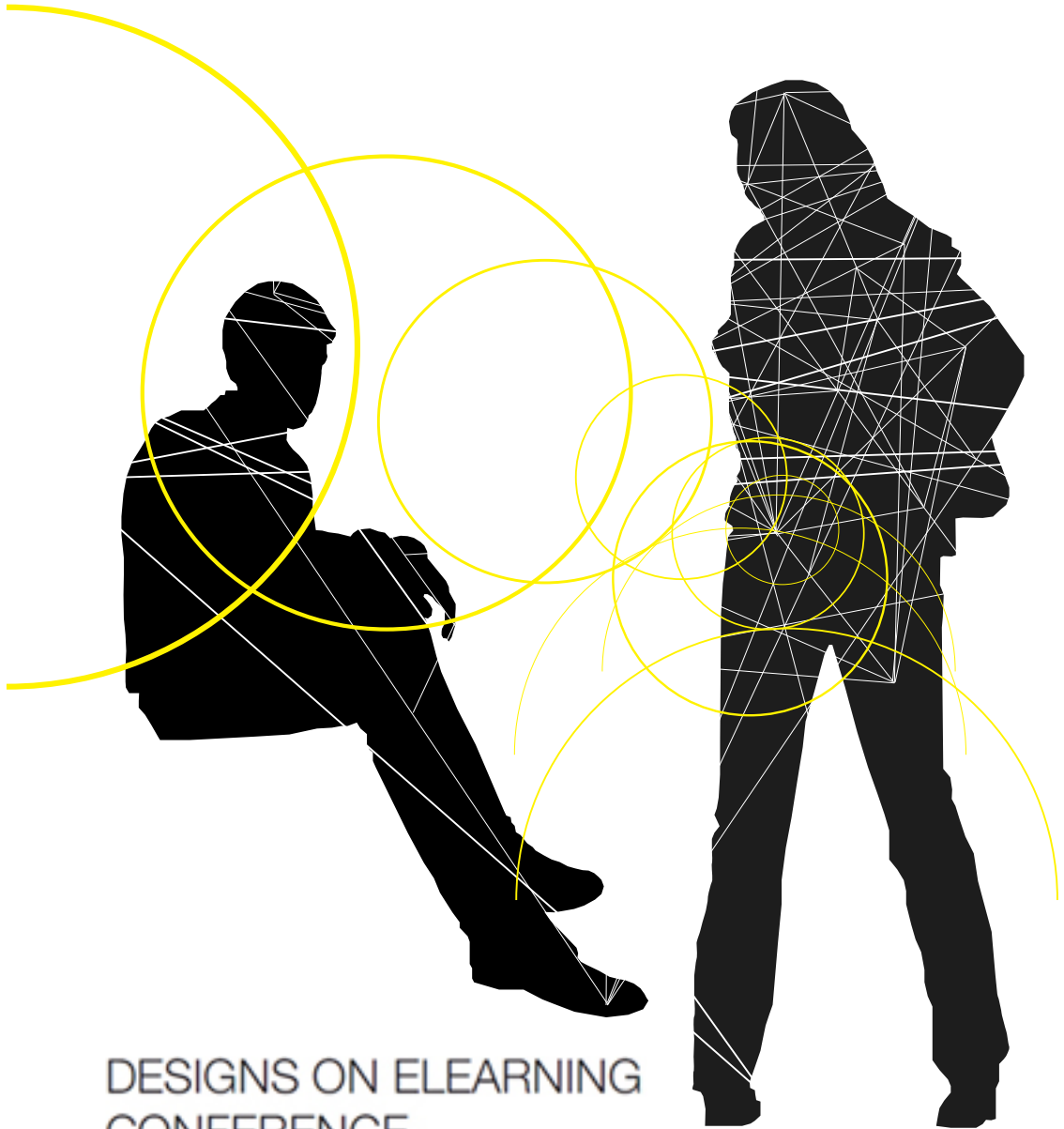


Stefan Sonvilla-Weiss & Owen Kelly (eds.)

future learning spaces



DESIGNS ON ELEARNING
CONFERENCE
PROCEEDINGS 2011

DoEL 2011: introduction

Stefan Sonvilla-Weiss

The notion of space regains fresh momentum every time anew we interact with the world around us. As mobile devices weave into the fabric of everyday life, one is no longer confined to a specific location, time and place in accessing and interacting with communication technologies. Thereby the interfaces become more adaptable and fluid according to the user's needs for switching seamlessly between augmented, real and virtual information and communication techniques and practices. In educational contexts, however, we are still entangled in the three-dimensional space of Euclidian geometry with which we commonly associate the institutional place of action, yet overlooking at the same the temporal dimension in it. Fragmentation, acceleration, accumulation, synchronicity, ubiquity of information storable and retrievable at different locations at the same time finds its equivalent in mobile and flexible living-, learning- and working arrangements.

The conference topics of investigation delves into these temporal intertwined modes of action between individuals, groups and institutions so as to uncover hitherto unexplored and unarticulated concepts and experiences which would help us to co-develop the creative spaces of the future.

The scope of investigation and participation is conceived as an interdisciplinary dialogue and discussion among students, academics, researchers, decision and policy makers, entrepreneurs and practitioners from various fields.

Specific emphasis is laid on cross-disciplinary dialogue between architects, designers, media artists, educators and entrepreneurs who are passionate about challenging novel media and means of interaction.

The main conference topics deal with the technological, social, cultural and aesthetic dimensions of creative learning spaces and will be discussed in four panels with the following themes:

1. Open experimental space
2. Institutional space
3. Social learning space
4. Networked space

How strongly do social software tools impact on current practices in e-learning in general, and second, what are the implications for the student's mode of interaction (social factor), aesthetics (interface culture) and techniques (interoperability)? Some of my findings derive from actual research on learning ecology and multiple reality constructions, which reciprocally both affect and are affected by multiple facets in socio-economic and culturally encoded concepts of living.

One of these aspects relates to competitiveness in a global job market, which is in fact the driving force behind the concept of lifelong learning and the prevailing motivation of our students to continuously qualify. Interestingly, yet not surprisingly, connectivity has expanded into fluid forms of networking on the basis of immaterial value exchange. Shared spaces where people can communicate, exchange and aggregate information, co-author and co-create areas of common interest, need flexible and adjustable arrangements. Some of the key problems include the limitations of interactions with structured tools; another confinement relates to interface design, communication and learning tools.

As an alternative to conventional tools we want to explore how modular tools can expand functionality; to what extent social tools encourage individual expression and connect learners and content; how synchronous tools can be integrated; and how learner-centered tools encourage learning ecology. The types of tools suggested include Blogs, Wikis, Virtual Worlds, social tools, networking tools, collaborative spaces, and connection-making protocols. But how do these alternatives provide the learner with control of the type of content explored, and how do they explore to effectively meet their learning goals?

In the Open experimental space discussion we want to look at the lessons that can be learned from the creative use of architectural space, and the modes of interaction that can arise within it. We will reflect upon innovative & interactive collaborative learning techniques.

How do social media, augmented spaces and networking tools constitute new forms of blended learning? In the Social learning space panel we will explore connectivism & strategies for learning in mobile spaces.

Can we expect to see smooth technology working in sustainable ways?

In the Networked space discussion we want to discover how is learning affected by the metaverse, ubiquitous computing & the reconceptualisation of cities as dynamic learning spaces?

How does institutional space extend into informal networked space and what would be the role of the university if many of its current services were disaggregated to specialist providers on the web?

At the core of the Institutional spaces discussion is the question what would happen if we share resources across the institutional boundaries and to work together in a spirit

of collaborative research and teaching?

Digital network culture has not only been changing the modes of media production and distribution: it coevally conveys emerging models of cooperation, communication and interaction by accumulating various ideas, talents and capabilities. Hence, the tasks of tomorrow's artists is that of an intermediary, a catalyst between diverse fields of knowledge, ways of thinking, social models and solution strategies. The protagonists of this development, hackers, software artists, media and knowledge designers who are irrespectively showing strong commitment in the face of considerable risk, are opening up new territories in which their role and their scope of action have not yet been fully explored. This alludes to critical inquiry, research and development in socio-political and scientific contexts.

Quality Assurance and the Phenomenological Space Design

Mauri Ylä-Kotola

Scientific Summary

When we talk about quality in our everyday lives, we mean success all around. Quality management means controlling and directing quality strategically. It is an approach that has become part of the development of processes in traditional industry as well as knowledge work. In the business world, quality management has seen as a means to achieve economic benefits, lower costs and increase profits.

Clearly, these aims are not directly applicable in the university context. Historically, quality assurance in the universities has focused on the products, scholarly works and services that the institutions produce. Peer review has served as the principal mechanism for gauging the quality of academic work such as staff publications or student theses. Indirect methods for assessing a university's performance include tracking graduates' career advancement. More often than not, however, competent quality assessment has remained the province of historians.

The recent cultural discussion has been dominated by the never-ending debate about the modern and postmodern culture. But can we also define, what is modern and what is postmodern quality assurance philosophy?

It is usual to consider modernism as a continuation of the Enlightenment and postmodernism as a new Romanticism. What connects modernism to the Enlightenment is first and foremost universalism; what connects postmodernism to Romanticism is cultural pluralism. Generally speaking, the Enlightenment and modernism believe in one reason; whereas Romanticism and postmodernism believe that there is no universally applicable reason, but different belief systems that cannot be compared with uniform criteria. It is also possible to think that in one production process there is only one pattern of indicators for the quality management or that there are different belief systems of quality that cannot be compared with uniform criteria.

According to the Enlightenment, human nature is the same everywhere and every time. It is through rational discussion that people and societies can find the right goals for them as well as the effective ways to reach them. This discussion is made possible by the human ability to use language and think rationally. Reason is an ability on which human relationships are based. It is reason that makes emancipation and progress possible.

Romanticism, on the other hand, is interested in what is special in individuals, groups, peoples, and nations. One cornerstone of Romanticism is nationalism; another one is ex-

pressionism. According to expressionism, genuine expressions of human emotion must take precedence over clinical and one-dimensional scientific rational concept of quality. What Romanticism emphasizes is genuineness as a symbol of quality and human nature instead of artificiality.

The previous characterizations of the Enlightenment and Romanticism can be reasonably well applied to modernism and postmodernism as well. At its purest, modern art was Bauhausian: scientific, ahistorical, and universal. The quality of art means that right combinations of colors and shapes could be determined by the structure of the human sense organ; understanding the principles of human sensomotoric functions made functionalism possible. Using information aesthetics, beauty as an aesthetics quality could be found somewhere between chaos and repetition.

Postmodernism, on the other hand, emphasizes distinction, differences, new tribalism that is created when people join various subcultures and leave them. The quality systems of different groups are equally valuable and cannot be evaluated with a uniform criteria.

The modern conception of quality assurance entails a range of procedures, processes and systems that will ensure and improve quality. Quality in this context means adherence to procedures, processes and systems that can be clearly articulated and are appropriately geared to achieving the objectives set. Underpinning this notion of quality is the mindset embodied in technical norms; as Georg Henrik von Wright put it, “If you want A and think that you are in situation B, your most rational course of action is X.” This approach in effect asserts that it is methodical and consistent action which produces quality.

Georg Henrik von Wright’s archetypal technical norm sets out not only the goals of the action but also an analysis of the situation and a specification of the means by which the objectives are achieved. In quality assurance work at many universities, the values of institutions are integrated into the systems of management, which purpose is to produce quality. However, management is not possible without constant analysis of the university in its operating environment. It is a process based on the development of various evaluation measures and indicators and the interpretation of the information they produce.

Following Georg Henrik von Wright, the general goal of metadesign can be said to be the specification of technical norms:

Our example is: If we want to produce spatial media space services that interest chinese people, we have to use certain methods of expression and production.

In their most general form, technical norms express an objective, A, a belief concerning the state of the world, B, and a means, X:

If you want A and think that you are in situation B, you should do (it would

be reasonable for you to do) X.

If we express the above example in terms of this equation, we obtain the following:

If we want A

If we would like to produce spatial media space services that interest chinese people

and we think that we are in situation B

and we think that certain cultural norms, audiovisual forms of understanding and perception determine whether chinese people are interested in a certain spatial media space service or not,

we should (it would be reasonable for we to) do X

we should use certain means of expression and production.

A technical norm such as this is true if the carrying out of X is truly a means of achieving A in situation B. Technical norms are contingent in that they are binding only on those people who accept the goal expressed in the conditional statement. If we think of the structure of for example media science, term A is media philosophy, which explores the goals and values which serve as our starting points in developing media. Term B is research in spatial media space culture. Actual guidelines (X) are provided by media design (the design of expression) and media education, which rely on terms A and B.

In order to design spatial media space service which is actualized as a particular mental representation, we must recognize what we can accomplish with regard to multimedia and ascertain the values our target audience ascribes to multimedia and the manner in which they perceive it. Thus, media research based on the traditions of humanistic and cultural research is an essential part of, and precondition for, media research in the industrial arts; but it does not encompass the entire discipline. Media design provides guidelines for how to create a spatial media product which the user will perceive in the desired way and it can thus be seen as a precondition for successful MediaSpace-based advertising. We can design two things: the physical spatial media product and the spatial media product as it exists in the user's mind.

In planning a media product in the user's mind, we can postulate a certain ideal user with certain culturally determined forms of audiovisual perception. At the same time, however, we must bear in mind that advertising and popular culture are consciously changing these perceptual habits to render them more receptive to new media products. In this connection, one might mention Andy Warhol, who not only created art but also changed the parameters according to which we perceive it. Media Space education is the branch of metadesign that specifies the means used in situation B to create the models and schemata that guide our perception of media products. For example, works of art

that fail to fit our established patterns of thought might change the way in which we perceive audiovisual material and spaces. Media design (the design of such products), guided by the appropriate scientific foundation, might provide media education with a useful tool for the phenomenological design.

The physical space created by the artist is more than a starting point for the mental space created by the perceiver; it has the potential to change the way the perceiver forms such spaces.

In this case, our example takes on the following form:

If we want to produce spatial media space services that interest Chinese people, we have to use the expressive, productive and technological methods that correspond to the present Chinese expectations of what constitutes an interesting media space service; or we have to use the expressive, productive and technological methods which yield a media product that, in being used, will change the norms that govern what Chinese people consider interesting.

Thus, a media product as a mental representation is the outcome of two parallel processes of design: physical design and phenomenological design.

One interesting example of two different quality assurance policies is in the area of aesthetics quality: is beauty universal quality? According to Romanticism, Russian beauty is different from German; according to postmodernism, beauty in the world of Miami Vice is determined by different rules than in the world of French art film.

Let's look at one enlightened attempt to find the universal basis of beauty. Professor of philosophy and mathematician at the University of Helsinki Ilkka Niiniluoto has applied the statistical concept of information to art: this is based on the fact that the elements of the language of art and their combinations appear in certain fields of culture and artistic styles relatively frequently. Thus, their 'surprise value' in relation to the frequency of appearance can be calculated. According to Niiniluoto, a similar idea is the basis of a construct presented by G. Elfving in 1965. This construct shows how certain stochastic processes can be used to make synthetic art.

The starting point is the beauty of sentences. A sentence has aesthetic value if the work of art is not too chaotic – as is the sentence “jkzao awqia rexr lumsz” which is informatively effective and has high entropy; nor too standard – as the sentence “kkkkkkkkkkkkkkkkkkk” which is an example of high redundancy; but there is the right amount of redundancy, as in the Finnish sentence “käki kukkuu kaunihisti” (literally, “A cuckoo cuckoos beautifully”).

This method can be generalized for two-dimensional images that are constituted of white and black squares. If the squares are colored according to a probable mechanism in a way that the correlation between adjoining squares is strong, but not too strong, we can

achieve aesthetically interesting entities. It has been claimed that this theory can be used to describe visual beauty in more general terms as well.

As such, Niiniluoto's theory cannot be accepted as the theory of beauty. Since perception is always directed and targeted, there are no absolute line formations that we see; rather, we see a structural entity that our perception constructs. For example, whether we perceive the dimension of depth has a radical influence on the phenomenon – I am referring to the well-known fact that in certain African cultures perception is two-dimensional. In fact, the physical image of the world is a construction created by our brains. This has been studied by Göte Nyman, professor of psychology at the University of Helsinki. This is how he describes his scientific progress: "One could almost say that I've proceeded as if along the optic nerve. It started with the problematics associated with the optic image. However, gradually I started to realize that it is not only an image that is transmitted in the process, since the neural web totally transforms the image already on the retina. One has had to think that this physical depiction of the world is, in fact, our personal picture created by ourselves". From that perspective romantic quality assurance policy can be more relevant than modern one.

Critical and emancipatory are complex terms that can be understood in a number of ways. A critical approach is crucial to the university's ability to produce new knowledge. In *The Egyptian*, Mika Waltari described medicine in Ancient Egypt as the transfer of tradition and ritual from one generation to the next. In contrast, the distinctive feature of modern science is that it is self-correcting and that it constantly challenges received knowledge. In this vein, quality assurance work requires ongoing evaluation and development of the procedures used in that work and a readiness to modify them. The innovation quality policy of university cannot be a fossilised, unassailable authority, but must provide a catalyst for debate at the institution on how quality assurance mechanisms can be improved.

Emancipatory knowledge is knowledge that enables us to challenge what we have considered to be self-evident and the truths we have held dearest. Jürgen Habermas posited three interests for science, the technical, the hermeneutic and the emancipatory. Science can solve problems and transfer knowledge and skills from one generation to the next, but it can also challenge social truths. As a core value of the university, this last interest translates into the emancipation of and guaranteeing of equality for minorities. This is an aspiration that should be embraced by every member of the community, mindful as we are, in Julia Kristeva's words, that "the other is within us."

The prevailing notion in the philosophy of science is that adherence to the scientific method ensures quality. Hans Reichenbach posited that scientific activity is divided into discovery and justification. Discovery as an activity does not fulfil the same conditions for science that are observed in the process of justification.

Creativity is a challenge to the quality assurance system. The relationship between the quality of a regular process and the outcome of that process differ, for example, if one

compares the work of a computer or an artist. Quality output in the case of a computer is traditionally defined in terms of mathematical algorithms and flowcharts, whereas quality achieved by an artist or researcher is a process that is difficult to standardise and describe. For a computer, or a production manager at a paper mill, quality means the flawless execution of repetitive operations in keeping with the relevant quality assurance system. The core process of a paper mill is far more conducive to description than creative research work or artistic work.

Keywords: learning centre, technologies, enriched learning spaces, digital multi-user interactive systems

THE IMPORTANCE OF THE PLACE, SPATIAL PRINCIPLES OF DESIGN IN LEARNING ACTIVITIES: A SHORT REVIEW

In recent years there has been a significant amount of debate regarding the importance of space and spatial design principles for learning. We can point out a few examples like: the “Designing Spaces for Effective Learning, guide for the 21st century” report by JISC exploring the relationship between space design and learning technologies; In the 2004 book by EDUCASE on the draft Learning Spaces; In 2005, EDUCASE Learning Initiative, focused on the informal design of learning spaces and studied design elements associated with the effectiveness of informal learning spaces, developing a guide for the design of diverse elements, assumptions and factors that contribute to the success when creating spaces for informal learning; the OECD-CELE project (Centre for Effective Learning Environments) began his studies in assessing the quality of teaching spaces in 2005.

One key aspect that has been gaining increased interest in the educational universe is that the learning process and its practice are understood to be taking place in other locations besides institutional educational spaces. In the book “Educating the Net Generation” (2005), Malcolm Brown defines as places of learning all the spaces where learning takes place, the real to the virtual classroom to the room “chat.” In “Assessment: The Key to Creating Spaces That Promote Learning,” Sawyer Hundley and Molly Schaller propose a series of criteria and a method for finding measurable factors to assess the complex interactions between universities, students, pedagogy, community, academic research, program planning and learning spaces. Philip and Holeyton (Holeyton and Long 2009) emphasize the importance of constantly monitoring and evaluating learning spaces. Finally, in Next Generation Learning Spaces Project by Carryck Institute for Teaching and Learning in higher Education project, which is focused on learning spaces, seeks to create a framework for guiding the design and operation of new learning spaces.

Herman Hertzberger (Hertzberger 2005) argues that spaces, in general, are more the product of collective appropriation of informal activities, given that this appropriation can transform the function or lack of function of places, giving them new meanings and other uses in result of the established interaction with users. All this changes the dynamics of those spaces and sustains the social and spatial importance of informal spaces. More than ever, learning nowadays happens outside the classrooms and classes timetables. With the increase in collaborative and group work, students are learning in small groups outside the classroom, using spaces that ease the interaction between them. ICT has had also a leading role in changing the learning spaces in many ways.

Scott Weber (Weber 2004) focuses on the relationships between pedagogical practices and the space properties from learning spaces distinguishing five basic types of transmission and acquisition of knowledge: a) delivering knowledge; b) applying knowledge; c)

creating knowledge; d) communicating knowledge; e) decision making. Continuing this work, Kenn Fisher (Fisher 2006) presents a model for the relationship between teaching practices and spatial conditions, identifying three types of zones indicating basics / alternative spatial configurations and furniture.

Schaller and Huley present a system for evaluating the physical learning spaces, exploring the relationship between learning and the characteristics of spaces (Schaller and Huley 2004). They relate and analyse information on learning satisfaction levels and occupation seeking to define the relationship between pedagogical innovations and learning spaces. In this study, they conclude that students tend to respond positively to environments that encourage interaction with the faculty and other students. Significant information that emerges from this study is that the physical characteristics of a space, its comfort and, above all, the possibility of customising or altering those spaces, are all extremely important, since they cause an emotional response that can encourage or discourage students from staying. Nevertheless, the academic program that fosters the integration, the communication, the respect for the student and the innovation in time and space usage, attract and positively influence student learning. Through systematic analysis of photographs of the various learning spaces, Schaller and Huley conclude that students prefer individual work spaces without distractions or noise, natural lighting, good level of comfort, and a careful aesthetic image; at the same time, it was found that to work in group, furniture should be more informal, enabling the training in small groups from 4 to 6 people; in both areas, of individual work and group work, space should facilitate interpersonal communication, be controllable and promote the integration of basic needs and desires (such as eating/drinking and socializing) with learning activities requirements such as access to information by ITC.

Jos Boys (Boys 2011) states that it will be advantageous that learning spaces have the properties for quickly being able to adapt to the needs of users, so that students can change the space to fulfil the needs of academic work and socialization, that can be provided with the mobility of objects, as furniture, lighting and ICT. In situations where the design team understands the space as a dynamic model, they try to create a design that allows users, if they feel the need for it, to move and rearrange the objects and atmospheric features with sufficient freedom so that he or she feels comfortable and identified with the space they are in. A learning environment should contain spaces with flexible levels of privacy and be able to be manipulated by the user. Another important factor for the design of an efficient learning environment is to understand what are the key concepts and spatial elements for positively answering the program and guarantee that the physical representation of the learning space should be a reflection of the philosophy of the university. (Boys 2011)

Philip and Holeyton emphasize the importance of constantly evaluating and monitoring learning spaces, which should be regularly “redesigned” by a multidisciplinary creative team. This project team should be well informed on many significant issues as emerging technologies, new strategies for the design of learning spaces and the recent

perspectives on science education.

Henry Sanoff presents a work focusing on learning spaces in “School Building Assessment Methods” (Sanoff 2001) where he proposes six variables to take into account for the spatial analysis of school buildings: Context, Massing, Interface, Way-finding, Social Space and Comfort. Sanoff argues that the architecture of the school environment can influence decisively the students’ involvement in social activities, work and study, advocating that the existence of diverse spaces for students to socialize, within the school environment, will grow up immensely the potential for them to obtain higher performances. Sanoff’s work is a very significant contribution to the studies that relate the space and the activities of teaching / learning, pointing out guidelines for the assessment and monitoring of spaces for teaching. Through his writings, the author argues that the organization of the spaces for teaching should consider the perceptual and cognitive mechanisms of the students - their spatial cognitive map. Thus, for Sanoff, it is essential to know how students move, orient and delimit its territory, in order to better understand how architecture can promote interaction between the user and space and, in this sense, between the student and the school.

In view of all this, we believe it is reasonable to admit that learning is an activity that will yield superior results if the environment where it takes place is a rich, dynamic and sustainable environment. In fact, as Whiteside refers “To create sustainable learning spaces, we must create community, take a holistic approach, use a common language, apply core pedagogical knowledge, and explore emerging technologies as a catalyst to engage faculty and students while we partner with others for pedagogy rich designs, assess learning in the new spaces, integrate ideas for Innovation, and revisit design methodologies.” (Whiteside and Duin 2009)

In *Linking Architecture and Education*, Anne Taylor (Taylor 2008) makes an approach to the relation between learning theories and design principles. In her work Taylor gives us a set of important design guidelines for educational built environment including: design criteria informed by the users needs, architectural form, educational spaces that are flexible; learning landscapes and post-occupancy user guides and evaluation. She points out the changing of instructional delivery system of schools arguing that the past models must incorporate the impact of technology and the information highway on the use of space.

Within this context, we think that technology is not, exclusively, an attribute of contemporary architecture, but is inherent in its concept and has always been among its deepest concerns. In fact, nowadays, technology is no longer understood only as a tool to answer to specific problems, but as a reality in itself that is present in all areas of human activity. It has revolutionized our perception of space and of ourselves, assuming a central role in how we understand and relate with the world around us (Neto 2002, 1998).

It is really important nowadays to reflect on the impact of emerging digital technologies on the field of architecture. Besides other reasons, these studies contribute for

gaining consciousness about the appropriate operational capacity and authorship that architecture design should reflect and to uncover the potential of digital artefacts that we have now, exploring its influence on the design of interactive spaces.

In recent years, in the university context, there has been an emergence and affirmation of spaces created to host functions where study and informal learning are mixed with the dynamics of socialization where the ITC has an important role.

As examples that reflect some of the considerations and concerns expressed by the authors in the cited bibliography we can point out:

(1) Saltire Centre, Glasgow Caledonian University exploring the relation of learning between social and academic work promoting teamwork and informal collaborations. It offers a set of spaces to support different learning activities from individual work, to group work, socialization in a café, furniture and zoned areas to allow some enclosed space from the large open space. All the spaces served by wireless technologies and the possibility to access laptops and mobile devices improve students' needs for academic work.

(2) Queen Mary University Blizard Building in UK offering a set of flexible working environments for individual and small groups and a variety of breakout spaces, meeting and seminar spaces;

(3) Queensland University Interdisciplinary Learning Centres, with three building spaces, reflecting the evolution of understanding the link between space technologies and learning activities improving the use of ITC to focus on learning;

(4) Collaborative Learning Centre - University of Melbourne fostering collaborative approaches to teaching and learning, in the small and large collaborative teaching and learning spaces through the videoconferencing and access to grid rooms. With breakout zones designed and located so that there is a sense of enclosure without closing-off the space. Where different areas have a distinct identity through pattern colour and texture;

(5) Rolex Learning Centre of Ecole Polytechnique Fédérale (EPFL) in Lausanne, Switzerland - an entire building dedicated to learning activities with open-stack library, a 600-seat auditorium, places to study, and facilities for dining and socializing. The building constitutes an unique undulating space with no partitions or walls, by dispensing with opacity, the architects, SANAA created the perfect image of a space for learning, one fluid space where students and researchers from the school's various disciplines can socialize, circulate, study and interact with each other.

We could continuing with a set of interesting examples where space design

with the active integration of ITC meets learning, academic work and socialization needs in higher education: University of Newcastle, University of Otago, the Techno-Café in department of computer Science, University of Durham, Learning Grid, University of Warwick Telford College Edinburgh, Stanford University Integrated Learning Centre (ILC) in the Faculty Applied Sciences at Queen's University and many others.

Focusing our attention to Portugal, we can say that there are an increasing number of activities related to the quality of teaching spaces in Portugal: a clear example of this is Park School with the Modernization Program for the Secondary Park School. Among various actions highlighted recently in the International Seminar «Doing School», which focused on the theme of Architecture School, devoted to reflection on the learning space with the Herman Hertzberger contribution that shows the importance and concern for the relevance of the school's physical space and its quality housing for the success of the teaching-learning process.

Finally, it is important to mention that the U. Porto and its Faculty of Architecture (FAUP) are very interested in the study of spatial principles for designing spaces for learning activities with strong ITC integration and in their construction and architecture. This can be seen by the development of the research project that began in 2006 that aimed to design and study hybrid spatial environments: E-Learning Centres. The design, construction and evaluation of hybrid spatial environments - E-Learning Centres - in U. Porto constitutes a very important and strategic research program that aims to offer to the academic community a set of integrated environments, providing new spaces where social and learning activities are combined and where the whole academic community can meet, exchange knowledge, share experiences and work more effectively in groups, thus promoting interdisciplinary and innovation.

It can be said that in recent years, many things have changed within the learning world of universities and we have witnessed the emergence of learning spaces created to host diverse uses, where formal activities related to learning and studying are combined with the dynamics of socialization and where ITC has an important role. Within this context, the U. Porto and its Faculty of Architecture (FAUP) are very interested in the study of spatial principles for designing spaces for learning activities with strong ITC integration.

E-LEARNING CENTRES IN U. PORTO: ASPRELA AND BOTANICAL GARDEN

The design, building and evaluation of hybrid spatial environments - E-Learning Centres - in U. Porto constitutes a very important and strategic research program that aims to offer to the academic community a set of integrated environments, providing new spaces where social and learning activities are combined and where the whole academic community can meet, exchange knowledge, share experiences and work more effectively in groups, thus promoting interdisciplinary and innovation.

The U. Porto campus pretends to offer various types of learning spaces covered by technology within its boundaries: E-Learning Centres. The E-Learning Café of Pólo da Asprela and the E-Learning Café of Botanical Garden and their programs are important steps in that direction. The general objective is to promote different types of communication among the users of university facilities, using ICT as the best means to structure and organize the university space. This project created a set of new dynamic learning spaces that integrate social and study activities constituting a strategic relational dimension for all the people implicated in some way with U. Porto, as will be seen in next chapters.

E-Learning Centre of Asprela

The first E-Learning Café designed in U. Porto - E-Learning Café of Asprela - started to be used since 2008 and the positive results coming from monitoring and evaluating that space and its uses have encouraged university to continue to further develop and support this strategic research line of these E-Learning Centres and their architectural design to enrich socialization and the learning process that takes place within those spaces.

The E-Learning Café project took advantage of the open space configuration of the atrium, first floor room and double height ceiling areas of an already existing University building, which was being used erratically as a bar facility for students who were living in a nearby residential unit. Its program consists of four main interrelated spaces: Cafeteria / Bar, Multimedia room, Chill-out room and Work / study room.

One of the first objectives of this new design was to free the interior space of that building from all of its architectural noise as mismatched colours, textures and materials. The aim was to create a strong coherent and flexible spatial design, linked to the new E-Learning Café program. A new set of interrelated spaces, having each one of those places, an individual ambience and design reinforcing its particular purpose or use, and the adoption of solutions that assured easiness for users or programmers to change some characteristics or ambiances of those spaces. This last aspect was important because it gave a greater flexibility for the E-Learning Café space to be renovated, making possible for students to customise certain spaces and change ambiances without compromising the overall unity and architectural coherence of the global space. The different ambiances that are created for each area are mostly the result of thinking the new furniture and its layout as an important spatial design element for characterizing the space and by controlling the natural light and applying different types of artificial lighting to each individual area. The interior building signage is still being studied and the objective is to create a set of strong and clear orientation signs, well integrated in the proposed spatial design, allowing people to easily identify the way to the different spaces i.e. Cafeteria / Bar, Multimedia room, Chill-out room and Work / study room and emergency exits.

The possibility for students to fix, stick or place different letterings or artefacts on many of the walls allow them to appropriate the space with their own work and visual language. To facilitate this appropriation and individual characterization of the physical

environment we designed the walls and ceiling using white cork material. All of these components have high sound absorbency characteristics that allow to control the sound on the different spaces without having to use doors and therefore with no segmentation of the actual space.

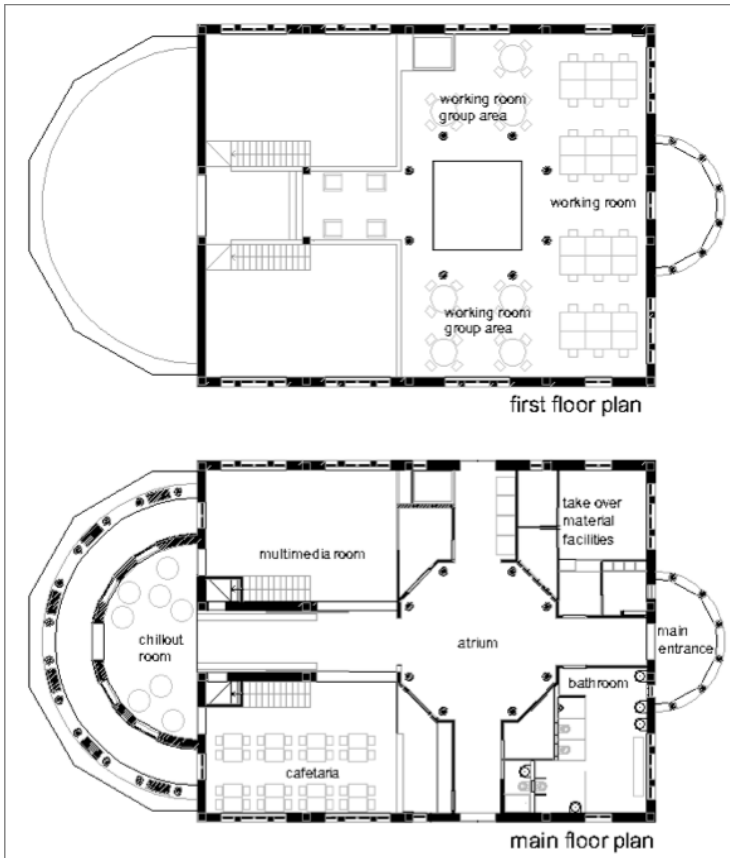


Figure 1: E-Learning Café of Asprela: main floor and first floor

Atrium, access and circulation space

The building has four main entries and we propose a new design for the door openings to match the rest of the building frames', creating a more unified exterior image. Nevertheless, the exterior of the building does not really suffer any change being just subject to some restoration and maintenance work.

Access to the second floor is through two symmetrical stairs positioned on the first floor near the West entrance that gives access to an open garden space. The different spaces on the first floor distribute themselves around a central octagonal atrium. This central area, equipped with some puffs and a multimedia kiosk, links the different ambiences of the rooms and serves as an entrance and distribution hall for the E-Learning Café. We propose, for the ground level, a homogeneous floor covering material in grey, which is resistant and easily washable. This neutral surface colour simultaneously gives unity, reinforcing the fluidity of the E-Learning Café space, and serves as a background for the different furniture and elements of the other rooms. A new suspended plaster ceiling is applied and we propose also the design of a new door in the West wing corridor entrance and a new set of shelves with two small niches to place a set of vending machines for food and drinks. The access and circulation space has as its most important reference the atrium, which is the central area with double ceiling height and natural lighting and the place where the four corridors that give access to the main entries of the building intersect.

All the space is accessible to people with motor difficulties, and for that it was found a solution of an elevator platform that links the first and the second floor



Figure 2: Atrium

Cafeteria / Bar

The bar is located on the first floor left West side and has two main areas: (a) the preparation of food and attendance vicinity and (b) the sitting area located where the ceiling is double height. The bar relates directly with the other informal working areas of this floor, encouraging the use of these spaces both for socializing and studying activities.

In order to create a feeling of shelter in the bar area that has a double height ceiling, we decided to change its scale perception, making the place less visually exposed from the upper floor by placing a set of overhead pendant lights, at the height of about 2,5 meters from the floor. This “rain” of pendent lights fills the volume of space in this very large room and is visually ‘draw down’ its high ceiling and help to define and delineate the bar zone, adding a certain intimacy to it. The green colour was chosen for the table furniture thinking on its tranquilizing and calm properties so important for people to relax. The walls, as was already pointed out, allow for students to personalize them with graphic material or other type of information.

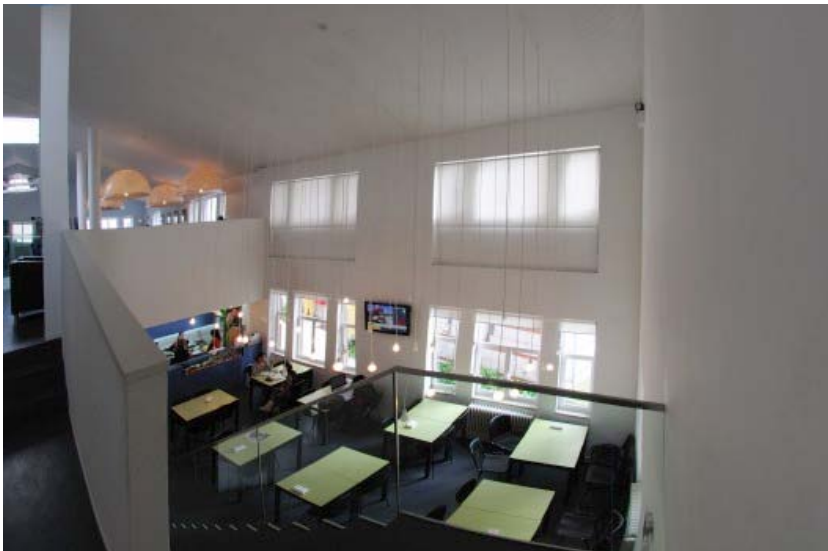


Figure 3: Cafeteria

Multimedia room

This multifunctional space, located on the first floor right West side, has also a double height ceiling and was designed to be the heart of all the performances and activities taking place in E-Learning Café that aim to animate and give a strong dynamic to this place. The objective is to manipulate the natural and artificial light in conjunction with the use of ICT for creating different ambiances and allowing several types of interaction with the people using the place. The pavement is made of the same resistant, washable neutral grey material so that light colours may be projected on top of it and as a result different ambiances are created. The first installation is an interactive web camera that captures the movement of people and sends a signal for different light colours to be projected in the walls and floor.

When no performance is taking place, a set of informal movable furniture for socializing activities or studying are setting in, assuring that this area will be always in use and integrated with the different studying areas of the E-Learning Café.



Figure 4: Multimedia room

Chill-out room

The objective is to use this South located half moon room both as an informal setting for relaxed and calm socialization and for studying. This strategic area is linked to the bar and multimedia rooms and serves as a transitional zone between the garden outside and the inside area of the building. The room has a tiled covered floor in a resistant and textured material; a white plaster ceiling and its wall surfaces allow students to customise them. The furniture for this room consists of a set of sitting pillows and small table furniture for working with laptops. In this way, we give a great freedom for users to organize and locate themselves both inside the building or outside in the garden.



Figure 5: Chill-out room

Working room

The working room area occupies the second floor and it is an open space designed to allow a set of different ambience / facility settings: an area with fixed computers distributed longitudinally in rectangular tables for individual work and an area for group work with circular tables topped by suspended acoustic lump domes and other more informal and less specific places.

The lighting and colours of the furniture characterize differently these two ambiences. Thus the fixed computers area for individual work is characterized predominantly by the blue colour and table lamps to give light in each individual table allowing the user to control at his will the light intensity. The working group area adopted orange to signal its different use and to obtain a higher diffusion of the light from the domes. The blue chromatic characteristics were thought as good for calming the mind and giving concentration and orange was believed to stimulate students, triggering their motivation for group work.



Figure 6: Working room

E-Learning Café: Study, Evaluation and Methodologies Applied

As we all know, every analytical method has its strengths and weaknesses, thus the choice among which to choose depends mostly on the characteristics of the problem we wish to find an answer, the objects that need to be studied and the characteristics of the investigation itself. Accordingly, we decided that the best choice was to have a blend of different methods for retrieving and processing data because this allowed choosing the most appropriate method accordingly to the topic and problem being addressed.

The analytic instruments that were used had as base the literature and experience related to evaluating the physical learning spaces (Schaller and Huley 2004) and applying a post occupation evaluation methodology in teaching environments (Sannof 2001) and the Space Syntax representation and analysis methods (Hillier and Hanson 1984, 1987). Applying these analytical methods for studying the building's different uses and perceptions, allows us to identify, within reasonable confidence, the morphologic rules and the functional changes occurred during its use, identifying compatibility / incompatibility factors between certain spatial properties and how those interiors are used.

The post occupation evaluation method is an important analytic tool that allows the tracking and evaluation in a systematic way the performance of diverse programs and built environment. The singularity of this evaluation technique is the inclusion of the user itself in the analysis process (Ornstein 1995), allowing through the evaluation of technical, functional, economic, aesthetical and behavioural aspects of the environment, to diagnose specific aspects of the spaces and its different uses.

The Space Syntax theory was first mentioned in the University College of London, Cambridge, and it has a peculiar way of representing the space, in order to systemize the information intended to gather, from concepts considered fundamental to the comprehension of different spatial characteristics. This theory supports the idea that space and its configuration have a great influence on the processes and social relations that occur when those spaces are inhabited and used (Hillier and Hanson 1984, 1987). Buildings aim to supply the required structure to support human activity, which are bound to a certain social organization and, in that sense, aren't unique and separated structures, but hold a global social organization right from the beginning of their design conception. Several authors believe that to understand effectively how architectural and urban spaces can influence our lives and the way we interact and function in them we need to analyse the morphological laws of the spaces (Hillier and Hanson 1984).

With the experience and the results obtained until now with this research focused on socialization and learning spaces with strong ICT integration, we can say, in general terms, that articulated and flexible spaces able to manage different uses are of paramount importance for encouraging strong interchange of ideas and diverse social interaction within a learning environment. (Neto et al 2009) (Neto et al 2007).

In fact, as was pointed out in the POE questionnaires, the overall impression of the

E-Learning Café space was considered, with a high percentage, Good and Very Good in relation to being a stimulating ambient in respect to its space variety, flexibility and strong identity (see table 2). These results are significant for this study, besides other reasons, because they confirm the important principles that literature review pointed out as important characteristics for the architecture of rich learning and socializing spaces.

Also, a very important result was the high percentage of students who considered the E-Learning Café spaces good and very good for Socialization, Individual Study, Group Study and Cultural activities (see table 1). Again, these types of uses that obtained so good results are also considered of paramount importance for building a rich learning and study ambience supporting a community of inquiry.

Capacity of space to promote:				
	Socialization between students (%)	Individual study and academic work (%)	Group study and academic work (%) (%)	Cultural activities (%)
Very bad	0	0	0	0
Bad	0	0	1,3	0
Neither good or bad	14,3	23,4	3,9	28,8
Good	64,9	49,4	50,6	45,5
Very good	15,6	22,1	39,0	20,8
Missing System	5,2	2,6	5,2	5,2

Table 1: User's opinion for the space capacity to promote socialization, study and work (%)

type of use	% of observations in each space					
	atrium	cafeteria	multimedia room	chillout room	group room	working room
studing allone	14	72	29	30	20	81
studing in group	26	21	67	67	76	18
socializing	60	7	4	3	4	1

Table 2: Type of uses observed in the space (%)

In relation to the results obtained with the space syntax methodology, the following conclusions seemed to be of paramount importance. In the first place, that the spaces more integrated favour a system with intense and informal interfaces – the atrium and corridors - and that these spaces are a potential factor for the effective learning and studying performance. This is so because they are break-out-spaces that allow students to meet and group together in discussion of ideas in/between the other spaces that are used for more specific, academic and concentrated studies or work – individual work and group work rooms or even the chill out room. Thus, they constitute spaces that connect with and aggregate the other rooms and are used simultaneously for reloading students’ mental energies by relaxation and social interaction. This mental reloading is even more obvious when break-out-spaces connect with and aggregate rooms with traditional configuration layouts that give little possibility for group work interaction or free interchange of ideas between students, something that still happens in many universities or departments.

It is important to emphasis again the importance of existing break-out-spaces: (1) that offer high levels of integration and connectivity, (2) that are strategically positioned in order to efficiently aggregate around them other rooms/spaces and (3) simultaneously allow and encourage group and social interaction – reloading mental energies and encouraging socialization. It is these aspects that support and reinforce a Community of Inquiry based on cultivating the intellect not only through scholarship, but also by socialization and free exchange of ideas, as well as critical, ethical, and creative thinking, dialogue and action.

The results of the last questionnaire made to collect the opinion of users in respect to how they use the space shows that students are in a general way satisfied with the E-Learning Café cultural activities program (~17% evaluated, cultural activities program in E-Learning Café as very good, and ~34% as good, ~35% as neither good or bad) and they also say, generally, that the E-Learning Café spaces are good for promoting the gathering of groups for cultural activities (-21% evaluated as very good, ~46% evaluated as good, ~30% as neither god or bad, 0% as bad or very bad).

The results on the evaluation of this E-Learning Centre obtained until now are very significant and confirm the important principles that literature review pointed out as important characteristics for the architecture of rich learning and socializing spaces. In fact, with the experience and the results obtained until now with this E-Learning Centre of Asprela, we can say, in general terms, that articulated and flexible spaces able to manage different uses are of paramount importance for encouraging strong interchange of ideas and diverse social interaction within a learning environment. (Neto et al 2009) (Neto et al 2007).

Accordingly, U. Porto as a higher institution concerned with the quality of their learning facilities took the redesign of this E-Learning Centre as a priority, especially after 2 years of its outstanding results (Neto et al 2010) (Vieira et al 2009) (Neto et al 2008), (Neto et al 2007). It can be said that the E-Learning Café is now a place of reference for all the academic community. The interaction and the personal enrichment are the base of all the activities developed and as will be seen next, with the new proposed design for its exterior gardens, this program will be even more consolidated and enriched.

Extending the Potential of Digital Multi-User Interactive Systems for the Outer Space of an E-Learning Centre: Architectural Design for the Arrangement and Design of Outer Space Garden of E-Learning Café of Asprela of U. Porto

The increased number of students using E-Learning Café of Asprela encouraged us to design a new program for the outer space of the building. The new proposal, U-thinking, aims to provide a solution of a coverage area, located on the back patio of the building making possible to use the garden for studying, working and for cultural activities regarding the arrangement of all the outdoor space surrounding the building.

The space is divided into two main areas protected with an innovative and distinctive coverage. Thus, at floor level we have two zones: a “more conventional” working/studying area with chairs and tables next to a more informal comfortable zone where a granite bench defines the space that can shelter some cushions and “bean bags” for more informal study and socialising area.

Partially covering the studding area, we designed an inflatable cloud that helps shelter and to define the space, its structure provides the necessary shade and protection from the humidity, solving also the problem of night lighting. The interior light can be emitted in a system of LED, allowing this space to be used at night.

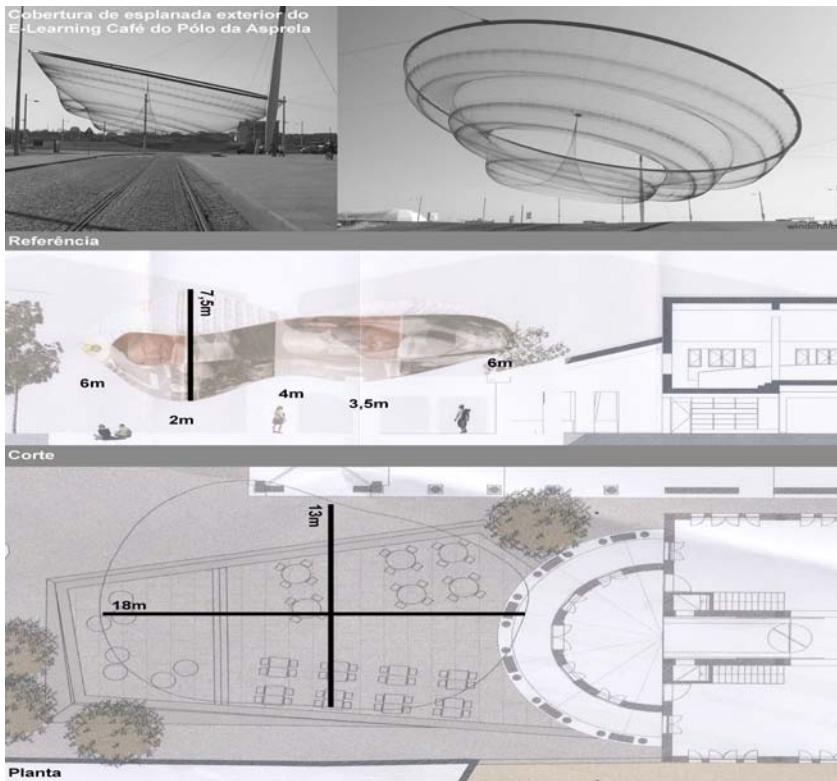


Figure 7: Section and plan of design project proposal for the outer space of E-Learning Café of Asprela



Figure 8: Simulation of the design project proposal for the outer space of E-Learning Café

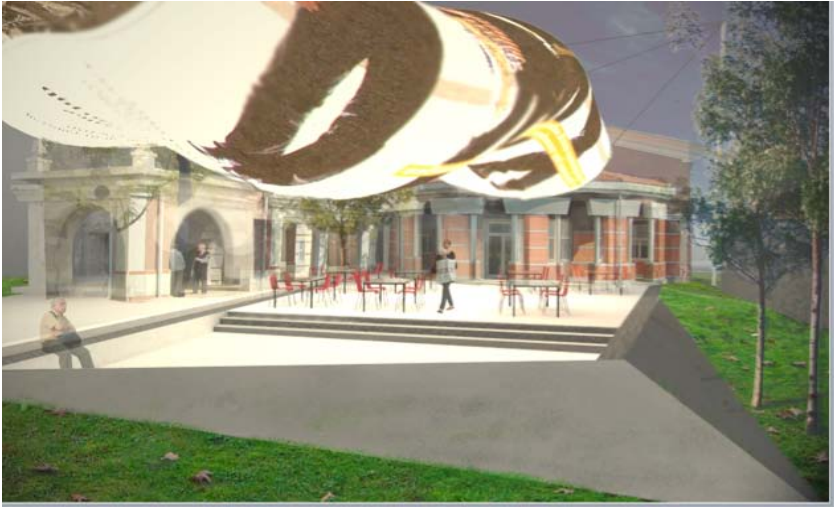


Figure 9: Simulation of the design project proposal for the outer space of E-Learning Café

One of our formal references for the cloud structure came from cartoons, since they typically represent someone’s thoughts in a form of a cloud. Thus we adopted the form of a cloud for our structure, which symbolises the materialization of everyone’s thoughts. The interior of this structure can be illuminated whenever necessary showing on its surface dispersed phrases, thoughts or famous formulas considered to have been a mark of knowledge in the past. The inflated membrane of the cloud is also inspired on the traditional illuminated balloon of our traditional popular festivities of S. João do Porto. The iconography of the cloud shape representing the thoughts in the cartoons is, in fact, an allusion to the great thinkers and urges students to idealize.

The technology embedded in the coverage structure will also allow projections of artistic interventions as well the implementation of interactive digital artefacts for reproducing for example the concentration of students in the space, the weather conditions or the state of emotions of users.

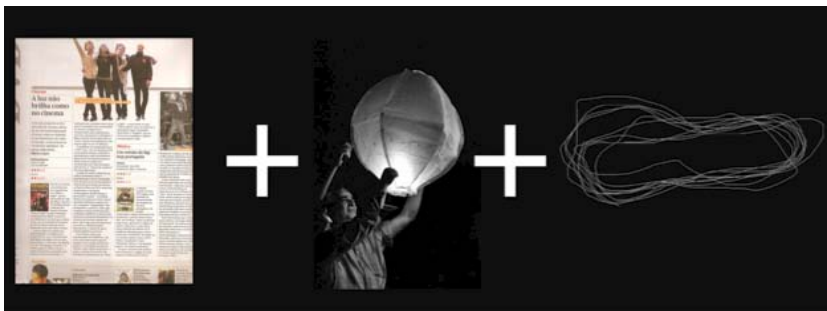


Figure 10: Cloud concept of the architectural design proposal

E-Learning Centre for the Botanical Garden of the City of Porto: The Program and its Design

The design of the E-Learning Café for the Botanical Garden of the city of Porto was another important output coming from the E-Learning Centres in U. Porto research project and is the result of the upgrading and transformation of Salabert House located inside the Botanical Garden, which constitutes an important public space and architectural equipment that strongly characterizes the architectonic and literary identity of Porto. Within this context, the architectural design proposal is paying special attention to the genius loci of this place proposing the reconstruction of Salabert house to its original volume and typology and a new extension building.



Figure 11: The E-Learning Café in the Botanical Garden: site



Figure 12: The E-Learning Café in the Botanical Garden: plan

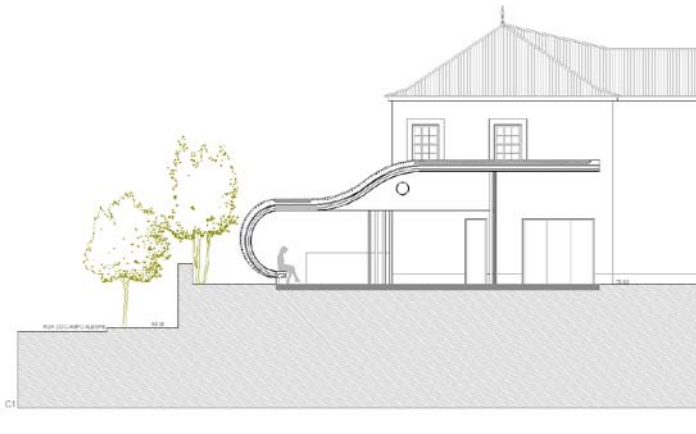


Figure 13: The E-Learning Café in the Botanical Garden: section

The proposed design for this new E-Learning Café will contemplate, in addition to the diverse learning and socializing spaces, other spaces for integrated activities that are known to balance the learning process and ensure regular healthy routines (informal learning spaces, multifunctional spaces, flexible spaces capable of adapting to different needs, spaces for music and sport activities related to students posture and relaxation). The program for the ground floor areas in the Salabert House contains the more public

spaces: cafeteria / bar and break out spaces, and in the upstairs floor the space is distributed among working group room and individual working room areas.

The new building will have a reception area where there will be dynamic data on for communicating interactively information related to the continuous monitoring and real-time occupation and programming of the E-Learning Café. Next to this “open space” area, we find the “chill out” room that will allow the implementation of collaborative projects and a significant interaction with technological artefacts, this area will also have specific technology with a design focused on body position, correct working postures and allowing high levels of performance and comfort.



Figure 14: The flexible space on E-Learning Café in the Botanical Garden

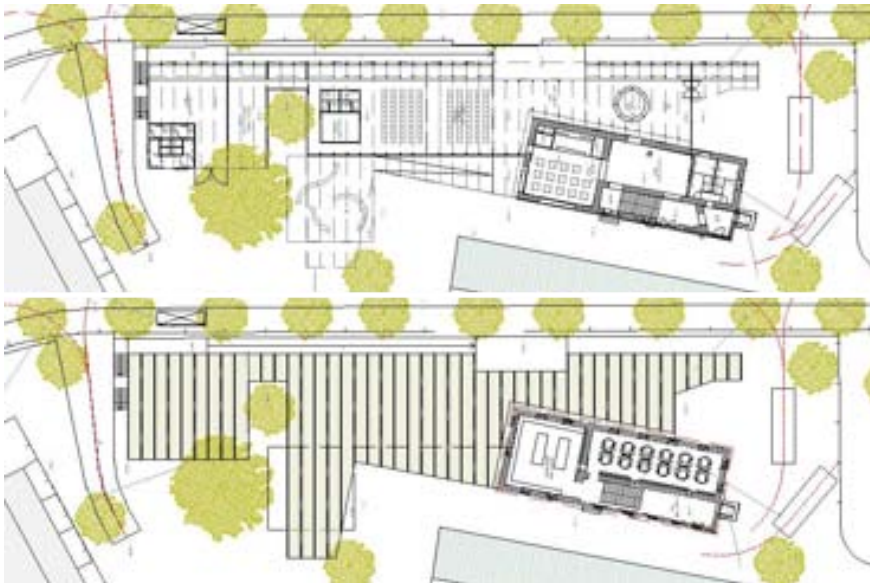


Figure 15: The E-Learning Café in the Botanical Garden: main floor and first floor plans

In addition to laptops for students and wireless connection, there are also small projectors which can be used anywhere within all the building. For the larger space, which is thought for the activities of larger groups, there will be a system of projectors, cameras and microphones able to be controlled by computer software that will serve the cultural and academic events that may take place and allow diverse interactive games and activities. We are also thinking in using the electronic communication system similar to the one utilised at the University of Strathclyde. In this new E-Learning Centre the interactive technologies will be present in many of its spaces, and may be temporarily used to change the perception of users / participants in relation to these spaces. Such initiatives, which interpret the individual's behaviour, provide a better awareness of the person itself and her place in the group and space environment. For this reason, they can improve the communication and interaction among the users of those spaces.

ACADEMIC ARCHITECTURAL DESIGN PROJECTS FOR AN E-LEARNING CENTRE

The program of the architectural design project for the CAAD course in FAUP is an E-Learning Centre, and students are encouraged to discuss significant architectural issues related to the design of these programs and also to question the role of digital artefacts integrated in these spaces.

The students' proposals for the digital interactive artefact resulted in a diversified set of solutions, both at the level of the global formalization of the whole E-Learning Centre building and of its spatial characterization. We list next a selection of the students' proposals showing the most interesting and imaginative ideas for integrating interactive digital artefacts in E-Learning Centre:

1) The digital interactive artefacts are in the facades that change their expression/colour with the weather conditions in order to bounce back some of the constraints that result from adverse conditions. Other interactions in the facades are the ones located in the courtyard area where diverse information/images concerning the different activities that were programmed to be held for the E-Learning Centre are projected interactively. In this way, people are actively informed of activities that are presently running or programmed for the near future and also have the chance to be able to tell what goes on in the building and what other users are doing.

2) In an E-learning Centre building based on the idea of a journey, the students propose an interactive xylophone as the main digital artefact. The interactive xylophone should produce sounds reflecting users passing by the central atrium. At every hour interval, the music produced would be changed, to avoid the interactions to become too repetitive or boring.

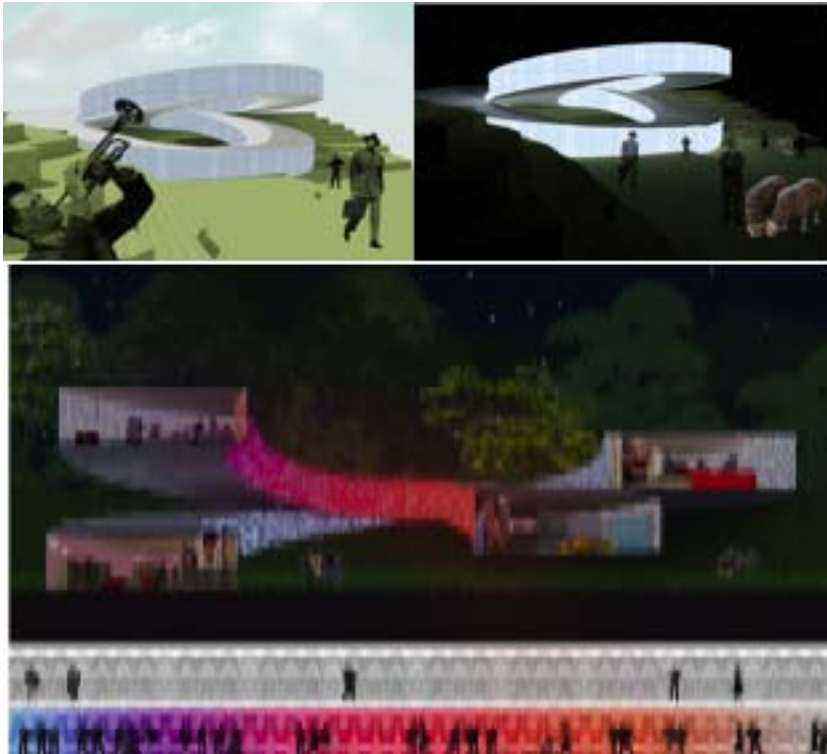


Figure 16: The E-Learning Centre "Ar2" design by CAAD students.

3) A very interesting project where an outdoor patio plays an important role as the entrance in the building. Students had the idea of placing an interactive digital artefact in this area to improve the socialization between the users of that space. While the information about the activities of the E-learning Centre are displayed to users in the exterior walls, the students shadows are also projected in the walls and function as "avatars" in an interactive way that relates to each person and its movement. The artefact improves the qualities of the patio, expanding its potential uses beyond circulation and access needs, transforming it into an important place for different actions and strong socialization and interaction with the building.



Figure 17: The E-Learning Centre “Atomic Café” design by CAAD students

4) An E-learning Centre building that has at its core an “empty space”, which is a central courtyard that serves as a terrace area allowing users who are located in different places of the entire building to have visual contact between them. CAAD students pro-

posed that the walls of this space should be cylindrical and used for projecting videos and images communicating interactively the diverse cultural activities that are taking place in the city of Porto, especially in the various faculties of U. Porto (exhibitions, movies, theatres, conferences, etc.). These projections, on the wall surrounding the courtyard, can be observed from all points of the building.



Figure 18: The E-Learning Centre “E-Noodle” design by CAAD students.

5) In an E-Learning Centre where the theme “Lego” is the main concept for its design, the proposed digital artefact is entirely related to this idea and the proposed colour game pieces and movement are very connected to the technologic solution proposed. This meant that CAAD students chose to include in this “Lego” E-Learning Centre motion sensors, which are used in the transition of spaces, for establishing relationships between colour, space, movement and the diverse mind states or moods of the users. Interactive walls, applied in the atrium and in the “Lego room”, are capable to establish an interactive digital relationship with the user’s playing “Lego”.

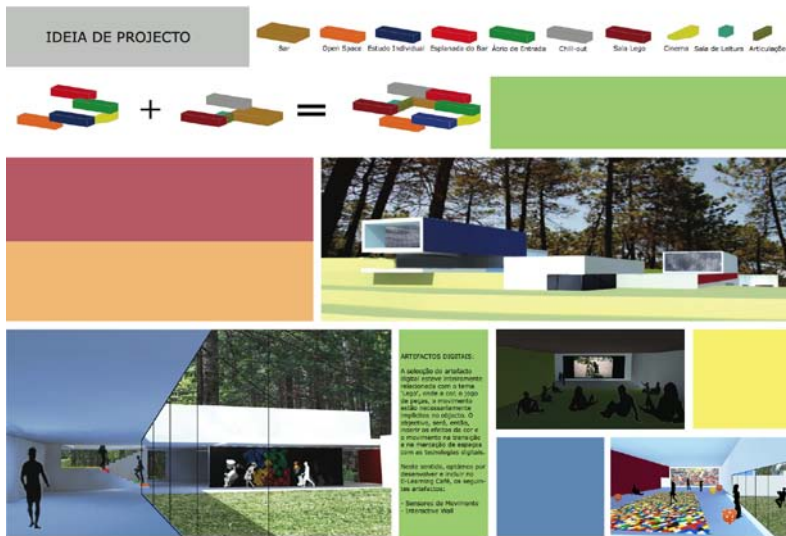


Figure 19: The E-Learning Centre “Lego” design by CAAD students

6) To improve the socialization between users in the circulation areas of the proposed E-Learning Centre, students imagined a digital artefact along the galleries and corridors of the building able to project their shadow on the glass when they are passing through that space. If two, or more people pass by at the same time and if there is no communication between them, then an image of shadows colliding is projected in the window glass, signifying lack of communication and socialization. When a relationship is established between the users that are passing by, the projected shadows on the glass are joined. In situations of greater action and movement, the artefact projects some balls falling down, signifying exaltation and socialization. Students also planned the use of holograms and sounds/music triggered by specific sensors to help people with learning difficulties.



Figure 20: The interactive artefact scheme from E-Learning Centre “Leque” design by CAAD students

Finally, we can say, taking into account the results from the questionnaires and the CAAD students works, that it is clear that the experience on CAAD lectures showed the great importance that students give to Interactive and Rich Learning Environments where learning and studying are mixed with cultural and social activities. They believe that the technologies and interactive artefacts can have an important role in engaging students in learning activities and that these interactive spaces provide a rich and diverse environment that gives new opportunities for different sorts of learning activities and socialization.

CONCLUSION AND FURTHER WORK

It seems reasonable, taking into account all that has been synthesised in this paper, to say that the present studies and results suggest the need for a new form of learning and social environment characterized by different activity settings, small-group activities and strong ITC integration. Moreover, when speaking about embedding efficiently technology in architectural spaces for learning and social activities, interactive digital artefacts can play a key role for strengthening the interaction of students, teachers and university staff with those spaces and foster new ways for them to communicate, study and work within these learning environments.

Nevertheless, for all the above to happen, it seems to us that universities have to be willing to change their facility planning process, their buildings programs, design and both integrate critically and use actively technology in their learning environments. We

believe that this has been the case of U. Porto with the E-Learning Café of Pólo da Asprela program, the new design proposals of U-thinking, E-Learning Design of Outer Space Garden and the new E-Learning Café for Botanical Garden, plus the research conducted until now focused on these issues, which all constitute important steps in that direction.

In fact, having seen how social areas in the university environment are important to enhance the learning and studying process and to create an overall atmosphere with which students can identify and feel a sense of ownership of the environment where they study and socially interact (Joss, 2011), we created a set of rich and diverse interactive social places in our Learning Centres that are also able to integrate some level of customisation by students.

Then, at a certain stage, we also tried to better integrate, in the study, evaluation and design process of E-Learning Centres, the students who showed a special interest in these study areas, making them part of our team work and testing some new ideas coming from their creative thinking. By doing this, we are convinced that we have more possibilities for enriching our study for new ways to experiment digital design in architecture and are also able to test those ideas in real life scenarios and have a different awareness of the architectural limits as an expression and image of our time. This can be seen especially with the new design proposals of U-thinking, E-Learning Design of Outer Space Garden. The design of U-thinking constitutes a very creative solution that integrates, in a unique way, the learning and socializing program for E-learning Centres with an innovative coverage in the form of a cloud and a lower level ground design for the E-Learning Café Outer Space in Asprela.

It is worth pointing out that the research and design of learning and socializing spaces with strong ICT integration developed by the CCRE group until now shows that, in contrast to the visual art media, the interactive environments takes the body of the visitor and ensures their action/motion in space. This could be clearly seen through the several workshops with interactive media held with students in the multimedia room of E-Learning Café of Asprela, and can also, in some way, be concluded after reading several writings of diverse authors (Bullivent, 2005; Castle, 2007; Hertzberger, 2005) and several case studies already pointed out in this paper.

Finally, we give some evidence that backs up what many authors assert for, and this is that architecture in general, and in these type of learning environment programs in specific, should integrate a spatial evaluation system in their design process (Sanoff, 2001; Brown, 2005; Schaller and Huley, 2004) explaining also how we have conducted our evaluation of the E-Learning Café of Asprela. In our opinion, this should be the most secure and reliable base for proposing physical improvements to university buildings since evaluation is a method of identifying needs and making possible the correction and the upgrade of these spaces in accordance to their functions. As a matter of fact, it could be seen until now that articulated and flexible spaces, which incorporate digital interactive artefacts that are able to manage different uses, are of paramount importance for

encouraging strong interchange of ideas and diverse social interaction within a learning environment. Also, very significant, are the results obtained for the performance of the learning environment of E-Learning Café of Asprela and its diverse places for Socialization, Individual Study, Group Study and Cultural activities, which corroborate the importance given to them in literature review and case studies presented in this paper. It seems, therefore, that they should be considered of paramount significance for building a rich learning and study ambience supporting a community of inquiry.

We are really convinced that our research agenda and design work allows the group to examine, in a significant way, the potential of interactive spaces, as well as outline a vision for the future: what these spaces are, what is their impact in our lives and what are the parameters for their design.

Thus we believe that it is by integrating technologies and architectural digital artefacts actively in the design process that these can (1) foster communication and interaction between people; (2) allow for different levels of privacy and types of activities within a university facility or program; (3) open these university places and programs to the city and abroad.

BIBLIOGRAPHY AND REFERENCES

- [1] Altman, I., *The Environment and Social Behaviour Books / Cole Monterrey*, 1975.
- [2] Boys, J., *Towards Creative Learning Spaces: Re-thinking the Architecture of Post-Compulsory Education*. Routledge, 2011.
- [3] Brown, M., *Inversions*, EDUCAUSE Review, vol. 44, no. 2, pp. 16–25, 2009. Brown, MB & Lippincott, JK, “*Learning Spaces: More than Meets the Eye*”, EDUCAUSE quarterly, vol. 26, no. 1, p. 3., 2003.
- [4] Brown, M., *Learning Spaces*, chapter 12 of *Educating the Net Generation*, ed. Diana G. Oblinger and James L. Oblinger (Boulder, Colo.: EDUCAUSE, 2005), e-book, available at <http://www.educause.edu/LearningSpaces/6072>, 2005.
- [5] Brown, M., Lippincott, J., *Learning Spaces: More tan Meets the Eye*, EDUCAUSE Quarterly, 1, pp.14-16, 2003.
- [6] Bullivant, L., *4dspace: Interactive Architecture*. London: AD/John Wiley & Sons, 2005. ISBN 0-470-09092-8, 2005.
- [7] Bullivant, L., *Responsive Environments: architecture, art and design*, V&A Contemporary, 2006. London: Victoria and Albert Museum. ISBN 1-85177-481-5, 2006.
- [8] Bullivant, L., *4dsocial: Interactive Design Environments*. London: AD/John Wiley & Sons, 2007. ISBN 978-0470 319116, 2007.
- [9] Castle, H.; Hensel M., Menges A.; Weinstock M., H (ed.), *Emergence: Morphogenetic Design Strategies (Architectural Design)*, London: John Wiley & Sons, Vol. 74:3, 2004, ISBN: 0-470-86688-8), 2004.
- [10] Dudek, M., *Architecture of Schools: The New Learning Environments*. Boston: Architectural Press (2000), 2000.
- [11] Fisher, K., *Research into identifying effective learning environments’, Evaluating quality in educational facilities*, pp. 159-167., 2005.
- [12] Fisher, K., ‘*The New Learning Environment: Hybrid Designs for Hybrid Learning*’, in R Donladson (ed.) *Education futures Public #2*, Woods Bagot, Melbourne, VIC, 2006.

- [13] Grummon, Phyllis, *Best Practices in Learning Space Design: Engaging Users.*, Educause Quarterly; v32 n1; 2009. <http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolume%20m/BestPr%20acticesinLearningSpaceDe/163860>, 2009.
- [14] Heitor, T., *School Modernization in Portugal: Towards a sustainable model of intervention.*, International Conference SUSTAINABLE SCHOOL BUILDINGS: FROM CONCEPT TO REALITY, Ljubljana, Slovenia, 2009 http://www.mss.gov.si/fileadmin/mss.gov.si/pageuploads/ANG/OECD_Conference/School_Modernization_Portugal_Heitor.pdf, 2009.
- [15] Hertzberger, Herman, *Space and Learning. International Conference*, 2009.
- [16] *SUSTAINABLE SCHOOL BUILDINGS: FROM CONCEPT TO REALITY* Ljubljana, Slovenia, http://www.mss.gov.si/fileadmin/mss.gov.si/pageuploads/ANG/OECD_Conference/Hertzberger.pdf, 2009.
- [17] Hertzberger, H., *Space and learning*, 010 Publishers, Rotterdam, 2008.
- [18] Hertzberger H., *Lessons for students in architecture*. Rotterdam: 010 Publishers, 2005.
- [19] Nair, P. and R. Fielding, *The Language of School Design. Design Patterns for 21st Century Schools*, Design Share, 2005.
- [20] Hillier B., Hanson, J., *The Social Logic of Space*, Cambridge University Press, Cambridge, 1984.
- [21] Hillier, B. Grajewski, T., *The Application of Space Syntax to Work Environments Inside Buildings*. Final Report to the Science and Engineering Research Council, Barlett School of Architecture and Planning, University College London, London, 1987.
- [22] Hillier, B., *Space is the Machine: A Configurational Theory of Architecture*. Cambridge: Cambridge University. Press, 1996.
- [23] Hunley, Sawyer; Schaller; Molly, *Assessment: The Key to Creating Space That Promote Learning*. Educause Review; v44 n2, p26-28,30,32-34 ; Mar-Apr 2009. <http://net.educause.edu/ir/library/pdf/ERM0923.pdf>, 2009.
- [24] Joint Information Systems Committee. *Designing spaces for effective learning: A guide to 21st century learning space design*. Bristol, UK: JISC, 2006, http://www.jisc.ac.uk/uploaded_documents/JISClearningspaces.pdf, 2006.
- [25] Johnson, C., Lomas, C., *Design of the learning space: Learning and design principals*. EDUCAUSE Review, 40(4), 16-28. Kuh, G.D., & Others, 2005.
- [26] Long, P., Ehrmann, S., *Future of the learning space: Breaking out of the box*, Educause Review, vol. July/August, 2005.
- [27] Long, P.; Holeyton, R., *Signposts of the Revolution? What We Talk about when We Talk about Learning Spaces*, Educause Review; v44 n2, p36-38,40,42,44-48 ; Mar-Apr 2009. <http://net.educause.edu/ir/library/pdf/ERM0924.pdf>, 2009.
- [28] Major M., Stonor T., *Designing for Context, 24th Inter-Schools Conference on Urban Development*, Edinburgh, 1997 Conference Proceedings (Leonard J.B., ed), Edinburgh College of Art/Heriot-Watt University, p. 228-243, 1997.
- [29] Malcolm B., *Learning Spaces*, in Educating the Net Generation, Diana G. Oblinger and James L. Oblinger, eds. (Boulder, Colo.: EDUCAUSE, 2005), <http://www.educause.edu/LearningSpaces/6072>, 2005.
- [30] Neto, P., Vieira, A.; Vale, C.; Ribeiro, L., *E-Learning Cafe at the University of Porto: ICT influence on design of social learning spaces*, European University Information Systems Organization 13th congress, 2007. <http://www.eunis.org/events/congresses/eunis2007/CD/pdf/papers/p131.pdf>, 2007.
- [31] Neto, P.; Vieira, A.; Pereira, L., *E-Learning Café and Virtual Environments: enhance university learning and socializing spaces improving their accessibility by linking them to Second Life*, In DSAI 2007 Proceedings of the 1st International Conference on Software Development for Enhancing Accessibility and Fighting Info-exclusion, Barroso, João; Cunha, António; Godinho, Francisco; Bulas-Cruz, José, Santos, Vítor (Eds.), UTAD, Vila Real, ISBN 978-972-669-841-8 http://dsai2007.utad.pt/workshop_accessibility_challenges_of_virtual_worlds.html http://dsai2007.utad.pt/pdfs/workshop_summary.pdf, 2007.

- [32] Neto, P.; Vieira, A.; Ribeiro, L., *Projecto de E-Learning Café - metodologia e implementação de um novo espaço de sociabilização e de estudo*, in Seminário Transdisciplinar sobre Espaços Físicos de Ensino e Dinâmicas de Sociabilidade FPCEUP, Porto, 7 e 8 Fevereiro; http://sigarra.up.pt/fpceup/noticias_geral.noticias_cont?p_id=F929007604/Programa_Definitivo_Seminario.pdf, 2008.
- [33] Neto, P.; Vieira A.; Ferreira, C.; Machado, I.; Ribeiro, L., *The Role of Digital Media and the Web for helping to transform an Old Place into a Rich Socializing and Learning Space: The E-Learning Café of U. Porto*. International Conference Skilled Art | Engenho & Arte. Abril 2010. <http://www.skilledart.eu/index.cfm?opt=3>, 2010.
- [34] Neto, P.; Vieira, A.; Machado, I.; Ferreira, C.; Ribeiro L., *E-Learning Café*. Re-shaping Learning Conference and Design Summer School, Brighton, UK .Jul 2010 <http://arts.brighton.ac.uk/research/cetld/reshaping-learning-conference>, 2010.
- [35] Oblinger, D., ed. *Learning Spaces*, An EDUCAUSE e-Book, August 2006, <http://www.educause.edu/books/learningspaces/10569>, 2006.
- [36] Oblinger, D., *Leading the Transition from Classrooms to Learning Spaces*. EDUCAUSE Quarterly, 28, no. 1 (2005), 14-18, <http://www.educause.edu/apps/eq/eqm05/eqm0512.asp>, 2005.
- [37] Oblinger, D., *Educating the Net Generation*. Boulder, Colo.: EDUCAUSE, 2005 <http://www.educause.edu/educatingthenetgen>, 2005.
- [38] Ornstein, S., *Ambiente construído & comportamento: a avaliação pós-ocupação e a qualidade ambiental*. São Paulo: Studio Nobel: FAUUSP: FUPAM, 1995.
- [39] Sawyer H.; Schaller M., *Assessment: The Key to Creating Spaces That Promote Learning*, EDUCAUSE Review, vol. 44, no. 2 (March/April 2009): 26-35, 2009.
- [40] Sanoff, Henry, *School Building Assessment Methods*. Washington: National Clearinghouse for Educational Facilities, 2001.
- [41] Schön, D., *Educating the Reflective Practitioner*. San Francisco: Jossey-Bass, 1987.
- [42] Scott-Webber, L., *In Sync: Environment Behavior Research and the Design of Learning Spaces*, Ann Arbor, MI: Society for College and University Planning, 2004.
- [43] Taylor, S., *Effects of Studio Space on Teaching and Learning: Preliminary Findings from Two Case Studies*. Innovative Higher Education; v33 n4 , p217-228 ; Jan 2009.
- [44] Taylor, A., *Linking Architecture and Education: Sustainable Design of Learning Environments*, Albuquerque University of New Mexico Press
- [45] Vieira, A.; Neto, P.; Ribeiro, L.; Sousa, M., *Requalifying Old Place For New Uses – The E-Learning Café U. Porto*. Requalifying Old Places for New Uses - International Symposium . IAPS-CSBE ‘CULTURE&SPACE IN THE BUILT ENVIRONMENT NETWORK’ and IAPS - HOUSING NETWORK REVITALISING BUILT ENVIRONMENTS, Istanbul, Turkey 2009.http://www.culture-space2009.org/#cnt=sem_genInfo.html, 2009.
- [46] Warger, T.; Dobbin, G., *Learning Environments: Where Space, Technology, and Culture Converge*. Educause, Boulder, CO , Oct 2009 <http://net.educause.edu/ir/library/pdf/ELI3021.pdf>, 2009.
- [47] Zimring, C., Peatross, D., *Cultural aspects of workplace organization and space*. In: Moore, G.;Marans, R. (Eds.) *Advances in environment, behaviour and design: towards the integration of theory, methods, research and utilization*. Volume4. New York: Plenum Press, 1997.

Open Spaces for Arts Education - The ALTO Ecosystem Model

John Casey, Wolfgang Greller, Hywel Davies, Chris Follows, Nancy Turner, Ed Webb-Ingall

ABSTRACT

Problem Area: The ALTO project (Arts Learning and Teaching Online) at the University of the Arts London has received funding in 2010 to engage the University with the rapidly growing global open education movement. This paper and multimedia prototype starts to explore the opportunities and challenges that the open agenda presents to art education institutions and those that study and work within them – as well as those outside the traditional ‘walled garden’ of formal education. We begin to identify and explore the intersecting topographies of the physical, social and technical spaces that are involved to discover possible sustainable paths forwards, this is especially relevant in the current climate of financial austerity.

Methodology: Our methodology is influenced by a number of approaches. Field-workers (as used in ethnographic and anthropological studies) are employed to understand cultures and their interactions with tools. Systems theory together with grounded theory is used to develop cohesive explanations of behaviours on which to base interventions. Our approach to technical systems design is guided by the socio-cognitive engineering methodology developed over the last 20 years or so.

Conclusions: The work of the project has involved critical engagement with current trends in diverse areas including education, e-learning, politics, informatics, knowledge engineering, economics and popular culture. As a result, we have sought to develop a simple and viable general socio-technical model for open arts education that can be adapted to fit local conditions, priorities and budgets.

Keywords: e-learning, open education, creative commons, cultural change, pedagogy, open educational resources, University of the Arts London, grounded theory, systems theory, socio-technical systems, art and design, learning design, instructional design, ALTO ecosystem, benefits realisation, design patterns, neoliberalism, tacit knowledge, interoperability

INTRODUCTION

The ALTO project (Arts Learning and Teaching Online) at the University of the Arts London received funding (JISC, 2011) in 2010 to engage the University with the rapidly growing global Open Education Resource (OER) movement. This paper starts to explore the opportunities and challenges that the open agenda presents to art education institutions and those that study and work within them – as well as those outside the traditional

‘walled garden’ of formal education. We begin to identify and explore the intersecting topographies of the physical, social and technical spaces that are involved to discover possible sustainable paths forwards, this is especially relevant in the current climate of cultural and financial austerity that is dominating discourse about public education in the UK in 2011.

This paper starts by describing the current software prototype in its current form with a breakdown of its components, their purposes and how they have been implemented. Next, we briefly outline the methods that we have used together with how their influences and rationales have helped in creating the prototype. After this we explore and describe the nature of some of the different spaces we have examined and traversed in the course of developing the prototype in the form of a series of reflective accounts. One of the discoveries of our work is that, of course, these spaces are really intersecting and interconnected ‘dimensions’ that cannot be dealt with in isolation. These reflective accounts provide both a series of ‘working sketches’ in words and a kind of reverse engineering to uncover the rationales behind our various design decisions to date and to help us consider how to take our work forward in the next design and development cycle. Finally, we conclude with a summary of our work and how we think the prototype may be developed further for use in arts education and in other cognate fields.

THE ALTO ECOSYSTEM SPACE

We have been developing a rich model for publishing OERs in practice-based arts subjects, which we hope to take forwards in further research and development projects. The working title for this is the ‘ALTO Ecosystem’ – this has the ambitious goal of creating a reusable and adaptable model for providing appropriate IT, cultural and policy support for OER development and collaboration in the Art and Design sector.

The project started with a strong focus on acquiring and installing digital repository software to handle the completed OERs, this had the secondary aim of enhancing the ability of UAL staff to manage their own learning resources internally. The repository software package ‘EdShare’ was chosen, a variant of the popular research paper repository ‘Eprints’ supplied by Southampton University. A design for the customised version of the EdShare system together with a metadata schema was developed (based on the Dublin Core metadata standard) and agreed. Repository software is optimized for storage and management and operates using a library paradigm - which is great for that particular purpose, but is not so good at presenting or publishing information. The presentational limitations of repository software became apparent in the context of ALTO and the Art and Design academic community, who traditionally place a high importance on ‘look and feel’ i.e. affective and usability issues. Similarly, in the wider world of OER the emphasis is much more on presentation, publication and communication. Hence, the leading initiatives do not use canonical repository software e.g. MIT OCW (previously Microsoft Content Management, now Plone), OpenLearn (Moodle), Merlot (A database driven central web site with distributed web ‘feeder’ sites),

IRISS, the Scottish Institution for Research and Innovation in Social Services, (Drupal).

We realized that while a repository might be a first step, it alone would not be enough, we came to understand that ALTO would need to be more than just one software tool - it would need to be a system of connected and related tools. The repository gave us a place to safely and reliably store resources in the long-term for which there was already a strong demand. But there was also a question of how ALTO might fit with other UAL information resources created by staff and projects that were being hosted on the open web outside of the official UAL infrastructure, which had been quickly blossoming over several years, often using Web 2.0 tools and services. We came to see that ALTO needed to fit into this wider and dynamic <ecosystem> of online resources and associated communities. Two things became clear. First, was that resources in the repository would need to be easily <surfaced> in other contexts in the wider UAL information ecosphere and beyond, in a variety of social media to aid dissemination and impact (not too hard technically). Second, that the other components of the UAL ecosystem might want to use the repository to deposit some of their outputs now that the possibility of a long term storage area was possible.

A good opportunity to explore this kind of connected systems approach became available through an existing UAL social media initiative called Process.Arts (<http://process.arts.ac.uk/>, Follows, 2011), which was the result of a staff teaching fellowship to produce an open online resource showing day-to-day arts practice of staff and students at UAL. This was set up to address the need for staff and students to display and discuss aspects of their practice as artists and designers by providing a collaborative space in an installation of the Drupal web content management system that included many common Web 2.0 features. This has been very successful in a short time, with users uploading images and videos and discussing each other's work, user numbers and interactions are high and growing with considerable interest from abroad. We realized that if the repository was the officially branded 'library' part of ALTO then UAL sites and communities such as Process.Arts would be the 'workshop' areas where knowledge and resources were created and shared. As a result, a decision to develop a socio-technical architecture for ALTO to fit into the wider UAL information ecosphere was accepted by the project board.

We think this approach represents a good path forwards for OER initiatives in Art and Design (and perhaps other cognate subjects) and recognizes the crucial importance of a contextually rich presentation layer, like MIT OpenCourseWare, with the addition of a social layer (like Process.Arts) that can also accommodate more granular resources. It's not enough to just provide a repository mechanism of storage or retrieval (important as that may be) – the presentation and social layers enable the important human factors of communication, collaboration, and participation that are needed for sustainable resource creation and sharing within community networks.

There is an online video describing our approach to these matters recorded at a workshop session at the OCWC 2011 conference at this link <http://process.arts.ac.uk/content/intro>

[duction-alto-and-processarts-ocwcglobal](#)

As at August 2011 the system consists of 4 'layers'

- 1) – Storage layer – Repository
- 2) & 3) – Presentation and Social Network Layers - Process.Arts
- 4) – Affiliate Layer – existing UAL websites that have adopted Creative Commons Licensing and an ALTO logo incorporating a link to a record in the repository. A schematic representation of the first 3 layers can be found below in Figure 1. A working sketch that describes the relationship of the ALTO Ecosystem to the rest of the UAL can be found below in Figure 2.

Another reason for having a social space to 'wrap around' shared learning resources is the special nature of the Arts and Art education, which tend to operate in highly confined contextual spaces. These spaces are determined by many things, such as socio-economics, political ideology and culture(s) and in these space it is challenged to distinguish itself from the 'ordinary'. Arts artefacts need to be embedded in a relevant context - else it is not Art, but a consumer object. Sculptures and installations of scrap metal need this context badly to be recognised as Art and not as a scrap heap. The context is often created by a physical space (museum, public square on a pedestal, gallery, etc) or social value (famous Artist, Architect, Brand Designer). Sharing of Arts and Design artefacts in digital form, therefore, depends much on the meta-contexts that can be associated with them. One way to investigate this further is to explore the sharing of such artefacts between different cultures, to see what kinds of meta-contexts are used.

Future Work

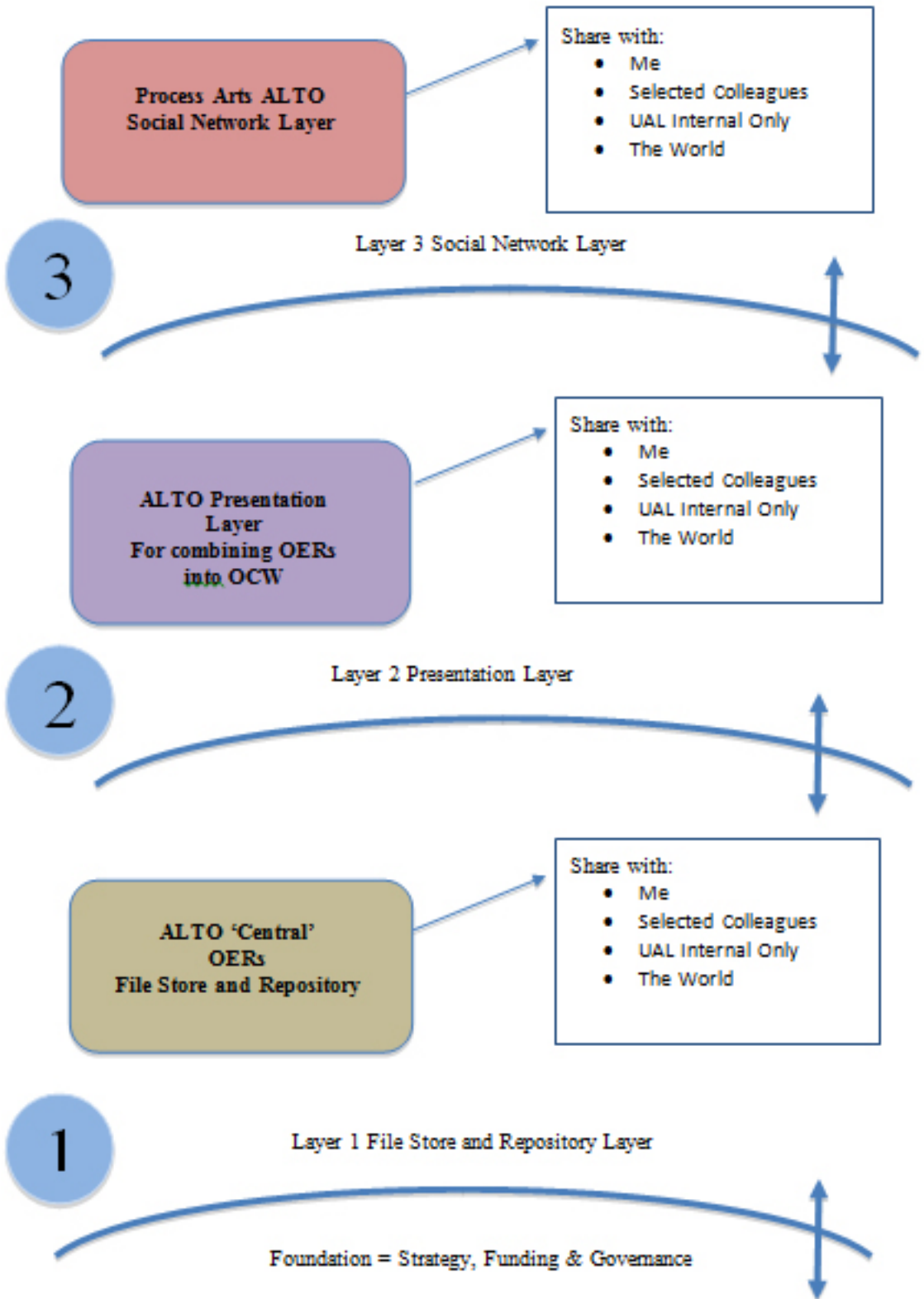
The ALTO ecosystem model is useful only in so far as it helps us to understand the organizations we work in and communicate our ideas. There can be a tendency in the educational technology field to try to replace reality with abstract models. As work proceeds we shall need to take a critical approach to our own model and change it as circumstances demand.

Next Page

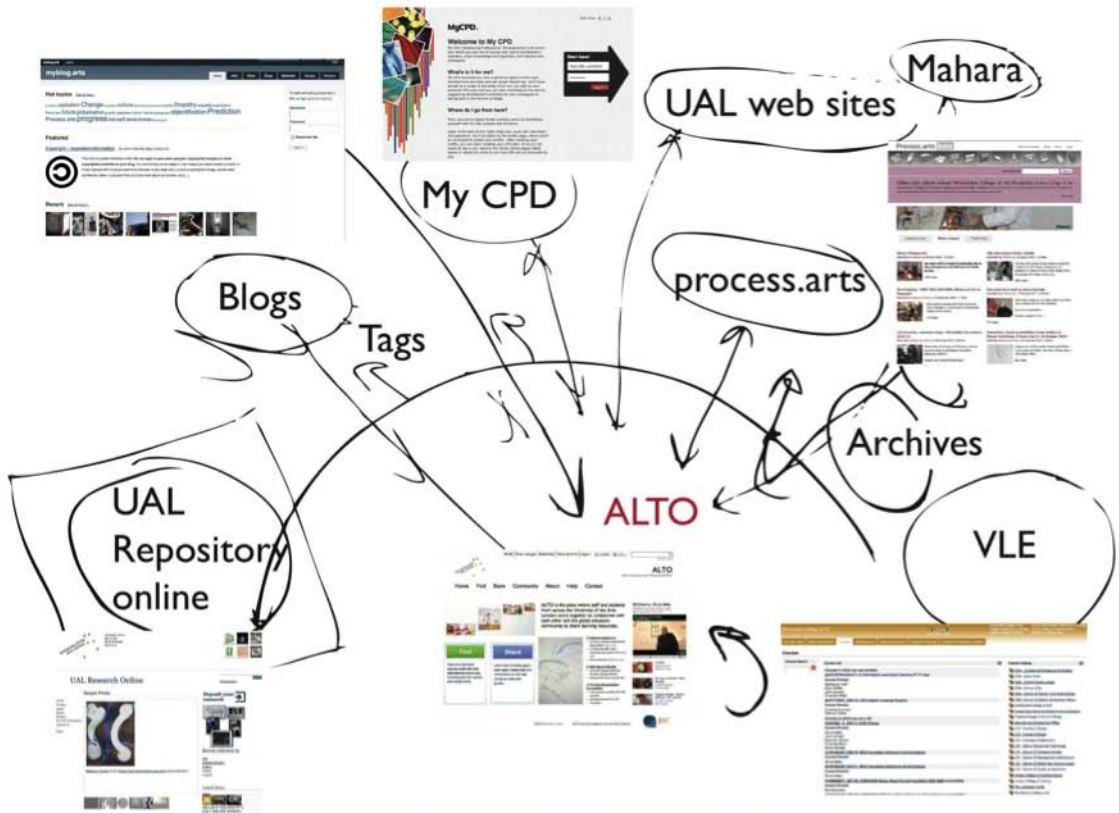
ALTO Ecosystem: schematic representation of the first three layers

Following Page

Working sketch of the ALTO Ecosystem related to the rest of UAL



A working sketch of the **ALTO** Ecosystem



METHODOLOGICAL SPACES

Grounded Theory

Grounded theory¹ consists of looking for commonly recurring patterns of activity and behaviour in order to understand how people and organizations work. Our project did not have the time to carry out an organized in depth indexation and taxonomy of observed behaviours of UAL academics in relation to their activities in relation to the design, development, sharing and reuse of learning resources. It is worth noting that, to the best of our knowledge, this kind of study on any scale has not been done before. This is notable because in over 15 years of UK government expenditure on technology enhanced learning the emphasis has been on the creation of digital learning content but there has been little apparent basic ‘market research’ about existing user behaviours and attitudes to sharing and reuse of learning resources. Instead, policy and strategy seems to have been based on sweeping assumptions that users are already sharing and want to share resources, Pollock & Cornford (2000) provide a useful analysis of the trend for rhetoric to replace evidence in e-learning development.

We adopted a sceptical attitude to the claims made by the e-learning ‘establishment’ in the UK that sharing and reuse of learning resources was a common activity amongst university teachers. Our own experience and that of our networks of colleagues suggested that this assumption was not always well founded and highly dependent on context. This echoes recent discussions in the international OER community that while many open resources are being created not that many people are actually reusing them (UNESCO 2005, Chow 2010). Rather, the pattern has been that OERs are created in the in the developed world and consumed in the developing world – the MIT OCW initiative being a classic example.

Future Work

With economic austerity being the rule in the developed world there are now strong economic reasons for advancing the OER agenda ‘at home’– the open textbook movement in the USA being a classic example (Chow, 2010). But, for sharing and reuse to take off in the UK and elsewhere we think much more basic empirical research needs to be done into how teachers actually design, develop, use and share learning resources as well as into their attitudes and values in relation to sharing and reuse.

Systems Theory

Universities and Art Colleges are complicated organizations that can be both highly resistant to change and reluctant to accept any shareable representations of their internal functionality. Modern systems theory can offer some help, to those engaged in change activities in universities. It provides some useful analytical tools for identifying and un-

1 http://en.wikipedia.org/wiki/Grounded_theory

derstanding the dynamic relations between the different components of such organisations. Senge and Sterman (1994) develop this theme in the context of Organisational Learning - a concept, which is of growing interest in the business world, it is worth briefly looking at some of their recommendations. They propose a 3-stage process for developing a better understanding of how an organisation actually works by the people within it:

- “1/ Mapping mental models - explicating and structuring assumptions via systems models;
- 2/ Challenging mental models - revealing inconsistencies in assumptions;
- 3/ Improving mental models - continually extending and testing mental models.”

They make the important point that flaws in the understanding of how an organisation works cannot be corrected until they are made explicit, which is the purpose of the modeling exercise.

Future Work

Introducing OER activity into a university involves encountering and dealing with different mental models of how the institution is structured, how it works and what its purpose is. These models can be quite varied and even conflicting, as a result we have found a need to create our own ‘meta model’ that is capable of containing other models as reference points. This is important, because much of the work involved in introducing OER activity into a university is in dealing with cultural issues. We will need to articulate our meta model as we go forwards and test it out with users to see if it is of use to them. We shall need to bear on mind that this is a highly contested space internally and externally, a point made forcefully by Barnett (2003).

Benefits Realisation

The ALTO project had as one of its high level aims to link engagement with OER to a process of educational culture change across the institution. Under the guidance of the project director, we were encouraged to look for opportunities to embed the benefits of OER engagement at the UAL and at the systemic nature of the obstacles to longer term change that were involved. To do this the project team engaged with the institutional context early by holding a benefits realisation² workshop with key UAL stakeholders; this has resulted in a set of simple ‘statements of principle’, which provided a sound foundation for the project (<http://blogs.arts.ac.uk/alto/about/>). The underlying driver behind the benefits realization managerial philosophy is that past experience in implementing change shows that many projects succeed in meeting their objectives but fail in making a lasting change on the host organization. A tendency that might be described as

2 http://www.gowerpub.com/pdf/SamplePages/Benefit_Realisation_Management_Ch4.pdf

‘tactically correct but strategically wrong’ or more prosaically as the ‘tick-box approach’ where participants lose sight of the big picture and fail to seize opportunities for fear of deviating from the plan. This is a mind set that can be prevalent in the UK public sector dominated by central planning and target setting. In the context of IT projects this tends to manifest itself in a top-down linear narrative that becomes entrenched very early on, often articulated by external ‘experts’, quangos and consultants. The net effect of this can be a denial of the lived reality of the people for whom the system is being designed to help, with discourse amongst ‘experts’ being substituted for reality. This in turn, not surprisingly, tends to produce inflexible software development methods (epitomized by the classic ‘waterfall’³ model of software development). These are well known problems in the software industry and the textbooks are full of case studies recounting famous project failures that met their objectives (Glass, 1997). The recent multibillion-pound UK NHS database system failure is a classic example of these trends combining⁴.

Future Work

Because of the factors described in this section it will be necessary to explicitly plan for the ‘unexpected’ in the project documentation to any funding agency, in order to create a ‘space’ in the planning methodology for deviations from the plan.

Socio-Technical System Design

Another major methodological influence on the project came from the socio-technical systems⁵ design tradition originated by researchers at the Tavistock Institute in London and described by Enid Mumford (1995) in a number of studies involving the effective introduction of technology in the workplace, originally in the context of heavy industries like coal mining after the second world war. This approach has since been adapted successfully for the introduction and adaptation of information technologies into the modern knowledge-based workplace. Notably by, Sharples (2002) as ‘Socio-Cognitive Engineering’ and Wenger (1995 & 2009) as ‘Communities of Practice’ and ‘Technology Stewards’. These approaches draw on traditional ethnographical approaches, where project fieldworkers interact with the groups under study to understand better how they work and live. This information is then used in the iterative construction of prototypes that are tested with people to understand how the tools and system may be improved. One way of describing this approach is that it is investigative and human-centred as well as contextually and culturally sensitive. This does not mean, however, that it is neutral. Sharples (2002), is explicit about the interventionist nature of this methodology i.e. it has a strategic dimension that is aimed at changing the way people interact with each other and their tools in knowledge working. Thus, user accounts and ‘official lines’ are not taken at face value and the aim is to seek to understand how people and organisations really work and function in relation to their stated aims in order to improve them.

3 http://en.wikipedia.org/wiki/Waterfall_model

4 <http://www.guardian.co.uk/commentisfree/2011/aug/03/nhs-database-digital-disaster>

5 http://en.wikipedia.org/wiki/Socio-technical_systems

Future Work

These approaches have a great deal in common with some of the classic approaches to product design as described by Don Norman (Norman, 1999) and Achille Castiglioni⁶ (Antonelli, 1997) and it will make sense to see our work as designing a suite of products to help teachers (and students) to design, develop, share and adapt learning resources.

Agile Software Development

An important influence on our methodology was that of agile software development⁷, which developed in reaction to the failure of traditional top down methods of software system development and management in the software industry to deliver usable and successful solutions to peoples needs. In this approach basic assumptions are questioned, problem areas are targeted early on and rapid early prototyping is used, continuous user testing and evaluation are also features of this approach to system design.

Future Work

Agile software projects, especially in the higher education sector, can become detached from real users and end up as interesting projects undertaken just for their own sake. To prevent this happening we shall need to have a strong end user focus, this will be achieved by regular meetings with real end users to test ideas and system prototypes. The project team will also have one or more ‘user advocates’ to represent user interests.

PHYSICAL AND POLITICAL SPACES

In *City of Quartz: Excavating the Future in Los Angeles*, Mike Davis (2006) describes the spatial politics and economics of modern Los Angeles and how architecture and city planning is used to control and influence the movement and congregation of individuals and groups to project and protect the power of ruling interest groups. In his analysis, Davis stresses the contested nature of ‘public space’ and the threat they pose to those in authority, resulting in the continual need to devise and implement means of observation and control over such spaces in order to respond to initiatives from below.

In terms of physical space, university education over the last millennia or so has been conducted in closed spaces exemplified by traditional campuses and buildings with strong regional and national connections to ruling social groups and their values. The pattern has remained remarkably consistent in the recent expansion of the university system in the UK through the 1990’s and 2000’s. This political and physical organization of universities has tended to preserve and perpetuate certain modes of education and cultural forms that produce conservative attitudes and highly entropic (resistant to change) professional and institutional structures and cultures. One example of this is the continued dominance of the physical university lecture hall /studio as the location

6 <http://designmuseum.org/design/achille-castiglioni>

7 http://en.wikipedia.org/wiki/Agile_software_development#Agile_Manifesto

of teaching. As Laurillard (2002) observes, the university lecture format was devised as a medieval lecture tool to efficiently transmit information in an era when books were expensive and in short supply. Yet the lecture format continues to dominate and universities are building ever-larger ‘mega’ lecture halls to cope with the ever-increasing size of classes (Shmier, 2011). There are two powerful drivers for this:

- 1) The commodification of UK education, where the cost of teaching is transferred from general social taxes to individual payment, which makes change more difficult as students and their parents demand traditional lectures because that is what ‘proper’ higher education is popularly perceived to be.
- 2) The dominant educational philosophy supporting undergraduate education was developed to meet the needs of a small elite (the children of the medieval aristocracy).

Meeting the challenge posed by i) is difficult where the prospective students and their families see college education as a part of the socialization process for middle and upper class youth and those aspiring to join these classes. This is much less of a problem for other demographic segments (to use the language of neo-liberalism) where students have more pragmatic aims. In that situation, branding and product development are capable breaking free of the lecture model. The open and distance learning sector as exemplified by the Open University in the UK and the University of Phoenix in the USA draw on a well established educational tradition going back to the correspondence courses of the 19th Century.

The challenge posed by ii) is a bit trickier. Laurillard (2002) approaches this by suggesting that the model of undergraduate education in the UK be changed from the idea that students and teachers are jointly constructing new knowledge in a domain. Instead, she asserts, students are in fact learning knowledge that is new only to them, and that the aim of teaching is to bring student understanding up to a level where they can participate in a cognate community. In this educational model, new domain knowledge is only encountered and created in postgraduate education.

The underlying educational philosophy governs how technology may be used in the educational process. Peter Dicken (2010) provides a useful insight into how our different conceptions of knowledge affect how it can be shared; he splits knowledge into 2 types:

- 1) Codified (or explicit): the kind that can be expressed formally in documents, plans, drawings, software and hardware etc.
- 2) Tacit: deeply personalized knowledge possessed by individuals is virtually impossible to make explicit and communicate to others

As Dickens observes, this distinction is fundamental to understanding the role of space and place in the technological diffusion of knowledge, with tacit knowledge having

a very steep ‘distance-decay’ curve, while codified knowledge can be projected relatively easily across time and space. But, Dickens also cautions, this distinction can change in a number of ways that can make tacit knowledge more easily exchanged at a distance. One way that springs to mind that may be used to communicate tacit knowledge is the use of rich media, such as video or animations, that convey a sense of ‘being there’ and can have a persuasive rhetorical power to convey not just ideas and concepts but also affective and cultural factors (Laurillard, 2002). Another, more radical, observation is that in higher education in Art and Design much tacit knowledge perhaps isn’t really tacit at all. Rather, the assertion that the knowledge involved is tacit may be a strategy to preserve the mystery and exclusiveness of the ‘secret garden’ of formal education. Jennifer Moon (2002) provides a good example of the latter in connection with her experiences as an educational developer in the UK, during the 1990s citing the anguish that the requirements to create clear learning outcomes caused to some university teachers.

“The ideas that learning [and by implication teaching] can be described at all can generate quite amazing angst....At the time, there were still lecturers who would say, ‘I don’t want to think in advance about what I am going to teach. I will decide when I get in with the class.’ The same lecturers would also say that they would decide on the assessment when it came to the end of the term or semester, and that they did not to discuss levels or standards because they would know a good or bad piece of work when they saw it.”

(Moon, 2002, p 9)

Future Work

We will need to be aware of the contradictory and paradoxical nature of universities engaging with the open education agenda. In many ways universities represent an education model based on scarcity and elitism while the open model is based on abundance and equality of access. There are clear parallels here to the underlying contradictions of neoliberal economics where, despite great and increasing wealth and productive capacities, human society is marked by increasing inequality (Harvey, 2007). The potential of open public spaces (both physical and online) to act as a conduit for social change are considerable, as Davis (2006) observes. Linking universities to such spaces and engaging with OERS can be seen as both extending the reach of the traditional academy and at the same time subverting it and, potentially, reforming it. In the process, institutions that are so place-based as universities run the risk of exposing practices and values that make little sense to the outside world. But, as prestigious institutions, they can also project their brand and values into an increasingly global education market. Sharing OERs can act as a valuable and low-threshold way of joining global collaboration networks as the Open University has found (Lane et al, 2009). Engagement with the open education agenda can also act as a powerful driver for cultural change in university teaching practice by reducing insularity and opening the door to innovation and collaboration with

others, both internally and externally. What kind of cultural change is a key question that needs to be clearly articulated if institutions are to benefit from involvement in the open education agenda.

EDUCATIONAL SPACES

Perhaps the biggest reason for teachers (and their institutions) to be involved in OER creation and sharing is the improvement in teaching quality that this may bring. Biggs (2006) and Ramsden (1992) both make the point that everyone has an implicit personal theory of teaching and learning and that the first step in the process of improving teaching is to start to externalise these internal conceptions in order to change them and learn from others. In his influential book, *Learning to Teach in Higher Education*, Ramsden (1992) outlines three theories of teaching in HE that co-exist and build upon each other in a hierarchical manner. They also nicely represent the stages a university teacher progresses through as their pedagogic expertise improves, as well as providing useful ways of analysing the proposed and actual uses of technology to support teaching. These three theories see teaching as concerned respectively with:

1. Delivering content
2. Organising and supervising student activity
3. Teaching as adapting to circumstances and context in order to make student learning possible

From this perspective much existing OER activity is currently to do with level 1. Addressing level 2 may be possible by developing sharable lesson plans or learning designs and design ‘patterns’ as developed in the field of architecture by Alexander (1979), the European E-Len project gives a nice introduction to this field⁸ and in the UK Laurillard and colleagues at the Institute of Education in London have been researching this area⁹. But, externalising and sharing knowledge at the third level of Ramsden’s model can be particularly tricky in practice-based subjects like Art and Design that are often highly dependent on cultural context and teachers personalities. In many ways this is a classic example of the problems of dealing with tacit knowledge; how can we represent and share such knowledge and share it, and even assess it?

De Corte (1990) provides a useful general description of the nature of the knowledge needed to underpin expertise in a domain that is also useful to frame a discussion about how to share it:

- a. The flexible application of a well-organised domain-specific knowledge base, involving concepts, rules, principles, formulae and algorithms etc.
- b. Heuristic methods.
- c. Metacognitive skills

8 <http://www2.tisip.no/E-LEN/info/e-len-leaf2.pdf>

9 Overview of learning design patterns from Diana Laurillard <http://www.youtube.com/watch?v=97NjUUAdyq0>

d. Learning strategies that learners engage in to acquire the preceding types of skills.

The field of design studies may help us in developing ways to share the heuristic and metacognitive aspects of such expertise. Donald Norman (1999) has written a classic account about this in *The Design of Everyday Things*, there are some important ideas in his text quoted below in relation to understanding the nature of the pedagogical knowledge of teachers. Norman makes a strong and useful case for the understanding the situated nature of such knowledge:

“A major argument [in this book] is that much of our everyday knowledge resides in the world, not in the head. This is an interesting argument and, for cognitive psychologists, a difficult one. What could it possibly mean for knowledge to be situated in the world? Knowledge is interpreted, the stuff that can only be in minds. Information, yes, that could be in the world, but knowledge, never. Well, yeah, the distinction between knowledge and information is not clear. If we are sloppy with terms, then perhaps you can see the issues better. People certainly do rely upon the placement and location of objects, upon written texts, upon the information contained within other people, upon the artefacts of society, and upon the information transmitted within and by a culture” (Norman, 1999, p. xi)

Future Work

The educational benefits for engagement with the open agenda are strong and need to be made explicit going forwards. It is precisely the situated, embedded, tacit and ‘craft’ aspect of teaching in mainstream art and design that needs to be comprehended in order to both understand and improve it. By engaging with OER creation and sharing, especially with a combination of rich media and practice-based accounts as exemplified in *Process.Arts*, we effectively open a door into this hitherto secret garden of educational practice. There is plenty of research support for this approach; Wenger (1998) calls these accounts ‘boundary objects’ that enable different communities of practice in the same subject (and even between subjects) to communicate meaning across the boundaries of different contexts. More recently, Conole (2008) and colleagues in the UK Open University and elsewhere have called these kind of resources ‘mediating artefacts’ for their ability to carry pedagogic meanings across institutional and national boundaries. Lastly, Paivio (1986) makes a good case for the inclusion of rich media in such artefacts as a way of aiding understanding, as part of his ‘Dual Coding’ theory.

LEGAL SPACES

Levels of awareness about copyright and other Intellectual Property Rights (IPR) amongst academics are fairly low. Engagement with OER creation forces individuals and

institutions to reexamine their attitudes and policies regarding the ownership of IPR in scholarly content. Traditionally, in the UK, ownership of such content has been passed over to commercial publishers in the form of articles for research journals and student textbooks.

The relationship with commercial academic publishers has become unbalanced over the last two decades with the prices of research journals and textbooks rising far more rapidly than inflation. This has led to the common situation that university libraries can no longer afford to buy back their own research for their students to read. In many ways this sums up the progress of neoliberalism¹⁰ over the same period, with the rising dominance of property rights to the exclusion of other rights and increasingly severe laws to protect and extend the rights of property in the digital domain. There is a clear parallel here to property law development and enforcement in 18th century England (Corrigan & Sayer, 1985).

Left to its own devices neoliberalism tends to strangle the sources of its own wealth – the creative ability of individuals and society. In reaction to the unbalanced use of IPR law by commercial publishers the Creative Commons organization (<http://creativecommons.org/>) proposes a simple set of legal tools to empower individuals and organizations across a wide range of activities to manage the IPR in their own creative outputs. This initiative has been extraordinarily successful and has been adopted around the world, showing evidence of a common need. The ALTO project has been using the licences developed by the Creative Commons, without which, it is fair to say, much of our work would have been practically impossible.

A legal innovation that the project has implemented has been the use of a customized version of a Creative Commons licence to support sharing just within the UAL, which has also introduced the valuable concept of the ‘UAL Commons’. This is modelled on earlier work in Canada in the state of British Columbia (<https://creativecommons.org/weblog/entry/26963>) this licence was based on the Creative Commons BY-NC-SA licence with additional restrictions to restrict use to within the UAL. This addresses the issue of building trust between the staff from the six highly autonomous individual colleges that constitute the UAL to support inter-college sharing.

Future Work

A simple but vital aspect of future work in this area is providing access to awareness

10 For those readers who are new to the subject of neoliberalism this entry in Wikipedia gives a good start: <http://en.wikipedia.org/wiki/Neoliberalism>. The A Short History of Neoliberalism by David Harvey, Oxford, University Press, give an excellent introduction to the economics and politics of the subject especially covering the globalisation phase. For those readers interested in the current and future trajectory of neoliberalism then this entry in Wikipedia is the place to start: <http://en.wikipedia.org/wiki/Financialisation> the book Meltdown: The End of the Age of Greed (Verso) by the BBC economics editor Paul Mason give a highly accessible introduction to current trends.

raising learning resources for academics and students about the legal aspects of OER engagement – possibly making this a mandatory part of teacher training.

TECHNICAL SPACES

Pioneering work about introducing technology into workplaces by Mumford (1995) and others has long since shown that successful innovation always has to address the contextual and social aspects of using the new technologies. This applies especially to HE organisational and teaching cultures, which can be notoriously resistant to change, with and without technology. Until recently in the UK work in the area of sharing and reusing learning resources has been dominated by technological concerns with interoperability standards, learning objects, metadata and the creation of specialist repository software – sometimes becoming an end in itself rather than linked to real users (Barker, 2010). There was a genuine belief amongst the ‘experts’ that if this were done according to the technical specifications then everything else would work. But, things have not worked out as expected, Fini (2007) describes it this way:

“This way of interpreting e-learning is running into a crisis: the promised economic effectiveness of content re-use is often hard to demonstrate or it is limited to specific contexts, while a general feeling of discontent is arising.”

(Fini, 2007, p. 5)

To understand this apparent impasse Friesen (2004a) and Friesen & Cressman (2007) helpfully point out there is a set of important political and economic sub-texts connected to the proposed uses of technical standards and technologies in education that need to be explored and challenged. Neglecting such ‘soft’ issues is a major cause of the problems cited above by Fini (2007). While Harvey (2007) notes a prevailing belief in neo-liberal thinking that there can be a technological fix for any problem and that products and solutions are often developed for problems that do not yet exist. In education, one of the materializations of this tendency is in the proposition that interoperability standards and techniques developed in the military and aviation sectors can be adopted in the mainstream public education system (Friesen, 2004a). But, despite the large amounts of money spent by public bodies in this area, Friesen (2004b) notes that there has not been wide adoption. In retrospect it is not surprising that standards and approaches that developed in the last century and originating in the military and industrial sectors have not taken root in mainstream public education systems; here teaching and learning is, inevitably, a far more messy, less controlled and contingent enterprise. Wilson (2009), who has been involved closely in the standardization development process, reflects on this state of affairs and suggests that there is a need for a more lightweight approach such as epitomized in web technology standards. Elsewhere, Hoel (2010) who has also been involved in developing educational interoperability standards is bleaker in his assessment stating “the interoperability standards in the LET [Learning Education and

Training] domain failed miserably”. Although the mood swings in the educational technology community can sometimes resemble those in the merchant banking community (from ‘master of the universe’ to deep despair) we need to remember that innovation is often a dialectical process and rarely proceeds in a straight line – especially once people are factored in. Casey and Greller (2007) provide a more sanguine longer-term view of these developments and suggest that some of these technologies may yet be adopted in unanticipated ways.

Future Work

We need to be aware that the underlying philosophical framework of those building technical tools in this area will determine the success or otherwise of the outcomes. Whatever the technical solutions that are developed, they should help and not hinder the activities relating to the design, development and sharing of learning resources. The guiding design principle for these socio-technical systems need to have a clearer philosophical basis rather than the currently dominant techno-centric abstractions, which often disguise a rather impoverished view of education and society. We think the guiding principles for system design should be based on the concepts of conviviality (Illich, 1973, Hardt & Negri 2009) and stewardship (Wenger et al, 2009). The tools developed should be based on truly free and open source software that is robust, easy to use, and is well documented¹¹.

CONCLUSIONS

The work of the project has involved critical engagement with current trends in diverse areas including education, e-learning, politics, informatics, knowledge engineering, economics and popular culture. As a result, we have begun to develop a simple and viable general socio-technical model for making tools to support open arts education that can be adapted to fit local conditions, priorities and budgets. Developing this paper has given the project team an opportunity to reflect on their work so far and begin planning for future developments.

ALTO, in many ways, represents a nexus between the traditional ‘walled garden’ approach to arts education regulated by national authorities and more open forms of educational practice. In many ways there is nothing new in the concept of open arts education, the academy has always been influenced by external developments and movements – sometimes resisting and sometimes embracing change.

11 NB not all software that claims to be free and open source actually is, the phrase is sometimes used as a feel good marketing ploy.

REFERENCES

- Antonelli, P. (1997). Curator's Essay. In Achille Castiglioni: Design! (A retrospective of the Italian architect and industrial designer), The Museum of Modern Art, New York. Retrieved July 27, 2009 from <http://www.moma.org/exhibitions/1997/castiglioni/index.html>
- Alexander, C. (1979). *The Timeless Way of Building*. New York: Oxford University Press.
- Barker, P. (2010) <http://blogs.cetis.ac.uk/philb/2010/09/10/open-closed-case/> accessed March 6 2011
- Biggs, J. (2006). *Teaching for quality learning at university: what the student does*. Maidenhead, United Kingdom: Open University Press.
- Barnett, R. (2003) *Beyond all reason: living with ideology in the university*. Buckingham: Open University Press.
- Casey, J. Greller, W. (2007) The RDA of Standards for a Healthy e-Learning System. In *Journal of e-Learning and Knowledge Society: The Italian e-Learning Association Journal*, Vol. 3, n.2. http://je-lks.maieutiche.economia.unitn.it/index.php/Je-LKS_EN/issue/view/33 accessed August 16 2011
- Chow, B. (2010) Taking the Open Educational Resources (OER) Beyond the OER Community: Policy and Capacity. UNESCO Policy Forum, Paris. <http://oerworkshop.weebly.com/policy-forum.html> accessed August 16 2011
- Conole, G. (2008). Capturing practice: the role of mediating artefacts in learning design. In Lockyer L., S. Bennett, S., Agostinho, and B Harper (Eds.), *Handbook of Research on Learning Design and Learning Objects: Issues, Applications and Technologies*. Hershey, PA: Information Science Reference.
- Corrigan, P., Sayer, D. (1985), *The Great Arch: English State Formation As Cultural Revolution*, Blackwell
- Davis, M. (2006) *City of Quartz: Excavating the Future in Los Angeles*, Verso Books
- de Corte, E. (1990). Learning with New Information Technologies in Schools: Perspectives from the Psychology of Learning and Instruction, *Journal of Computer Assisted Learning*, (6) pp69-87
- Dicken, P. (2010) *Global Shift: Mapping the Changing Contours of the World Economy*, Sage Publications
- Fini, A. (2007). Editorial, Focus on E-Learning 2.0. In *Journal of e-Learning and Knowledge Society: The Italian e-Learning Association Journal*, Vol. 3, n.2 http://je-lks.maieutiche.economia.unitn.it/index.php/Je-LKS_EN/issue/view/33 accessed August 16 2011
- Follows, C. (2011) *Process.Arts*. <http://process.arts.ac.uk/> accessed August 16 2011
- Friesen, N. & Cressman, . (2007). "The Political Economy of Technical E-Learning Standards" In Koolhang, A. & Harman, K. (eds.), *Learning Objects: Theory, Praxis, Issues & Trends*. Warsaw: Informing Science Press. pp. 507-526.
- Friesen, N. (2004a). Three Objections to Learning Objects and E-learning Standards. In: McGreal, R. (Ed.). *Online Education Using Learning Objects*. London: Routledge. pp. 59- 70.
- Friesen, N. (2004b). *The E-Learning Standardization Landscape*. Canada, Cancore. Retrieved 11/12/09 from: http://www.cancore.ca/docs/intro_e-learning_standardization.html accessed August 16 2011
- Glass, R., L., (1997) *Software Runaways: Lessons Learned from Massive Software Project Failures*, Prentice Hall

- Hardt, M., Negri, A., (2010) Commonwealth, Harvard University Press
- Harvey, D. (2007) A Short History of Neoliberalism, Oxford, University Press
- Hoel, T. (2010) <http://hoel.nu/wordpress/?p=426> accessed August 16 2011
- Illich, I. (1973). Tools for Conviviality. London: Harper & Row.
- JISC (2011) Open educational resources programme - phase 2. <http://www.jisc.ac.uk/oer> accessed March 6 2011
- Lane, A; McAndrew, Patrick and Santos, Andreia (2009). The networking effects of OER. In: 23rd ICDE World Conference 2009, 7-10 June 2009, The Netherlands.
- Laurillard, D. (2002). Rethinking University Teaching. Abingdon: Routledge and Falmer
- Moon, J. (2002) The Module and Programme Development Handbook: a practical guide to linking levels, outcomes and assessment, Abingdon: Routledge and Falmer
- Mumford, E. (1995). Effective Systems Design and Requirements Analysis: The ETHICS Approach. Basingstoke: Macmillan. Ap-
- Norman, D. (1999). The Design of Everyday Things. Cambridge, Massachusetts: MIT Press.
- Pavio, A. (1986). Mental Representations. New York: Oxford University Press.
- Pollock, N., & Cornford, J., (2000) Theory and Practice of the Virtual University: report on UK universities use of new technologies. ARIADNE issue 24, 2000 <http://www.ariadne.ac.uk/issue24/virtual-universities/>
- Ramsden, P. (1992). Learning to Teach in Higher Education, Abingdon: Routledge and Falmer
- Senge, P., & Sberman, J. (1994) Systems Thinking and Organisational Learning: acting locally and thinking globally in the organisation of the future, in Morecroft, J., & Sberman, J., Modelling for Learning Organisations, Productivity Press, Portland, Oregon
- Sharples, M., Jeffery, N., du Boulay, J.B.H., Teather, D., Teather, B., and du Boulay, G.H. (2002) Socio-cognitive engineering: a methodology for the design of human-centred technology. European Journal of Operational Research, 136, 2, pp. 310-323. [Preprint available as 104Kb pdf file](#)
http://www.lsri.nottingham.ac.uk/msh/Papers/mediate_ejor.pdf
- Schmier, L. (2011) Random Thoughts. <http://therandomthoughts.edublogs.org/?s=mega>
- Wilson, S. (2009) IMS's three-pronged strategy, Retrieved 11/12/09 from <http://eduspaces.net/scottw/weblog/698961.html> accessed August 16 2011
- UNESCO (2005) & International Institute for Educational Planning, Internet Discussion Forum for Open Educational Resources Open Content for Higher Education
<http://www.unesco.org/iiep/eng/focus/opensrc/PDF/OERForumFinalReport.pdf> accessed August 16 2011
- Wenger, E. (1998). Communities of Practice. Cambridge: Cambridge University Press.
- Wenger, E., White, N., Smith J.D., (2009) Digital Habitats: stewarding technology for communities, Portland.

Creative Commons Licence

The essays and presentations collected here are all licensed under the Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License, except where explicitly stated.

CREATIVE COMMONS ATTRIBUTION-NONCOMMERCIAL-NODERIVS 3.0 UNPORTED

THE WORK (AS DEFINED BELOW) IS PROVIDED UNDER THE TERMS OF THIS CREATIVE COMMONS PUBLIC LICENSE (“CCPL” OR “LICENSE”). THE WORK IS PROTECTED BY COPYRIGHT AND/OR OTHER APPLICABLE LAW. ANY USE OF THE WORK OTHER THAN AS AUTHORIZED UNDER THIS LICENSE OR COPYRIGHT LAW IS PROHIBITED.

BY EXERCISING ANY RIGHTS TO THE WORK PROVIDED HERE, YOU ACCEPT AND AGREE TO BE BOUND BY THE TERMS OF THIS LICENSE. TO THE EXTENT THIS LICENSE MAY BE CONSIDERED TO BE A CONTRACT, THE LICENSOR GRANTS YOU THE RIGHTS CONTAINED HERE IN CONSIDERATION OF YOUR ACCEPTANCE OF SUCH TERMS AND CONDITIONS.

1. DEFINITIONS

“**Adaptation**” means a work based upon the Work, or upon the Work and other pre-existing works, such as a translation, adaptation, derivative work, arrangement of music or other alterations of a literary or artistic work, or phonogram or performance and includes cinematographic adaptations or any other form in which the Work may be recast, transformed, or adapted including in any form recognizably derived from the original, except that a work that constitutes a Collection will not be considered an Adaptation for the purpose of this License. For the avoidance of doubt, where the Work is a musical work, performance or phonogram, the synchronization of the Work in timed-relation with a moving image (“synching”) will be considered an Adaptation for the purpose of this License.

“**Collection**” means a collection of literary or artistic works, such as encyclopedias and anthologies, or performances, phonograms or broadcasts, or other works or subject matter other than works listed in Section 1(f) below, which, by reason of the selection and arrangement of their contents, constitute intellectual creations, in which the Work is included in its entirety in unmodified form along with one or more other contributions, each constituting separate and independent works in themselves, which together are assembled into a collective whole. A work that constitutes a Collection will not be considered an Adaptation (as defined above) for the purposes of this License.

“**Distribute**” means to make available to the public the original and copies of the Work through sale or other transfer of ownership.

“**Licenser**” means the individual, individuals, entity or entities that offer(s) the Work under the terms of this License.

“**Original Author**” means, in the case of a literary or artistic work, the individual, individuals, entity or entities who created the Work or if no individual or entity can be identified, the publisher; and in addition (i) in the case of a performance the actors, singers, musicians, dancers, and other persons who act, sing, deliver, declaim, play in, interpret or otherwise perform literary or artistic works or expressions of folklore; (ii) in the case of a phonogram the producer being the person or legal entity who first fixes the sounds of a performance or other sounds; and, (iii) in the case of broadcasts, the organization that transmits the broadcast.

“**Work**” means the literary and/or artistic work offered under the terms of this License including without limitation any production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression including digital form, such as a book, pamphlet and other writing; a lecture, address, sermon or other work of the same nature; a dramatic or dramatico-musical work; a choreographic work or entertainment in dumb show; a musical composition with or without words; a cinematographic work to which are assimilated works expressed by a process analogous to cinematography; a work of drawing, painting, architecture, sculpture, engraving or lithography; a photographic work to which are assimilated works expressed by a process analogous to photography; a work of applied art; an illustration, map, plan, sketch or three-dimensional work relative to geography, topography, architecture or science; a performance; a broadcast; a phonogram; a compilation of data to the extent it is protected as a copyrightable work; or a work performed by a variety or circus performer to the extent it is not otherwise considered a literary or artistic work.

“**You**” means an individual or entity exercising rights under this License who has not previously violated the terms of this License with respect to the Work, or who has received express permission from the Licenser to exercise rights under this License despite a previous violation.

“**Publicly Perform**” means to perform public recitations of the Work and to communicate to the public those public recitations, by any means or process, including by wire or wireless means or public digital performances; to make available to the public Works in such a way that members of the public may access these Works from a place and at a place individually chosen by them; to perform the Work to the public by any means or process and the communication to the public of the performances of the Work, including by public digital performance; to broadcast and rebroadcast the Work by any means including signs, sounds or images.

“**Reproduce**” means to make copies of the Work by any means including without limita-

tion by sound or visual recordings and the right of fixation and reproducing fixations of the Work, including storage of a protected performance or phonogram in digital form or other electronic medium.

2. FAIR DEALING RIGHTS.

Nothing in this License is intended to reduce, limit, or restrict any uses free from copyright or rights arising from limitations or exceptions that are provided for in connection with the copyright protection under copyright law or other applicable laws.

3. LICENSE GRANT.

Subject to the terms and conditions of this License, Licensor hereby grants You a worldwide, royalty-free, non-exclusive, perpetual (for the duration of the applicable copyright) license to exercise the rights in the Work as stated below:

to Reproduce the Work, to incorporate the Work into one or more Collections, and to Reproduce the Work as incorporated in the Collections; and,

to Distribute and Publicly Perform the Work including as incorporated in Collections.

The above rights may be exercised in all media and formats whether now known or hereafter devised. The above rights include the right to make such modifications as are technically necessary to exercise the rights in other media and formats, but otherwise you have no rights to make Adaptations. Subject to 8(f), all rights not expressly granted by Licensor are hereby reserved, including but not limited to the rights set forth in Section 4(d).

4. RESTRICTIONS.

The license granted in Section 3 above is expressly made subject to and limited by the following restrictions:

You may Distribute or Publicly Perform the Work only under the terms of this License. You must include a copy of, or the Uniform Resource Identifier (URI) for, this License with every copy of the Work You Distribute or Publicly Perform. You may not offer or impose any terms on the Work that restrict the terms of this License or the ability of the recipient of the Work to exercise the rights granted to that recipient under the terms of the License. You may not sublicense the Work. You must keep intact all notices that refer to this License and to the disclaimer of warranties with every copy of the Work You Distribute or Publicly Perform. When You Distribute or Publicly Perform the Work, You may not impose any effective technological measures on the Work that restrict the ability of a recipient of the Work from You to exercise the rights granted to that recipient under the terms of the License. This Section 4(a) applies to the Work as incorporated in a Col-

lection, but this does not require the Collection apart from the Work itself to be made subject to the terms of this License. If You create a Collection, upon notice from any Licensor You must, to the extent practicable, remove from the Collection any credit as required by Section 4(c), as requested.

You may not exercise any of the rights granted to You in Section 3 above in any manner that is primarily intended for or directed toward commercial advantage or private monetary compensation. The exchange of the Work for other copyrighted works by means of digital file-sharing or otherwise shall not be considered to be intended for or directed toward commercial advantage or private monetary compensation, provided there is no payment of any monetary compensation in connection with the exchange of copyrighted works.

If You Distribute, or Publicly Perform the Work or Collections, You must, unless a request has been made pursuant to Section 4(a), keep intact all copyright notices for the Work and provide, reasonable to the medium or means You are utilizing: (i) the name of the Original Author (or pseudonym, if applicable) if supplied, and/or if the Original Author and/or Licensor designate another party or parties (e.g., a sponsor institute, publishing entity, journal) for attribution (“Attribution Parties”) in Licensor’s copyright notice, terms of service or by other reasonable means, the name of such party or parties; (ii) the title of the Work if supplied; (iii) to the extent reasonably practicable, the URI, if any, that Licensor specifies to be associated with the Work, unless such URI does not refer to the copyright notice or licensing information for the Work. The credit required by this Section 4(c) may be implemented in any reasonable manner; provided, however, that in the case of a Collection, at a minimum such credit will appear, if a credit for all contributing authors of Collection appears, then as part of these credits and in a manner at least as prominent as the credits for the other contributing authors. For the avoidance of doubt, You may only use the credit required by this Section for the purpose of attribution in the manner set out above and, by exercising Your rights under this License, You may not implicitly or explicitly assert or imply any connection with, sponsorship or endorsement by the Original Author, Licensor and/or Attribution Parties, as appropriate, of You or Your use of the Work, without the separate, express prior written permission of the Original Author, Licensor and/or Attribution Parties.

For the avoidance of doubt:

Non-waivable Compulsory License Schemes. In those jurisdictions in which the right to collect royalties through any statutory or compulsory licensing scheme cannot be waived, the Licensor reserves the exclusive right to collect such royalties for any exercise by You of the rights granted under this License;

Waivable Compulsory License Schemes. In those jurisdictions in which the right to collect royalties through any statutory or compulsory licensing scheme can be waived, the Licensor reserves the exclusive right to collect such royalties for any exercise by You of the rights granted under this License if Your exercise of such rights is for a purpose or

use which is otherwise than noncommercial as permitted under Section 4(b) and otherwise waives the right to collect royalties through any statutory or compulsory licensing scheme; and,

Voluntary License Schemes. The Licensor reserves the right to collect royalties, whether individually or, in the event that the Licensor is a member of a collecting society that administers voluntary licensing schemes, via that society, from any exercise by You of the rights granted under this License that is for a purpose or use which is otherwise than noncommercial as permitted under Section 4(b).

Except as otherwise agreed in writing by the Licensor or as may be otherwise permitted by applicable law, if You Reproduce, Distribute or Publicly Perform the Work either by itself or as part of any Collections, You must not distort, mutilate, modify or take other derogatory action in relation to the Work which would be prejudicial to the Original Author's honor or reputation.

5. REPRESENTATIONS, WARRANTIES AND DISCLAIMER

UNLESS OTHERWISE MUTUALLY AGREED BY THE PARTIES IN WRITING, LICENSOR OFFERS THE WORK AS-IS AND MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND CONCERNING THE WORK, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, OR THE ABSENCE OF LATENT OR OTHER DEFECTS, ACCURACY, OR THE PRESENCE OF ABSENCE OF ERRORS, WHETHER OR NOT DISCOVERABLE. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO SUCH EXCLUSION MAY NOT APPLY TO YOU.

6. LIMITATION ON LIABILITY.

EXCEPT TO THE EXTENT REQUIRED BY APPLICABLE LAW, IN NO EVENT WILL LICENSOR BE LIABLE TO YOU ON ANY LEGAL THEORY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES ARISING OUT OF THIS LICENSE OR THE USE OF THE WORK, EVEN IF LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

7. TERMINATION

This License and the rights granted hereunder will terminate automatically upon any breach by You of the terms of this License. Individuals or entities who have received Collections from You under this License, however, will not have their licenses terminated provided such individuals or entities remain in full compliance with those licenses. Sections 1, 2, 5, 6, 7, and 8 will survive any termination of this License.

Subject to the above terms and conditions, the license granted here is perpetual (for the

duration of the applicable copyright in the Work). Notwithstanding the above, Licensor reserves the right to release the Work under different license terms or to stop distributing the Work at any time; provided, however that any such election will not serve to withdraw this License (or any other license that has been, or is required to be, granted under the terms of this License), and this License will continue in full force and effect unless terminated as stated above.

8. MISCELLANEOUS

Each time You Distribute or Publicly Perform the Work or a Collection, the Licensor offers to the recipient a license to the Work on the same terms and conditions as the license granted to You under this License.

If any provision of this License is invalid or unenforceable under applicable law, it shall not affect the validity or enforceability of the remainder of the terms of this License, and without further action by the parties to this agreement, such provision shall be reformed to the minimum extent necessary to make such provision valid and enforceable.

No term or provision of this License shall be deemed waived and no breach consented to unless such waiver or consent shall be in writing and signed by the party to be charged with such waiver or consent.

This License constitutes the entire agreement between the parties with respect to the Work licensed here. There are no understandings, agreements or representations with respect to the Work not specified here. Licensor shall not be bound by any additional provisions that may appear in any communication from You. This License may not be modified without the mutual written agreement of the Licensor and You.

The rights granted under, and the subject matter referenced, in this License were drafted utilizing the terminology of the Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979), the Rome Convention of 1961, the WIPO Copyright Treaty of 1996, the WIPO Performances and Phonograms Treaty of 1996 and the Universal Copyright Convention (as revised on July 24, 1971). These rights and subject matter take effect in the relevant jurisdiction in which the License terms are sought to be enforced according to the corresponding provisions of the implementation of those treaty provisions in the applicable national law. If the standard suite of rights granted under applicable copyright law includes additional rights not granted under this License, such additional rights are deemed to be included in the License; this License is not intended to restrict the license of any rights under applicable law.

FUTURE LEARNING SPACES

This ebook is the proceedings of Future Learning Spaces, the 7th annual conference in the Designs on E-Learning series.

The Designs on E-Learning conferences were founded by The Centre for Learning and Teaching in Art and Design (cltad), which is based at the University of the Arts London.

The first conference was held in September 2005.

The Future Learning Spaces conference was organised by Aalto University.

It was held on September 27 - 30, 2011 at the School of Arts, Design and Architecture, Aalto University, Helsinki, Finland.

ISBN 978-952-60-4517-7 (pdf)
ISSN-L 1799-4853
ISSN 1799-4861 (pdf)

Aalto University
School of Arts, Design and Architecture
Department of Art
www.aalto.fi

**BUSINESS +
ECONOMY**

**ART +
DESIGN +
ARCHITECTURE**

**SCIENCE +
TECHNOLOGY**

CROSSOVER

**DOCTORAL
DISSERTATIONS**