The Reflective Practice in Interaction Design at PUC-Rio's Design Program

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Abstract

The article presents the practical-experimental methodology adopted within the teaching of "Interaction Design" in the Undergraduate Program in Design-Digital Media at PUC-Rio[1]. In the course it is mandatory for the students to attend a class named *Interfaces Físicas e Lógicas* (Physical and Logical Interfaces), in which students are encouraged to solve complex interaction design problems by using Physical Computing resources. In the article, a series of students' projects is presented and commented. The article also comprehends a discussion on issues such as reflective practice, a concept proposed by Donald Schön; design practice by Cross and Polanyi; ubiquitous computing, by Mark Weiser; and Physical Computing, by O'Sullivan.

Keywords

Interaction Design, Physical Computing, Reflective Practice, PUC-Rio

Introduction

The Undergraduate Design Program at PUC-Rio offers four majors: Visual Communication, Product Design, Fashion and Digital Media. The pedagogic approach adopted in the program is grounded in an integrated curricular proposal for the majors referred above, which comprehends theory and disciplines of fundamentals, hands-on activities, and project development. In this context, it is mandatory, for the students of Design–Digital Media, to attend the class named *Interfaces Físicas e Lógicas* (Physical and Logical Interfaces). In this article we discuss Interaction Design as an emerging area of design, from the framework of its concept; practice; and teaching initiatives in design school.

The concept of Physical Computing is also presented, to support and explain the pioneering work that is currently under development at PUC-Rioin Brazil, within the *Interfaces Físicas e Lógicas*' class, and in the LIFE lab. In addition, the concepts of Reflective Practice and Tacit Knowledge are brought as proposed learning methodology, exploring the relationship between the theory of design and its practice.

To conclude, a selection of projects developed in the LIFE lab, and also in the class*Interfaces Físicas e Lógicas* is presented, aiming to exemplify the variety of creative processes resultant from the learning of Physical Computing based on reflective practice.

[1]PUC-Rio – Pontifícia Universidade Católica do Rio de Janeiro

Interaction Design: a new area of Design practice

Computer technology has become, since the end of the 20th Century, more and more present in our lives. Recently, digital systems have been integrated in everyday objects and activities, in a post-desktop context that has been called Ubiquitous Computing.

In 1991, computer scientist Mark Weiser, from Xerox Palo Alto Research Center (PARC), created the term ubiquitous computing. In his own words: “The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.”[2]

Weiser sees technology as a natural extension of our bodies. In his seminal paper The Computer for The 21st Century, he brings the example of written language toillustrate his idea: we live surrounded by signs, books and TV monitors, without being conscious that we are reading all the time. What Weiser proposes with the concepts of ubiquitous computing and Calm Technology is something similar, which meansthat digital devices should be able to assist us in our daily lives, in an invisibly and non-intrusively way.

The scenario described by the author as computing’s third wave isconsidered an evolution,inrelation to the previous generation of the personal computer and the graphic user interface. While in the personal computer the mouse-keyboard-monitor interface handles numerous tasks –each task in individual windows in the same operational system –in thecontext of ubiquitous technology we would have many digital devices, handling individual tasks and also sharing information between them.Nowadays we have less computers and more computing around us. Since the beginning of the 21st century, only 2% of the 9 billion microprocessors manufactured are used in desktop and laptop computers.[3] The other 98% are used in mobile phones, pads, TVs, sound systems, toys, printers, videogame consoles and gadgets of all kinds.Today welivesurrounded by digital interfaces embedded in objects thathelp us in a number of activities related to communication, information, entertainment, health and wellbeing.

The Design field, after the emergenceof interactive technologies,iswitnessing the rising of a new era of design practice. Designers, besides being users of digital interactive systems, are gettinginvolved in the processof development of the interfaces,which are responsible for the mediation between the computer systems and men. This new area of Design practiceis being called Interaction Design.

A key subject in the Interaction Design area is the discipline known as Physical Computing – in Brazil, *Interfaces Físicas* – which explores the relationship between the physical world and computer systems. Through the use of software,hardware, electronics, sensors, microcontrollers, automation systems and motors, the Physical Computing devices are digital interactive systems that feel and react to the physical world. (O’SULLIVAN, 2004)

Even though the study of Interaction Design and Physical Computing is a global trend, in Brazil not manydesign schoolsare teaching interaction design yet. There are currently around 330 undergraduate design programs in Brazil, but only seven of them offer a specific trainingin Interactive Media. (PINHEIRO. 2011, p.32) Among these seven courses, is the PUC-Rio’sDesign-Digital Media undergraduate program, in whichtheresearchis conducted. Since 2007, the Arts and Design Department of this university offers the Design-Digital Media major, besides the traditional majors in Visual Communication and Product Design.In this program, the *Interfaces Físicas e Lógicas*class is, since 2009, the first Physical Computing class offered in a Brazilian undergraduate design program.

Teachers and researchers who were particularly inspired by the works being developed in New York University’s Interactive Telecommunications Program (ITP),the cradle of Physical Computing, were invited to collaborate and planPUC-Rio’s course. This article presents the discussion conducted during the planning and development of the course, and its impact inthe teaching of Interaction Design in Brazil.

Aiming to bringthis new area of knowledge to the practice of design, we started by searching for references in Design’s own epistemology.In this context, the writings of many authors,such as CROSS, SCHÖN and POLANYI were studied.All the authors highlight the importance of the practice of design as discipline. However, although these authors refer to the relationship between design and its practice, they don’t specifically coverinteraction design and physical computing subjects.

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[2]WEISER. 1991, p.1

[3]BARR e MASSA, 2006

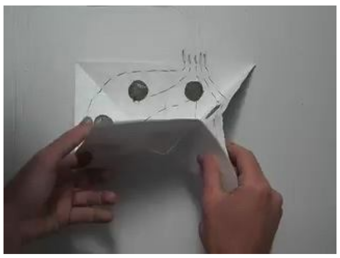
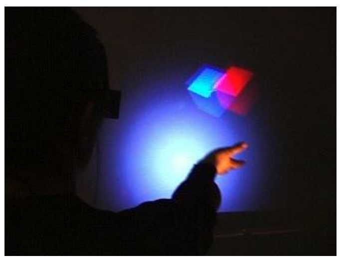
In this study,the relationship between design practice and the teaching of Physical Computing based on a practical experimental approach is explored.The resulting work from this approach is investigated, and an analysis, according to parameters as relevance, personal growth of the student, creativity and knowledge acquired is made.

Physical Computing

Concerningthe area of Interaction Design,as posted before, one main subject is the discipline known as Physical Computing, which may also be described as the one in which the integration of computer systems with sensors and actuators occurs. In this context,

Sensors are mechanisms that translate information from the physical world into electronic information that will be handled by the computer system, as for instance buttons, light sensors, temperature sensors or pressure sensors.

Actuators are devices that are controlled by the computer system and act on the physical world, as for instance motors, LEDs and solenoids.


Figures 1 to 3: Examples of Physical Computing projects. (1) Fold Loud, by Joo Youn Paek: sounds are generated based on the folding of an origami-like paper structure. (2) Untouchable Object, by João Bonelli: a virtual tridimensional object that can be viewed and manipulated, but not touched. (3) Wooden Mirror, by Danny Rozin: a mirror where small pieces of wood change position,in response to body movements,forming an image.

The term Physical Computing was coined in the realm of the Interactive Telecommunications Program (ITP) from New York University. Since 1971, the graduateprogram is home to some of the most significant research in the area. Widely known technologies such as QuickTime VR, the Processing programming language, Arduino and the first interactive television were developed there. The current chair Dan O'Sullivan is internationally recognized as the creator of the term Physical Computing, and is the author, with Tom Igoe, of the pioneering book *Physical Computing: Sensing and Controlling the Physical World with Computers*. In the introductory chapter of the book, the authors wrote:

> We believe that the computer revolution has left most of you behind. Steve Jobs had similar thoughts when he founded Apple Computer and set out to build 'computers for the rest of us'. The idea was to enable people who were not computer experts – like artists, educators, and children – to take advantage of the power of computing. The graphical user interface (GUI) popularized by Apple was wildly successful, widely copied, and is now the standard interface of almost all personal computers. (…) Now we need to make 'computers for the rest of you'. We need computers that respond to the rest of your body and the rest of your world. GUI technology allows you to drag and drop, but it won't notice if you twist and shout. It's made it easy to open a folder and start a program, but we'd like a computer to be able to open a door or start a car. Personal computers have evolved in an office environment in which you sit on your butt, moving only your fingers, entering and receiving information censored by your conscious mind. (…) We need to think about computers that sense more of your body, serve you in more places. And convey physical expression in addition to information.[4]

In Brazil, PUC-Rio is the first university to include Physical Computing contentin an undergraduate design program. Since 2008, the Design - Digital Media program of this university includes classes of*Interfaces Físicas e Lógicas*, dedicated to the teaching of physical computing.

[4] O'SULLIVAN. 2004, p.7

The *Interfaces Físicas e Lógicas* classes*:*Physical Computing content in an undergraduate design program

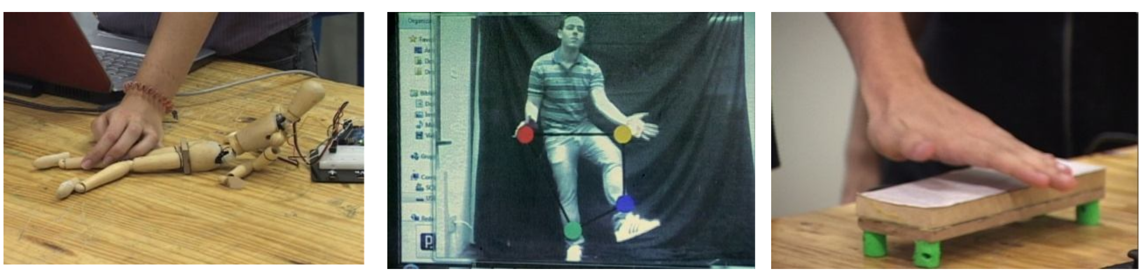
In PUC-Rio's undergraduate design program, the students are required to choose between one of the four offered majorsin Design: Visual Communication, Product Design, Fashion and Digital Media. Specifically in theDesign - Digital Media curriculum, four classes cover aspects of Interaction Design: *Hipermídia* (Hypermedia); *Design e Expansão dos Sentidos* (Design and Expansion of the Senses); *Design de Objetos Inteligentes* (Design of Smart Objects); and *Interfaces Físicas e Lógicas* (Physical Computing).

In the realm of the *Interfaces Físicas e Lógicas* class, the students acquire the skillsnecessary for the practical experimentation with Physical Computing projects. It is a mandatory class, planned for students attending the seventh semester of an eight semester major in Digital Media. Being senior students, they are already aware of the issues related to interaction design, and have a wide understanding of design processes and methodology,since at this point of theircourses,they have already developed at least six design projects in the mandatory design project classes.

In the *Interfaces Físicas e Lógicas* class, the students learn, by practicing, programming, electronics and the use of sensors and actuators. By the end of the oneacademicsemester class, the students must develop a physical interaction project, and present a working demo of it. For the development of the projects, the students need to learn specific techniques required to build it. Many times the students needs to collaborate with other areas of knowledge such as engineering and computer sciences.

The syllabus of the class includes:

- Introduction to programming in the Processing language
- Electricity and Electronics
- Use of sensors and actuators
- Computer vision
- Mobile development
- Interaction Design project development



Figures 4 to 6: Examples of projects developed in the *Interfaces Físicas e Lógicas* class. (4) A puppet that responds to your social network's status, by Camilla Slotfeldt and Daniel Palatnik; (5) A dance-based interface that interprets your movements into music, by Bruno Medaber and Hugo Benchimol; (6) An electronic gesture-based percussive musical instrument, by Wesley Oliveira and Pedro Reis.

LIFE: PUC-Rio's Physical Computing Lab

The LIFE – *Laboratório de Interfaces Físicas Experimentais* is an initiative of PUC-Rio's Arts and Design Department that aims to providean appropriate environment for the practical development of Physical Computing Projects. The lab, established in february 2013, has 36 sq. meters of floor space equipped with computers, open source software, electronic components, Arduino boards and a small library.

The lab is planned to bea space dedicated to the creative experimentation in interaction design. The goal is to provide computational and electronic resources, to allow innovativephysical computing projects.

Fig. 7 to 9: students at work in the LIFE lab.

Ever since the implementation of the lab, a variety of Physical Computing projects was developed in its premises. A significant selection of which will be shown at the end of this article.

The reflective practice learning experience

> What designers know about their own problem-solving processes remains largely tacit knowledge – i.e. they know it in the same way that a skilled person 'knows' how to perform that skill. They find it difficult to externalize their knowledge, and hence design education is forced to rely so heavily on an apprenticeship system of learning. It may be satisfactory, or at least understandable, for practicing designers to be inarticulate about their skills, but teachers of design have a responsibility to be as articulate as they possibly can about what it is they are trying to teach, or else they can have no basis for choosing the content and methods of their teaching. (CROSS. 1982, p.224)

Many researchers have studied the issue of the practice of design, its characteristics and peculiarities. What defines the designer's practice, how do designers work, how do they think? A first step towards understanding design as a discipline is to try to establish relations to the major areas of knowledge. Would Design be part of the Human Sciences, Exact Sciences or the Arts?

Historically, since the beginning of the modern age, there have been attempts to make design more scientific. Cross (2001) identifies a search for scientific design in thinkers like Le Corbusier, who defended the concept of the house as a "machine for living", and Theo Van Doesburg, who defended that "Our epoch is hostile to every subjective speculation in art, science, technology, etc. The new spirit, which already governs almost all modern life, is opposed to animal spontaneity, to nature's domination, to artistic flummery". Later, in the sixties, Buckmister Fuller defended a "Design Science Revolution": science, technology and rationalism to overcome the human and environmental problems that he believed could not be solved by politics and economics.

Herbert Simon, referring tothe relation between Design and Science, states, "The natural sciences are concerned with how things are...design on the other hand is concerned with how things ought to be." (SIMON *apud* CROSS 2001, p.51) To Simon, Design would be the Science of the Artificial – a body of intellectually tough, analytic, partly formalizable, partly empirical, teachable doctrine about the design process. It would use the scientific method, exact, in the construction of the artificial world.

Horst Rittel and Melvin Webber were pioneers in the concept that scientific principles wouldn't apply perfectly to the practice of design, architecture and urban planning. In the seminal article "Dilemmas in a General Theory of Planning" the authors define the projectual problems of design as "wicked problems", fundamentally unamenable to the techniques of science and engineering, which dealt with "tame" problems.

Diverse authors as CROSS, BUCHANAN and SCHÖN have addressed the issue of the wicked problems in the practice of design as a starting point to the conclusion that the designer has its own unique way of thinking and working. In the 1982 article "Designerly ways of knowing" (1982), Cross establishes Design as a third area of study, through the analogies with the two other major areas of knowledge: Sciences and Humanities. In the study, Cross states that the importance of the culture of design is not easily recognized, but some comparisons – that,will be shown below – are possible between Design, the sciences and humanities, taking into account parameters as phenomenon, method and valuesas follows[5]:.

The phenomenon of study in each culture is:

- in sciences, the natural world

- in humanities, human experience

- in Design, the man-made world

The appropriate methods in each culture are:

- in sciences, controlled experiments, classification, analysis

- in humanities, analogy, metaphor, criticism, evaluation

- in Design, modeling, pattern-formation, synthesis

The values of each culture are:

- in sciences, objectivity, rationality, neutrality, and a concern for 'truth'

- in humanities, subjectivity, imagination, commitment, and a concern for 'justice'

- in Design, practicality, ingenuity, empathy, and a concern for 'appropriateness'

In this context, the term Design Thinking has been evoked as "the identification of the mental processes that are necessary to identify and understand Design problems and to create Design solutions" (LAWSON, 2006. p.129). It is common to a number of authors the notion that there is a specific mannerfor the designer to analyze and create solutions inthe process of a design project.

Physical Computing as Design Practice

In the precedingsection of this articlewe refer to the singularity of designer's process of solution of complex problems. In the present section we propose a discussion on the ways and methods for the development of this skill to solving complex problems. In this regard, we consider professor Donald Schön'spoint of view extremely relevant[6]. He suggests an approach for the teaching of design and architecture based on its practice, a concept he namedReflective Practice. Schön identifies that there is a component of artistry in the practice of the professionals that we recognize as being successful in their careers – in several areas, not only in design. He relates this talent to the capacity to deal with 'complex problems that escape the canons of rationality'. In his words, 'there is a central nucleus of artistry in the practice of the professionals that we recognize as being the most competent' (SCHÖN. 1988, p.22).

Schön advocates that practical experimentation with the real situations of the professional practice is the best way to prepare a future professional, a concept that he called "reflective practice", based on the ideas of 'knowing-in-action' and 'reflection-in-action'.

According to the author, knowing-in-action is 'the type of knowledge that we reveal in our intelligent actions'. (1988. p.31) When we do something intelligently, the act of knowing is in the action done. The knowledge is revealed by the performance, by the execution. An example: when we are riding a bike, we are not aware of the theory of how to ride a bike. We are not consciously aware of the complex movements of

[5]Cross. 1982, p.221

[6]Donald Schönwas an influential thinker in developing the theory of reflective practice. From 1968 until his death in 1997 he was a professor at the Massachusetts Institute of Technology Department of Urban Studies and Planning.

our body to compensate and equilibrate our weight in motion. We simply do it, and different people will explain differently how they do it. To learn how to ride a bike it is necessary to try it until your body associates it in a tacit manner.

Schön based his study on the concept of 'tacit knowledge' coined by philosopher Michel Polanyi. In the book The Tacit Dimension (1967) Polanyi writes about 'knowing more than you can tell' and of tacit knowledge, defined as 'the formation of experience in the search of knowledge' (POLANYI. 1967, p.4).

The author makes an analogy between knowledge and the way we catch a ball in the air – the way we adjust and extend our arms while the ball is approaching, and the way we can predict the result of our act based in our prior experiences; or also with the way we saw a line traced on a piece of wood, which requires a constant process of detection and correction of any deviation in the line.

Schon also cites British philosopherGilbert Ryle when trying to establish a relation between the act of designing and doing: 'Thinking what I am doing' does not connote 'both thinking what to do and doing it'. When I do something intelligently, I am doing one thing and not two. (RYLE. 1949, p.29).

The academic activity of reflective practice gathers the characteristics of freedom of experimenting without the compromising of time and the high cost that are usually present in the real conditions of the professional practice of design.

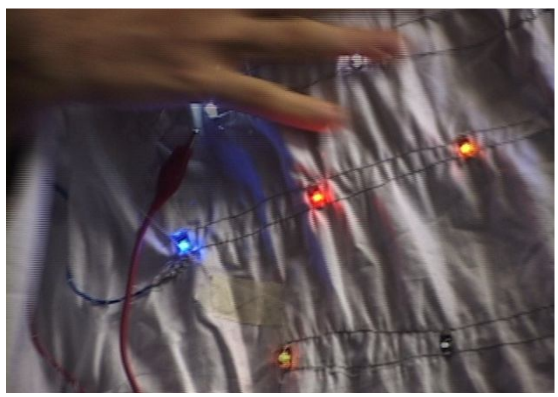
This is the environment that inspiresthe practical-reflexive teaching and researching of Interaction Design in the LIFE Lab, in the *Interfaces Físicas e Lógic*as class, and in PUC-Rio's Design -Digital Media program.

Projects

A selection of projects developed in the LIFE Lab is shown below, in order to allow a reflection upon the variety of Design processes resulting from the learning methods based on the reflective practice of interaction design.

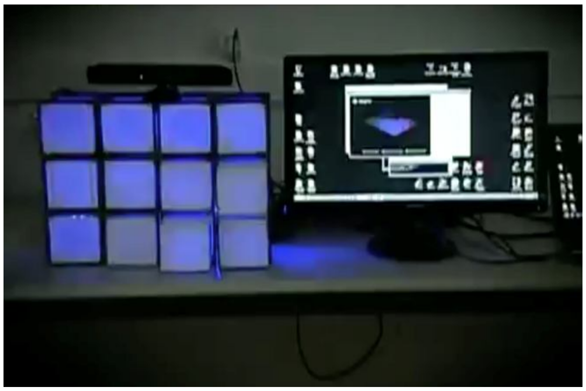
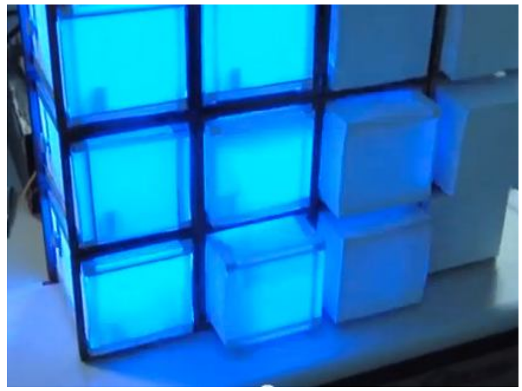
1. Parangolés

Students Natalia Bruno and Carolina Secco



In this Product Design undergraduate thesis project, wearable technologies are used in an interactive vesture that encourages socialization in an elderly people group. The project is inspired by the work of Brazilian contemporary artist Hélio Oiticica, who created the first Parangolés as vesturesdesignedfor free expression.The students' project was developed in collaboration between the Product Design Project class, the *Interfaces Físicas e Lógicas* class, the Introduction to Computer Sciences Class (from PUC's Computer Sciences Department) and the LIFE Lab. Product Design student Natalia Bruno collaborated with Design-Digital Media student Carolina Secco in the research, creation, prototyping, testing and building of the wearable vesture. In an interdisciplinarycollaboration, each student brought to the project knowledgerelated to the more specific area of design practice: the product design student collaborated with product prototyping, testing and building; while the Design-Digital Media student collaborated with interaction, electronics and programming issues. For the development of the project the students used the Arduino Lilypad toolkit– developed by MIT's High-Low Tech Research Group[7] – along with leds and conductive textiles sewed onto the wearable apparel. To be able to experiment with wearable technology the students had to acquire knowledge of e-textiles and electricity.

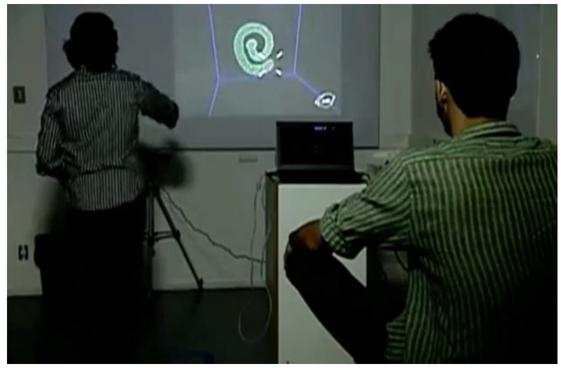
2. Tangima
Student Rafael Crespo

The Design-Digital Media undergraduate thesis projectTangima (from *tan*gible *ima*ge) is a volumetric display that is capable of dynamically reproducing a tridimensional image in the physical space.The project was developed in collaboration between the *Design e Expansão dos Sentidos* class, the *Interfaces Físicas e Lógicas* class, the Design Project Class, the LIFE Lab and the *Laboratório de Volumes e Protótipos* (Product Design Lab).The concept of the project was primarily defined in the *Design e Expansão dos Sentidos class* – the first idea was to create a display that would dynamically change shape to offer a tactile interface for the visually impaired.In the *Interfaces Físicas e Lógicas* class, the student learned to acquire and interpret a digital tridimensional image using the Kinect sensor[8], the Processing programming language and the Simple OpenNi library[9]. In the Design Project Class the student experimented with various means for building the physical display, in a process that included extensive experimentation with different types of motors (continuous DC motors, servo motors, stepper motors). Working in the Product Design Lab, the student experimented with gears and bearings to create thedynamicallymoving structure. For the final building of the working prototype the student experimented with 3-D printing and laser cutting.During the development of the project, the interface migrated from the first proposal of offering a tactile interface for the visually impaired; to a second proposal of offering a tactile interface for remote intimate relationships; to a more open proposal where many uses come together besides the ones previously cited – dynamic visualization of graphics, topography, display of information, tridimensional visualization.In a thorough hands-on approach, the student was able to generate, test and reflect upon the design solutions he was proposing in anenvironment that favors creativity and out-of-the-box solutions for wicked design problems. After its completion the project received a grant from the *Instituto Rio Patrimônio Histórico*(Rio de Janeiro Historical Patrimony Institute) to further develop a large-scale version of the project, planned for exhibition in November 2014 in the *Centro Carioca de Design* (Rio de Janeiro Design Center).

[7]http://hlt.media.mit.edu/?p=34
[8]The Kinect sensor is a depth camera developed by Microsoft to be used with their videograme console Xbox. Originally developed to generate physical inteaction with their videograme console, the sensor was later hacked and made available for use by the community. http://www.xbox.com/en-US/kinect
[9]The Simple Open Ni is a library for theProcessing programming environment that allows the interpretation of data acquired by the Kinect depth camera. The library was developed by Max Rheiner. https://code.google.com/p/simple-openni/

3. DIn3D
Student Antonio Thiele



The Design-Digital Media undergraduate thesis project DIn3D isa gestural interface for 3D modeling. The system uses a Kinect sensor to recognize gestures and translate them into a virtual 3D model. The project was developed in collaboration between the Design Project Class, the *Interfaces Físicas e Lógicas* class, the LIFE Lab and the NEXT[10] Lab.Antonio, an intern in the NEXT Lab – PUC-Rio's tridimensional experimentation group –wanted to experiment withprocedural 3D modeling and printing. His goal was to produce a more organic way of dealing with 3D modeling, in opposition to the traditional Cartesian model. In the *Interfaces Físicas e Lógicas* class, he got acquainted with the Kinect sensor and the Processing programming language, and started experimenting with point cloud visualizations and gesture recognition. Inspired by the act of modeling clay with one's bare hands, the interface evolved into the concept of using no tool but the user's hands to generate a virtual 3D model. The student often referred to his project in terms of being 'an interface that you can use naked', this meaning without any devices attached to the user's body.After testing several modes of interacting with the depth camera, the student decided to use the Simple Open Ni library and the Processing development environment to recognize the user's gestures in spacein order to manipulate a virtual sculpture that can later be exported and 3-D printed. In anextensive experimentation process, the student was able to define, test and refine the interface. After its completion, the project was awarded 6thplace in the Intel Perceptual Challenge Brazil Award, in October 2013.[11]

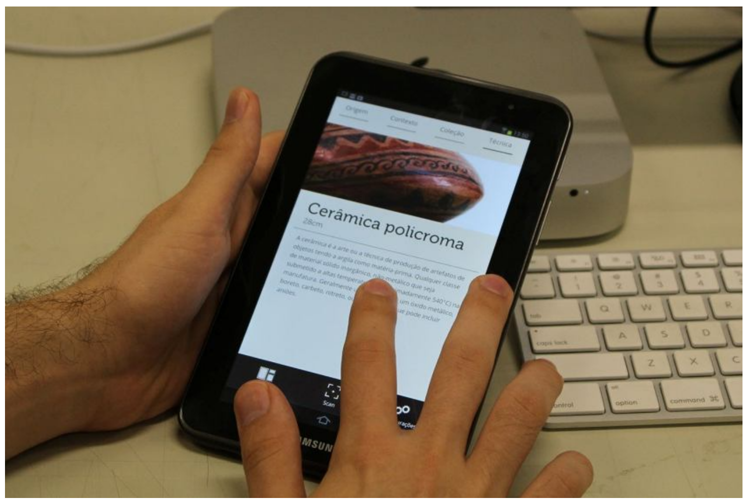
4. TatuAR interactive tattoo
Student Gabriela Schirmer

The Design-Digital Media undergraduate thesis projectTatuAR uses Augmented Reality technology to create a virtual tattoo that is viewable only in mobile devices and can also be shared in social networks.As a starting point, the student wished to explore the body as a surface for artistic expression. Gabrielaaimedatdesigning a technology that would allow people to virtually draw on the skin, without the

[10]NEXT – Núcleo de Experimentação Tridimensional PUC-Rio (Tridimensional Experimentation Group)
[11] Intel Perceptual Challenge Brasil: http://intel.ly/1aDGDQU

permanence of tattoo ink. In a thorough practical-experimental process, the technologies of Projection Mapping and Augmented Reality (AR) were tested. The AR opportunity was considered more viable because it didn't depend on a video projector to form the image on the skin. The mobile development approach allowed for portability and embodyment. The project has two components: a tag – the part that is attached to your skin– and the mobile software that recognizes it and generates the virtual tattoo in the screen of the device. For development of the tag,Gabriela experimented with different graphic techniques: rubber stamp, adhesive labels and removable tattoo.For the development of the software, the student– who had a prior knowledgeof Processing Programming Language acquired in the *Interfaces Físicas e Lógicas* class – had to deepen her knowledge of JAVA Programming and Android Mobile Software Development. The project relied on anintense process of experimentation and testing.

5. ArtScan
Students Vitor Moura, Fellipe Ladeira and Matheus Villaça



The project ArtScan was developed in the Design Project 3 class, in collaboration with Rio de Janeiro's *Museu Nacional*(Natural History Museum). Itwon the *Prioridade Rio* grant from FAPERJ[12] to be developed in the LIFE Laband implemented in the museum. In the Design-Digital Media program at PUC, the students are required to complete 8 Design Project courses before graduating. In Project 3, the main focus is in the development of basic design methods and skills, and the students are encouraged to searchforreal design opportunities in society. In the collaboration process with the museum, the fact that there is much more information on the web about the works exhibited than is actually available in the exhibition space came up as design challenge.The project solution adopted uses the technology of QRCode in a mobile application to provide context-based hyperlinks to information in order to enhance the experience of the visitors of the museum.The studentsdeveloped the concept, wireframes, navigation and layout for the mobile applicationin the design project 3 class. The project won the grant from FAPERJ to be produced in the LIFE Lab and implemented in the museum until december 2014.

[12]Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ) – Rio de Janeiro State Foundation for Research Fundinghttp://www.faperj.br

Conclusion

The projects described in this articlereveal that there is in the Design-Digital Media program at PUC-Rio an environment established as a space for the reflective practice with interaction design.This environmentfollowsPUC Rio design program methodologies and educational philosophy,which encouragecreativity andexperimentation in the approach of design wicked problems.

In this context, the LIFE Lab is the physical space designed as a catalyst for these processes, allowing for interdisciplinary collaboration with other areas of knowledge– notably computer sciences and humanities.

Themain purpose of this space resides in the exchange of experiences, ideas and challenges, and for that the environment is preparedwith the necessary infrastructure that comprehends computing devices, mobile devices, electronic components, sensors, actuators, prototyping materials, video projection capabilities and wireless internet. Besides that, the geographic proximity with the other labs of the Design program – the Project Design Lab, the Fashion Lab, the Graphic Design Lab, the NEXT Lab and the Video and Animation Lab – allows for transdisciplinary design practices. In this permeable and creative environment, the students are encouraged toexplore design issues in non-conventional ways.

Last but not least, we hope to contribute to the transformation of societythrough design.The fact that this work is being recognized in the form of partnerships, grants, awards, exhibitions and publications confirms that we might be on the right path.

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