How Computers shape Educational Activities at Casa da Música

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In this paper we present the main ideas that shape musical experiences in the context of the Education Service program at Casa da Música, Porto and analyze how computers, applications and technology in general are part of a strategy that aims to provide a broad access to music making. A particular emphasis is given to technologies that have been purposely developed in order to fulfil particular needs of our program. We describe how a technologically enhanced musical education culture is emerging and how Factor E, the resident educators team of CdM, is constantly setting up new challenges that lead to innovative practices and to the development of new tools and artifacts.

Keywords non-formal music education; computers; innovation; laboratory

1. Introduction

Casa da Música was conceived to be part of Porto, European Capital of Culture, in 2001. A remarkable building designed by Rem Koolhas was created exclusively for musical purposes, and since its opening in 2005, Casa da Música (CdM), has been developing as an institution with an inventive and wide cultural project that promotes the national and international musical scenario. The philosophy of CdM is based in a very broad and eclectic idea of Music: Casa da Música aims to be the home of every music, therefore it hosts music from a wide range of areas, from classical music to jazz, from fado to electronic music, from the great international productions to more experimental projects.

Fig. 1 *Casa da Música*.

Education was inscribed in the philosophical roots of the project and is regarded as an essential part of its mission. Education at CdM is seen in a very eclectic and broad manner: we believe that Education is not a synonymous of School and dispute the idea of Music as an activity exclusively accessible to musicians, which others can only contemplate. The function of the Education Service is to provide ways for everyone to develop personal relationships with Music. The Education Service offers, therefore, a broad range of activities for a broad range of publics, from babies and their parents, children, families, schools, adults, elderly, people with special needs, experienced musicians as well as new comers, teachers or communities. The construction of these relationships involves many aspects and it can be done in different manners: Listening, Making, Creating and Knowing. The more we listen, make, create and know about music, the better we comprehend it and this comprehension is the basis upon which Music exerts its power, fascination and pleasure on us. The Education Service tries, therefore, to provide different ways of exploring the possibilities of having a relationship with Music so a person can enter through different doors (and build his/her own Education) and different people can have a place in the house (Casa) of every music.

In practical terms, the educational program is divided into two broad classes: the Regular Activities and the Projects. Whereas Regular Activities are short musical experiences that tend to be completed within one or few sessions, the Projects develop in several sessions, throughout weeks or moths and tend to end up with a public performance. Regular Activities are open to all (having, of course, specificities according to the target audience), whereas Projects are designed bearing specific groups in mind (communities, for example). Regular Activities include the following categories: Hot Spots, Workshops, Espectáculos (Shows), Formação (Training) and A Casa Vai a Casa (a service that allows musical activities to be developed outside CdM, for example in

community groups, hospitals, prisons or other institutions). The Projects are tailored to the specificities of particular groups and can vary a lot. We´ve had projects in a prison with mothers and babies (Bebé Babá), projects with families (Orquestra de Famílias Reais) or schools and communities (Aniki Bobó or Histórias do Norte), for example. These projects are the complement of the two main big projects that aim at disable people (Ao Alcance de Todos) and community groups (Sonópolis).

The development and implementation of such a program (about 1300 events in 2007 and a similar figure in 2008) relies on a great number of external educators and musicians. There is, however, a core team that guarantees a substantial part of the Regular Activities and some of the Projects, too. This team is designated Factor E and it is regarded as the resident educators team. Factor E is a group of ten young musician/educators that create, develop, test and implement educational activities specifically designed to meet the specificities of the Education Service at Casa da Música. They are experienced, creative, and versatile and they have very different skills and musical expertise. The work of the group has a laboratorial basis developed over a series of creative residences, in which the technological aspect is frequently a strong element. The skills of these educators allow the development of a range of activities, from the more conventional approaches to the more technological mediated (computers, sensors, video, electronic interfaces) and the aim of this work is not only to guarantee an important part of the educational activities the Casa da Música needs, but also to innovate and reflect upon new ideas that can inspire and be used by other educational agents.

2. Computers and Educational Activities at Casa da Música: State of the Art

Educational activities with computers were amongst the first to be offered on a regular basis since the beginning of Casa da Música, in 2005, with HyperScore workshops being a case of success among schools. In early 2007, a new trend was initiated and a set of programs developed on purpose opened the perspectives of musical experiences with computers into new areas. These included the applications Narrativas Sonoras, Políssonos and Digital Jam. At around the same time, a series of discussions was initiated with partners from universities and research institutions in Porto, namely the Institute for Systems and Computer Engineering of Porto (INESC Porto), the School of Music and Performing Arts (ESMAE) and the Porto Catholic University (UCP), addressing the issues of providing a broader access to digital music making within informal contexts and contributing to the development and spreading of free software. It was within this framework that the idea of creating Digitópia, a Platform for the Development of Communities in Creating Digital Music emerged. In July 2007 Digitópia was officially opened, its visible face being a centre installed in the main entrance hall at Casa da Música equipped with computers representative of the available state of the art for regular use. The choice of software was oriented, in the first place, to the use of reliable free software with a wide range of capabilities for music making. Some commercial programs were also installed in order to fulfil occasional requirements that free software applications do not fulfil. Later, some controllers such as keyboards and drum-pads were added and more recently the possibility to listen to all computers at the same time, therefore enabling collective music making. Digitópia is open for free use by anyone, everyday, and for three hours a day, seven days a week, an assistant is available to explain and introduce the project, as well as helping people dealing with the computers and software or talk about musical ideas. The profile of these assistants is quite broad, ranging from young composers or advanced music students to digital musicians without formal musical training and a true sense of community and participation in the evolution of the project is emerging due to exchanging of information in daily reports as well as regular meetings. Digitópia also hosts workshops, according to a predefined schedule, and some of the assistants of Digitópia are part of Factor E, which means that there is a great understanding of the tools and full potential available. A full description of this project is beyond the scope of this paper and can be consulted in [1] and [2]. It is important, however, to realize that Digitópia fulfils an important role in Casa da Música´s educational program and has an impact well beyond its actual location and original purposes: it became a paradigm and a boost for a technology oriented culture that now encompasses many of the Education Service activities.

a)

b)

Fig. 2 a) *Digitópia.* b) *Assistant.*

3. A closer look at some regular activities and projects

In this section we group several regular activities and projects according to the categories: create, knowing and making music. It is obviously an exercise in reductionism, since all activities have aspects of all categories. It is however possible to consider that some of these characteristics are more important than others in certain activities.

3.1 Create music

In the first group, "create music", we include the workshops Compor com Loops (Composing with Loops), Compor com Instrumentos Virtuais (Composing with Virtual Instruments), Compor com Sons do Quotidiano (Composing with Every Day Sounds), Som a Som se Faz a Canção (Sound by Sound, Making the Song). These are short composing experiences (the duration of a workshop is 75 min), the first three being individual or in groups of two, per each computer of Digitópia. The users might hear some historical examples and learn basic ideas of articulating sounds (texture, structure, density, intelligibility) by doing their own small composition after learning some basics about one or more tools thought to be more adequate for the age and purpose of the composition. These workshops can be performed with children. aged from 6, up to adults. The applications used may include Pompiloop, Garage Band, Políssonos, Narrativas Sonoras, Ableton Live, Reason, HyperScore, HighC or others. The purpose is not the learning the application but to have a creative experience in manipulating and articulating sounds in a musical manner. The workshops are led by groups of two educators and this allows for the utilization of different applications within the same group of people. By the end of the workshop everyone listens to the work produced by others, through the loudspeakers installed in he facility. The case of Som a Som se Faz a Canção is different: it is a collective experience of composing a "song" (it can be any type of music, including instrumental pieces) by recording sound by sound or phrase by phrase, with a multi-track audio/midi recording application. In this instance the users do not deal with computers, one of the educators does, while the other does the interaction/composing work with the group of people. Again, this is an experience that can be successfully performed with a broad range of ages.

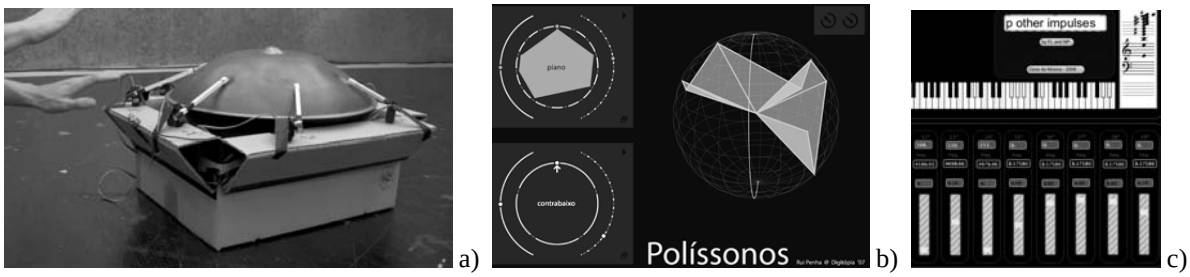
3.2 Making music

In the second group, "making music", we include the workshops Orquestra Digital (Digital Orchestra), Bandas Sonoras em Tempo Real (Real Time Sound Tracks), Beats& Bytes, Sound=Space, Pássaros e Cores (Birds and Colors) and the short project OrCA (Orquestra de Computadores e Autómatos). The first two occur at Digitópia but, unlike the ones previously described, they are truly collective music making experiences, making use of the loudspeakers installed. A typical set up may include many different applications at the same time, different interfaces (keyboards, drum-pads) and the learning of the application is reduced to a minimum. The purpose is music making, either improvised with more or less control, or directed by the educator who establishes specific rules and/or structures. The case of Bandas Sonoras em Tempo Real (Real Time Sound Tracks) is really a variation of the first, and the purpose there is to understand how music/sound works with the moving images, by making music as a response to imagery. Beats & Bytes is a percussion workshop with a strong technological component: contact microphones that pick up sounds from the walls or the floor of the room where it takes place, microphones that pick up the sound of voices or acoustic instruments which are then processed by a computer or used to trigger previously recorded sound, real time recording and manipulation of sounds, real time loop composition, etc. Like in the case of Som a Som, in this workshop the public is not involved in the technological aspects, one of the educators is. The workshops Sound=Space, make use of the interactive musical environment created by Rolf Gehlhaar which is essential an echo-location system connected to a computer that produces sounds according the positions of users in space or amount of movement produced by them. In this non-formal learning environment, participants of different ages, abilities and musical training are invited to listen, play and compose music (real-time) using their body movements in a surveyed space. The user's musical thinking becomes materialize in the way he moves and in the choices he makes when interacting with the system and with the other participants. The system has been used also in projects with disabled people as well in a major project in the Underground network whereby people could come and record their own sounds and be part of an evolving collective piece of interactive music to celebrate the World Day of Music. All the above-mentioned workshops are available to a wide range of audiences, from schoolchildren to adults. In the case of the Sound=Space they can be as young as 4 years old. Contrasting with this, the workshop Pássaros e Cores is offered only to schools of the 5 and 6th grade, because of the specific nature of some of the game-like activities. It explores the ideas and sonorities of Messiaen´s music and makes use of applications that have been specifically developed for this experience, like samplers that can be easily loaded with sounds developed by the group or with images that are projected as part of the scenic and ludic component of the workshop. OrCa (Orchestra of Automatons and Computers) was a laboratory of creation and performance with computers

develop with adolescent students during one week in the summer holyday. Several activities were developed to challenge students to make use of different software and diverse controllers to create music. Besides the pure musical experimentation, each participant could develop his own instrument making use of different software and controllers such as the Wii remote control or Wacom tables, amongst others. These instruments were rich in timber and easy to use, offering many possibilities in composition, improvisation and group performance in an experience that, above all, was musically rewarding. A small robot that played a hang drum (Lula) was part of the project, leading to present developments in building a robot that plays the gamelan of Casa da Música.

3.3 Knowing music

A third group of experiences is related with "knowing" physical and mathematical concepts that allow a better understanding of sound and musical aspects. Física e Matemática do Som (Physics and Mathematics of Sound) and Políssonos use applications that were developed by members of Factor E for the purpose of these workshops. They have a strong graphics component and they allow an easy understanding of concepts such as harmonic series, intensity and amplitude, beating, minimum common multiple number, regular and irregular polygons or permutations. Políssonos is particularly effective in introducing ideas about rhythm, form, melody or scale, for example, and Física e Matemática do Som, provides real time experiments in acoustics, an experience that books difficultly can provide.



a) b) c)

Fig. 2 a) *Lula*. b) *Detail of Políssonos.* c) *Detail of Física e Matemática do Som (Physics and Mathematics of Sound).*

4. How computers shape the educational activities at Casa da Música

Looking at the range of educational activities offered by Casa da Musica it becomes quite clear that computers have an important role in many of them. The cases mentioned above are just a few examples of a trend that we see developing further and further. In some cases, computers are the musical instruments that people use in a Workshop or in a Project. In some others, computers are not the instrument people deal with but they provide particular aspects of the musical and pedagogical context in which the activity develops. At Digitópia, computers are available for creating music at any time without supervision or with little tutorial help at certain times. Interactive spaces such as the Sound=Space or the Public Sound Objects allow anyone to explore music making. In projects with disabled people or very young children computers offer quite often an alternative that conventional instruments do not allow. Computers are being used in a great extent, but more than that, they are establishing their "own agenda", that is, they are shaping a substantial amount of what we have to offer. The Education Service has a short life of so far, but we believe that there are certain interesting aspects emerging and we feel it is possible to understand the driving force of this evolution.

Computers became part of our work and, lately, of our lives. Some of the most interesting recent developments in music are related to the fact that ordinary computers and mobile devices acquired capabilities to make, record, store and spread music, while becoming available to a greater number of people. An "active relationship" with music is nowadays within the reach of people that did not go through the process of formal musical education, due to an increasing number of software applications that allow creating and making music in a friendly and intuitive manner. We are witnessing a true worldwide revolution in the way we create, perform, spread, listen and learn music. The strong presence of computers in educational music activities at Casa da Música is therefore just the consequence of an almost natural and unavoidable phenomenon. The fact that we deal a lot with young generations that were born "plugged in" the computer world makes us particularly aware of its potential and interest. Computers as tools allow a major shift in the way we deal with music education. Traditionally musical activities are strongly dependent on achieving technical abilities before enjoyment and creativity take place. Computers allow a number of difficult steps to be removed and democratize the access to music making and creating, in a similar manner they do in other fields. An experience such as a workshop with

Políssonos or HyperScore would only be possible, a few years ago, with many musicians playing and a deep understanding of the codes of musical language. Computers have also created sound possibilities that were simply not available before. In certain cases they add a certain “magic” which is really important. It is therefore natural that people develop an “affective” relationship with computers: they facilitate our urge to create and make music, they provide new means of expression, they allow inclusion. In the context of non-formal learning, which is where the Education Services operates, this is fundamental. In many instances computers are the only viable option for a first encounter with music. This attraction also exists for educators, and Factor E is no exception, on the contrary. The fact that there are several members of the team with capabilities to program creates yet another front to be explored and there is a permanent challenge in developing new ways, frequently personalized, of dealing with known ideas. It is very much a question of exploring the limits of creativity. Technology becomes an interesting subject of discussion and creation. We believe, however, that we look at technology as means to an end and not as an end in itself. Our strategies tend to make use of commercially available applications, freeware, as well as some others that were purposely developed for the activities of the Education Service. We look at ways of combining different applications in the same activity to attain specific musical and educational ends. We choose sometimes different applications to implement the same idea, according to the capabilities of the people involved in the activity. We have abandoned a tool-based, tutorial-dependent concept of organizing musical activities and started to deal with technology the same way we do with the instruments in an ensemble, that is, composing with them in order to attain a musical goal.

5. Conclusion and future directions

We presented some examples of computer-mediated activities that allow us to fulfil one of the most important objectives of the Education Service, to make music available to everyone. In our work we put a strong emphasis in applications and technologies that we develop at Casa da Música. This has allowed us to develop specific ideas for which solutions were not immediately available. Frequently, simple original technological solutions are developed as an answer to a request for a particular activity and this is taken and incorporated as a common resource that then evolves further because establishes new challenges that need new answers. We believe this is a major source for continuous progress and innovation. We are entering a time where computers are really becoming creative tools allowing the expression and development of original ideas. Education and music will certainly benefit from it immensely. It is, however, necessary to realize that a computer by itself is just a tool. It needs to be shaped for specific needs. The big advantage nowadays, is the easiness of programming a computer and the possibilities that before would require a great amount of work and/or money. The evident idea that computers enlarge and extend pedagogical activities also brings the question of how to use them. In specific tasks, the computer can do "all the work", leaving the user unaware or unfamiliar with what happens. Practices and competences can be lost or diverted. Nowadays, different software make available, by the push of a few buttons, complete works of music. This trend exposes the danger computers can have in pedagogical contexts. The idea of being emerged in the work, developing motivation, skills, meaningful strategies and autonomous thinking can easily be lost by the use of computers. Computers should therefore emphasize practice, devotion and creativity, not laziness.

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