LEARNING ENVIRONMENTS IN UNIVERSITY CONTEXT

EURAU'12

ABSTRACT. The paper examines the relationship between space and learning in university context. The research questions are focused on identifying and characterizing the spatial properties of the university learning settings, which support and facilitate the generation, sharing and acquisition of knowledge. These interactions rely on a social and informational framework, which is expressed differently in every setting. It aims at identifying urban and architectural settings that host knowledge acquisition and or transmission. It will offer a tool to create or modify a setting that facilitates predetermined experiences and interactions. This tool also enables the creation of an urban/architecture system, creating a new sense of continuous learning place. It scopes several thematics: scale, learning mode, actors, interaction, environmental characteristics and morphology; aiming at a succinct and structured characterization of every type of space.

KEYWORDS: University, learning environments, space analysis, analysis tool.

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Introduction

The paper examines the relationship between space and learning in university context, as part of the theoretical framework of the Educational Campus (Campos Calvo-Sotelo, 2010). The Educational Campus defines the university learning setting in a broader context, from personal spaces to shared facilities, empathizing on the articulation of the university precinct and its direct connection to the city.

The research questions are focused on identifying and characterizing the spatial properties of the university learning settings, which support and facilitate the generation, sharing and acquisition of knowledge. These interactions rely on a social and informational framework, which is expressed differently in every setting. This extensive research aims at identifying urban and architectural settings that host knowledge acquisition and or transmission. It will offer a reliable tool to create or modify a setting that facilitates predetermined experiences and interactions. This tool also enables the creation of an urban and architecture system, creating a new sense of continuous learning place.

To properly catalogue each type of space, the developed tool scopes several thematics: scale, learning mode, actors, Interaction, environmental characteristics and morphology; aiming at a succinct and structured characterization of every type of space held in two phases.

The first phase comprehends the structuration of every possible setting within the scale, learning mode and actors criteria. For a proper understanding of this tree graph, each thematic is accurately defined.

1. Scale

With the rapid changes taking place in educational ideology, and the world as a whole, in almost every other respect the conventional classroom space and time built for a 'one size fits all' model of teaching and learning has become outdated, whether it is organized with students sitting in rows in individual desks, facing the teacher and the blackboard, or with different seating arrangements like semi-circles or clusters.

The goal of encouraging innovative teaching and learning is critical for every student and therefore for every higher education institution. If we want to foster innovative learning we need to improve the entire student learning environment, not just classrooms and labs where students spend a very small percentage of their learning time.

It is known that learning isn't restricted to the classroom, informal learning typically happens where students tend to gather: outside the classroom. The proper design of such spaces is important (Lomas & Oblinger, 2006) and they do not have to be necessarily inside the building or the precinct. Therefore it is critical to analyze the university space at different scales, instead of focusing exclusively in the classroom. The university spatial context is divided into four different scales: urban space, precinct, building and compartment.

1.1 Urban Space

Urban space is the most comprehensive and broader category of analysis. The city supports the university precinct and experiences it. Its dynamics and experiences are evaluated regarding the effect of the university in the city and of the community in the university. Students' integration in the city and in its community prepare them for their working (and more collaborative (Bickford & Wright, 2006)) life, typically in office environments.

The city itself, an urban structure, may be a case study, for it is composed by studiable elements. These elements are very diffuse and broad such as: the history of the village and its inhabitants, urban planning, architecture, construction systems, the road network system, ecosystems, the society that inhabits it, the pieces of art that decorate it, etc..

1.2 Precinct

This category concerns the analysis of the university space. The precinct contains the grounds that the institution has/uses for their activities. These activities include learning, researching, working and living. It comprises constructed and not constructed spaces. Outdoor spaces such as gardens or sacred spaces[i] and buildings themselves are included in this category, regardless of their academic nature.

1.3 Building

The building category comprises the analysis of built spaces. The analysis focuses in the building: partially or as a whole.

1.4 Compartment

The compartment category is seen as an enclosed space within a larger closed space. The compartment is the elementary cell of analysis. The size of this type of spaces varies. It can range from the niche or recess in the corridor, to the amphitheater, study room or library.

Each scale: urban space, precinct, building and compartment, can have different types of interaction and knowledge transmission.

2. Learning Modes

In the early centuries, the Church was the sole responsible for the education of people in Europe, aiming mainly at the evangelization (Carvalho, 2008. 12). The constant upheaval and social uncertainty drove the non-ecclesiastical off (Carvalho, 2008. 12).

The first school opened to the community, a college in Paris, was founded just in 1244 by the cistercian monks (Fortunato de São Boaventura apud Carvalho, 2008. 29-30). It led to the creation of universities in Western Europe during the 13th

century[ii] (Carvalho, 2008. 43). In 1453, the fall of Constantinople marks the end of the Middle Ages and the beginning of the early Renaissance (Carvalho, 2008. 123). The religion imposition and persecution ends and the search for knowledge begins. In the late 18th century student instruction was common practice (Carvalho, 2008. 526).

Traditional, formal, teacher centered, memory based expository teaching has strict monitoring and schedules (Fisher, 2007). It is based on the teacher and student hierarchy, typically occurs in masterly lessons, based on deductive methods of teaching and learning, that force the passive role of the student (Alegre, 2009. 36). The evaluation is through individual oral or written exams (Fisher, 2007).

Learning is continuous and cumulative (OECD, 2007. 215) and, nowadays, can be defined as *"a change in the efficiency or use of basic cognitive processes, both conscious and unconscious, that promote more effective problem solving and performance in the tasks of everyday life"* (OECD, 2007.212). "*Motivation has a pivotal role in the success of learning, especially intrinsic motivation. The individual learns more easily if s/he is doing it for him/herself, with the desire to understand."* (OECD, 2007. 27)

Child centered education, based on Rousseau's (1712-1778) ideals, emerges as the first reaction to the traditional masterly lesson, valuing individuality (Alegre, 2009) 37. Pestalozzi (1746-1827) and Fröbel (1782-1852) later develop this learning theory, with special emphasis on schools and kindergartens (Alegre, 2009. 37). Montessori (1870-1952), Claparede (1873-1940), Ferrière (1879-1960), Dewey (1859-1952), Decroly (1871-1932) and Freinet (1896-1966) also develop similar models, based on innovative teaching methodologies (Alegre, 2009. 38). These learning methods are based on individual and collective labor and value the autonomy of the student (Alegre, 2009. 39).

A recent method, based on the construction of knowledge, the hands-on learning, "*relies on the development of prior knowledge, based on the experience, desires and needs of each individual*" (OECD, 2007. 26). Kolb e Fry (1975) summarize hands-on learning as a spiral learning cycle model. A concrete experience triggers the learning process; a reflective observation is made leading to abstract conceptualization and materializing in active experimentation. The learner will acquire a new concrete experience and the learning cycle spiral evolves (Kolb & Fry, 1975). Tutoring can be included in this type of learning, because it requires a clear and objective organization and knowledge transmission (Walberg & Paik, 1999).

"*I hear and I forget, I see and I remember, I do and I understand.*" Confucius

Project based learning is a similar learning method, based on several research methods. It can occur in diverse places, aiming at solving stimulating and pertinent questions or problems. It should be "*challenging, fun, interesting, relevant and purposeful"*(State Government of Victoria, 2009. 8). This type of learning streamlines and encourages students to seek answers to the posed problems. Students work in small collaborative groups to solve a common problem, taking the initiative to research solutions. The teacher guides and facilitates learning (Learning Theories Knowledgebase, 2011).

Collaborative learning is based in small groups' interaction, where students socialize, discuss and reflect. Learning is accelerated, because students freely pose questions to their group of colleagues that they wouldn't pose to the whole class (Walberg & Paik, 1999). There is a noticeable increase of interest in the subject. Social and emotional interactions between students are improved (Brophy, n.d.).

Based on several learning types, typically practiced in university context, ten learning categories were outlined, in order to classify each space. These categories may contain several learning types. The learning categories are: presentations/masterly lesson, seminar, brainstorming, study/tutoring, simulation/office practice/in situ, distance/mobile, arts/contemplative and social/community service.

2.1 Presentations / Masterly lesson

A presentation is defined as a lecture given by a speaker on a specified subject for an audience. Typically there is no feedback from the audience.

The masterly lesson is a type of presentation. It is formal, expository and usually taught by a professor (Matos, 1999. 37-46). The speakers must have intellectual authority, because they are knowledgeable of a certain topic (Goffman, 1981. 195). It is based on deductive methods of teaching and learning (Alegre, 2009. 36). The rules of conduct require that the professor fulfills his obligation to teach, whilst the student will see this same obligation as an expectation, which he anticipates (Goffman, 1967. 49).

2.2 Seminar

The seminar class is a discussion group, which debates a topic per session. It is usually moderated and each seminar participant is an active participant in the featured discussion.

2.3 Brainstorming

A brainstorming session consists on a group session, in a relaxed environment, aiming at creating new, innovative and creative ideas or concepts. The core concept is that the joint effort of the group is more effective than an individual (Osborn, 1953).

2.4 Study/Tutoring

Study sessions can take place individually or within a group. Reading a book, solving an exercise or playing the cello can be defined as studying. When, amongst the group, one assumes the leading role and explains one's peer(s) the subject, one is tutoring his peer(s). Tutoring promotes socialization and requires a clear and objective organization and transmission of knowledge (Walberg & Paik, 1999).

2.5 Simulation/Office practice/In situ

This type of setting is functionally identical to the one in real life. This learning mode is very effective, for it prepares the student for his future career practice. Usually students are very enthusiastic, for they can anticipate their future profession with real life practice.

This type of setting enables knowledge creation and dissemination (at graduates and postgraduates level), which will be reflected in the quality of the university (Caraça, Conceição, & Heitor, 1996).

2.6 Distance/Mobile

The persons born after 1981 [Net Gen (internet generation), D(igital)-Generation or Millennials] have had, since they were born, internet access, mobile phones and computers (Lancaster & Stillman, 2002) and an ease of use of these gadgets (Gurr, 2008; Oblinger, 2003; Shih & Allen, 2007). The massification of such mobile devices and the mandatory wireless connection enables the access and sharing of information in any location (Gurr, 2008), reducing the dependence of learning over time and space.

2.7 Arts/Contemplative

Art includes several forms of art, like painting, sculpture, music, etc.. These types of art may enhance and enable knowledge acquisition in other scientific domains, thus improving knowledge transfer.

Moreover trough contemplation one can absorb the intrinsic value of the piece. Almost anything can be contemplated: a mechanical engineer can contemplate a garbage truck, an architect can contemplate the town's square, an anthropologist can contemplate people's interactions, etc..

2.8 Social/Community service

Furthermore, the university has a public service mission, which comprises the engagement of the institution with its surroundings: whether through strategic entrepreneurial or social connections.

Social interaction is particularly important, becoming a key aspect in the acquisition and transmission of information. Informal, student centered learning, encourages critical thinking, communication, teamwork and collaboration (Fisher, 2007). Active learning environments support this non-scheduled knowledge sharing and acquisition.

3. Actors

The Actor-Network Theory (ANT) is a sociological theory that states that, in a network, the actors are not only people, but also objects and organizations (York University, 2011). Based on Bruno Latour's, Michel Callon's and John Law's ANT the users of the university space were characterized in four types: Professor, Expert, Student and Object.

3.1 Professor

The professor is a member of the university staff that addresses the student.

3.2 Expert

The non-teaching staff, researchers or knowledgeable professionals that, due to their practical and tacit knowledge, contribute to the students' learning and knowledge acquisition are categorized as expert.

3.3 Student

The student is a person that learns. According to this analysis, in certain occasions, the Full Professor himself can be characterized as a student.

3.4 Object

Certain objects have an active role in the diffusion and transmission of knowledge. This category can include art pieces, a coffee machine, work tools, artifacts, exhibitions, architectural objects or the urban space itself.

The application of these (scale, learning mode and actors) criteria generates a tree graph with every possible solution (Fig. 1).

Fig. 1

4. Interaction

Communication is a social activity (Emmitt & Gorse, 2003. 27). We communicate and interact even when we are not speaking (Goffman, 1967. 1). *"Any act or event that a person perceives can be deemed to be an act of communication. It may be information gained from verbal and non-verbal information, body language, facial expression, touch and olfactory information from our immediate environment that is made manifest and therefore has meaning."* (Emmitt & Gorse, 2003. 24) Non-verbal communication shows outward intentional and unintentional signs of involvement and behavioral orientation (such as gestures, looks or positioning) (Goffman, 1967. 1) and suggests if it is pertinent or not to increase or decrease the social distance and formalism (Goffman, 1959. 226-227). This spatial language is intrinsic and international, tough every culture has its own "dialect" (Lawson, 2001. 2). Every society has their own rules and conventions however, there is an understanding about when, where and with whom one can have a conversation and which topics can be addressed (Goffman, 1967. 33-34).

The communication process requires that the sender and receiver can encode and decode the message and that the communicated message influences the receiver (Emmitt & Gorse, 2003. 35). According to Shannon (1948) in order to have knowledge transfer it is necessary that the message is encrypted by the sender, sent, resists distortion noise (i.e., everything that can interfere with the transmission of the message) and be decoded by receptor. Feldberg's human communication model, developed in 1975 emphasis on the needs, perceptions, goals, past, external pressures, expectations, reactions and feedback from participants (Emmitt & Gorse, 2003. 41-2). The expertise is in the coding of the

message, so that the receiver understands it (Emmitt & Gorse, 2003. 36). The transmitted message will never be understood in the same manner for each individual, for it depends on the experience, education and prior information process ability inherent in each person (Emmitt & Gorse, 2003. 38).

Knowledge transmission implies the spontaneous involvement of the participants and their visual and hearing attention must be focused and kept (Goffman, 1967. 123-4 and 134). If the issuer/sender disperses or if there is a distraction, the receiver can be distracted (Goffman, 1967. 123-4). A meeting, a conversation where there is a single visual and cognitive focus of attention linking the participants (Goffman, 1963. 243), may be (1) totally focused: two participants in a meeting, (2) partially focused: When there are more participants in the same meeting, but are not well focused or (3) several foci: more than one meeting in the same situation (Goffman, 1963. 91).

According to Emmitt & Gorse (2003. 45) there are several levels of communication, depending on the involved people:

– Intrapersonal: the cognitive process, in which the individual builds their knowledge,

– Interpersonal: the individual work together for a common goal, creating affection and friendship bonds. Can be subdivided into three groups (Emmitt & Gorse, 2003. 48): (1) Linear: the focus is on how the message is transmitted, not the receiver's reaction, (2) Interactional: the concept of return is introduced and (3) Transaction: the content of information transmitted can vary as the transmitter of the receiver evaluates the reaction.

In order to categorize the interaction in the university context several criteria are addressed. The global analysis will consider the number of participants, knowledge transfer and levels of communication:

– Individual

- Intrapersonal

– Pairs

- Interpersonal (Linear, Interactional, Transactional)

– Small group

- Interpersonal (Linear, Interactional, Transactional)

– Medium group

- Interpersonal (Linear, Interactional, Transactional)

– Large group

- Interpersonal (Linear, Interactional, Transactional)

Further on every solution of the three graph has their interaction categories. Fig. 2 and 3 represent presentations/masterly lesson and study/tutoring interactions respectively.

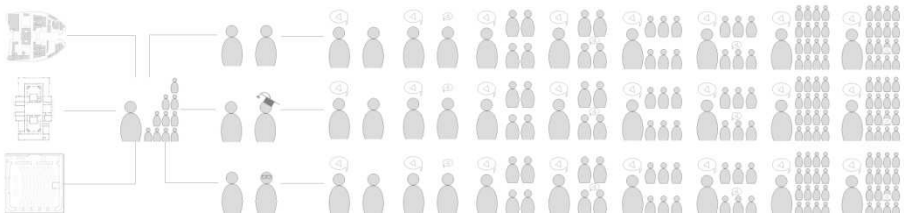

Fig.2

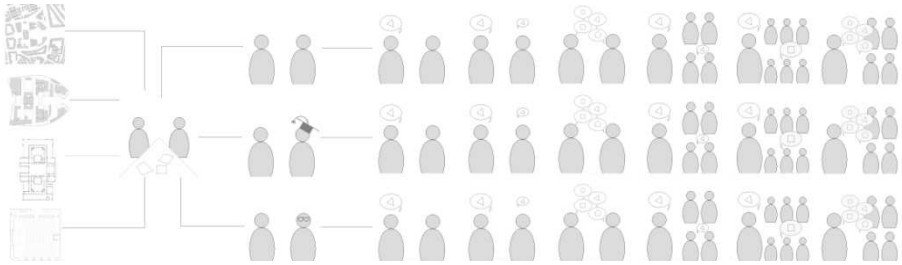

Fig.3

Subsequently in a posterior, detailed and incisive analysis the communication type, territory, courtesy rules and dominant social profiles criteria are applied.

There is often a communication type differentiation of informal or backstage language and staging language. Backstage language presupposes a familiarity and ease, where the actors feel uninhibited. Staging language is the opposite: formal, assuming the intimacy as lack of respect (Goffman, 1959. 154). Staging language is typically used in masterly lessons. Backstage language is commonly used among professor and their peers (Goffman, 1959. 208-9).

Oral presentations can be classified into four categories: memorization, reading aloud, fresh talk (Goffman, 1981. 171) and production shifts (Goffman, 1981. 172). Reading aloud presentations are fairly frequent, however fluent conversation presentations would be ideal, because it best suits the audience (Goffman, 1981. 172).

– Communication type

- Formal language

- Informal language

Spaces can be characterized regarding to the practiced personal distances. Our wellbeing depends on the type of territorial transgressions: the invasion (when one enters a territory with the intention of the control), rape (temporary intentional or accidental invasion) and contamination (deliberately leaving something on other people's territory) (Gifford apud Oliver, 2002. 150). In this context, privacy is the selective control of access to you or your group (Altman apud Oliver, 2002. 180).

Several authors have classified personal distances areas; we highlight Hall's proxemics areas (Hall, 1966) and Altman’s (apud Oliver, 2002) territory categories: primary, secondary and public.

– Territory (Altman):

– Primary

- Secondary

- Pubic

Good manners and public order rules are usually symmetrical. However, certain contexts (such as the University) have asymmetric rules (Goffman, 1967. 53).

– Courtesy rules (Goffman, 1967. 53):

- Symmetric

- Asymmetric

The demographic (gender, age, race) and psychological (personality, learning style) characteristics of the user predict the environmental characteristics (Strange & Banning, 2001. 4-5). Several authors have developed models that categorize students: Clark & Trow (1966), Astin (1986), Holland (1973); Meyers and Briggs type indicator (1962) and Kolb (1980). Each one has a set of characteristics, which determines the thinking and acting mode. Further on Loureiro[iii] describes a social interaction profile model (not specific for learning spaces), which can be transposed to this context.

Typically, each precinct has a dominant group, with its own culture, ethnicity and age. Subsequently the precinct will attract people, which identify themselves with these same dominant characteristics and their attitudes and expectations towards the space will be similar (Strange & Banning, 2001. 6). These environments are known as consistent environments, while inconsistent environments are composed of individuals with distinct characteristics. Therefore the specific user can be characterized as congruent or incongruent with the space. Incongruence causes discomfort, dissatisfaction and instability, which leads (a) to the pursuit for a consistent environment, (b) the adaptation of the environment where one is or (c) the modification of one's personal characteristics in order to adapt to the environment (Strange & Banning, 2001).

– Social profiles (Loureiro, n.d.):

- Analyst

- Practical

- Supporter

- Sociable

Further on, in a posterior phase, each entry of Fig. 1 will have a correspondent characterization sheet with a more concrete analysis of each space and actual examples. This analysis comprises an objective investigation, based on the interaction modes, environmental characteristics of the spaces and the morphology criteria. Each sheet will have practical examples and guidelines for the creation or adaptation of such spaces.

Conclusions

University learning environments have a great impact on the city landscape and their community. The proper design of such facilities enables the synergies of the academic's and city's communities.

This characterization tool can help future land developers and city planners to contemplate such learning friendly environments. These spaces will provide urban

cohesion in an urban and academic setting, enabling the expected collaboration between these institutions and their surroundings.

The ultimate goal of this research is to inspire universities to foster diverse learning experiences to their students by incorporating new settings, promoting synergies with the city and thus improving their competitiveness.

Images

Fig. 1 Learning environments in university context.

Fig. 2 Presentation/Masterly Lesson: applicable scales (precinct, building and compartment), actors (student/student, student/professor, student/expert) and interactions (Pairs/Uni-directional/Interpersonal linear; Pairs/Uni-directional/Interpersonal transactional; Small group/Uni-directional/Interpersonal linear; Small group/Uni-directional/Interpersonal transactional; Medium group/Uni-directional/Interpersonal linear; Medium group/Uni-directional/Interpersonal transactional; Large group/Uni-directional/Interpersonal linear; Large group/Uni-directional/Interpersonal transactional)

Fig. 3 Study/Tutoring: applicable scales (urban, precinct, building and compartment), actors (student/student, student/professor, student/expert) and interactions (Pairs/Uni-directional/Interpersonal transactional; Pairs/Bi-directional/Interpersonal Interactional; Pairs/Bi-directional/Interpersonal transactional; Small group/Uni-directional/Interpersonal transactional; Small group /Bi-directional/Interpersonal Interactional; Small group /Bi-directional/Interpersonal transactional)

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Biography

Maria Bacharel Carreira *is a Phd student in Architecture at IST and is part of the research team of IN_LEARNING (http://in-learning.ist.utl.pt/) project since 2010. Her research interest are focused on space-use analysis aplyed to university learning spaces and other knowledge transmission scenarios. She holds a Master Degree in Architecture from Instituto Superior Técnico (IST).*

Teresa Heitor *is full professor of architecture at IST. She has research expertise in the area of space-use analysis within the theoretical and analytical framework known as 'space syntax'. Her current research interests include the understanding of the structure of built space, shape and form and their functional, behavioral, cognitive and cultural implications. Prof. Heitor's first degree was in Architecture from the Escola Superior de Belas Artes, Lisbon, Portugal (after which she practiced as an architect for several years). Her Masters degree in Urban Design was completed in 1984 at the Joint Centre for Urban Design Oxford Brooks University, UK and her PhD, in 1997 at the Instituto Superior Técnico, Lisbon, Portugal.*

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[i] Sacred spaces are ritual/ceremonial spaces (such as a football stadium), processional spaces (for parades, monumental), perspective-dominant spaces (with scenic views), and refuge spaces (typically small and intimate) (Broussard, 2009).

[ii] The University of Bologna was the first European university, founded in the late 12th century, followed by Paris' in 1209/9, Montpellier's in 1240, Padua's in 1222, Naples' 1224, Rome's 1244, Siena's 1246, Angers' 1229, Toulouse's 1230, Orléans' 1235, Palencia's 1212, Salamanca's prior to 1230, Valladolid's 1250, Seville's in 1254 (Carvalho, 2008:44) and Coimbra's 1290.

[iii] According to Loureiro (Loureiro, n.d.) there are four social interaction profiles: analyst, practical, supporter, sociable. Each one has a set of characteristics, which determines the thinking and acting mode. These four basic types of profiles are determined by the combination of interaction patterns: rhythm: calm, quick and focus: task, relationship.