Little	Average	Much	Very much
Having the opportunity to create music collaboratively	0,0%	1,2%	13,1%	61,9%	23,8%
Having the opportunity to create music online with people from other countries	0,0%	8,3%	16,7%	39,9%	35,1%
Being able to create something that can be used by other students from different countries and backgrounds	0,0%	1,2%	22,0%	45,8%	31,0%
Being able to select the members of my team and start a new creative idea with them	0,0%	3,6%	14,9%	40,5%	41,1%
Being able to clearly see other people's contributions and how these had been used in the various projects	0,0%	1,2%	25,0%	45,8%	28,0%
Having the opportunity to work in an integrated and supportive educational environment that provides access to a plethora of tutorials, guides and databases	0,0%	2,4%	23,8%	47,6%	26,2%
Having the opportunity to meet other students, with the same interests	0,0%	3,6%	14,3%	44,6%	37,5%
Having the opportunity to acquire real-life skills that will expand my future employment opportunities	6,3%	1,3%	19,6%	43,7%	29,1%
Having the opportunity to strengthen the sense of belonging to a group and citizenship	6,0%	14,3%	19,0%	41,7%	19,0%
Having the opportunity to create music collaboratively	6,5%	19,6%	15,5%	36,3%	22,0%

Table 13. Aspects of the OPEN SoundS platform considered useful from the point of view of training and education

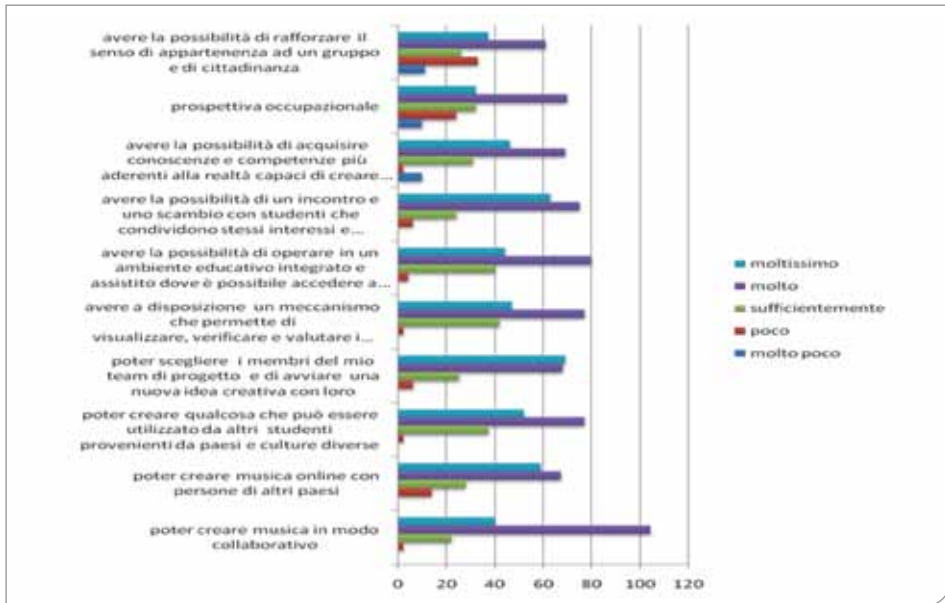


Figure 9. Aspects of the OPEN SoundS platform considered useful from the point of view of training and education

Usability evaluation of the OPEN SoundS platform

The analysis of the data relating to the question “*thinking about the platform OPEN SoundS describe the actual level of accessibility/usability of the platform and technical functionality of the tools for remote collaboration provided*” as revealed by the participants in the trial have been evaluated in positively different aspects that characterize the technical functionality, accessibility/usability, the ability to support creative expression the use of informal and formal skills possessed by the students.

With a very low presence of answers 1 and 2 (*very little and little*) of the favorability scale 1-5 and with a significant presence of answers focused on the value 4 (*much*), we see how the 59,6% of users declares that the practices implemented in the OPEN SoundS platform allow “*to play in a creative and constructive way, enhancing my formal and informal skills*”.

Students and teachers at 54,8% (*very much* scale) of the cases also believe that “*the collaborative tools are appropriate and closely aligned to the OPEN SoundS project objectives*” and that “*the tools available for sharing the music/audio files were easy to use*”.

Always popular are “*the guides, tutorials and instructions available on the OPEN SoundS platform where clear and easy to follow*” (Tab. 14).

	Very little	Little	Average	Much	Very much
It is easy to use and navigate	0,0%	2,4%	41,0%	37,3%	19,3%
The guides, tutorials and instructions available on the OPEN SoundS platform where clear and easy to follow	0,0%	1,3%	37,7%	39,6%	21,4%
The tools available for sharing the music/audio files were easy to use	0,0%	1,2%	23,5%	54,8%	20,5%
It enabled me to play in a creative and constructive way, enhancing my formal and informal skills	1,2%	0,0%	19,3%	59,6%	19,9%
The collaborative tools are appropriate and closely aligned to the OPEN SoundS project objectives	1,2%	0,0%	23,5%	54,8%	20,5%

Table 14. Usability of the OPEN SoundS platform

Assessment of the contribution of OPEN SoundS development of knowledge and competences

The ability to capture aspects of the analysis on the effects teaching / operational related to the use of the OPEN SoundS platform and more generally the use of digital technologies and the network's musical education has constituted the most important goal of the process of evaluation of the results of the trial.

The data that emerged from the responses to the question of the questionnaire outgoing asked to indicate to what extent the environment and tools OPEN SoundS had contributed to the development of specific knowledge and skills is a focal point of interest because they provide the updated documentation on penetration of DT in the educational environment allowing you to test practical skills and technologically oriented that the faculty and students can be put in place.

Therefore, the effects teaching/operating of collaborative activities supported with the use of the OPEN SoundS platform were considered the beating heart, the soul, the great transformation that can be engendered in the universe from the entrance music education in the school of information technology digital and network.

To probe these various aspects in their possible nuances, the specific question was divided into a number of modes that allowed us to photograph the fallout of the use of DT in music education within macro-areas that refer to knowledge/competences type “cognitive” “functional” “personal” and “ethical”.

The consistency rate and articulation of the answers given by students and teachers was such as to ensure ample scope for analysis and interpretation of data collected.

The responses with reference to the scale of liking 1-5 proposal, present a picture remarkably consistent and confirms the potential of the platform and creative experiences produced inside to support the full range of educational and training objectives of OPEN SoundsS.

The obtained data indicate (Tab. 15) as the OPEN SoundS environment and tools contributed to the development of knowledge and competences such as **cognitive and functional** “*new concepts, terms and competencies, related to music, information and communication*” (58,5% much and 15% a very much), “*manage projects and develop my problem solving skills*” (55,8% and 29,9%), “*understand more about social networking*” (58,5% and 20,4%), “*autonomous learner, in charge of my own learning process*” (55,8% and 29,9%), “*understand more about tools that foster creating and sharing work using digital technologies*” (47,6% and 29,0%) – Tab. 15, Fig. 10.

The students and teachers involved in the OPEN SoundS activities declare, moreover, that it has acquired personal knowledge and competences such as the ability to “*learn with the other*” (53,1% and 27,9%) the ability “*to communicate, cooperate and negotiate*” (52,1% and 30,1%) and the ability to “*auto-analyze himself, self-evaluation*” (42,1% and 30,3%) – Tab. 15, Fig. 10.

Next, we find, again, a clear indication of capacity that refer to knowledge / skills “**ethical**” such as the ability to “*acquire a greater sense of the world around me and a greater respect about other people’s diversities*” (48,3% and 26,5%), to “*gain a sense of greater responsibility for my own behavior*” (45,6% and 35,4%), and the ability to “*enhance my critical thinking*” (49,9% and 29,7%) – Tab. 15, Fig. 10.

	Very little	Little	Average	Much	Very much	Average / much / very much
It helped me learn new concepts, terms and competencies, related to music, information and communication	0,0%	4,8%	21,8%	58,5%	15,0%	31,76%
It helped me understand more about social networking	0,0%	7,5%	13,6%	58,5%	20,4%	30,83%

It helped me understand more about tools that foster creating and sharing work using digital technologies	1,4%	8,2%	25,9%	46,9%	17,7%	30,16%
It helped me understand how to understand and solve problems and tasks	1,4%	1,4%	20,7%	47,6%	29,0%	32,43%
It helped me further develop skills for tackling particular tasks strategically	2,7%	4,8%	29,9%	40,1%	22,4%	30,7%
It helped me manage projects and develop my problem solving skills	2,7%	4,8%	21,8%	48,3%	22,4%	30,83%
It helped me to work effectively towards the successful completion of a project	0,7%	9,6%	17,8%	46,6%	25,3%	29,9%
It helped me develop as an autonomous learner, in charge of my own learning process	0,0%	2,7%	11,6%	55,8%	29,9%	32,43%
It helped me learn together with other people	0,0%	5,4%	8,8%	55,8%	29,9%	31,5%
It helped me develop my self-assessment and self-evaluation skills	0,0%	6,8%	12,2%	53,1%	27,9%	31,06%
It helped me develop my communication, collaboration and co-operation skills	0,0%	4,1%	23,4%	42,1%	30,3%	31,93%
It helped me develop my skills in managing complex tasks	1,4%	1,4%	15,1%	52,1%	30,1%	32,43%
It helped me enhance my critical thinking	1,4%	5,4%	26,5%	41,5%	25,2%	31,06%
It helped me gain a sense of greater responsibility for my own behaviour	1,4%	2,1%	17,9%	49,0%	29,7%	32,2%
It helped me acquire a greater sense of the world around me and a greater respect about other people's diversities	2,7%	2,7%	13,6%	45,6%	35,4%	31,53%
It helped me learn new concepts, terms and competencies, related to music, information and communication	1,4%	4,1%	19,7%	48,3%	26,5%	31,5%

Table 15. OPEN SoundS contribution to the development of knowledge and skills

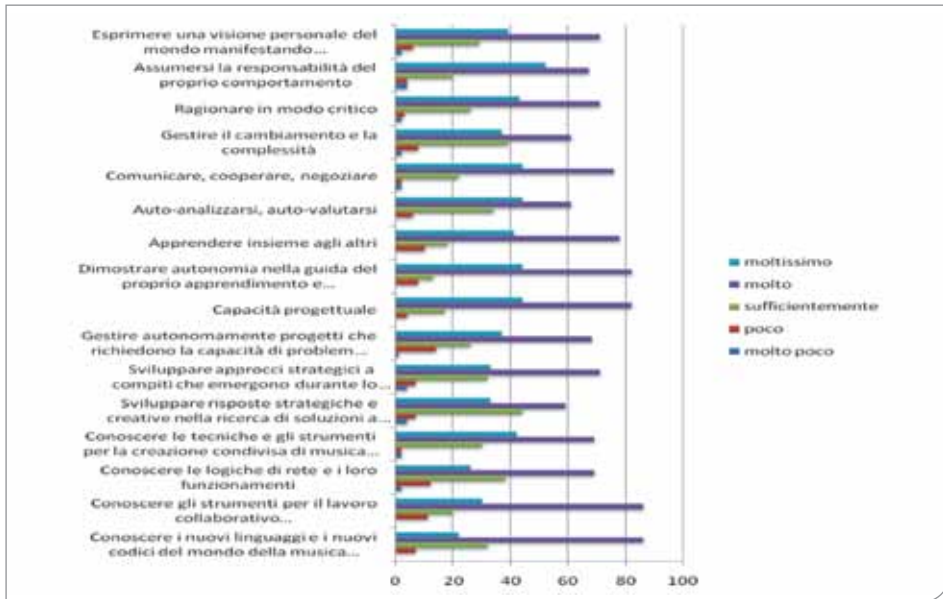


Figure 10. OPEN SoundS contribution to the development of knowledge and skills

The choice and formulation of the different ways in which the question related to the contribution of OPEN Sounds to the development of knowledge and skills is articulated, as already mentioned in Chapter 2 of this volume, was carried out as and, coherently, with the main objectives of the project, declined in detail in the General Framework of OPEN SoundS.

More specifically in the definition and construction of the Conceptual Framework of OPEN SoundS:

- have been identified a number of learning outcomes related to the use of an environment dedicated to the production of music in virtual and transnational teamwork, such as the OPEN SoundS platform;
- the learning identified were formulated in form consistent with:
 - the European reference framework of key competences for lifelong learning;
 - the descriptors of achievements and abilities associated with qualifications / academic degrees to the European Qualifications Framework that represent the levels 6, 7 and 8 and the corresponding instruction cycles.

The results described above and for the contribution provided by OPEN SoundS development of knowledge and skills have allowed us to detect the multiple aspects of the OPEN SoundS potential educational and training and showed a high significance consistency between the general framework of the project objectives and the results obtained.

The consistency rate and articulation of the answers given by students and teachers has been such as to allow outlined a very homogeneous knowledge and “cognitive” “functional” “personal” and “ethical” competences acquired via the platform OPEN SoundS and the creative experiences produced inside.

The practices of shared musical creation and all the processes put in place by the use of the OPEN SoundS platform by the users of the Italian network of experimentation, and from the European network in general, have given to the main stakeholders inserted in different educational contexts connected the music (schools, universities, conservatories, professional training system), the ability to reflect about:

- the radical transformations that have occurred in the world of music creation and production;
- the access to their size conceptual and operational;
- to the acquisition of useful information to the management of change in creative and educational imposed by digital technologies to musical practice.

The opportunity to identify and analyze the educational impact of the use of shared environments dedicated to creative production has been, also, a valuable opportunity to identify ‘quality indicators’ in the musical and artistic expression, in the system of public education in Italy and in the European countries partners of the project, that have not yet been sufficiently highlighted.

3.4 Survey results achieved through the testing activities in DK

The testing phase of OPEN SoundS in the Danish network of schools was conducted with a selection of schools with different levels of technological integration within their pedagogical approaches. The aim of the experimentation was to obtain an accurate assessment of the efficiency of the OPEN SoundS platform among Danish students in regard to **developing social integration, learning and understanding of key competencies in the field of music technology and the social media, and embracing extended collaborative working processes across national borders.**

The school network was composed of 2 main types, both of vocational nature but with different approaches and levels. **The first type was a set of 7 schools regrouped under a regional teaching center in the city of Aarhus.** This group is teaching music at the MGK (Musikalsk Grundkursus) level, which is a public foundation course in music aimed at preparing students to superior conservatory auditions. **The second type was represented by Produktionskolen Aarhus.** Produktionskolen Aarhus is a specific category of public-funded schools where young people who either left the main school system after the 9th grade or finished a technical education but haven’t yet found a job. By going to Produktionskolen

Aarhus (or other Produktionskoler in Denmark), they are allowed to refine their competencies with professional teachers while getting a salary. The aim of the school is that the new competencies acquired by the students will facilitate their entry into the professional world. Besides music, the school also offers tuition in woodwork, metallurgy, photography, drama, and more.

The Danish network was gathered on three occasions for sessions of two natures. In the first phase, the educators in charge of conducting the test with their students were met by the Danish partner of the project in order to introduce the platform, define the scope of the testing phase (both theoretically and practically), and agree on the actual phases of the test with a selection of their students. Considering the time frame where the test phase was conducted, which happened to be at the start of the preparatory work for exam periods in Denmark, the students involved in the test were narrowed down in terms of availability. The two other sessions were organized at the regional MGK center in Aarhus, and in the computer lab of Produktionskolen Aarhus. All the participating students were gathered and introduced to the OPEN SoundS platform, its aims, its potential for learning key competences, and finally to the purpose and the process of the testing phase. Live demonstrations of the workings of the platform were conducted by the Danish partner, and the students were invited to get acquainted with the collaborative tool right after the session, accompanied by their teacher and the Danish project partner.

3.4.1 Structure and profile of European testing Networks in DK: School, Conservatories, VET

The two types of schools addressed during the testing, **MGK centres and Produktionskoler**, were selected because they represent different quite opposite approaches to music teaching, one being more focused on the performing and theoretical sides of music teaching, whereas the other one has a social mission that is embraced in most of the activities conducted in class.

Facts about the Danish test network:

- 7 schools offering the MGK foundation course from the Midtjylland region participated, for a total of 210 students regrouped under one regional center at Aarhus Musikskole in Aarhus.
- Produktionskolen Aarhus, of which 100% of the students of the music line were involved in the testing phase of OPEN SoundS.
- Out of the potential 270 students, 50 students were selected and/or volunteered to participate in the test phase of the OPEN SoundS Platform according to the criteria and restrictions described earlier, which is a 18,5% participation rate.
- 8 educators were involved in the testing phase, 2 of which actively monitored the progress of the students during the testing phase.

3.4.2 Knowledge and expectations

A) Student profiles

As a result of the survey analysis, we can draw some conclusions on the profile of the **60 students who have participated in the test phase**. First of all, it appears that the large majority were boys (77%) with an intermediate to advanced level of musicianship (96%). 96% of them use social networks such as Facebook or Twitter at home, but only 42% answered that these same tools were also used at the school for pedagogical activities.

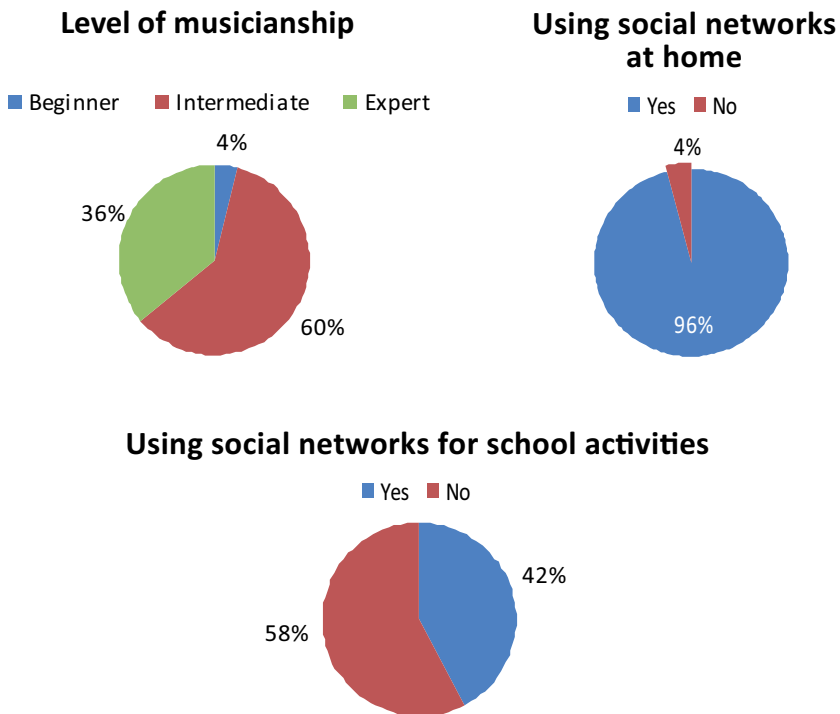


Figure 1. Level of musical competence, and use of the social networks tools

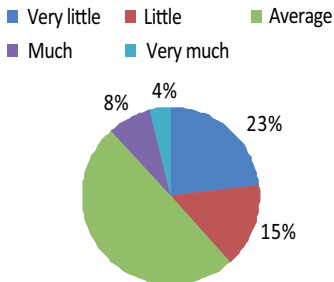
B) Expectations

The expectations of the students in regard to the goals they could achieve by using the OPEN SoundS platform are mainly **centred on the “average” answer** (see charts below).

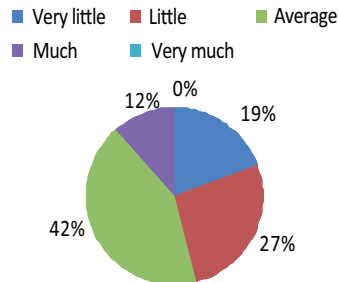
It appears that the expectations to learn new skills in music technology and social media were slightly positive, but that in general, the test group was mostly indecisive on what to expect from the platform.

There are a few striking exceptions though. A vast majority of the students had high expectations for creating music together with others they didn't know. Furthermore, the large majority was also hoping to share ideas with people having the same background as them. We can therefore easily draw a conclusion that the Danish test group was in its majority not expecting to acquire new learning processes, skills with a professionalizing aim or technological abilities, but rather **hoping to use a tool that would enable them to communicate with others sharing the same interests**. This can be either explained by the informal nature of the platform, which deals directly with creative processes, or with the fact that Danish schools have already put a lot of efforts into integrating technological tools into music education while have not yet developed and made available to the students shared and remote collaborative environments, which is that achieved through the Leonardo da Vinci TOI OPEN SoundS.

Hoping to acquire knowledge and skills in the field of music production, using technology

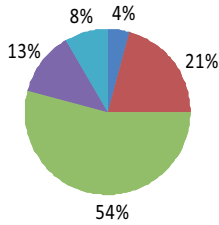


Hoping to acquire new skills in web 2.0 related technologies and social media, using a collaborative environment



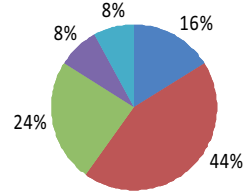
Hoping to able to collaborate with people from other countries by participating in collaborative music making project

Very little Little Average
Much Very much



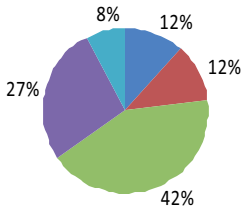
Hoping to have exciting learning/training experiences

Very little Little Average
Much Very much



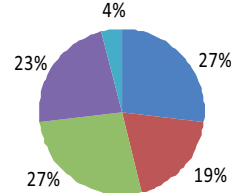
Hoping to exchange experiences and encounter sharing new ideas with people that have similar interests and backgrounds

Very little Little Average
Much Very much



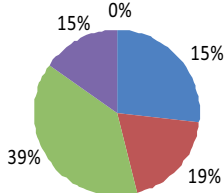
Hoping to be able to acquire knowledge and skills that will help expand my future employment perspectives

Very little Little Average
Much Very much



Hoping to be able to strengthen my social skills and promote citizenship, by working in a group

Very little Little Average
Much Very much



Other (please specify)

Get inspired
Share with others
Don't want to use the platform

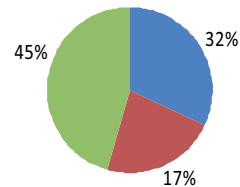


Figure 2. Expectations with regard to participation in the testing phase to the project OPEN SoundS

3.4.3 Learning process and achievements

A) Learning process preferences and self-assessment

According to the exit survey of the test phase, it appears that the Danish test group is strongly agreeing on a few points in regard to their own assessment of the efficiency of the different learning processes.

First of all, all of the students replied that the learning that start on their “own initiative” was a much or very much efficient learning process. This contrasts somewhat with the second most positively answered suggestion, which was “to be told what to do”.

Other values consisting in a positive sense in relation to the learning processes by the Danish students are those relating to “practical work”, the possibility to “obtain direct feedback”, to “have no negative feedback on their mistakes” and to have the possibility to “work in groups”, in particular the aspect that implies a strong socializing contact.

When considering that the least popular entry was “to learn alone”, we can draw some conclusions in order to set a general profile on the Danish test group.

The Danish students who tested OPEN SoundS are attracted by the social aspect of learning, both with their fellow students and with their teacher. The learning process ideal for them involves direct contact and dialogue, as well as guidance, as opposed to more unilateral learning methods where the educator isn’t expecting active participation from the students.

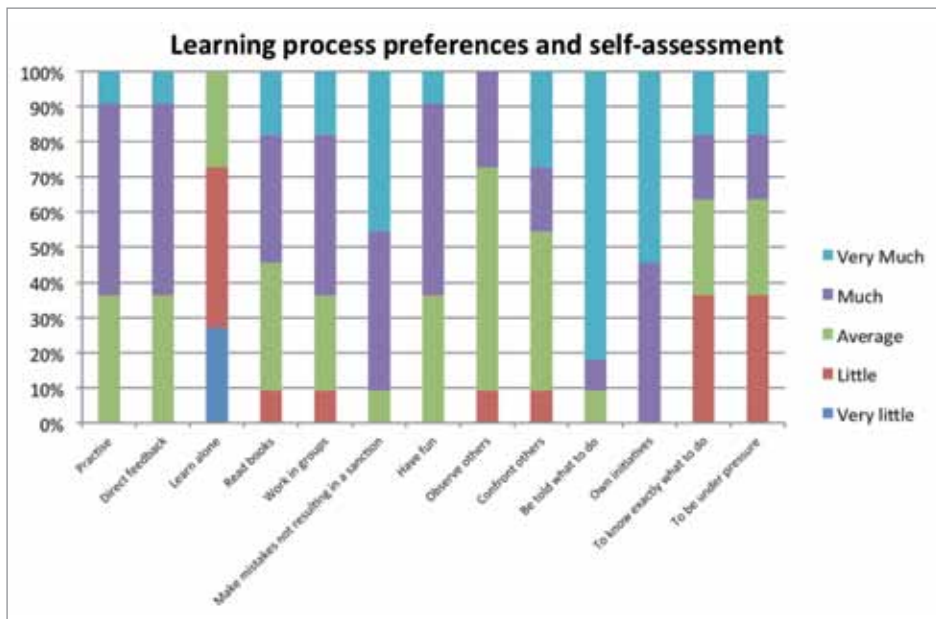


Figure 3. Learning process considered most appropriate by the Danish students

B) Assessment of the usefulness of OPEN SoundS

When reviewing the results of the exit survey about the Danish students' own view of the usefulness of the various aspects of the OPEN SoundS platform, it appears clearly that **the main well-received aspects are linked with the creative and collaborative processes.**

Creating music, sharing it with others, meet others sharing the same interests and see contributions made by other people are the three most valued aspects of OPEN SoundS in terms of usefulness, according to the Danish test group.

This confirms the conclusions we drew earlier from the learning process preferences, where we concluded that the Danish test group was mostly inclined to learn in a creative, socializing and communicative environment.

The underlying agenda of OPEN SoundS, which revolve around the strengthening of the feeling of citizenship and the teaching of key competencies for active life was not seen as useful as the creative and social aspects by the students, but the correlation between these goals, the nature of the platform and the long term effects it may have on the students is likely to be difficult to foresee by the target group itself.

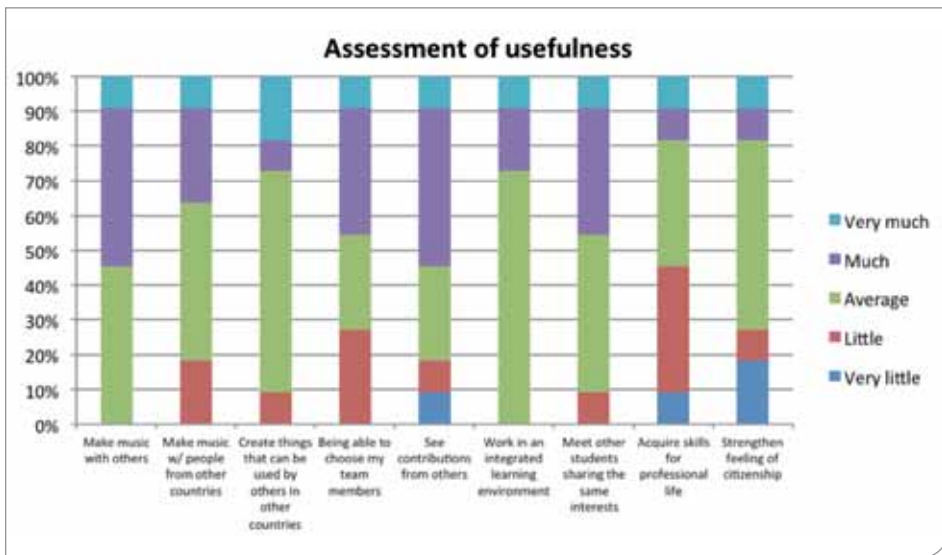


Figure 4. The most interesting/useful aspects of the OPEN SoundS platform according to the participants' ratings

C) Assessment of the tools of the OPEN SoundS platform

The evaluation of aspects related on usability of the platform and those related to the knowledge and competences s acquired through the use of OPEN SoundS platform, revealed several points which characterize the experience of

the Danish test group when correlated with the data from the other parts of the test survey, i.e. their background and expectations.

Most of the answers regarding the technical aspects of the platform (ease of use, tools to share content) were in the “Average” area, with an equal number (around 50%) of satisfied and unsatisfied students.

In regard to the results in terms of learning, i.e. of acquired knowledge and skills, the most positive answers were centered on the social and communicative aspects of OPEN SoundS, including the “ability to develop projects”, to “develop communication, collaboration, co-operation and negotiation skills”, “manage change and complexity”, and “taking responsibility for their own behavior”.

All these aspects of OPEN SoundS, which are the very innovative core and driving force of the project, were those most highly regarded by the students.

One of the few aspects that the Danish test group didn’t regard as well tackled by the platform of the OPEN SoundS project was the ease to “*know the tools of the collaborative work*”, with 70% of the students answering negatively in their usability assessment, as well as the “*strategies to solve abstract and concrete problems*”. This might point out to an issue with the methodological resources available, or it could perhaps be due to missing guidance by the tutor while the students were using the platform, even though both were available on the platform at the time of the test. Or perhaps even the tendency of the Danish students during the test to learn in a pro-active way, instead of doing preparatory research to establish working strategies in advance.

The result of the assessment of these two last points could arguably have been different if the teachers in charge of the test groups had had the possibility to use the platform extensively before introducing it to the students, and familiarize themselves to a larger extent with the various topics at stake both technologically, socially and methodologically.

On a final note, a few students answered the last open question asking them to comment freely on their experience during the test phase, and **several asked for more social functionalities, such as a chat feature on the platform. Others have acknowledged the innovative aspects of OPEN SoundS but mostly as a social tool, as they could not relate to collaborating virtually with others, i.e. over the internet, as opposed to sitting with them in the same room and exercising direct social and musical interaction.**

A few students expressed worries about releasing their music under a Creative Commons license, which would disqualify the work for commercial release. However, these concerns in regards to copyrights were much higher before the Danish partner introduced the students to the pedagogical gains attained by using the OPEN SoundS platform, which was recognized as more valuable than a potential commercial licensing of short-length musical recordings.

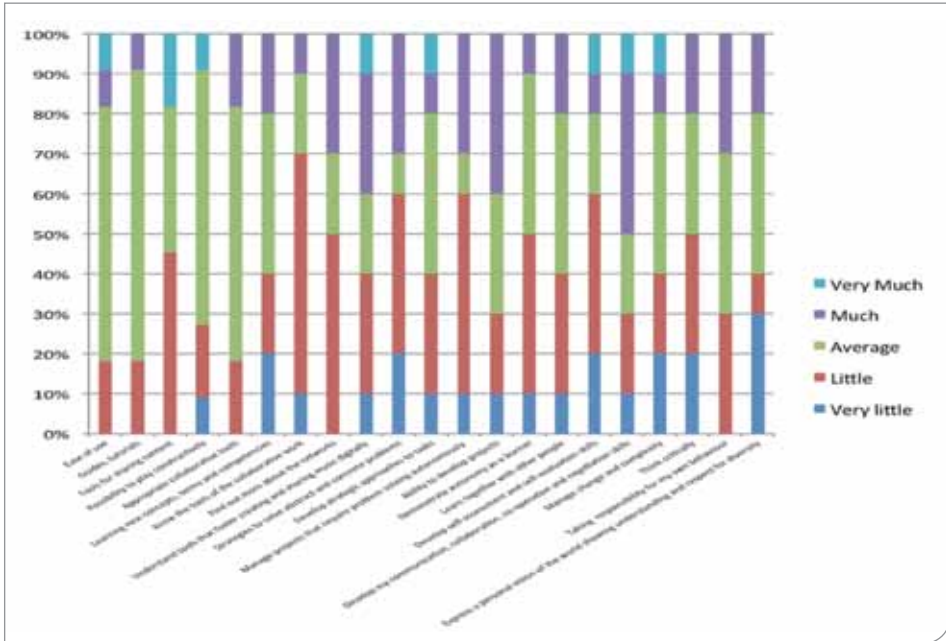


Figure 4.

3.5 Survey results achieved through the testing activities in UK

3.5.1 Structure and profile of European testing Networks in UK: Schools, Conservatories, VET

The OPEN SoundS testing network in the United Kingdom, excitingly, spanned outside the United Kingdom as well. This is due to the fact that a specialist team in Spain, working at post compulsory as well as undergraduate level music education became introduced to the OPEN SoundS project and demonstrated profound enthusiasm in actively participating in the project, as part of the testing network. The OPEN SoundS team responded to this passionate will to contribute very positively, and allocated spare time and effort in order to accommodate this collaboration to the maximum extent possible. The collaborative side of the OPEN SoundS platform was also translated in Spanish, and the colleagues from Spain were able to collaborate with students from the United Kingdom, Italy, and Denmark, thus celebrating the transnational ethos of this exciting initiative. Another volunteer to the OPEN SoundS network that showed great commitment and enthusiasm in becoming part of the testing phase, has been a leading International School in the heart of London, providing both primary and secondary education, in two dedicated sites, and hosting children from the

world around. Today, it is one of very few schools in the UK that offers the full range of International Baccalaureate programmes (Primary Years, Middle Years and Diploma) for students aged 3-18 years. There are currently 250 students studying at this international school across the Primary campus located on the edge of Regent's Park and the Secondary campus near Hyde Park. The School community is truly diverse with over 45 different nationalities represented and this adds to the richness of our student's experience at the school. Due to the wonderful diversity of the student demographic in this school, the OPEN SoundS team responded very positively and facilitated weekly collaborative music making group sessions with primary, secondary and post compulsory students, using a highly experienced post doctoral researcher and educator as session facilitator.

Besides the two exciting 'add-ons', the formally organised testing network in the UK comprised nearly 600 students across all possible learning contexts that could be related to music making. The general ethos for the selection of the network schools has been that: the team wanted to ensure that access to this exciting network was

- democratic;
- inclusive;
- representative;
- polyphonic
- able to provide empirical insights from groups throughout the learning lifespan;
- not necessarily focused on music technology, but every possible music making.

Therefore, the UK OPEN SoundS testing network comprised:

- High school;
- Mixed Compulsory and Post Compulsory Arts College;
- Post compulsory college;
- Primary school;
- Secondary specialist music school;
- Specialist music teacher training institution;
- Undergraduate music programme.

Given the tight schedule for the testing phase, and the student workload and curricular commitments during the assessment phase, the response rate to the entry and exit surveys was quite high at nearly 42% (approximately 250 responses) for the entry questionnaire, and 32% (approximately 192 responses) for the exit questionnaire.

The spread across the different educational groups has been:

Institution type	Responses (N)	Responses (% of total)
High school	7	2,8%
Mixed Compulsory and Post Compulsory Arts College	70	27,7%
Post compulsory college	82	32,4%
Primary school	24	9,5%
Secondary specialist music school	17	6,7%
Specialist music teacher training	40	15,8%
Undergraduate	13	5,1%
Grand Total	253	100%

Table 1. Access to the entrance questionnaire, by type/level of education (absolute and percentages values)

Institution type	Responses (N)	Responses (% of total)
High school		0,0%
Mixed Compulsory and Post Compulsory Arts College	63	32,8%
Post compulsory college	58	30,2%
Primary school	19	9,9%
Secondary specialist music school	15	7,8%
Specialist music teacher training	27	14,1%
Undergraduate	10	5,2%
Grand Total	192	100%

Table 2. Access to the exit questionnaire, by type/level of education (absolute and percentages values)

The respondent group was fairly evenly divided regarding sex/gender, with approximately 40% of the entry questionnaire respondents being male, and 60% being female accordingly, and, similarly, nearly 43% of the exit questionnaire respondents being male, compared to male respondents, nearly at 57%.

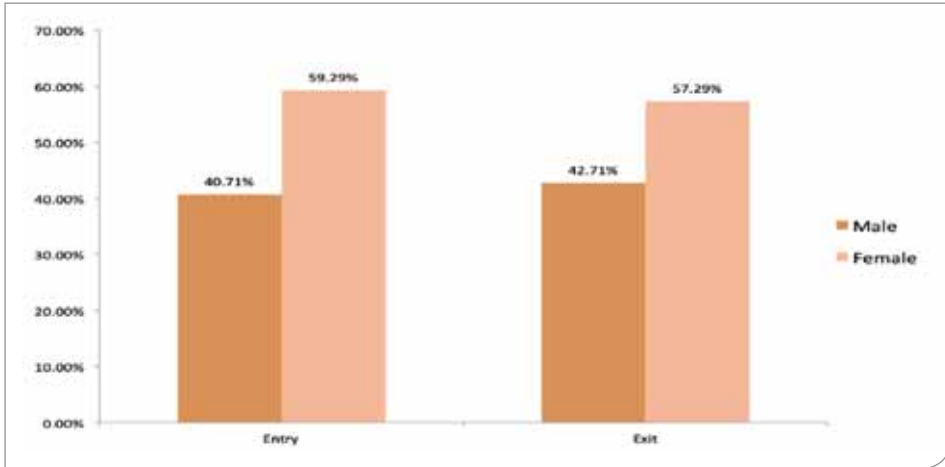


Figure 1. Access to the entrance and exit questionnaire, by gender (absolute and percentages values)

3.5.2 Knowledge and expectations

Nearly three out of four respondents (74%) reported that they played a musical instrument. A negligible percentage of the respondents did not provide information about whether they played a musical instrument (0,74%), with approximately 25% of the population having reported that they did not play any musical instrument.

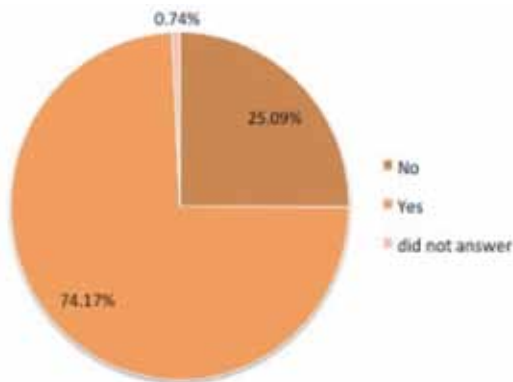


Figure 2. Previous musical knowledge

Of those respondents that reported to play a musical instrument and provided further information about their level of expertise, the vast majority (approximately 63%) positioned themselves as intermediate musicians, with nearly 26% labelling themselves as novice musicians, and only one in ten (approximately 10%) stating that they were expert musicians.

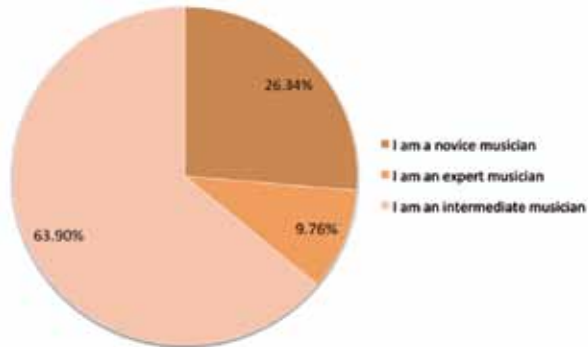


Figure 3. Level of musical competences

The vast majority of student respondents (79%) reported to be using social networking tools, with only one in five respondents claiming not to use similar technologies (e.g. facebook, twitter, myspace, etc.). Only 1,11% of the respondents did not provide relative information.

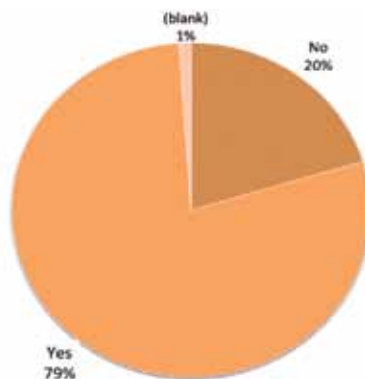


Figure 4. Percentage of students that uses social networking tools at home

Of those respondents that reported to be social networking tool users, more than seven in ten (72,39%) reported that they don't use those when in school. An interesting phenomenon is that the distribution of users versus non users of social networking tools within school was not school-specific, as someone would probably expect (i.e. the school running a policy against the use of such tools, or certain tools being blocked by school firewalls). This suggests that a large percentage of the users might be interacting with these tools via their mobile phones and web enabled mobile devices (e.g. iPads and other tablets) outside general school guidelines.

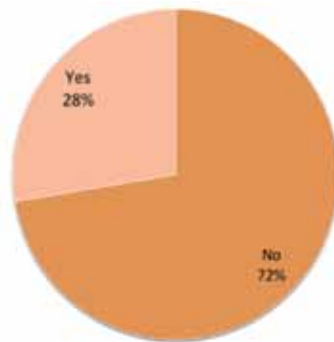


Figure 5. Percentage of students that uses social networking tools at school

The respondents were asked to provide ratings in a set of statements, mainly focusing on their aims and aspirations in becoming engaged with the OPEN SoundS collaborative platform testing.

The overall response was overwhelmingly positive, for all statements that the respondents were invited to rate. More specifically:

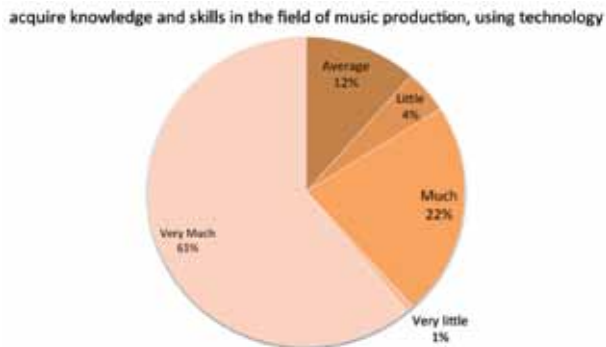


Figure 6. Value of the different expectations expressed by the students in relation to the use of OPEN SoundS

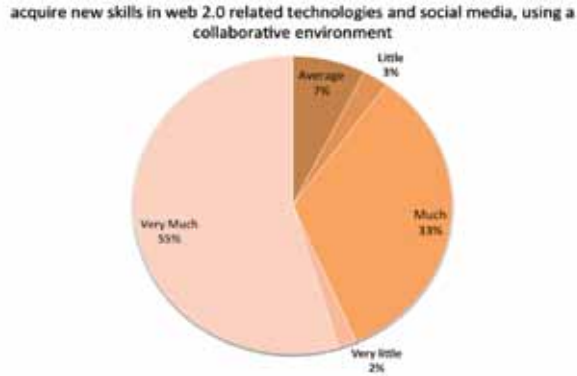


Figure 7. % Value of the different expectations expressed by the students in relation to the use of OPEN SoundS

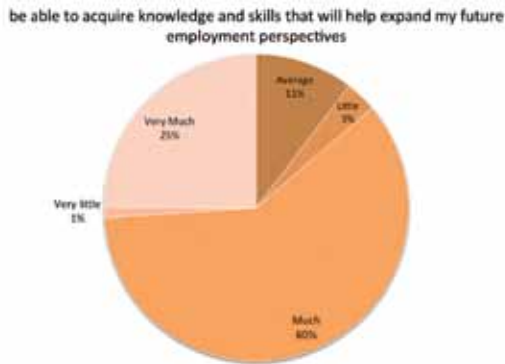


Figure 8. Value of the different expectations expressed by the students in relation to the use of OPEN SoundS



Figure 9. % value of the different expectations expressed by the students in relation to the use of OPEN SoundS

exchange experiences and encounter sharing new ideas with people that have similar interests and backgrounds

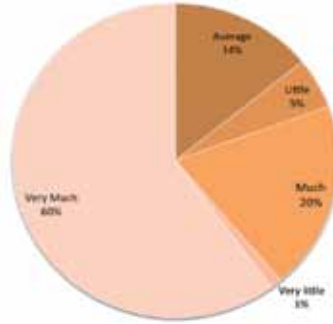


Figure 10. % value of the different expectations expressed by the students in relation to the use of OPEN SoundS

be able to acquire knowledge and skills that will help expand my future employment perspectives

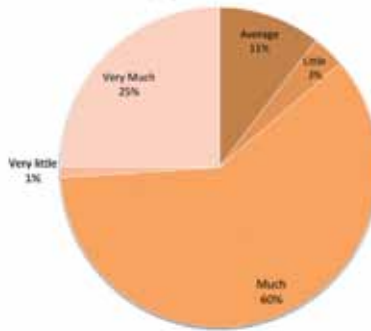


Figure 11. % value of the different expectations expressed by the students in relation to the use of OPEN SoundS

be able to strengthen my social skills and promote citizenship, by working in a group

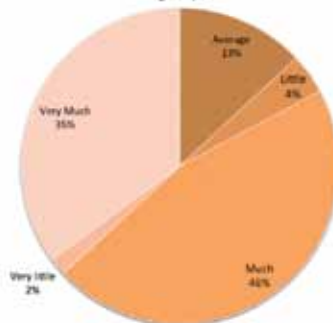


Figure 12. % value of the different expectations expressed by the students in relation to the use of OPEN SoundS

A summary table of all responses to the available statements demonstrates the remarkable level of positivity in participating in the OPEN SoundS network:

	Average rating
Acquire knowledge and skills in the field of music production, using technology	4,4
Acquire new skills in web 2.0 related technologies and social media, using a collaborative environment	4,4
Be able to collaborate with people from other countries by participating in collaborative music making projects	4,3
Have a new and exciting learning/training experience	4,6
Exchange experiences and encounter sharing new ideas with people that have similar interests and backgrounds	4,3
Be able to acquire knowledge and skills that will help expand my future employment perspectives	4,0
Be able to strengthen my social skills and promote citizenship, by working in a group	4,1

Table 3. Main expectations regarding the use of the platform OPEN SoundS in the school environment

3.5.3 Learning process and achievements

All participants were invited to respond to an 'exit' questionnaire. This was a survey instrument available online, in which participants were able to rate a larger (compared to the entrance survey) set of statements that aimed to capture participants' experiences, sense of progress and achievement using the OPEN SoundS testing platform, and generally report their opinions regarding the overall experience.

The results demonstrated that almost all participants were extremely positive about their experiences. The response was overwhelmingly, again, positive.

In more details, the online survey was structured under four key themes: experienced learning processes; aspects of the OPEN SoundS project that participants have found particularly useful; usability of the OPEN SoundS platform; contribution of OPEN SoundS to the development of knowledge and skills.

Learning Process Tested

To the question "*Participants' beliefs about different learning ways/styles and their opinions about their importance and/or effectiveness*" it was possible to make a choice between the following learning methods:

These were:

- practising;
- receiving immediate feedback;
- learning on your own/alone;
- reading;
- working within a group;
- being allowed to make mistakes without being penalised for that;
- being able to enjoy yourself;
- being able to observe other people;
- being able to confront other people;
- being told what to learn;
- how engaged you are;
- being able to discover and explore;
- knowing exactly what to do;
- being under pressure.

The responses highlighted that all suggested styles were perceived to be of very high importance to the participants.

No statistical significance was observed regarding the perceived dominance of one suggested learning style versus another. The actual responses count is offered within the following table:

Different ways of learning are listed below. In your opinion, which are more useful for your successful learning? (please rate all statements)							
	Very little	Little	Average	Much	Very Much	Rating Average	Response Count
Practising	0	0	36	39	122	4,44	197
Receiving immediate feedback	0	0	46	41	110	4,32	197
Learning on your own/alone	0	0	34	42	120	4,44	196
Reading	1	2	42	49	103	4,27	197
Working within a group	0	0	48	39	110	4,31	197
Being allowed to make mistakes without being penalised for that	0	1	32	38	126	4,47	197
Being able to enjoy yourself	0	0	43	44	109	4,34	196
Being able to observe other people	0	0	29	38	130	4,51	197

Being able to confront other people	0	0	38	37	122	4,43	197
Being told what to learn	0	0	47	25	125	4,40	197
How engaged you are	0	0	32	42	123	4,46	197
Being able to discover and explore	0	0	44	41	112	4,35	197
Knowing exactly what to do	0	2	41	50	104	4,30	197
Being under pressure	0	0	40	33	124	4,43	197

Table 4. Learning methods considered the most appropriate and useful by students

Aspects of participating in the OPEN SoundS collaborative project that the participants found particularly useful

Participants were invited to rate a set of statements, highlighting the extent to which they found particular aspects of participating in OPEN SoundS useful or not. The various aspects were:

- having the opportunity to create music collaboratively;
- having the opportunity to create music online with people from other countries;
- being able to create something that can be used by other students from different countries and backgrounds;
- being able to select the members of my team and start a new creative idea with them;
- being able to clearly see other people's contributions and how these had been used in the various projects;
- having the opportunity to work in an integrated and supportive educational environment that provides access to a plethora of tutorials, guides and databases;
- having the opportunity to meet other students, with the same interests
- having the opportunity to acquire real-life skills that will expand my future employment opportunities;
- having the opportunity to strengthen the sense of belonging to a group and citizenship.

The overall responses/ratings show remarkable positivity towards the numerous aspects of the collaborative project. This is clear in the table 5.

None of the rated statements received an average response rating smaller than 4,27, with the first statement (having an opportunity to create music collaboratively) being the highest rated statement, with a rating average of 4,38. A more detailed presentation of the responses is offered in the table 5.

By participating in the testing of OPEN Sounds, I found useful ...						
	Very little	Little	Average	Much	Very Much	Rating Average
Having the opportunity to create music collaboratively	0	1	29	61	106	4,38
Having the opportunity to create music online with people from other countries	1	0	25	81	89	4,31
Being able to create something that can be used by other students from different countries and backgrounds	0	0	35	70	92	4,29
Being able to select the members of my team and start a new creative idea with them	0	4	34	64	95	4,27
Being able to clearly see other people's contributions and how these had been used in the various projects	0	0	30	67	100	4,36
Having the opportunity to work in an integrated and supportive educational environment that provides access to a plethora of tutorials, guides and databases	1	2	31	64	99	4,31
Having the opportunity to meet other students, with the same interests	0	0	37	69	91	4,27
Having the opportunity to acquire real-life skills that will expand my future employment opportunities	0	1	24	75	97	4,36

Having the opportunity to strengthen the sense of belonging to a group and citizenship	0	0	41	62	94	4,27
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Table 5. Aspects of participation in OPEN SoundS considered most useful by the participants

Usability of the OPEN SoundS platform

All participants were asked to provide their opinions regarding the usability of the OPEN SoundS platform, by rating a set of five statements. These were:

- It is easy to use and navigate.
- The guides, tutorials and instructions available on the OPEN SoundS platform where clear and easy to follow.
- The tools available for sharing the music/audio files were easy to use.
- It enabled me to play in a creative and constructive way, enhancing my formal and informal skills.
- The collaborative tools are appropriate and closely aligned to the OPEN SoundS project objectives.

Responses were overall very positive, with no statistically significant differences. Regardless, the statement receiving the highest rating was the second one (i.e. about guides, tutorials and instructions) receiving a rating average of 4.02 out of a theoretical maximum value of 5.

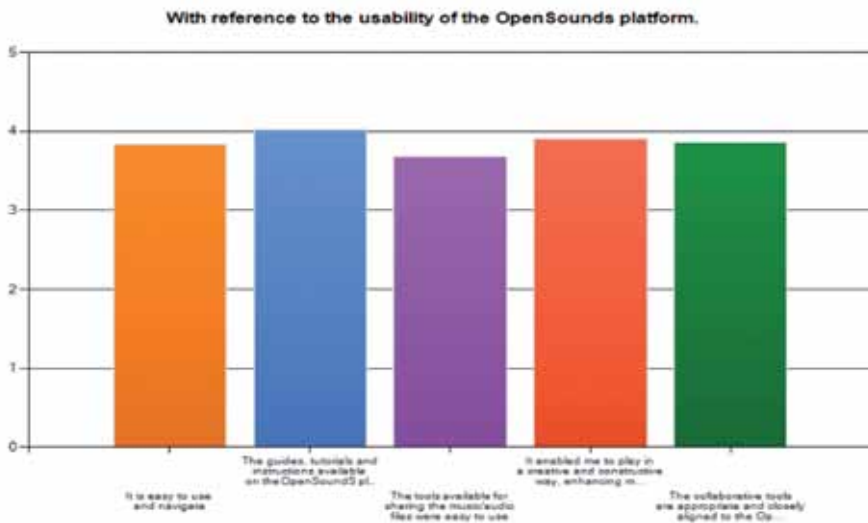


Figure 13. Level of usability and functionality of the platform OPEN SoundS

Perceptions of the OPEN Sounds platform role in the development of knowledge and skills

Finally, all participants were invited to provide ratings for the extent of their agreement or disagreement with a set of 21 statements regarding the role of OPEN Sounds in the development of their knowledge and skills.

The statements were the following:

- learn new concepts, terms and competencies, related to music, information and communication world;
- know the tools for the collaborative /cooperative work;
- find out more about the networks and how they function;
- understand more about tools that foster creating and sharing music using digital technologies;
- living strategic and creative answers to find solutions to abstract and concrete problems;
- develop strategic approaches to tasks that arise during the study by applying specialized knowledge;
- autonomously manage projects that require problem solving skills;
- ability to develop projects;
- demonstrate autonomy as an learner, and understanding of learning processes;
- learn together with other people;
- develop my self-assessment and self-evaluation skills;
- develop my communication, collaboration, co-operation and negotiation skills;
- manage change and complexity;
- think critically;
- taking responsibility for my own behaviour;
- express a personal vision of the world showing understanding and respect for diversity.

The vast majority of the respondents reported that their engagement in the testing activities in the OPEN Sounds collaborative platform turned out to be highly effective as well as a rewarding experience.

The students with very high percentages declare that they have acquired all the skills of type, “**cognitive**” “**functional**” “**personal**” and “**ethical**” indicated in the questionnaire.

Even more surprising and significant is the percentage of affirmative responses that, as evidenced both in table 7 and in figure 16, present in the scale that goes from 1 to 5, all close to the medium 4 or above four. With percentages of presences of *much and very much* that, in a large amount of cases, they move between the 70% and 100%.

Results, in short, very satisfactory and fully consistent with the conceptual framework and the objectives that guided the entire development of the project.

The responses in detail are presented in the following data table.

Please rate the extent to which the tools of the OPEN SoundS platform played a role in the development of your knowledge and skills						
	Very little	Little	Average	Much	Very Much	Rating Average
Learn new concepts, terms and competencies, related to music, information and communication world	0	1	79	78	37	3,77
Know the tools for the collaborative/cooperative work	10	7	45	94	39	3,74
Find out more about the networks and how they function	5	20	46	53	71	3,85
Understand more about tools that foster creating and sharing music using digital technologies	3	10	54	59	69	3,93
Living strategic and creative answers to find solutions to abstract and concrete problems	3	11	34	65	82	4,09
Develop strategic approaches to tasks that arise during the study by applying specialized knowledge	3	12	42	70	68	3,96
Autonomously manage projects that require problem solving skills	4	14	42	57	78	3,98
Ability to develop projects	5	11	44	65	70	3,94
Demonstrate autonomy as an learner, and understanding of learning processes	2	12	47	54	80	4,02
Learn together with other people	1	14	49	65	65	3,92
Develop my self-assessment and self-evaluation skills	4	12	44	57	77	3,98
Develop my communication, collaboration, co-operation and negotiation skills	1	13	38	61	82	4,08
Manage change and complexity	13	5	47	54	76	3,90
Think critically	12	6	42	100	34	3,71
Taking responsibility for my own behaviour	0	12	46	86	51	3,90
Express a personal vision of the world showing understanding and respect for diversity	0	1	38	85	71	4,16

Table 6. Assessment of knowledge and skills acquired in the course of the testing activities

A very powerful message is presented from the responses dataset; although, again, the responses are very positively skewed, it is interesting to observe that the highest rated statement (average 4,16) was “Express a personal vision of the world showing understanding and respect for diversity”.

This is somewhat of a celebration of the ethos of the OPEN SoundS project and very much inline with the European community’s ethos and aspirations for younger generations’ development of a greater understanding and respect of diversity (cultural, economic, racial, developmental, etc.).

4. Final comments

A synthesis of the results of the testing activities, conducted in Italy, Great Britain, Denmark and Spain, in terms of learning acquired/acquirable by the students through the use of the OPEN SoundS platform, and more generally in the field of music technology education, obliges us to distinguish between:

- a) acquisitions clearly due to a structured framework of knowledge and skills;
- b) and acquisitions that, instead, invest more properly transformations on the conceptual and operational level.

The first important indication provided by the data collected through the survey is that major acquisitions obtained/obtainable by the students are all directly attributable to the “**Common European Framework of Key Competences for Lifelong Learning**”⁴ and the objectives of the “**Strategic framework for European cooperation in the field of education and training – ET2020**”.

With regard to the eight key competences, in the “Common European Framework of Key Competences for Lifelong Learning”, the analysis of the data collected shows that the skills listed as achieved quite correspond **to 6 out of 8 of the objectives of the framework**, and more specifically: *communication in foreign languages, basic competences in science and technology, digital competence, learning to learn, social and civic competences, and cultural awareness and expression*.

As recently clarified the recommendation of the European Parliament and of the Council:

4 In the Recommendation of the European Parliament and of the Council of 18 December 2006 inviting the Member States to develop the provision of key competences for all as part of their lifelong learning strategies, including strategies for achieving universal literacy, using the framework ‘key competences for lifelong learning’ as a reference tool the European reference Framework sets out eight key competences: communication in the mother tongue, communication in foreign languages, mathematical competence and basic competences in science and technology, digital competence, learning to learn; social and civic competences, sense of initiative and entrepreneurship, and cultural awareness and expression.

“The skills are defined the same way as a combination of knowledge, skills and attitudes appropriate to the context. Key competences are those which all individuals need for personal fulfillment and development, active citizenship, social inclusion and employment. The key competences are all considered equally important, because each of them can contribute to a successful life in a knowledge society. Many of the competences overlap and interlock: aspects essential to one domain will support competence in another. Competence in the fundamental basic skills of language, literacy, writing, numeracy and information and communication technologies (ICT) is an essential foundation for learning, and learning to learn supports all activities learning. There are several themes that are applied throughout the Reference Framework: critical thinking, creativity, initiative, problem-solving, risk assessment, decision taking, and constructive management of feelings play an important role in all eight key competences”.⁵

As evidenced by the text of the Recommendation cited above, in addition, also the learning/competencies corresponding to all *Issues* that apply to the framework, from the critical thinking to creativity, from the ability to solve problems to the constructive management of feelings, all appear to have been acquired and / or acquirable through a work of digging and diving, on the border, active and constructive represented by the use of the binomial, music and technology in education.

But what about the connection between the results of testing activities in terms of knowledge and competencies that students claim to have been obtained / obtainable by the practices of shared creation of music in the net and the objectives of the “Strategic framework for European cooperation in the field of education and training – ET2020 – these are no less surprisingly consistent and coherent.

The framework addresses, in particular, the following four strategic objectives:

1. *make lifelong learning and mobility a reality* through the implementation of lifelong learning strategies, development of national qualifications frameworks linked to the European Qualifications Framework, the creation of more flexible learning pathways;
2. *improve the quality and efficiency of education and training*, through the development of projects that allow to all citizens to acquire the fundamental competencies; the promotion of excellence and the attractiveness of education and training developed at all levels;
3. *promote equity, social cohesion and active citizenship*: through policies of education and training that allow to all citizens to acquire and develop professional competencies and competencies needed to foster their

⁵ Recommendation of the European Parliament and of the Council of 18 December 2006 - Official Journal of the European Union - EN - 30.12.2006 L 394/13- L 394/14

employability, further learning, active citizenship and intercultural dialogue; 4. *encourage creativity and innovation*, through practices that encourage the acquisition of transversal competences by all citizens and ensure the proper functioning of the knowledge triangle (education/research/innovation). The same practices should promote knowledge partnerships between the business world and training institutions, and encourage broader teaching community, including representatives of civil society and other stakeholders.

Even here appears very **significant the level of consistency between the four objectives of the Strategic Framework 2020**, just set out, with particular reference to 2, 3 and 4, and the address and the numeric entity of the answers given by students and teachers, part of the European network of testing activities.

All the skills that users of OPEN SoundS declare acquired and / or acquirable and, with percentages as significant as those mentioned above, support the objectives of the Strategic Framework ET 2020.

Desire of excellence, appeal for education, active citizenship, intercultural dialogue employability, creative expression, the desire to research and innovation are the key features of the framework to the development of practices for creating musical projects in collaborative and transnational dimension, promoted and finally accessible within the European educational system thanks to OPEN SoundS.

In the learning environment created through the project, students and teachers have the possibility: to realize pathways of learning for creative production, both individual and social; to promote forms of collaboration, including virtual, between teachers and students; to enjoy with extreme accessibility and breadth of information, of creative and training products, and to be able to constantly share them with other users.

It is the self-regulated and collaborative nature of the awareness process that allowed the students to achieve such results.

In the model we proposed, the results achieved are closely connected to the features that the learning process was supposed to have.

In the model we suggested, learning above all is:

- *accumulative*: based, namely, on a universe of interests and knowledge already built by the student, and on the possibility that this condition offers to carry out a selective choice of information and active, to establish a different relationship with the teacher (knowledge held reversing the order of the reports, in the teacher-student relationship), to construct new meanings and develop new skills in the first person;
- aimed at *achieving objective* is characterized, then, on the conscious and self-determined search of objectives and results: creating and developing an individual or collective projects, obtaining a creative product;

- *self-regulated*: students self-manage and “monitor” their learning and skill acquisition process;
- requires collaboration: knowledge acquisition is not an exclusively individual process, but a social and cultural one. A process which is developed and enriched by interacting with other students, with the group and with the context;
- *individual and specific*: aptitudes, objectives, skills, cognitive patterns, learning strategies, interests, motivation, etc., vary among students and students considerably influencing the processes and outcomes of the learning process; thus significantly affecting the learning process and its results;
- requires *student-to-student interaction*: the exchange of information, ideas, motivation, help, between peers. It requires negotiation, mediation and communication of ideas, reasoning, explorations and considerations generated while working together.

The knowledge and skills that students and teachers declare that they have acquired and/or potentially be acquirable using the OPEN SoundS platform are, therefore, absolutely consistent to the model of learning at the base of the project and to the technological and pedagogical implant of the platform, which was created to allow students and teachers to promote it and practice it.

The ability to develop their own project or, at least, to have more confidence in their ability to do so, the ability to express themselves creatively, the ability to cooperate, the ability to practice different levels of communication and to work in a group, the responsibility, the solidarity and the sense of belonging, the enduring ability of self-assessment, it should be stressed once again, are the skills that fully consistent with the proposed learning model, students declare, in absolutely significant way, to be able to achieve thanks to the practices collaborative and creative offered by OPEN SoundS.

The data thus confirm the great potential of the environment of OPEN SoundS, once integrated in the educational context, to be able to support the acquisition of key competences for lifelong learning, those transversal competences can be spent in all disciplines and educational contexts. Competences able to promote and support, throughout the lifecycle, motivation and ability to learn.

The results presented above can have undoubted importance and strategic value in the training of students as future, independent and aware citizens of the real world and as individuals capable of conceiving virtual worlds of *meanings* or shared sensations, by means of open spaces where they can unfold the collective intelligence and imagination.

There is a special circular coincidence between knowledge and the types of grow just described, in philosophy that animates our project, what the students wrote about their learning, and the culture underlying the practice of digital music production.

If we look back over the learning underlined to the students in their responses about the relations established, practices realized, emotions felt, discoveries achieved and effort profuse, we realize just all these correspondences. In these practices, in their history, in their character of “making community”, in the sounds shared and independent by vocation and self-produced by choice, in the assembly that defy the rules of sound and fascinate for their citation, loose and joyful, of the infinite forms of hearing and feel the world. There is in all this, a knowledge, a new idea of “to know and to do”, and it is that, more than anything else, that we have hoped and tried to transfer to our students.

Part Two

The creative experience of OPEN SoundS



Part Two | The creative experience of OPEN SoundS

From Don Juan to additive synthesis: some examples of the musical experience produced

Andrea Pozzi, *Midiware*

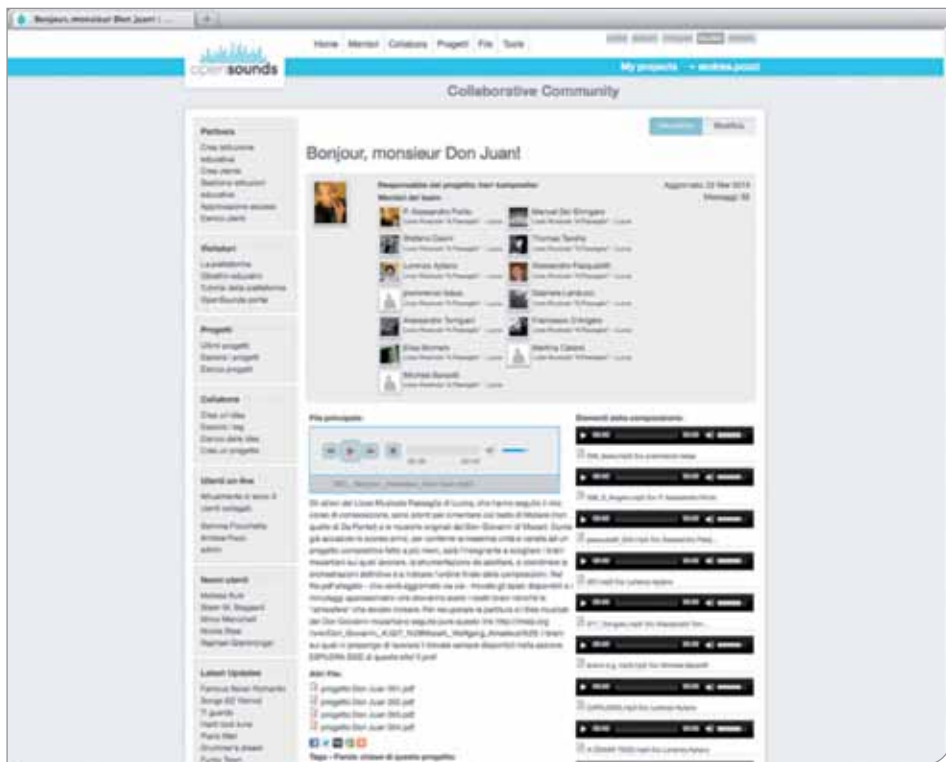
The Collaboration area is at the heart of the OPEN SoundS portal where the student community can showcase and develop musical ideas and projects in a transnational dimension. The target group of students from the high schools and vocational institutes involved in the four countries of the partnership (Italy, Denmark, United Kingdom and Spain) took part actively in the testing phase. A number of projects presented in this phase completely match the premises and purposes set by the OPEN SoundS project. Thanks to a particularly valid and close teamwork, a solid engineering of the project and, last but not least, a good dose of talent and creativity, the projects here described fully achieve the aim of Open Sounds, namely to transfer to the students from these different contexts the functional tools and expertise needed to use digital music technology in a collaborative and remote key.

Bonjour, monsieur Don Juan! - *Passaglia Music High School in Lucca*

This is probably one of the most complex, active and successful projects to be found on the OPEN SoundS platform. Twelve students of the team from the Passaglia Music High School in Lucca, supervised by Mr. Alessandro Polito, collaboratively developed the entire music accompaniment of *Bonjour, monsieur Don Juan*, a play performed in Florence at the Piccolo Theatre during the Maggio Musicale event. The project springs from a previous significant experience, in 2012, when ten students from the same music composition class – inspired by Bartok's music and supervised by Mr. Polito himself – composed the original music for the play *Barbebleue*, written by pupils from the Machiavelli-Capponi High School in Florence. The rather bold and ambitious idea underlying the collaborative project was to re-interpret the original music of Mozart's *Don Giovanni*, by adapting it to Molière's original text, in accordance with precise guidelines set the by project supervisor, Mr. Polito, who selected the works by

Mozart suitable for his team, as well as the instruments. He also organized the finished orchestrations and the final order of the compositions, so as to vary the collaborative features of the project, yet keeping it consistent.

In this respect, the added value of the tools available on the OPEN SoundS platform fostered a music composition process previously unheard of. These tools encouraged collaborative team work and provided the means of sharing online every idea or compositional stage with the rest of the team. Meanwhile, track was kept of the compositional sequence and of the individual contributions to the project. A similar creative environment in the education system was inconceivable before OPEN SoundS.



Once the Idea was created and a team formed in the Collaborate section – the main gateway to the OPEN SoundS platform –, the supervisor used a dedicated template to define the level of experience he expected from the team members, their expertise in the use of software, the selected Creative Commons license. The final sixteen pieces were then composed and developed in the section dedicated to the project, where the supervisor uploaded constantly updated .pdf files, reporting precise and detailed compositional guidelines – available space, timings and the “atmospheres” to be achieved. The twelve pupils of the Passaglia High School taking part in the project had thus the

opportunity to work and check online every development step, from the earlier stages up to the final structure, and were always able to access the scores, the synoptic table of contributions and each music file chosen for the final mix of Mozart's Don Giovanni. The students and supervisor cooperation yielded about sixty contributions and comments – which allowed everybody to come up with and post drafts, corrections or suggestions, and upload graphic, .pdf or music files to share personal views about the final version.

E. Alessandro Polito - Progetto per la scena in scena di *Benigno, musicista Don Juan*

Tavola sinottica N.1 degli interventi

Autore/i	Titolo	Scena	Oggetto	Durata appross.	ALMOSPHERA DA DESCRIVERE
		I	inno	2:00	Sono di bell'aria NON sono.
		I	2 il e sc	2:00	Il catalogo di Leporello...ma in pianissimo!
Mozart	Madamina, il catalogo è questo	I	tracce originali da CD del Catalogo	30 secondi	propone un re-mix in stile dance
		I		1:00	finale drammatico/ scena della ballata (!)
		II		1:00	La ci darem la mano prima variazione
		II		1:00	La ci darem la mano seconda variazione
Mozart	La ci darem la mano	II	tracce originali da CD del Catalogo	1:40	propone un re-mix in stile dance
		II			finale molto teso
		III	24. 26. 28.	1:00	scena di speranza ingenua degli ALBERI
		IV		1:00	scena della ball?
		V	R. 26. 27. 28. 29.	2:00/3:00	preparazione della scena di Don Giovanni
		V	inno	1:00/2:00	Don Giovanni, a casa tua... il brano inizia in sordina e deve esplodere in fortissimo, chiudendo di colpo
Mozart	Don Giovanni, a casa tua	V	tracce originali da CD del Catalogo	1:00	propone un re-mix in stile dance
		V	sfoltisce solo?	1:00	chiudono ballata

Regarding this specific job, a further difficulty arose in the fact that the composition had to be tailored to a theatrical text; sometimes, for instance, the music had to suspend a finale to better adapt to the scene. The result was amazing: well known arias, such as Madamina il catalogo è questo or La ci darem la mano, were revisited and structured anew with modern remixes, nonetheless with taste and balance, in drum & bass or dance-dubstep style, under the direction of the project supervisor, whose skill streamlined the students'

creativity as it progressed. Leporello's catalogue aria turned into a pianissimo, whereas some passages from *Là ci darem la mano* became extremely minimalist, even with seventh chords arpeggios or other original and pertinent ideas and embellishments. The team perfectly adhered to harmony and counterpoint, avoiding baroque or pompous overwriting.

Clearly, the opportunity the students were given to show the rest of the team an idea or a draft – being able to rely almost in real time on the suggestions and corrections posted by their music composition teacher – proved a unique, very stimulating occasion for personal growth, from both an artistic and practical point of view.

Brain Fantasy - Giorgione High School in Castelfranco Veneto

This is another project clearly consistent with the educational and vocational objectives of the OPEN SoundS learning environment, both in terms of number of team members and quality of their contributions to music production. Brain Fantasy is a further excellent example of how close teamwork supervised by a competent and well-trained teacher – whose task is to channel and gradually improve skills in the use of digital music technology in a collaborative and remote key – is able to achieve the education aims of OPEN SoundS.

The screenshot displays the OPEN SoundS Collaborative Community interface. At the top, there is a navigation bar with links for Home, Membri, Collabora, Progetti, File, and Tools. The main header area includes the OPEN SoundS logo and the text 'My projects → andrea.pozzi'. The central focus is the 'Brain Fantasy' project page, which is part of a 'Collaborative Community'. The page features a sidebar on the left with sections for Partners, Visitatori, Progetti, Collabora, Utenti on-line, and Nuovi utenti. The main content area shows the project title 'Brain Fantasy', the responsible teacher 'Ireneando', and a list of team members including Alberto Anhaus, Elena Muranelli, Lorenzo Tomason, Emma Mazzoli, and Lutz Marchetti. Below this, there is a 'File principale' section with a media player and a description of the project. The description states: 'Hi! This project is based on an idea of a student attending "Liceo Giorgione" in Castelfranco Vto (Tg). There will be some instruments generally used to play Jazz Music (Guitar, Bass, Piano, Voice, Percussion, and so on). To develop our idea, we are going to use some MIDI soundboard some basic rhythm patterns could be produced using software sounds or playing acoustic instruments and recording new tracks. We will use different softwares such as Finale MixalMusic 2005 (no other version), MacMap 5.0 (no other version), Cubase.' The page also includes social media sharing options and a list of 'Elementi della composizione' with audio preview buttons.

The propelling idea (as posted in the dedicated section of the platform) was proposed by a girl pupil from the Giorgione High School, who set off the project proposing an initial melodic/rhythmic texture and a chord progression of what was basically conceived as a pop song. From the start the project was open to new arrangements of the earlier sketch; after various contributions, it eventually took on a more classical, almost jazz flavour. The team – formed by ten students of the same high school and supervised by Mr. Michele Della Ventura – mainly worked with the MIDI format when exchanging their contributions to the music, thus providing the teamwork with maximum convenience and ease of use when parts needed to be replaced or new ones added.

Brain Fantasy

Open Minds (I Fantastici II)

The musical score for "Brain Fantasy" is presented in a standard staff format. The key signature is one sharp (F#) and the time signature is 4/4. The score includes the following parts:

- Voice:** A melodic line with lyrics.
- Piano/Forte:** A grand piano accompaniment.
- Flute:** A melodic line.
- Flauto d'alto soprano:** A melodic line.
- Clarinetto in Si:** A melodic line.
- Sax soprano:** A melodic line.
- Sax contralto:** A melodic line.
- F. Basso d'alto contralto:** A melodic line.
- Violino:** A melodic line.
- Violoncello:** A melodic line.
- Chitarra:** A guitar part with chord diagrams for C, D7, G, B7, C, D7, G11 G, G, Am, G, Am, B7, C, D7.
- Chitarra acustica:** An acoustic guitar part.
- Chitarra elettrica:** An electric guitar part.
- Timpani:** A percussion part.
- Vibrazioni:** A vibration part.
- Marimba:** A marimba part.
- Percussioni:** A general percussion part.

The contributions gradually shaped together this collective composition, when guitars, bass, piano, vocals and percussion were added. The around thirty contributions in the page dedicated to the project prove the team's active and conscious involvement. Traditional software, such as Finale and Cubase, as well as MaxMsp (a more programming-oriented environment), were used to develop the project. The final result is quite remarkable and the coordination job of the supervisor was simplified by the inclination and talent of the students, who really displayed noticeable compositional skills. Moreover, the whole collaborative work on the platform was performed in English, therefore improving their knowledge of it.

Pianodrum - Music High School in Potenza

The main characteristic of the project can be found in the originality of the initial idea and in the quality of the early composition – together with the equally proficient following contributions – rather than in the collaborative features, nonetheless excellent, of its development. After the proposal of a brilliant student from the Music High School in Potenza, the team engaged in musical experimentation, improvisation and the contemporary classical electronic music inspired by the prepared piano Erik Satie and John Cage were fond of.

At the first contribution step, the audio file, uploaded while posting the Idea, features the recording of an excellent piano performance played unconventionally: to produce sounds, the strings were not hit by the key-driven hammers, but vibrated after direct percussion with wooden sticks. The originality and outstanding quality of the performance, uploaded at the very first stage of the idea, attracted many students when the team had to be put together and lead to a high level transnational team.

After the first piano track, an equally valid contribution was later posted – a violin track recorded by another brilliant pupil in the team, this too in a contemporary style with the same compositional approach based on improvisation and experimentation, with special timbral effects, such as *jetè*, *glissato* and *con legno*. Guitar, synthesizer, strings and percussion joined in the mixdown accomplished with good taste by the author of the project himself.

Pianodrum highlights another chief feature of the OPEN SoundsS platform. For the student, who put forward a very original and interesting idea, the portal represented an important showcase which triggered interaction and also supplied the necessary tools to improve and refine the composition, brilliant from the start. Unlike the previous examples examined, this project had no teacher supervision to carefully streamline the contributions as music composing unfolded: every phase was self-managed by the student team leader who proposed the initial idea and decided, based on personal taste and expectations, the contributions useful for the project.

The screenshot displays the 'Pianodrum' project page on the 'open sounds' platform. The page is titled 'Collaborative Community' and features a navigation bar with 'Home', 'Membri', 'Collabora', 'Progetti', 'File', and 'Tools'. The main content area is divided into several sections:

- Partners:** A list of roles including 'Crea situazione educativa', 'Crea utente', 'Gestione istituzioni educative', 'Approvazione accessi', and 'Elenco utenti'.
- Visitori:** A list of roles including 'La piattaforma', 'Colettori educativi', 'Tutorial della piattaforma', and 'Download portal'.
- Progetti:** A list of roles including 'Ultime progetti', 'Esplora i progetti', and 'Elenco progetti'.
- Collabora:** A list of roles including 'Crea un'idea', 'Esplora i tag', 'Elenco delle idee', and 'Crea un progetto'.
- Utenti on-line:** A list of roles including 'Attualmente ci sono 2 utenti collegati'.
- Nuovi utenti:** A list of roles including 'Melissa Kull', 'Steven M. Slogard', 'Mico Marchetti', and 'Nicola Star'.

The main content area features a project description for 'Pianodrum', a list of team members (including 'Responsabile del progetto: Mirkoas' and 'Membri del team' such as 'Irenece Agnoli', 'Frances Casalelli', 'Alessandro Spazzano', 'Giacomo Rusci', 'Ermengia Hernandez', 'Emanuela Caruso', 'Michele Migliorini', 'Antonio Migliorini', 'Antonio D'Elia', 'Mauri Villari', and 'Stefania Klyuyev'), and a section for 'File principale' with an audio player. The audio player shows a track titled 'Pianodrum - NCL.mp3' with a duration of 00:20. Below the audio player, there is a list of 'Elementi della composizione' with various tracks and their durations.

John Dowland between past and future - “S. Satta” Music High School in Nuoro

Another project, based on a brilliant idea and a convincing development, was performed by the team from the Music High School in Nuoro. The challenging task posed by supervisor Mr. Stefano Ferrari was the re-interpretation of the Renaissance song *Can she excuse my wrongs*, by John Dowland, in a flute, guitar and voice arrangement, digitally processed to confer modern colours and sound to the music. As set by the project's guidelines, the original melodic line was to be kept unaltered, whilst the harmonic and rhythmic characteristics could be shaped using sound effects.

The students taking part in the project were allowed to create different versions of the same piece based on their culture and sensitivity, inspired by their music-listening or artistic backgrounds and revisiting the original composition with no style limitations. The only restriction was to leave the lyrics and melody unaltered.

The team used Ableton Live software as digital audio workstation, whereas

the Finale software was the main notation application of choice. Once the main MIDI files were dropped in Ableton Live, following Mr. Ferrari's instructions, the students could accurately re-arrange the song, occasionally modifying harmony or the tone colours of the performing elements. The implementation of the Operator synthesizer in Ableton Live and the introduction of new rhythmic patterns in the context did the rest, achieving a remarkable and very captivating collective outcome. The contamination between electronics and madrigals, new technologies aiding composition and a shared creation process, all emphasized the talent of the students taking part in the project, enhancing the potentialities of the tools the OPEN SoundS platform is equipped with.

The screenshot displays the Open Sounds Collaborative Community interface. The main heading is "John Dowland between past and future". The project is managed by Stefano Ferrari, with an update date of 26 Jun 2015 and 10 messages. The team includes Davide Fadda, Giovanniantonio Satta, and Maria Lucà. A central audio player shows a track titled "John Dowland - Can she excuse my wrongs [audio].m4a". Below the player, a text description explains the project's goal: to re-interpret the piece "Can she excuse my wrongs" by Renaissance composer John Dowland (1583 - 1626) for lute, flute and voice, using digital processing to modify the melodic line and add new musical elements like rhythm, harmony, and timbre. The text notes that there is no stylistic limit, but lyrics and the melodic line are fixed. It also mentions that participants submit materials like audio recordings of vocals and guitar, or MIDI files, which are then processed with software and hardware digital instruments. The page includes a sidebar with navigation options like Partners, Visitors, and Projects, and a footer with Creative Commons Attribution Non-Commercial Share-Alike 3.0 license information.

Melodia di timbri e Sintesi Additiva - *ITIS Fermi in Rome*

This project too relates to classical music, to Karlheinz Stockhausen and to Arnold Schönberg and his Klangfarbenmelodie or sound-colour-melody – the process of music language restructuring on which Electronic Music was built.

Advanced levels of expertise and software handling skills were clearly requested since the Idea definition stage. The project supervisor, Mr. Stefano Petrarca, set up the work as a proper drill for his Computer Music class, part of the additional training offer of ITIS Fermi in Rome.

As further proof that the OPEN SoundS platform offers a vast array of options to its users, the team was able to set up most of the work at the Idea stage, choosing the programming language (Csound) and all the models of reference for research. It all began with a script (uploaded by the supervisor) reporting a sample of synthesized sounds based on Csound's additive synthesis script. In the development stage Mr. Petrarca was able to post more samples of music to aid the creative process in the programming stage. To better preserve dynamics and render all the tone nuances of electronic classical music, the supervisor could use the .wav linear audio format instead of mp3's, typically used on the platform. The script was produced in the lab to allow the creation of very different sound patterns with maximum flexibility and, according to the final outcome, the work definitely accomplished noteworthy results.

The screenshot displays the OPEN SoundS Collaborative Community interface. At the top, there is a navigation bar with links for Home, Membri, Collabora, Progetti, File, and Tools. The main header area includes the 'opensounds' logo and a 'My projects' dropdown menu currently set to 'andrea.pozzi'. Below this, the page title 'Collaborative Community' is centered. The main content area features a project titled 'Melodia di timbri e Sintesi Additiva' by 'stefp'. The project description states: 'Questo progetto si basa su un parametro musicale che è stato il motore dello sviluppo della Musica Elettronica così come fu concepita originariamente da K. Stockhausen negli anni '50 e che ha continuato a promuovere la sua evoluzione fino ai giorni nostri. Per ora, come esecrazione del corso di Informatica Musicale al ITIS Fermi di Roma, è stato sviluppato lo script Csound allegato e che si presta a essere ampliato. Si allega anche un esempio di realizzazione di alcuni suoni sintetizzati con lo script per la sintesi additiva.' The project details include 'Livello di esperienza: Advanced', 'Livello di competenza software: Advanced', 'Software e tecnologie: Csound, wav, csd', and 'Licenza Creative Commons: Attribution Noncommercial Share-Alike 3.0'. The 'Allegati' section lists 'sintesAdditiva.cpp'. A 'Join in and Comment' section shows three comments from users: Federico Federaro (25 Maggio, 2013 - 09:41), Stefano Petrarca (25 Maggio, 2013 - 10:10), and Federico Federaro (30 Maggio, 2013 - 09:55). Each comment includes a text area, a timestamp, a user profile picture, and a 'Modifica Elimina' link.

Part Two | The creative experience of OPEN SoundS

The marriage of online and offline collaboration - Experimentation within the Danish network of schools

Quentin Nicollet, *EarMaster*

Introduction

Upon completion of the test phase of the OPEN SoundS platform, a few projects have been selected among those that involve students belonging to the Danish network of schools in order to analyze how the creative process did unfold for the students. The selection criteria of the projects in question have been twofold:

1. The projects involve students belonging to one of the schools of the Danish test network.
2. The projects display different aspects of how the platform has been used to collaborate with other students.

Our analysis will begin with a factual description of the preparation work prior to the test conducted at one of the schools of the Danish network, Produktionskolen Aarhus, where we will review the various phases preparing the students and teachers for the experimentation using the OPEN SoundS platform. We will then focus on the selected projects and cover each one separately in order to show, with input of the involved students, what creative collaborative processes have been in use and how the OPEN SoundS platform played a role in performing them.



Preparation of the test phase with Produktionskolen Aarhus

Produktionskolen Aarhus is one of the schools selected to constitute the Danish network of music schools that tested the OPEN SoundS platform.

A *Produktionskole* is a specific type of school where young people who either dropped off the main school system after the 9th grade or finished a technical education but haven't yet found a job can extend their range of professional and technical skills. By going to Produktionskolen, students are allowed to refine their competencies with professional educators while getting a state-funded income. The aim of the school is that the new competencies acquired by the students will facilitate their entry into the professional world and facilitate social insertion. Besides music, the school also offers tuition in woodwork, metallurgy, photography, drama, and more.

The social mission of a *Produktionskole* being at the very core of its pedagogical approach, OPEN SoundS was immediately embraced by both the teaching staff of the school and the students. Generally, a lot of effort is put in collaborative working strategies at Produktionskolen Aarhus, and OPEN SoundS' international dimension was perceived as a perfect broadening of the local collaborative approach used during regular music tuition at the school.

After structuring the experimentation strategy together with music teacher Joakim Øster, the Danish partner EarMaster organized a 5-hour session at the school together with the students. The aim of the session was to:

- Introduce the students to the general concepts behind the platform
- Explain them the experimental and research value of the project and the benefits it will have for other students across Europe.
- Demonstrate in practice how the platform functions. To that aim, a projector was used and a fictive idea and project were created in direct in order to show OPEN SoundS to the students with a practical angle.
- Illustrate each core concepts of collaborative creation with OPEN SoundS with musical and technological examples.
- Explain the experimentation planning, including the explanation of entry and exit surveys and project creation.
- Discuss with the students and the teachers various aspects of the platform that would remain unclear.
- Start the test phase in the music technology room of the school together with all the involved students, teachers and the OPEN SoundS partner EarMaster.

At the end of the session, most students had shared ideas on the platform, started their own project by uploading sound files, or participated in existing projects created by their fellow students from the participating countries of the OPEN SoundS platform. The general supervision was then handed over to Mr. Øster who followed up on the creative work of the students and made them engage in further collaborations on the platform.



Rainy Tuesday project

Number of team members: 3

Number of composition elements: 11

Other files: 2 (png picture and zip archive with audio files)

Contributions and comments: 12

Software used: GarageBand

Rainy Tuesday is one of the early projects of the OPEN SoundS platform. It involves team members from Denmark, Spain and the UK. Starting out in a purely 'rock' or perhaps even 'hard rock' direction, the project ended up drawing towards a more experimental piece as contributions from other members were added.



Rainy Tuesday includes 11 composition elements which are instrumental –, vocal – and sample-based: several tracks of guitars and vocals, computer-programmed drums, effected acoustic guitars, bass guitar, saxophone and flute. A screenshot of the original session made in Apple’s GarageBand (see above) as well as a ZIP archive containing all the stem tracks of the first post is also attached to the project, making it easy for collaborators to import the entire session in lossless format into any other recording and mixing software on any other computer platform. The screenshot provided allows listeners and contributors to understand the underlying structure of the creative process and draw experience on the techniques used to achieve the mixed result. *Rainy Tuesday* is one of the projects of OPEN SoundS where contributors from 3 different school test networks got involved in a transnational manner and added musical collaborative elements to reach a common creative goal.

The composition was set with a tempo of 100 beats per minute (BPM), and is structured around a simple A/B/A pattern. In its original form, the project was made of a virtual drums track, 3 guitars, and a piano track. Students from the University of Segovia added 2 parts of vocals, additional drums, flute and saxophone. These additions were mixed together by a Danish student from Aarhus MGK and the contribution was promoted to “current mix” by the project owner.

The Same Pop Song Project

Number of team members: 2

Number of composition elements: 11

Contributions and comments: 1

Software used: Logic 9

The project *The same pop song* was created by 2 Danish girls working on a single workstation using a single OPEN SoundS account. The current mix was elaborated using 9 different composition elements. The elements are instrumental and vocal tracks performing, as the self-explanatory title suggests, a traditional contemporary pop song.

The core team worked together on a single workstation at Produktionskolen Aarhus using Logic Pro 9 on a iMac, adding traditional one-to-one collaboration in the premises of the school to the digital collaborative approach of OPEN SoundS. The 11 composition elements are made of acoustic recordings and sample-based programming, and include vocals (lead and backing), bass, percussions, cello, glockenspiel, guitar, piano, drum machine and viola. The project was created, elaborated upon, and mixed in Logic 9 in the computer lab of Produktionskolen Aarhus.

The same pop song shows the advanced instrumental and technological level of the project owners, and the current version of the project is very polished

production-wise. Even though the core team of *The Same Pop Song* did call for active participation from other OPEN SoundS members, more specifically for rap vocals among others in order to turn the song into a new direction, no other member of the platform has yet gotten involved and uploaded contributions. This can be due to several factors. First of all, it seems that vocal performances, which were demanded by the project owners, are generally rarer on the OPEN SoundS platform. The reason for that is not to be discussed here, but it could shed some light on that issue especially as the instrumental arrangement of the project was very furnished right from the beginning.

Another possible reason seems to us much more valuable for the analysis of the test phase. It seems to prove that projects that are almost complete upon the first upload don't motivate other users to engage into a collaborative process. Projects that are too complete go rather against the pedagogical and conceptual approach of the OPEN SoundS platform, and tend to discourage other members to participate as the range of influence on the direction of the project becomes fairly diminished for potential new participants. We could therefore conclude that *The Same Pop Song* epitomizes one of the challenges of OPEN SoundS, which builds upon the opportunity to be creative collaboratively. If most of the creative process of a project has been completed by the project owner prior to uploading it and sharing it with the other members of the platform, some of the essence of the pedagogical intents of OPEN SoundS is indeed being misunderstood by the student.

The same pop song

Project owner: Camishhh Updated: 6 Jun 2013 Posts: 1

Main Mix:

00:00 02:36

Opensoundmain.mp3

Need a nice rap part, could be anything as long as it fits the song :) Please anyone? I'll do the mixing afterwards

BPM: 100.00

Composition Elements:

- 00:00 00:15 Backing Voc1.mp3 By: Kamie Graczyk
- 00:00 02:14 Bass section.mp3 By: Kamie Graczyk
- 00:00 00:36 Bass.mp3 By: Kamie Graczyk

***Ny Dansk Sang* Project**

Number of team members: 3

Number of composition elements: 2

Contributions and comments: 2

Ny Dansk Sang was created by 2 Danish students from Aarhus MGK. The original files consisted in a doubled vocal part, with one lead female singer and a harmonized backing vocal line, as well as a piano part.

Production-wise, *Ny Dansk Sang* is very simple. The tracks were all recorded as one live acoustic take with all 3 parts recorded at once by the original team members. This aspect has both positive and negative sides. On the one hand, it gives a certain cohesion to the performance and sound as all the constituting parts were captured from a single source using the same equipment. But on the other hand, it makes it challenging for other members of the platform to use or manipulate the files and to contribute to the project, as one of the comments of the project implies.

Besides the original upload of the first files of the project, a contribution was added with a discrete background guitar supporting the vocal melody, and a general remix of the project where the sonic qualities of the main audio file were slightly improved. This contribution is in the same line as the first files uploaded for the project, which are exclusively acoustic and do not contain any programmed material as met in various other projects of the platform.

***Rock Soul* Project**

Number of team members: 3

Number of composition elements: 2

Contributions and comments: 1

Software used: Logic 9

The *Rock Soul* project was started as a 2-persons project created by Danish students from Produktionskolen Aarhus. Both students sat together at the same workstation running Logic 9 to elaborate the starting point of their collaborative contribution to the platform. The starting contribution consists in a melodic line played by a Rhodes-style keyboard in 70's psychedelic rock fashion following a simple V-IV-I progression at a tempo of 120 beats per minute (BPM). The production work, even though limited because there is only one track, is well-balanced and heart-felt. A third team member joined and added a guitar part to the organ track.

The guitar uses a typical 70's guitar effect: the Wah-wah pedal which filters the sound in a non-linear way in order to create an artificial sound that seems as if the guitar notes are sung by a person. The contribution shifts the stylistic

quality of the project from psychedelic rock to a more funk mood without creating any temporal paradox – we are still deep into the 1970's.

According to Henrik and Benjamin, using the platform was very inspiring. They created their project with the hope that it could attract other students with different ideas that could turn a standard track into something completely different. Their expectations were met as soon as the first contribution was posted and their psychedelic rock project mutated into a lively rock-funk hybrid.

Rock Soul

Project owner: Henrik S Ballowitz
 Updated: 1 Oct 2013
 Posts: 1

Team members:
 Benjamin Jon Hansen
 Produktionskollet Aarhus
 Steen M. Biggaard
 Aarhus Musikskole

Main Mix:
 Open_sound_Rock_Soul.mp3

Composition Elements:
 Project: Rock Soul by Henrik Sandberg
 Licensed under Creative Commons Attribution Noncommercial Share-Alike 3.0 - Tutorial

This idea could be some 60's/70's rock/soul thing, maybe hip hop. Fell free to jam Bpm 120

Tags - keywords about this project: ROCK, GUNAW

Collaborative development: contributions and comments

Steen M. Biggaard
 1 October, 2013 - 16:10

rocksoulwaaaaaah.mp3
 I added a Wah-guitar to that sweet organ riff. Now we really need some bass :)

Edit Delete

Dubstep Tune Project

Number of team members: 3

Number of composition elements: 4

Contributions and comments: 4

Software used: Cubase, Arturia Spark, Logic 9

Dubstep Tune involves 3 team members from Italy and Denmark around the theme of Dubstep, an electronic musical genre that emerged a couple of decades ago in the UK out of the electronic underground scene.

An Italian student from Saint Louis College of Music started out the project with a single track providing a sketch of his idea which other students could collaborate upon with him. One of his fellow students from Saint Louis and a student from Produktionskollet Aarhus joined the team and added 4 additional tracks to the project. Some of these contributions were of a harmonic nature

Part Two | The creative experience of OPEN SoundS

OPEN SoundS as a resource for collaborative composition among students: an experience of research in the Escuela Universitaria de Magisterio de Segovia

David Carabias Galindo and Andrea Giráldez Hayes, *Escuela Universitaria de Magisterio de Segovia Università di Valladolid*

As a visiting researcher at the Institute of Education during the first semester of 2013 I had the chance to work with Dr. Evangelos Himonides as supervisor. Being interested on the possibilities of OPEN SoundS, we decided to design a small research proposal for some classes at the International Community School. The proposal presented to the Head of Studies and the music teachers, was approved on March and we started working with the students groups on April.

Andrea Giraldez, in coordination with the two music teachers (Theo Steyn and Svetlana Klyuyeva) assisted to some of the classes to gather information for this case study. They were a MYP3 group (12 students), a MYP5 group (2 students) and a DP1 group (2 students). Taking in account that we only had six weeks left, we decided to integrate the use of OPEN SoundS sin their own programs and activities. As a result, in each class the students uploaded their own composition as ideas or projects to receive some contributions. At the same time, we encouraged them to explore the platform ideas and projects and if they wished to contribute in their free time.

Using OPEN SoundS was the first collaborative music composing experience for most of the students. The interaction with students and musicians motivated most of the students to keep on working on their own compositions, as they felt their work was not a “music classroom task” but something that was valuable for other students and even for professional musicians that contributed with their own parts or helped to obtain better results.

Although the ICS is a school with students from many different countries, OPEN SoundS gave them the opportunity to work collaboratively with people from different European countries, which gave them the chance to know different ways of solving musical problems and, at the same time, promoting mutual understanding.

The music teachers at ICS considered the results were positive for their classes, encouraging and motivating their students to work even harder in their compositions.

Part of the data gathered for the study demonstrates how OPEN SoundS' possibilities might be regarded as invitations to compose and collaborate, regardless of the previous musical experience of the participants. At the same time, the findings show how students without formal musical training are able to engage in interesting conversations about the music composing process.

Complete Report

Following the presentation of OPEN SoundS we planned a small research project based on the use of the platform as a resource for collaborative composing among music education students. We choose a group of the 3rd year (out of a total of 4) of the "Mención en Educación Musical del Grado en Educación Primariaa music specialist teacher in Primary schools. The group, with 15 students, worked during seven weeks in this project, in a weekly three hours session.

1st week

I presented OPEN SoundS and the general objectives of the collaborative composing project, the rules and the main activities. We signed a *Learning Contract* in which all students, as well as the lecturer, compromised to develop the project as planned. Attending to the proposal and total number of students, we decided to work with three groups of 5 students, diverse in the musical competences of their members and their expertise using ICT. Each group chose a name: *TrotamusiTIC*, *Nostrum* and *Semifusos*.

After that, the teacher registered the students on the platform and explained that besides the composing activities and the use of the platform, they had to keep a collaborative diary registering all the process. Some of the sessions were also audio-video recorded.

Finally, the teacher asked the students to go into OPEN SoundS and look for the projects that were already looking for a collaborator.

2nd week

Each group looked for ideas and projects in OPEN SoundS and chose the ones that seemed suitable to contribute with attending to their own interests and competencies.

After that, they developed a based collaboration proposal analysing the chosen ideas or projects and considering some possible contributions. The different groups and the teacher contributed to the following projects:

- *Breadspread*. Project owner: Quentin Nicollet, Denmark
- *Batucada*. Project owner: Andrea Giraldez, UK

- *Rainy Tuesday*. Project owner: Quentin Nicollet, Denmark
- *Muse Style ballad*. Project owner: Matthew Domine, UK

At the end of the session, the students were asked to start thinking on their own music idea and the tools needed to record it.

3rd week

Each group recorded its musical idea using technologies and also acoustic instruments and voices. After the recording session they uploaded the results to OpenSounds, to share them with the other participants.

Finally, the teacher told that for the following session they had to explain to the whole class each group progress.

4rd week

Each group showed it's work progress to the rest of the class and all the students discussed the results and made proposals. By this, they reflected on the own collaborative music composition work, as well as on the others.

During the rest of the class each group worked in a new idea that they uploaded to OPEN SoundS.

- *Folk Celtic Music Style*
- *Intercultural Folklore*
- *Segovia Rumba Style*

5th week

Each group used technologies, voices and acoustics instruments to record the parts proposed in their ideas.

6th week

They finished the recording and uploaded the results to OPEN SoundS.

During this week, the different groups received collaborations and ideas.

7th week

Each group presented its work, ideas and projects uploaded as well as the comments and contributions received. They also assess their participation in the project.

The information gathered during the process is now being analysed by the teacher. The observation process demonstrated the students' engagement and motivation working with OPEN SoundS and the importance for their training as teachers.

All the students considered that the objectives they set at the beginning were achieved and that they would be able to apply what they've learnt by working on the project. They find collaborative music composition using a virtual platform as a innovative teaching method, full of possibilities and very important for their motivation.

OPEN SoundS has generated a high motivation among the students that was even more important when the platform was translated into Spanish (their mother tongue). All the students demonstrated their interest to keep working with OPEN SoundS next school year (2013-2014) and in their future works as teachers.

(Segovia January-June 2013)

Part Three

OPEN SoundS: Technology, research, education



Part Three | OPEN SoundS: Technology, research, education

Technology enhanced learning in the 21st century: the ethos of OPEN SoundS

Evangelos Himonides, *iMerc, Institute of Education University of London*

Introduction and background

A multitude of educational ‘theories’ and ‘models’ (either behaviourist and/or functionalist) exist, many of them based on current and widely scrutinised research in the Social Sciences. The measurement, though, of the ‘effectiveness’ of the application of such theories and/or models in everyday educational practice is a *dædalus* concept which often leads to heated debates. Nevertheless, it would be safe to claim that no research evidence exists in the published literature that confirms the existence of relevant, robust assessment frameworks within technology mediated music making. On the other hand, meaningfully structured educational datasets are already in place, vast in size, and continually evolving. This author believes that we are at a turning point, where learning theories and models need to be interrogated by, and mapped on robust, longitudinal datasets. The partner and participants’ work on the OPEN SoundS innovation project is thought not only to have contributed towards the notion of evidence-based education¹, but, most importantly, praxially demonstrated first, the important role of music within intrinsic but also other than musical educational contexts and objectives, and, second, the impact of music and music technology inspired collaborative online work on other than musical skills’ development (i.e. a multitude of reported – in the project outcomes – data skills such as in IT, project management, and communication). The OPEN SoundS team’s transfer of innovation work is believed to have resulted in a technology that not only ticks all of the aspired ‘design boxes’, but further celebrates the importance of the semantic rationalisation, interrogation, distillation, archival and retrieval of information in a critical way, thus laying some of the crucial first building

1 Goldacre, B. (2013). *Building evidence into education* (No. 110313). Department for Education. Retrieved from <http://www.education.gov.uk/inthenews/inthenews/a00222740/building-evidence-into-education>

blocks towards the meaningful exploitation of large and non-conventional, real-life, educational datasets. This sketches the OPEN SoundS team's ethos regarding the provision of support to educators, learners, as well as policy makers, organisations and governments in experiencing a more meaningful, sound, robust, socially inclusive, and systematic education. In line with Goldacre's beliefs (op.cit. footnote 1), this author believes that this will empower educators to become more confident in identifying the best practice, based on the intelligent (and creative) data-mining for evidence. This new praxis will also take into account the – admitted – failures of the previous foci that the American federal government maintained² for educational research funding (i.e. adopting a sterile model that bluntly tried to copy medical research), as also highlighted by Whitty³ in a recent online discourse. The OPEN SoundS transfer of innovation project was a success not only because of the teams' achievement in delivering a modern, successfully piloted and tested, collaborative platform; OPEN SoundS also contributed positively in identifying how future research could focus on the design of context-sensitive, blended (deterministic/stochastic and qualitative) systems that will be continually exploiting educational datasets, whilst being highly sensitive and adaptive to qualitative educational measures/annotations and semantic meta-interpretation of the datasets.

Learning Models

As briefly highlighted in the introductory section, numerous established models and theories exist concerning learning in general, and also related to music education, a field that is quite diverse, as current neuroscientific as well as cognitive research suggests. Most conceptual models stem from the – now somewhat obsolete – Watsonian⁴ model of behaviourism. The very interesting, for this present discussion, matter is that, although Watson's beliefs regarding subject 'conditioning' are now perceived to be 'extreme' at least, if not borderline 'inappropriate', his fundamental belief that behaviours are (or should be) measurable is a notion upon which systematic pedagogy and evidence based education could be based. This concept was further augmented by 'cognitivists'⁵,

2 Coalition for Evidence-Based Policy. (2003). *Identifying and implementing educational practices supported by rigorous evidence: a user friendly guide* (Practice Guide No. NCEE EB2003). Institute of Education Sciences. Retrieved from http://ies.ed.gov/ncee/pdf/evidence_based.pdf

3 Whitty, G. (2013). CERP - Evidence-informed policy and practice – we should welcome it, but also be realistic! *Centre for Education Research and Policy*. Retrieved April 4, 2013, from <https://cerp.aqa.org.uk/perspectives/evidence-informed-policy-practice>

4 Watson, John B. (1930). *Behaviorism*. Chicago: University of Chicago Press.

5 Haugeland, J. (1978). The nature and plausibility of cognitivism. *Behavioral and Brain Sciences*, 1(02), 215-226.

as the intellectual offspring of gestalt psychology⁶, who demonstrated a stronger focus on behavioural patterns, as opposed to isolated observations (something that behaviourists valued). There are certain aspects of early cognitivism that are still dominant in contemporary educational theories, mainly related to memory, its organisation, and its role in effective learning. Education has changed dramatically over the past century and, gladly, the old notion, adopted by most behaviourists and ‘some’ cognitivists, that the learner came into the learning context as an empty ‘vessel’ ready to be filled with knowledge by the expert/master educator, is on its way to become extinct (surprisingly, it has not become extinct yet!). Positive catalysts for this conceptual turn have been the works of Dewey⁷, Montessori⁸, Froebel⁹, as further framed by scholars such as Piaget¹⁰, Bruner¹¹ and Vygotsky¹², and although differences – of course – exist in their approaches, they all have contributed to three very important notions:

- 1. that learning should be student focused;**
- 2. that learning should be student lead and;**
- 3. that learning is socially located.**

These notions have been the conceptual as well as moral compasses of OPEN SoundS and its predecessors. This is, naturally, why the funding bodies found the OPEN SoundS team’s initial proposal important, as an innovative work that deserved to be transferred and sustained. We believe that this has been achieved to the fullest extent, and are delighted to be able to provide evidence supporting this approach.

Music education might be perceived as a mere subset of ‘education’, where one would naturally hypothesize that all related properties, parameters and variables might simply cascade from the parent set; but research evidence suggests that music education is quite unique. This is strongly related to our inherent musicality as human beings¹³, and interwoven with our musical, emotional ‘bodymind’ and its development throughout our lifespan¹⁴. This is why research

6 Humphrey, G. (1924). The psychology of the *gestalt*. *Journal of Educational Psychology*, 15(7), 401–412.

7 Dewey, J. (1910). *How we think*. Courier Dover Publications.

8 Montessori, M. (2004). *The discovery of the child*. Aakar Books.

9 Froebel, F. (1885). *The education of man*. A. Lovell & co.

10 Piaget, J. (1952). *The Origins of Intelligence in Children*. W. W. Norton & Co.

11 Bruner, J. S. (2009). *The process of education*. Harvard University Press.

12 Vygotsky, L. S. (1962). *The Development of Scientific Concepts in Childhood*. Cambridge: MIT Press.

13 Welch, G. F. (2000). The Ontogenesis of Musical Behaviour: A Sociological Perspective. *Research studies in music education*, 14(1), 1-13.

14 Welch, G. F. (2005). We ‘are’ musical. *International Journal of Music Education*, 23(2), 117-120.

in Music Education¹⁵ has attracted substantial interest from neuroscientific and cognitive research centres and teams over the past decade¹⁶.

The numerous researchers, practitioners, commercial partners, and policy-makers involved with OPEN SoundS and its predecessors believed from the very beginning (i.e. the precursors of the OPEN SoundS project) that by focusing on a Music Educational context, they were ensuring that their research investigations, activities, and consequent technological developments would be passed through the finest possible filters, and tested within the most demanding educational scenaria (i.e. because of the unique nature of Music in our lives¹⁷).

Foci

In order to ensure the fruitful development of meaningful and effective technological solutions, the OPEN SoundS team initially endeavoured systematically to map existing cognitive learning models and theories, as well as their praxial manifestations, and synthesize their findings. This mapping exercise entailed a systematic review of existing literature(s) and triangulation with findings of similar research initiatives (i.e. a meta-analysis of existing works). The OPEN SoundS team, lead by this author at iMerc, Institute of Education, University of London, has been developing valuable experience in the particular field over the past decade. One conceptual compass for this undertaking had been framed and presented in three key recent works:

1. Himonides, E., & Purves, R. (2010) 'The Role of Technology' In S. Hallam & A. Creech (Eds.), *Music Education in the 21st Century in the United Kingdom: Achievements, analysis and aspirations*. London: Institute of Education, University of London.
2. Himonides, E. (2012) 'Music learning and teaching through technology' In G. McPherson & G. Welch (Eds), *The Oxford Handbook of Music Education*. New York: Oxford University Press.
3. Himonides, E. (2012) 'The misunderstanding of Music-Technology-Education: A Meta-perspective ' In G. McPherson & G. Welch (Eds), *The Oxford Handbook of Music Education*. New York: Oxford University Press.

As argued by Himonides and Purves (2010), technology should not be treated as the panacea, nor as a first aid kit that contains sterilized heuristic remedies for the music educator to apply in their classroom context. It is advocated that technology, in our case "music technology," should be treated as any other tool

15 Welch, G. F., & Adams, P. (2003). *How is music learning celebrated and developed*. Southwell, Notts, UK: British Educational Research Association.

16 Stewart, L., & Williamon, A. (2008). What are the implications of neuroscience for musical education? *Educational Research*, 50(2), 177-186.

17 Patel, A. D. (2010). *Music, language, and the brain*. Oxford University Press, USA.

underpinning and supporting teaching and learning that “equips learners for life in its broader sense”; helps us “engage with valued forms of knowledge”; celebrates and “recognizes the importance of prior learning and experience”; “requires the teacher to scaffold learning”; “needs assessment to be congruent with learning”; “promotes the active engagement of the learner”; “fosters both individual and social processes and outcomes”; “recognizes the significance of informal learning”; “depends on teacher learning”; and, finally, “demands consistent policy frameworks with support for teaching and learning as the primary focus”. We believe that these notions are in full alignment with Europe’s vision and mission for future education, outside any particular educational focus. We also believe that these echo the European Commission’s concern and provision for sustaining research and innovation in order to tackle societal challenges, but also underline the common strategic framework for education and training, by pointing out that knowledge, and the innovation it sparks, are the EU’s most valuable assets, particularly in light of increasing global competition. Another important aspect of this is the realisation that learning is a life-long process, and not a time-structured endeavour.

The approach [i.e. the Education and Training 2010 work programme launched in 2001] recognises that high-quality pre-primary, primary, secondary, higher and vocational education and training are fundamental to Europe’s success. However, in a rapidly changing world, lifelong learning needs to be a priority – it is the key to employment, economic success and allowing people to participate fully in society¹⁸. OPEN SoundS and its predecessors have been shining exemplars of this ethos, celebrating the importance of life-long learning using new technology and through creative music making activities.

The OPEN SoundS experiences

Education and learner development are now concepts completely different to what they were in the past, even as recently as a decade ago. Our needs have shifted, from aspiring to acquire particular skills that will serve us within predetermined future work-related trajectories, towards aiming for a holistic development that will enable us to become agile, adaptive, critical, and self-sufficient, in order to be able to survive future challenges that have not necessarily been identified yet. As a few journalists and writers put it, “we are preparing students for jobs that don’t exist yet”¹⁹. A common, though, and seldom disputed understanding, is that the role of technology in these loosely defined occupational plateaus is vital. We, therefore, come to the realization

¹⁸ European Commission. (2013). *EC Strategic framework for education and training*. Retrieved September 3, 2013, from http://ec.europa.eu/education/lifelong-learning-policy/framework_en.htm

¹⁹ Dunn, J. (2011). *How Do We Prepare Students For Jobs That Don't Exist Yet?* - Edudemic. Retrieved October 3, 2012, from <http://www.edudemic.com/students-of-the-future/>

that a sustainable and successful future in education is a future that relies on the creative and effective use of technology in facilitating, assisting, supporting, developing, assessing, communicating, recording, and evaluating meaningful learning. Very much in line with Sir Ken Robinson's view that learners (i.e. life-long learners) can accomplish self-fulfilment through the convergence of natural talents and personal passions²⁰. Creation, in our case 'musical creation', is such a passion, within the whole continuum of abilities and what counts as differently abled²¹, socio-economic background²², and any other setting^{23,24}. Musical creation within a secure, exciting collaborative online environment that provides the opportunity to create and learn with other students has been the overarching aim of OPEN SoundS in order to foster students finding their own 'elements', and also to acquire vital skills (e.g. IT, project management, collaboration, communication) whilst doing so.

By studying the findings from the empirical research assessments during the testing and evaluation phases of OPEN SoundS, as presented elsewhere within the present volume, we can corroborate that students' and practitioners' engagement, enthusiasm and zeal have been overwhelming. This is evident from participants within all initial country-groups (i.e. Italy, Denmark, and United Kingdom), but also the participants of the fourth group from Spain (i.e., participation of the Spanish group was not initially planned, but later affirmed with great enthusiasm, thus confirming the international appeal of the OPEN SoundS initiative). Although detailed statistics are being presented earlier within this volume, it is worth reminding ourselves that the overall responses/ratings provided by all participants in the exit survey instruments showed a remarkably positive attitude towards the numerous aspects of their participation in the OPEN SoundS collaborative project. For the British and Spanish participants, for example, none of the rated statements received an average response rating smaller than 4.27 from a maximum possible score of 5, with the first statement (having an opportunity to create music collaboratively) being the highest rated statement, with a rating average of 4.38 (again, 5.0 being the maximum possible score).

Notwithstanding young people's enthusiasm to engage with novel technology, what transpired beyond our initial aspirations was the evidenced positive attitude

20 Robinson, K., & Aronica, L. (2013). *Finding your element: how to discover your talents and passions and transform your life*. New York: Viking Adult.

21 Magee, W. L. (2011). Music Technology for Health and Well-Being: The Bridge Between the Arts and Science. *Music and Medicine*, 3(3), 131–133. doi:10.1177/1943862111411719

22 Blamires, M. (1999). *Enabling Technology for Inclusion*. London: SAGE.

23 <http://www.hiphopdx.com>, H.-. (n.d.). *Digitally Divided: Technology's Impact On Hip Hop Music & Culture | Discussing Lil' Wayne, Drake & Many More Hip Hop Artists | HipHop DX*. Retrieved May 18, 2013, from <http://www.hiphopdx.com/index/editorials/id.2109/title.digitally-divided-technology-s-impact-on-hip-hop-music-culture>

24 Webster, P. R. (2012). Key research in music technology and music teaching and learning. *Journal of Music, Technology and Education*, 4(2-3), 115–130. doi:doi:10.1386/jmte.4.2-3.115_1

that the vast majority of the participants demonstrated towards their own personal, critical, assessment of their development of knowledge and skills by active participation in OPEN SoundS. Although, again, almost all of the responses were very positively skewed, it was interesting to observe that the highest rated statement (average 4,16 out of 5,0) was “Express a personal vision of the world showing understanding and respect for diversity”. This attitude was recorded amongst the complete participant demographic (including within the British paradigm, which involved a very wide age-range, from primary education up to post-graduate education). As also highlighted earlier, this is a tribute to the overarching ethos of OPEN SoundS and is very much inline with the European Community’s ethos and aspirations for younger generations’ development of a greater understanding and respect of diversity (including cultural, economic, racial, and developmental).

Coda

The long-term strategic objectives of EU education and training policies are:

- making lifelong learning and mobility a reality;
- improving the quality and efficiency of education and training;
- promoting equity, social cohesion and active citizenship;
- enhancing creativity and innovation, including entrepreneurship, at all levels of education and training²⁵.

OPEN SoundS put great emphasis on the social aspects of learning, by incorporating a highly adaptive, social media focused, layer in the developed technology and user interface. This was scrutinised during the piloting phase, and further enhanced using participant feedback, resulting a more cohesive and effective user experience. Due to its careful design, numerous measures have also been included in order to safeguard the positive nature of the users’ online social/networking experiences.

This underpins the OPEN SoundS ethos, given that strong evidence exists that positive feedback on adolescents’ social networking profiles enhances their social self-esteem and well-being²⁶. This is also supported by studies suggesting that positive associations exist among the number of ‘friends’ on social networking platforms, supportive interactions, affect, perceived social support, sense of

25 European Commission. (2013, July 9). EC Strategic framework for education and training. Retrieved October 3, 2013, from http://ec.europa.eu/education/lifelong-learning-policy/framework_en.htm

26 Valkenburg, P. M., Peter, J., & Schouten, A. P. (2006). Friend Networking Sites and Their Relationship to Adolescents’ Well-Being and Social Self-Esteem. *CyberPsychology & Behavior*, 9(5), 584–590. doi:10.1089/cpb.2006.9.584

community, and life satisfaction²⁷. Reid and Boyer (2013) also offer a positive prospective use of social networking online technology, presenting their findings from a study that focused on a well established platform²⁸. They suggest that the potential role (of such social networking technologies as pedagogical tools that could foster communication among educators, students, their families, and community members) is to facilitate greater understanding of curricular concepts, promote ethical online behaviours, and support digital citizenship of children and youth.

The OPEN SoundS transfer of innovation project rehearsed and attempted to bring together creativity, music, collaboration, technology, cultural exchange, communication, team development, leadership, social understanding, and skills development. This 'marriage' was conducted within a safe and supportive novel environment, where music making took centre stage, whilst 'gently nurturing' the development of other skills. Parents, educators and public servants could benefit from noting the OPEN SoundS exemplar, particularly during these challenging times, when the roles of music and music education are being undermined by myopic, misguided and highly parochial policy making.

Participant EW says: I could have never even imagined posting my music on a place like YouTube. I couldn't bear the attack of the trolls. I was so happy to be able to make music with students from other countries. We didn't use the same software, we didn't have the same kit... hell, we weren't even fans of the same music... but it was such fun trying to work on a project together and making it our own. I feel way more confident now to engage in new, more challenging projects. Thank you!

27 Oh, H. J., Ozkaya, E., & LaRose, R. (2014). How does online social networking enhance life satisfaction? The relationships among online supportive interaction, affect, perceived social support, sense of community, and life satisfaction. *Computers in Human Behavior*, 30(1), 69–78. doi:10.1016/j.chb.2013.07.053

28 Reid, G. G., & Boyer, W. (2013). Social Network Sites and Young Adolescent Identity Development. *Childhood Education*, 89(4), 243–253. doi:10.1080/00094056.2013.815554

Part Three | OPEN SoundS: Technology, research, education

Music Technologies between research and didactic: from electronic music to *Sound and Music Computing*

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1. Electronic Music and Electronic Sound

A large part of the popular music today is produced using information technology. The most immediate example is the high-tech version of the *one man band* (modern version of a street musician who plays all the instruments with some part of the body), which often in the piano bar manage a small panoply of electronic instruments able to simulate an entire virtual orchestra and that are often placed inside of a keyboard. Even the *karaoke* is an example of the not trivial use of electronic technologies that constitute a modern version of the *music minus one* dating from half century ago: in this case, the accompaniment of the amateur singer is realized in a completely electronic way and it is able to adapt itself instantaneously to both the vocal range and the capabilities of the interpreter. There are also countless examples of recording products that are made in the studio by very few people. Even classical music is often recorded using digital technology in immersive way: short audio excerpts are extracted from different performance *takes*, and then processed together by means of a meticulous editing work. The balance of the parties are determined a posteriori re-formulating the dynamics according to the director (and often also to the producers). In this sense, the recording of a classic piece is more like working on a movie that the recording from a performance played in a concert hall.

This way of doing is not related to the electronic music that it could be defined research music. The above examples represent a use of technological means aims to imitate and to substitute forms and traditional instruments. The electronic music research is designed to create new forms and musical expressions through the use of new technological devices, forms and expressions that were not even conceivable and feasible with traditional musical means.

As we know, when we talk about music we talk about notes, rhythm, dynamic, timbre, and so on. These elements are obviously linked to specific physical parameters (although the relationship is complicated by the phenomena of

perception): the frequency to notes, the time to rhythm, the energy to the dynamic, the spectrum for the timbre. Traditional music has, over the centuries, segmented physical spaces in which these parameters can be moved: there is a finite number of notes in the continuous space of frequencies, the subdivisions of the time do not permit the use of the continuity in the rhythm, dynamics is made of *pianissimo*, *mezzo forte*, etc., with very few other nuances, and, finally, the timbre is inextricably linked to musical instruments, and with them is identified. There are no timbres intermediate between two different musical instruments, although the spectral space is continuous. This segmentation is linked (i) to the needs of musical languages, initially simple, (ii) to the restrictions related to the mechanics of the instruments and (iii) to the limitations of human performers. Of course, the segmentation has brought with it a series of musical conventions that have been gradually adopted: in order to release these constraints, the languages are in perpetual evolution. It is also true, however, that cognitive system of the listeners is crystallized in this segmentation, i.e., their ability to listen and mediate between the reassuring presence of what is already known and the necessary introduction of new linguistic and expressive elements.

Conversely, the computer technology has allowed the sounds of not being forced by the constraints discussed above. The music produced by the means of modern technology moves in continuous spaces that the composer can refine and segment as she/he wish, continuously form from the basic primitives (sine wave, pulse, white noise), until their combinations and processing, even very complex. Even sounds recorded from the real world can be processed in a musical sense and integrated in the electronic sound universe.

In addition to release the music from the constraints imposed by the mechanical and physical limits of the nature, the birth of electronic music revolutionize the production system of the music itself: the composer, in addition to compose, becomes the luthier and the performer of the completed product, usually recorded on magnetic tape, which is configured as an *unicum* (Figure 1) on a par with the products of other art forms (painting, sculpture, etc.). The music changes its artistic category: it is an allographic art (i.e., art performed through the contribution of many actors – in the case of music composer and performer), and it becomes an autographic art (i.e., art in which there is a complete product *in se* at the end of the creation process)¹.

1 Nelson Goodman (1968), by means the distinction between autographic and allographic, not only distinguishes the replicas from the reproductions and the *falsifiable* works from those constitutively *unforgeable*, but faces the problem of the *identity-difference* relation between work and object, and between work and text.



Figure 1. The Israeli composer Josef Tal at the Electronic Music Studio in Jerusalem (~1965). The composer is also the performer (a Hugh Le Caine synthesizer, at right) of the completed product, usually recorded on magnetic tape (a Studer C37 recorder, at left)

2. The birth of the electronic music

At the beginning of the 20th century, in the music field there is a vertiginous research questioning the compositional instruments and the performance praxes used until then. Not only the twelve-tone system undermines the harmonic functions: Schönberg himself pays particular attention to the timbre, as testify the *Farbenmelodien* (melody of colors – i.e., timbres) on the third of his five pieces for orchestra, Op. 16, or the invention of the *Sprechgesang*, vocals/speech of the actress in the *Pierrot Lunaire*. Many others composers experience new paradigms in this important compositional period: among all, it is worth to cite Edgar Varèse, a true pioneer and visionary of a new music. Starting from completely different premises, even the Italian Futurists (Marinetti, Russolo, Pratella) participate fully in this fervor of inventions, by creating new forms of music and new instruments (the famous *Intonarumori*, see Figure 2).

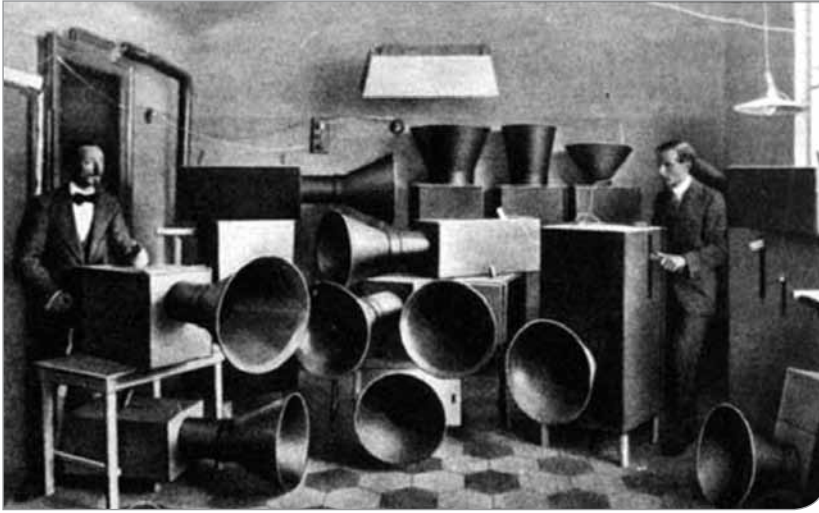


Figure 2. Luigi Russolo (at left) and Ugo Piatti (at right) with their *intonarumori*: devices for producing a broad spectrum of modulated, rhythmic sounds similar to those made by machines, but without imitating or reproducing them. In 1914, the first concert for 18 *intonarumori*, a work divided into eight different categories of sounds, caused a huge scandal in Milan

Despite all this, in the first half of the 20th century, contacts between music and electronic technology are absolutely odd, linked to the curiosity of the individual (such as Hindemith's interest for the *Trautonium* played by his friend Oskar Sala), rather than precise expressive needs. It is the second World War, in his tragic developments, to create the necessary technological leap to the composers. The Western world out of the conflict with the National Broadcast Radio Stations as a new pole of cultural aggregation, especially in the music field. Begins to spread to the magnetic tape and the computers are designed. Some young composers find themselves working in the offices of public broadcast radio such as shows directors and creators of musical performances, coming into contact with new technologies in the electronics laboratories internally on each broadcast radio station and beginning to use (often abuse) these technologies for musical purposes. They use the oscillators, filters and modulators combining them with the recording of small pieces of tape. These fragments are mixed together, giving rise to new combinations of sound. The electronic music is born.

The experiments of composers arouse the interest of the leaders of the broadcast radio stations who promote the realization of electronic music centres (Paris, Cologne, Milan, Princeton, Warsaw, Tokyo, etc.) as an element of prestige of this new stage that is distributed radio broadcasting. Of course, each of these centres has its own specificity and its own story, but they all contribute to the creation of this new form of art that is the electronic music and rapidly developing field in functional radio and film (Mathews, 1969; Pousseur, 1976).

The attention to new musical possibilities related to the electronic technologies will not remain confined in the radio stations. In Padova (Italy), for example, Teresa Rampazzi immediately grasped the importance of new ideas of electronic music. In the wake of effervescent activity of the *Gruppo N* (a group of artists dedicated to the design art, starting from innovative premises) is promoting the musical group *New Proposals Scores* (NPS) in 1965 (Figure 3). A few years later, she become, thanks to the enthusiasm of its director Wolfgang Dalla Vecchia, the professor – always in Padova – one of the first classes in electronic music in Italy at the Conservatories. In the research field, in 1957 Giovanni Battista Debiasi (Figure 4) was delivered at the University of Padova an organ based on a photoelectric tone generation system (copyrighted by Italian patents, in 1957, and by German Lichttonorgel, in 1960). This was the first step of the multi-disciplinary research in electrical/electronics engineering and music that led to the birth of the *Centro di Sonologia Computazionale* (Sound and Music Computing Center) of Padova (CSC, <http://csc.dei.unipd.it>), that is still today among the most leading laboratories in the world of computer music.



Figure 3. Teresa Rampazzi (with sunglasses, at left) with Alvis Vidolin (in the foreground, with white sweater), Giovanni De Poli (with beard, in the middle of the last row) and others



Figure 4. Giovanni Battista Debiasi, founder of the CSC at the University of Padova, and one of the fathers of musical informatics at the world level

Many musical instruments using electricity in different ways to produce sounds, called electrophones, have also been used in the field of popular music. Lets think of the most famous of all, the *Moog* synthesizer (Figure 5). The first record hit played entirely with the *Moog* was performed by Walter Carlos (now Wendy Carlos): *Switched on Bach* (based on the classical notations of Bach).

In the field of rock *Moog* and *Minimoog* are played, among the first, by The Beatles, *The Moody Blues*, Keith Emerson and Rick Wakeman.

In the world of jazz Sun Ra was the first to use the *Minimoog*, received in 1969 by its inventor Robert Moog.



Figure 5. Keith Emerson in the seventies while playing the monumental modular monophonic synthesizer MOOG III C, customized especially for himself by the electronic engineer Robert Moog in person. Emerson was the first musician to play a Moog instrument live: until then this synth was only used in a recording studio

From analog technology to digital world

If it is true that electronic music was born and developed within the public broadcast radio station, in other areas – mainly research centres in the universities and telecommunication fields – are evolving information technologies related to sound and music. In the seventies, the composers discover the potential of digital technology and adopt the computer as a natural evolution of the instruments developed in the analog broadcast radio station (Roads, 1996).

Thus were born, always under the pressure of the composers, the computer music centres. The most famous are the *Center for Computer Research in Music and Acoustics* (CCRMA), Stanford University; the *Institut de Recherche et Création Acoustique/Musique* (IRCAM) in Paris, and the *Centro di Sonologia Computazionale* (CSC), Padova University. One of the distinctive and innovative characters of these centres is the relationship among scientific research, production music and teaching. Composers and scientists have realized that the only possible way to reach important results is to work together, combining the compositional requirements with the rigor of scientific research. Of course, the results are important not only from the musical point of view: these centres (and others like them) reached a dramatic deepening of knowledge within the

acoustic and psychoacoustic fields. It is to them that the foundations are laid for some major technological innovations that are now part of everyday life, even in the field of technologies for teaching: Compact Disc, MP3, iPod, Dolby Digital Surround, software for editing sounds, etc.

The rapid evolution known by the computers in the second half of the last century leads to reduce the time interval needed to process the sounds to a imperceptible range, allowing to retrieve the relationship performer-musical instrument (the computer, in this case) and then reintroducing the causality between gesture and sound typical of the musician with his instrument. This evolution makes it possible to integrate the electronic medium in traditional music orchestra, mixing so freely the sound of mechanical instruments with the audio processing generated during the concert: the birth of *live-electronics* performer. The computer allows to control the processes (synthesis and sound processing) to a more abstract level than can be reached with the analog equipment of the sixties (generally based on the control voltage). As an airplane pilot maneuver his instruments – during the flight – all the equipment (mechanical and electronic) of her/his plane, and as the conductor controls by means of gestures – during the concert – the performances of different musicians, the interpreter of *live-electronics* processes using computers and Natural User Interface (NUI) – during the performance – the audio signal produced by other musicians.

Another innovation of computer music is the digital simulation of instrumental and electronic sounds. The first language dedicated to sound synthesis was developed by Max Mathews in 1957 (MUSIC I) at the Bell Labs. Other research centres (IRCAM, Melbourne, Glasgow, London) generate significant changes to the language, carrying out to the development of Csound (written in C by Barry Vercoe, MIT, 1986) and its derivatives CSound AV and Direct-Csound, still used today by many composers. John Chowning (Stanford University) developed in the seventies the frequency modulation method, based on a vibrato led to audio frequency, which allow the generation of very complex sounds using extremely simple devices. This created a new characteristic timbre space combining continuous frequency of: the carrier, the modulating frequency and the modulation index (an important example is *Turenas*, 1972). The digital sound synthesis had extraordinary impact on music writing, allowing composers to better understand the way in which sounds are made, and their effect on auditory system, totally transforming the orchestral composition. In this regard, Tristan Murail speaks about a revolution of complex sounds. The *Iteneraire* group (Gerard Grisey and Hughes Dufourt, among others) used in the orchestral composition the mathematical procedures of sound synthesis.

The music was perhaps the first artistic discipline to internalize all of these informatics innovation in its expressive language: from the nineties, all the performing arts used the computer.

3. Musical technologies: present and future

In recent years there was an epochal paradigm shift: the transition from the industrial society to the information society. The goods become intangible (information, knowledge, culture, etc.) forcing us to an urgent review of the values and rights protections (copyright, licenses, patents, etc.). If the fundamental research of computer music remains the prerogative of the universities, it is also evident that the change has completely transformed the opportunities of applied research in this area. The gradual movement of products from industries (electronic musical instruments, devices for the fruition of audio contents, etc.) to service industries (music service providers and content aggregators) offers unexplored perspectives of industrial application of knowledge development in the computer music field. In the industrial society knowledge and culture could be considered superstructural in a society based on renewable energy and on tangible products: in the information society infrastructure they become fundamentals. A concrete example of this change is the extensive multiplication of the technologies application fields, initially developed only for musical composition. Because if it is true that the computer music was initially based on the issues of composition, it has embraced over time increasingly wider areas, becoming a mainstay of research ranging from psycho-acoustic to musicology, creating entirely new disciplines. At the turn of the millennia, computer music is transformed into *Sound and Music Computing* (SMC), which includes many non-musical research fields (Bernardini and De Poli, 2007): if it is true that the de-materialization announced by the prophets of virtual reality is not (yet) taking place, it is also evident that the amount of material goods that use technologies related to the SMC are constantly growing. In more general terms, the information society will generate a progressive shift of paradigms of research: it will no longer centered on technology for its own sake, but directed to the solution of human beings' problems: the technological development will become a means to help human beings to survive in a world increasingly overloaded of information and complex that it is both the key resource and the main cause of pollution (as indeed were the sources of energy for industrial society).

In recent years, the **sound interaction design** is greatly considered, that is a very careful and rigorous (although still very creative) control of the enormous information loading that is routinely conveyed through sound. In essence, the sound interaction design is concerned with developing new strategies for the creation and production of so-called *everyday sounds*, to maximize their information content while reducing as much as possible the well-known unnecessary and annoying information. It is therefore a discipline that is rooted both in research and in industrial production but also in the more creative aspects related to design.

Lately this has also the focus for the **sonification** discipline that studies issues related to sound output data sets (instead of graphics and/or visual), too large or too complex to be analyzed with the usual tools. In this case, sub-sets

of considered data are associated with specific sounds (processed with *sound interaction design* strategies), taking advantage of our ability to understand the polyphony and the repetitions patterns by mean our auditory system. An example is the genome research: the DNA helix are difficult to analyze visually, while their *sonification* makes it instantly clear all the regular and irregular iterations. Even the psycho-motor rehabilitation strategies are now in widespread use of tools developed in the SMC field (e.g., to show unequivocally the presence of pathological elements, or to re-educate – by means audio feedback – a limb, or even in the development of musical instruments with special interfaces designed to allow disabled patients a better socialization).

The transition to the immaterial society also poses the migration of a number of material products toward the immaterial characteristic of this historical moment: documents must be digitalized to be preserved and must be retrievable by means the increasingly sophisticated tools and powerful. In today's society everything has to be stored, searchable, available to everybody, everywhere and every time: the implications of this paradigm are very important when referring to the sound field. In this context, SMC consider research activities related to the **preservation and restoration of musical and speech signals** (Godsill and Rayner, 1998), which are combined with the technology's innovations in storage and retrieval of information. This does not imply only protocols definition for digitization able to guarantee the documents preservation and the definition of new strategies for data storage, but also the study of new techniques of information retrieval (e.g., query by humming, query by example) in huge data mines, often not homogeneous and non-conventional – as well as strategies to return the sound adapting it to each different architectural contexts (home environment, concert hall, phone communication, etc.) and based on advanced tools for digital signal processing, guided by the knowledge of the internal history of the original document and the study of material and technological conditions that produced it. Relating to the audio enhancement research field, the CSC, in advance of the international scientific community, has developed algorithms dedicated to electronic music restoration, in which, being present sound material with characteristics similar to the noise, it becomes particularly difficult to separate the useful signal from not intentional noise (Canazza and Vidolin, 2001).

Other recent scientific research in the SMC field can be found in the analysis of musical performance, where computer models related to the representation of expressive components, emotions, intentions and affections are defined. Since the nineties of the last century, various scientific disciplines (systematic musicology, historical musicology, psychology, neuroscience, information engineering) studied the connections between two universes that may seem antithetical: emotions and machines, investigating the human-computer communication by means of expressive content, using a non-verbal channel. The aim is focused on the improvement of the human machine interaction using the typical channels of the human-human communication, which are less

frustrating and easier, especially for users with disabilities or without informatics skills (musicians, teachers, children). This research field is called Affective Computing in the United States, *Kansei Information Processing* in Japan and ***Expressive Information Processing*** in Europe (Canazza et al., 2004). The first studies in this field have been conducted by Sergio Canazza, Giovanni De Poli and Alvisè Vidolin (CSC, Padova) and by Johann Sundberg and Anders Friberg (KTH, Stockholm).

The Net and OPEN SoundS

The abandonment of the conventional structures of industrial societies (the factory, the company) and the birth of new businesses model completely virtual (search engines, social networks, etc.) require a complete rethink of the educational processes at all levels. The new generations are born and grow in the difficulty of finding out their functions within the new social structure. They must focus on content and potential (still largely unspoken) of the Net. We have already noted that these research areas are of vital importance in this society, and the music (in general, the SMC) is a privileged terrain of investigation.

OPEN SoundS (Leonardo Da Vinci project) fits in this context. OPEN SoundS offers a new dimension in training on the Net: the possibility to produce and share music remotely within communities: a transnational virtual studio.

The main objective of the project is to transfer to the students in different contexts operating tools, processes and practices related to the use of musical digital technologies from a collaborative and remote point of view. In particular, the project experience the extension of a informal learning model and its integration in a creative way, in teaching paths/processes that match the demands of the knowledge and information society, as well as the students individual needs and vocational. The platform developed during the project by the partners of the international consortium (Italy, Denmark and the UK are the countries involved) enables young students to: (i) build the first, structured, European educational network able to carry out creative musical projects in music in collaborative, remote and transnational way, (ii) develop digital and technology skills, and (iii) strengthen the sense of active citizenship through a collaborative practice that will involve a large number of young students (in the partner countries) music enthusiasts, (iii) increase the ability, the quality, the opportunities and the areas of job market.

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Part Three | OPEN SoundS: Technology, research, education

Drupal for Collaborative Educational Environments

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Brightonart and Nuvole

1. The Collaborative Model: Open Source and OPEN SoundS

The cornerstone of the OPEN SoundS project is remote collaboration, a new concept for music production in educational settings. Although the OPEN SoundS collaborative model is innovative in its domain, in other areas the concept of remote collaboration has been present and exploited for decades. A particularly interesting example is the development of software according to the Open Source model.

In the case of OPEN SoundS, a further parallel with Open Source software is the availability of the output in two forms, one for final use and one intended for reprocessing. In the case of a music file, the version for use (and therefore ready for immediate listening) is the final composition file, for example in MP3 format, while the version for reprocessing (intended for those who want to work on and improve it) is the set of the various samples available. In the case of a computer program, the version for final use is the “binary”, ready to be executed on a computer, and the version for reworking is the set of files used by programmers, the so-called “source code” of the program.

Another important commonality between OPEN SoundS and Open Source software, is the choice of license to apply to works and derivative works. This is utilised in OPEN SoundS to add significant educational value. The student users of the system, often for the first time, face the question of which license to choose for their works. The reference model in OPEN SoundS is that of Open Source licenses, developed over many years by the online community of programmers. The partners have selected the appropriate Creative Commons licenses¹ for the project which encompass the relevant concepts² for good use of copyright.

1 Creative Commons, *What is Creative Commons?*, available at: <http://creativecommons.org/about>

2 Nicolas Suzor, *What motivates free software developers to choose between copyleft and permissive licences?*, available at: <http://opensource.com/law/13/8/motivation-free-software-licensing>

The principles of OPEN SoundS reflect, therefore, in a natural way, the founding values of the free software movement and Open Source. As early as the mid-eighties, with the birth of the GNU project³, so-called “fundamental freedoms” were identified. All of these are strictly adhered to in OPEN SoundS. These freedoms include, in particular, the availability of the source code (which translates in OPEN SoundS to the obligation to make available to other users of the platform not only the final version of a composition, but also all samples and the data used to produce it); and the ability for any user to improve the software and distribute improved versions (which in OPEN SoundS translates into the ability to insert comments, new samples and audio files that can be incorporated in the initial project).

The technical choice of software to be used for the development of the collaborative platform could not disregard the affinities previously described. Open source software is the only type of software that can embody the spirit of the project and the only solution for creating a platform that can go beyond excellent technical implementation to constitute a living example of the collaborative development model, and bring human and didactic values to the project.

The two technology partners, Brightonart and Nuvole, agreed to collaborate at a distance on a common development platform, GitHub⁴. This allowed us to share with each other, and where relevant and necessary with the community of external developers, the source code and customisations applied, thus facilitating peer review of changes and improvements. In collaborating in this way the technology partners have brought their real-world experience in Open Source to the benefit of the OPEN SoundS project.

2. Drupal: a Powerful and Flexible Open Source System

Among the many Open Source frameworks available, Drupal occupies a key position and was readily identified as the best solution for OPEN SoundS.

Drupal is an open source content management system for web development. It is free, highly flexible and widely used in institutional and educational contexts for websites of any size.

In the institutional context, websites based on Drupal include the U.S. White House⁵, the London Assembly, those of the cities of Bologna and Genoa and the provincial administrations of Rome and Venice. In the educational sphere, Drupal is the most common solution for the websites of Italian universities: including,

3 Richard M. Stallman, *Il Manifesto GNU*, 1983, available at: <https://www.gnu.org/gnu/manifesto.html>

4 Github, *Build software better, together*, available at: <https://github.com/about>

5 *The White House*, available at: <http://www.whitehouse.gov/>

among others, the universities of Siena, Catania, Parma, Trento, LUISS, Brescia and Bocconi⁶; and is the platform used for Cambridge University's website.

A key element to the success of Drupal is the availability of thousands of modules that allow the customisation of the functions available on a site. These modules are programmed, in most cases, by volunteers or small businesses which form part of the international community at drupal.org. They are developed using a collaborative model that allows any member of the community to suggest improvements to an existing contribution or report problems to solve.

Drupal's large user base allows us to consider it a professional tool, sturdy and safe, with over 10 years of development behind it. The collaborative nature ensures a constant attention to the evolving needs of web users and to new technologies available. These new technologies are popular with young people and thus very appropriate for a project with a young audience such as OPEN SoundS.

Of particular interest might be the decision of the Directorate-General for Informatics of the European Commission (DIGIT) to base the whole Commission on Drupal web infrastructure. The Commission has developed an internal version of Drupal (the "Multisite" distribution) equipped with all modules commonly used in European portals. Two default installation profiles are provided, a "classic" for ordinary institutional sites, and one "for the community" intended for portals which include content from visitors and allow interaction between visitors⁷.

3. Drupal: Ideally suited to OPEN SoundS

As a transfer of innovation project, the primary technical goal for the OPEN SoundS platform was to build on the success of the existing MODEM platform and to provide the technology necessary to upscale from a demonstration system to a fully functional platform for use in schools and other institutions around Europe.

The requirements of the OPEN SoundS project were ideally suited to Drupal, which works well for community systems where many people need to be able to log in and interact with the system.

Several major new features in Drupal 7 were used in OPEN SoundS, in order to improve user experience and to allow the team to develop a bespoke system suitable for use in the sensitive environments of schools and other musical institutions.

The collaborative area, designed to host projects and students' discussions and contributions, was an ideal use case for Drupal's discussion system, which allows user comments that can be customised to contain files, text, images and

6 AA.VV., *Analisi dei siti Drupal italiani*, settembre 2013, available at: <http://top-websites.burtronix.co.za/drupal/italy/2013-09-02>

7 European Commission, *Mission statement of the Directorate-General for Informatics (DIGIT)*, http://ec.europa.eu/dgs/informatics/index_en.htm

multimedia content. Usability features were implemented to design simplified user interfaces for students to accept other contributions from their peers, and to bring these contributions into their projects.

Open Sounds needed different types of users: Students, Teachers, Project Partners and Technical Admins. Distinct user account roles were coded to allow this differentiation and to enable the different permissions necessary to ensure good management of the creative process and the correct levels of privacy to all users: for example, a teacher can enable personal accounts for the students of their own school, decentralising administration of the platform and thus improving its security.

Files contributed by students had to be safe but accessible to partners, so that they could be overseen to ensure good practice. Drupal facilitated the development of custom file access systems which allowed us to establish all relevant permissions.

Modern multimedia technology was one of the core requirements of OPEN SoundS. HTML5 media playback technology was integrated into Drupal to allow musical pieces to be listened to directly on project pages as well as allowing browsing and previewing of composite samples suitable for sharing and collaborative composition. The media players chosen featured the ability to play directly on mobile phones and tablets with attractive user interfaces as well as providing fallback to legacy Flash where necessary to give the widest possible support and ensure everyone could access the system.

Thanks to Drupal's multilingual system, the collaborative platform is available in multiple languages (English, Italian, French, Spanish and Danish). Project partners provided translations, working with the technical team to internationalise the whole interface, and thus to allow a fully localised user experience whilst facilitating communication across languages and countries.

The system is hosted on EU based servers on a complete open source system, thus ensuring very strong security and data safety credentials, in addition to providing the best possible visibility for internet users around Europe and beyond.

Open Source technology can be considered to provide very good outcomes for the project both in terms of its ability to allow us to maximise the resources available by benefiting from the work of thousands of interested developers around the world, but also in terms of the futureproofing and ongoing usefulness of the system that we have developed. The OPEN SoundS platform is based on strong open source technologies and therefore presents a fertile ground for future development, both in the current context of collaborative musical composition and also as a platform base for new projects in other educational areas.

4. Contributions of OPEN SoundS to the World of Open Source

Some aspects of the OPEN SoundS development project required a level of innovation that led us to work with the open source communities concerned

to move technology forward, and thus to contribute to the wider field in these respects.

In particular we needed to work with the teams developing Drupal's media and file handling systems. For some time Drupal has offered a good media system via the 'Media' module. The Media module is one of many Drupal projects that brings together open source developers from around the world to work together to provide features required by the community. This is a strong codebase with over 125 000 active installations worldwide, providing a base framework for a variety of media types to Drupal developers. In the case of OPEN SoundS we found that the project's requirements could not be met by the standard system, but that with some custom development for the project we could make use of the strength of the Drupal media project and build our own additional features on top. Certain aspects of the OPEN SoundS development, however, required us to become involved in state of the art developments in the Media module and associated file handling projects.

The particular aspect of the OPEN SoundS project that led us to get involved in cutting edge developments here was the granularity of permissions required for media file access: students' contributions needed to be accessible to other students in order to collaborate, but protected from interference by other people to ensure traceability and credit to their authors. In this respect we have contributed to the wider community by helping with the development of the system to make it more appropriate for use in collaborative educational environments.

Further work was necessary due to the particular necessities of the educational environment in the field of user management. A cascading permissions structure was decided on by the OPEN SoundS Partners so that project partners would be able to appoint teachers, and that teachers would in turn be able to enrol students. In addition, a requirement arose for Teachers to have special permissions regarding the management of students only within their schools. These requirements also led to us working with the community to develop and test leading edge solutions to the problems of working in a collaborative educational environment where very particular permissions structures are required to ensure the safety of student contributions whilst promoting collaboration.

The Open Source movement relies on the contributions made by developers to commonly held code repositories for its testing, security and development; but it is also very much in the interests of projects like OPEN SoundS to make these contributions. When contributions are made, other developers are able to conduct peer review and are able to take into account the specific needs of the contributing project in future developments of the systems concerned. It is always a pleasure to be able to work together with other open source developers and thus to take the movement forward. When developers work together in this way the benefits to the wider community are considerable.

Appendice | Appendix

I Partners | Partners



Istituto Tecnico “Attilio Deffenu”

<http://www.deffenu.it>

L'istituto Tecnico “Attilio Deffenu” di Olbia, promotore e coordinatore del progetto, da anni è leader nel territorio per l'attività di ricerca e di sperimentazione, in ambito educativo, finalizzata all'innovazione didattica e metodologica. Negli ultimi 10 anni ha partecipato e promosso numerosi progetti nazionali ed Europei, in rete con altre scuole per sperimentare con docenti e studenti nuovi modelli e metodi di apprendimento supportati dall'uso delle TIC. Quale sede di un Innovativo Centro Risorse Contro la Dispersione Scolastica, ha fornito, inoltre, un significativo contributo allo sviluppo di modelli di intervento per il recupero del disagio giovanile e la promozione del successo scolastico. L'istituto per le sue caratteristiche è sede di diverse iniziative legate al territorio, facilitate dalla presenza al suo interno dell'Auditorium della città di Olbia.

The Olbia's Technical High School “Attilio Deffenu”, contractor and coordinator of the project, is since many years the leader in the territory in the experimentation and research activities in the educational field, oriented to the didactical and methodological innovation. In the last ten years the Deffenu Institute has been involved in many National and European projects, building a schools network in order to experiment with teachers and students new learning models and new methods with the aid of new technologies. As the centre of an innovative “Centre of Resources Against the Scholastic Dispersion”, and “Service Centre for all local schools” has supplied, moreover, a meaningful contribution to the development of models of participation for the prevention of the juvenile uneasiness and the promotion of the scholastic success. The Institute for its characteristics is centre of various activities in the territory, thanks also to the presence in the school of the Auditorium of the city of Olbia.

EarMaster[®]

EarMaster

<http://www.earmaster.com>

EarMaster ApS è una software house danese, che lavora principalmente nell'ambito dello sviluppo e della distribuzione di programmi interattivi per l'educazione musicale. Circa due terzi delle scuole superiori danesi utilizzano EarMaster per i loro programmi di educazione musicale e il team EarMaster lavora costantemente a contatto con i principali educatori musicali in Danimarca per lo sviluppo di nuovi strumenti interattivi per l'insegnamento della musica. Essendo stato tradotto in 25 lingue, la maggior parte delle quali europee, il software EarMaster è molto utilizzato anche al di fuori dei confini danesi da scuole di musica ed educatori della maggior parte dei paesi europei.

EarMaster ApS is a software publisher based in Denmark, and working primarily with the development and distribution of interactive programs for music education. About two thirds of all Danish high schools use EarMaster for their music education program, and the EarMaster team is currently working closely with Danish leading music educators on the development of future interactive tools for music tuition. Being translated into 25 languages, most of which are European languages, the EarMaster software reaches largely outside of Denmark too, and is used by music schools and educators from the majority of the European countries.



DEI - Università di Padova

<http://www.dei.unipd.it>

Il Centro di Sonologia Coputazionale del Dipartimento di Ingegneria dell'Informazione (Università degli Studi di Padova, Italia), attivo sin dagli anni Sessanta, è stato ufficialmente fondato nel 1979. Tra gli anni Settanta e Novanta, il CSC è emerso come uno dei centri leader a livello mondiale per la ricerca nel campo della "Computer music". La progettazione e lo sviluppo di software e dispositivi hardware (filtri, schede digitali), condotte dai ricercatori padovani hanno rappresentato lo stato dell'arte sia dal punto di vista tecnologico che da quello musicale, e hanno prodotto collaborazioni con i maggiori compositori musicali contemporanei. Le attività del CSC possono essere raggruppate in quattro aree principali: ricerca scientifica, ricerca musicale, produzione ed esecuzione di opere musicali, insegnamento e attività di disseminazione. Il CSC ha portato significativi contributi allo stato dell'arte in diverse discipline scientifiche come il sound design, la conservazione e la promozione del patrimonio culturale musicale, e la riabilitazione cognitiva e fisica.

The Centro di Sonologia Computazionale (Sound and Music Processing Group) of the Department of Information Engineering (University of Padova, Italy) is active since the 1960s and was officially founded in 1979. Between the 1970s and 1990s, CSC emerged as one of the world leading centres for research into “Computer music”. The design and development of softwares and hardware devices (filters, digital boards) conducted by Paduan researchers have represented the state-of-the-art from both the technological and musical point of view, and have generated collaborations with several renowned contemporary musical composers. Activities of CSC can be grouped into four main areas: scientific research, music research, production and performance of music works, teaching and dissemination. CSC has led to advances in such widely differing fields as sound design, musical cultural heritage preservation and promotion, and cognitive/physical rehabilitation.



MidiWare

<http://www.midiware.com/>

Con più di 27 anni di esperienza, MidiWare ha conquistato una quota enorme nel crescente mercato dei software musicali e prodotti informatici in Italia. Attraverso la sua divisione Educational, MidiWare offre un ampio supporto per gli insegnanti di musica, scuole, conservatori, ecc. MidiWare offre seminari e corsi di formazione per i prodotti distribuiti, sia per gli insegnanti che per gli utenti finali. MidiWare educational è anche un Centro di formazione autorizzato ad operare a livello nazionale. Insieme ad altre importanti istituzioni europee, MidiWare è stato partner di progetti europei indirizzati a promuovere l'uso delle tecnologie digitali nell'educazione musicale, stabilendo collegamenti con molte altre aziende di settore e strutture istituzionali per costruire una solida rete di stakeholders nel settore della formazione e produzione musicale con le nuove tecnologie.

With more than 27 years of experience, MidiWare gained a huge share in the growing market of software and computer music related products in Italy. Through its Educational division, MidiWare offers an extensive support to music teachers, schools, conservatories, etc. MidiWare offers seminars and training courses for the distributed products, both for teachers and end users. MidiWare educational is also appointing Authorized Training Centres all over Italy. Together with other important European Institutions, MidiWare has been partner in European project addressed to promote the use of digital technologies in the musical education, establishing connections with many other companies and institutional structures to build a network of stakeholders in the sector of music learning and production with new technologies.



Nuvole

<http://nuvole.org>

Nuvole si occupa principalmente di comunicazione web per organizzazioni internazionali in Italia e in Belgio. Le soluzioni proposte da Nuvole utilizzano esclusivamente strumenti open source e coprono: siti web per aziende o progetti, gruppi di lavoro privati online, minisiti per conferenze ed eventi. Nell'ambito di progetti europei Nuvole ha contribuito a <http://europeancampus.eu> (portale dei master universitari europei) e <http://bolognaexperts.net> (comunità virtuale dove 1.000 esperti discutono proposte per semplificare il riconoscimento dei titoli di studio a livello europeo).

Nuvole works with international NGOs in Italy and Belgium to streamline their online communication. The solutions proposed by Nuvole rely exclusively on open source tools and cover: websites for companies and projects, private online working groups, mini-sites for conferences and events. In the field of European projects, Nuvole contributed to <http://europeancampus.eu> (a portal listing the European Masters Programmes) and <http://bolognaexperts.net> (a virtual community where 1.000 experts discuss proposals to simplify recognition of academic titles across Europe).



Brightonart

<http://brightonart.co.uk/>

Brightonart è una piccola, indipendente società di tecnologia sviluppatasi da alcuni anni a Brighton UK, sud di Londra, e specializzata nella gestione e nella realizzazione di progetti web poliedrici e per diversi ambienti. La società ha 11 anni di esperienza nel guidare lo sviluppo del web multilingue sui progetti UE, e dal 2000 ha fornito un'ampia gamma di servizi per web & media ad organizzazioni pubbliche e private come BBC, O2, UK Channel 4 Television e il Centro Pompidou di Parigi. La società ha costituito un punto di forza per il recente avanzamento di sistemi semantici open source, e per l'utilizzo di tecnologia per i social media in un contesto educativo.

Brightonart is a small, independent technology company specialised in delivering multi-faceted web based projects in diverse environments. The company has 11 years of experience in leading multilingual web development on EU projects, and since the year 2000 has provided a range of web & media services to public and private organizations including the BBC, O2, UK Channel 4 Television and the Pompidou Centre, Paris. The company has been a leading force in the recent advancement of open source semantic systems, and the use of social media technology in an educational context.



International Music Education Research Centre (iMERC)

<http://imerc.org>

iMERC (international music education research center) è stato fondato nel 2005 all'interno del Dipartimento di Lettere e Arte dell'Institute of Education dell'Università di Londra (IOE). iMerc.org è un luogo in cui i ricercatori in didattica musicale, i professionisti dei settori correlati ma anche studenti ed appassionati possono incontrarsi e scambiarsi informazioni e conoscenze in materia di: didattica musicale, psicologia della musica, didattica e musica per disabili, musica e sviluppo nell'età infantile, didattica della psicologia musicale, didattica della tecnologia applicata alla musica, esecuzione musicale, sociologia e didattica della musica e della musica corale, musica e salute e infine sviluppo musicale nell'arco della vita.

iMerc (the international music education research center) was founded in 2005 within the Department of Arts and Humanities (now Culture, Communication and Media), Institute of Education, University of London. iMerc.org is a place where researchers in music education, professionals in related fields, as well as undergraduate students and enthusiasts, can get together in a virtual exchange of information and knowledge in the field of Music Education, Music Psychology, Special Needs Education and Music, Early Childhood and Musical Development, Philosophy of Music Education, Music Technology Education, Musical Performance, Music Curriculum, Sociology of Music and Music Education and Choral Music Education, Music and Health and Musical Development across the Lifespan.

