

# AMPS Proceedings Series 17.2



## **Education, Design and Practice**

Understanding skills in a Complex World

# AMPS CONFERENCE 17.2

Education, Design and Practice – Understanding skills in a Complex World.

Stevens Institute of Technology, AMPS, PARADE, Architecture\_MPS.

17—19 June, 2019

## **Education, Design and Practice – Understanding skills in a Complex World.**

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## INTRODUCTION

This publication is the product of the conference *Education, Design and Practice – Understanding skills in a Complex World* held at Stevens Institute of Technology in 2019. The keynote speaker was Peggy Deamer, Yale University. The call upon which the conference and this publication are based argues that:

The relationship between education and practice in any discipline is complex. In an ever changing world, it is also in flux. In a context such as the built environment, it is also interdisciplinary. Today, educators in the liberal arts still identify learning as an end unto itself, and designers still draw on ideas about intuitive knowledge. By contrast, the businesses behind urban development or city and regional growth call for graduates armed with the skills required in practice from day one. At the same time local government and cultural or city management firms need creative thinkers capable of continual adaptation. In the industries and sectors such as construction, transport and engineering, managers focus on a foundational baseline and value engineers and designers as both pragmatic problem solvers and visionaries.

These alternative perspectives have been reflected in multiple changes to the practice and structure of the education sector. One such example was the Boyer-Mitgang report which restructured architectural education in the US to reflect other professions. As in other areas, it resulted in a ‘degree arms race’, with MAs and doctoral programs multiplying more rapidly than the research and teaching methods they required. At the same time, the ‘widening participation’ agenda produced an explosion of research and funding for new pedagogical approaches and initiatives. Attempts to fuse education with the creative arts, industry and business through university led partnership schemes also proliferated. More recently, changes in the financing of the HE sector in places like the UK, mean universities now stress educational efficiency and guarantees of graduate jobs.

Working within this context, educators in sectors connected with the design, management and construction of the built environment have developed new and innovative ways to teach, they have embedded collaborative practices into their pedagogy, have forged unique partnerships across disciplines and outside the academy, and much more. However, research into best practice learning and teaching in the classroom is still evolving and educational initiatives can sometimes be seen as contradicting on-the-job realities in practice. The *Education, Design and Practice* conference publication explores this complex and contradictory scenario from multiple perspectives.

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## INDEX

1: REVIEW OF MASTER SEMINAR “RESEARCH-PROJECT” WITHIN A PROJECT AND PRACTICED ORIENTED INSTITUTION Clémence Montagne	8
2. MEDIATING THE TRANSITION BETWEEN COLLEGE AND WORK Mary Raber, Kedmon Hungwe	15
3. USING BIM TO ACHIEVE ARCHITECTURAL ENGINEERING UNDERGRADUATE LEARNING OUTCOMES Athena Moustaka, Paul Coates, Ali Rachid	22
4. EARNING SKILLS AND EXPERIENCING COLLECTIVE VALUES THROUGH DESIGN-BASED UNIVERSITY-COMMUNITY PARTNERSHIPS Carles Martinez-Almoyna Gual	38
5. IMPROVING SKILLS ON ARCHITECTURE STUDENTS TO UNDERSTAND AN URBAN ENVIRONMENT OF CONSTANT CHANGE THROUGH DATA VISUALIZATION Covadonga Lorenzo	50
6. ARCHITECTURAL INVESTIGATIONS: INTEGRATIVE VISUALIZATION AND FABRICATION  Alexandra Barker, Olivia Vien	59
7. LEARNING DESIGN BY MAKING: AN ALTERNATE PRACTICAL PEDAGOGICAL APPROACH FOR DESIGN EDUCATION IN THE UNITED ARAB EMIRATES Marco Sosa, Lina Ahmad	72
8. TEACHING EXPERIMENTATION IN THE FIELD OF DESIGN: CROSSING DIGITAL TOOLS WITH ANALOGICAL ACTIVITIES Luisa Collina, Laura Galluzzo	84

9.	SHARED MENTAL MODELS AND ZPD IN TEACHING AND LEARNING ARCHITECTURE	90
	Lee Ariav, Gabriella Goldschmidt, Tali Tal	
10	BILGE KARASU'S FEAR WITH VARIATIONS AND THE STUDIO FOR POTENTIAL ARCHITECTURE	101
	Levent Şentürk	
11.	TOWARD AN INNOVATIVE LEARNING ENVIRONMENT TO SUPPORT EDUCATIONAL FACILITIES. SPACES AND SERVICES FOSTERING INTERACTIONS IN THE COMMUNITY OF THE CAMPUS	110
	Luisa Collina, Giulia Gerosa, Andrea Manciaracina, Martina Mazzarello, Francesco Vergani	
12.	UNDERSTANDING URBAN COMPLEXITY THROUGH RESEARCH-DRIVEN DESIGN: THE CASE OF MONTREAL	119
	Tatjana Leblanc, Noemie Candau	
13.	DESIGNING WITH UNCERTAINTY	133
	Thomas-Bernard Kenniff	
14.	DESIGNING WITH INDIGENOUS KNOWLEDGE: A JOURNEY TO DEVELOP POLICY AND PROTOCOLS FOR RESPECTFUL CROSS-CULTURAL REPRESENTATION IN DESIGN EDUCATION AND PRACTICE.	147
	Russell Kennedy	
15.	TWO SIDES OF THE DESIGN: ARCHITECTURAL MEANING BETWEEN CONCEPT AND EXPERIENCE	157
	Xi Ye	
16.	ADAPTING TO A CHANGING PROFESSIONAL CONTEXT	167
	Christo Vosloo	
17.	TECHNICAL SKILLS FOR STUDENTS OF ARCHITECTURE	177
	Pete Silver, Will McLean	
18.	UNDERGRADUATE VALUE ENGINEERING COLLABORATION WITH INDUSTRY PARTNER	192
	Shannon Casebeer, Katie Loughmiller, Ray Buyle	

19.	HARNESSING THE PROLIFERATION OF SOCIAL MEDIA IN SPATIAL DESIGN DEVELOPMENT — FINDING INTEGRITY AND EXPERIENCE OVER TREND AND VISUAL REPLICATION	202
	Jack Tooley	
20.	THE RISE AND THE SHORTAGE OF DANISH-TRAINED ARCHITECTS UNDER NEO-LIBERAL WELFARE STATE	216
	Angela Gigliotti	
21.	LEARNING ARCHITECTURE: A COGNITIVE APPROACH	226
	Çagda Türkmen, Enis Dönmez	
22.	EXPERIMENTAL LEARNING IN ARCHITECTURAL TRAINING – EXEMPLIFIED IN BUILDING ON A SCALE OF 1:1 AT THE UNIVERSITY OF LIECHTENSTEIN	236
	Carmen Rist-Stadelmann	
23.	INTERIOR ART LEARNING SPACES—WHERE INSPIRATION MEETS CREATION, AN ART PROFESSIONAL LEADERS’ SURVEY	244
	Catherine Lan	
24.	BETWEEN PLAYING AND REALITY, THE ARCHITECTURAL DESIGN STUDIO AS A "POTENTIAL SPACE"	252
	Ehud Belferman, Shulamit Beimel, Shoham Shefy	
25.	“PUSHING BOUNDARIES”: THE ADU-TUW STUDENTS WORKSHOP IN AL-AIN, UAE AS CASE STUDY OF COLLABORATIVE KNOWLEDGE EXCHANGE	263
	Paolo Caratelli, David Calas, Maria Alessandra Misuri	
26.	GEODESIGN AS ITERATIVE ANALYSIS AND DESIGN/PLANNING PROCESS TO FACE PRESENT AND FUTURE CHALLENGES OF CLIMATE CHANGE IN THE FIELDS OF URBAN AND LANDSCAPE PLANNING	271
	René Burghardt, Lucas Büscher	
27.	EXPLORING COMPLEXITY IN DESIGN: AN ARCHITECTURAL STUDIO EXPERIENCE	280
	Salih Ceylan, Ayse Irem Maro, Ahmet Ergelen, Ömer Okan, Seda Nur Alkan	
28.	ANALOGOUS SYSTEMS AS A PEDAGOGICAL TOOL IN URBAN DESIGN	292
	Tatjana Capuder Vidmar	

29.	LIVE PROJECT: UNDERSTANDING THE DESIGN PROCESS FROM THE PROJECT BRIEF TO POST OCCUPANCY EVALUATION	305
	Ana Rute Costa, Susanne Bauer	
30.	DESIGN/SCIENCE FICTIONS: WORLDBUILDING AS LANDSCAPE PRACTICE	314
	Marc Miller	
31.	COLLABORATIVE AND EXPERIENTIAL LEARNING VIA "THE DAILY WORKSHOP SERIES (G.A.S.)"	318
	Gizem Ozer Ozgur	
32.	MODELLING A FUTURE PRACTICE	327
	John Doyle, Ben Milbourne	
33.	ARCHEATABLE: FOOD AND PASTRY ART AS A VEHICLE FOR THE TEACHING OF DIGITAL DESIGN AND FABRICATION LESSONS IN ARCHITECTURE	337
	Jose A. Carrillo	
34.	TEN YEARS OF BUILDING TECHNOLOGY AT CITY TECH: REFLECTIONS ON THE EVOLUTION OF FIRST YEAR BUILDING TECHNOLOGY COURSES IN AN OPEN ENROLLMENT CANDIDATE BARCH PROGRAM	348
	Jason A. Montgomery	

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New Jersey / New York: 17-19 June, 2019

## TOWARD AN INNOVATIVE LEARNING ENVIRONMENT TO SUPPORT EDUCATIONAL FACILITIES. SPACES AND SERVICES FOSTERING INTERACTIONS IN THE COMMUNITY OF THE CAMPUS

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### INTRODUCTION

#### **New learning models and technology**

The new generations of students, born and raised with the web in the era of the world wide web, will soon start an educational path within one of the many universities' educational offers. The future users of university campuses, grown up with smartphones, social media and virtual realities, will expect the university experience to reflect the "connected in real time" nature of the web. As a result, the future of university education will require a more focusing on the figure of the learners, enhancing experiential, immersive and social activities between the users. To overcome these challenges, it is important to start a rethinking of the university environment, trying to make it performing and flexible, always ready to follow and stimulate students by offering constant access to learning materials and resources. It can also change the way in which teaching spaces are used in relation to new user behaviors:

Among these we can highlight:

- Work is fragmenting and becoming less and less tied to a specific physical place. People are moving outside the physical containers of their buildings into larger collaborative networks that incorporate spaces that can be located almost anywhere in the world.
- Space expresses culture and reinforces the values and identity of a subject rather than simply being a container in which work takes place.

These factors are affecting the entire structure of learning spaces, which is no longer conceived as a centralizing place of individuals but a facilitator of sharing and deepening of the disciplines: a place at the service of learning which becomes the fulcrum of interaction between students. Space and its occupation are interrogated through their dynamic intersection as social and spatial practices<sup>2</sup>. Rather than confining students to a passive experience, we need to consider how to more fully engage students in the learning activities.



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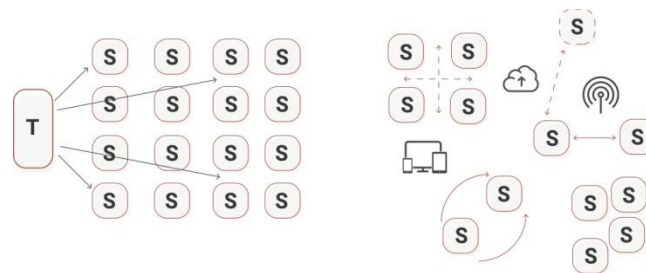


Figure 1. A comparison between the previous learning environment and the current needs

## Learning spaces and learning corridors

University campuses are complex environments in which interstitial areas between learning and connection spaces are often poorly defined. It is necessary to redesign all those transit spaces, inside and outside the buildings, making full use of their intrinsic potential. The creation of corridors equipped both for individual work and for teamwork, can constitute a strategy aimed at creating a continuous network of information exchange: the creation of these spaces with different densities can either generate different activities or favor the creation of social relationships and work synergies.

*"Learning happens everywhere, not only in classrooms and libraries, but in corridors, social structures and walkways, courtyards and squares between buildings. Even the academic space as an end in itself is disappearing. There is still room for traditional classrooms, but they too can be remodeled to meet other needs".<sup>3</sup>*

With the diffusion of a teaching based mainly on the development of group projects, the need for larger, hybrid and flexible spaces that allow for active and collaborative learning becomes evident. Traditional classrooms and libraries are no longer able to properly support new teaching models due to the obvious design limitations imposed in a different historical context.

All those spaces designed for other types of activities - such as cafeterias, bars, green areas - and all the connective and transit fabric, seems more suitable to intercept more efficiently the changes imposed by the revolutionary technological learning tools. Nowadays, thanks both to new devices currently in use in educational offers and the consequent redesign of the canonical idea of space, much of the time spent in studying and learning takes place in those informal spaces outside the classroom where it is possible to trig new ways of collaboration.

It is interesting to see how the exponential increase in users of hybrid spaces is due to the new concept of activity-based working (ABW) achievable thanks to personal electronic devices such as computers and tablets. This function is evolving as a nomadic type of activity that does not require traditional spaces, designed solely for a specific activity, but hybrid environments that provide individual spaces and shared infrastructures to which all users can access quickly and easily. In the activity-based reality it is the single user who chooses, according to his needs and requirements, the best position to work from: the space is subordinated to the activity since the latter can potentially be applied everywhere. Schools and university campuses are no longer seen as a series of "educational" buildings or containers, but as a holistic combination of spaces all with the potential to contribute to the educational impact. They must be outlined as *"a complete network of connected learning environments [...] where the learning process does not exist individually, but takes place within a range of different types of pedagogy, spaces and technologies"*<sup>4</sup>.

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New Jersey / New York: 17-19 June, 2019

## **An Italian informal learning experience: the Politecnico di Milano**

A big challenge has emerged from present and plans of the Politecnico di Milano, defining a general program with these primary goals for the next three years, to address the new contemporary needs on the topic by developing different prototypes of innovative university classrooms.

An in-depth revision of its spaces to understand the needs of all the university users, with a particular focus on the design discipline of the School of Design.

The primary purpose it's not only to rethink the environment referring to the design disciplines in general, but it's also fundamental to think about a system to combine the different subjects, with a total integration between them.

For these objectives, a research team of the Politecnico di Milano has been appointed to define a series of requirements and needs for the general organization of the innovative teaching and learning spaces, involving the users directly to investigate new demands in the field. The team has been asked to dissert on spatial needs, potentialities, new habits and uses, and organize all in spatial requirements in "directions", especially focus on the design field, to be applied to one classroom's prototype and then finalized and revised for large-scale dissemination.

An evolution of the teaching space in which analogical and digital, physical and intangible aspects contribute to improve the relationships between the different actors involved in the teaching process. The context in which the application will be tested, the School of Design of the Politecnico di Milano, 5th in the worlds' university ranking, 1st university in Italy, 44.300 students' population, a place in which we are teaching spatial design and architecture, and so the space has to be Able to support the learning activity. The strategy of the Politecnico action plan presented in this paper aims at the creation of informal, porous, hybrid zones closely related to learning spaces, an integral part of the new educational classrooms, detailed in the next chapter.

It also presents the introduction of spaces defined as informal learning spaces, which become 360-degree connectors, spaces that favor the interaction of different campus users for a total dynamic and fluid use of these spaces. It is a first example prototyped by the "Agorà degli studenti", inaugurated in July 2019. The area appears as a large square, a work and meeting welcoming place with 200 study places, built in the wide corridor leading to the traditional classrooms of the university, enlarged by the demolition of a central room in which there were some administrative offices. The demolition of the central part led to the creation of a large space designed to accommodate different types of use. The more traditional workstations, with tables and chairs arranged in a linear way, are flanked by higher workstations along the large full-height windows. Along the walls there are lockers designed as a support surface for study models, which can be positioned vertically even in the upper part of the modules, creating exhibitions and providing students with information about their projects. The space is also thought of as a lunch break area, with microwave ovens and a filtered water dispenser.

The new space belongs to the VIVIPOLIMI project, aiming at improve the use and life of Politecnico spaces via actions of redevelopment, enhancement and implementation of the existing structures.

The plan is to create relaxation areas to facilitate socialising, study areas (with student spaces for individual, group and "flexible" study), work areas (through the creation of faculty spaces for teachers), and multi-purpose halls suited to events as well. Use will furthermore be made of a lighting-technical equipment to enhance the campus buildings.

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New Jersey / New York: 17-19 June, 2019



Figure 2. View from the entrance of the “Agorà degli student” (picture by Marco Introini)

## Grammar Of Directions for connective spaces

A complex system of spaces, with a large number of different types of users, requires strategic planning to facilitate the usage of the space. It is useful to build and manage a whole and complex system of elements that is made of a technical shell and performative furniture to be flexible in terms of time, functions and users’ needs to achieve the learning environment goals. Using a planning system following rules and criteria can also help planners, technical offices and area management to develop all the functions required.

A grammar of directions (GOD) has been defined both to create a common base for the spaces of the new disciplines and to verify the types of intervention to elevate the space to an innovative and flexible status. The use of this grammar, which arises from the basic needs related to the behaviors found in the learning spaces, is useful for planning an environment that can gradually be implemented over time. Understanding the needs in common and the individual requirements helps to establish a hierarchy of interventions to be planned immediately to prevent the space becoming unable to support the present and future ways of teaching and learning.

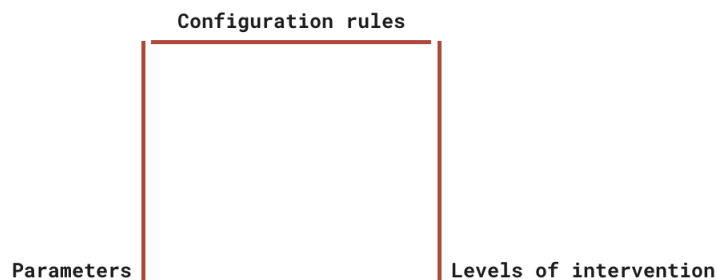


Fig. 3 Grammar of Directions’ elements

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## Levels of Intervention

In order to allow the development of a basal matrix to be updated with possible optimization interventions for the peculiar activities, a scheme has been adopted to interweave the different spatial components with the possible degrees of intervention. To differentiate the types of intervention needed, 3 groups of elements and components, physical and virtual, with a significantly different impact were outlined:

- **Building:** the framework of the space consists of systems and surfaces to better support any activity to be performed within the space.
- **Furniture:** the furnishing components with high flexibility to allow a quick recomposition of the layout according to activities needs.
- **Technology:** everything that includes the virtual appearance and digital devices to amplify the experiences.

The three groups of elements contain all the supporting components necessary to allow an effective teaching and learning path. However, as verified in the previous paragraph, since the space has to support different types of activities in addition to the common ones, it is necessary to make changes through an implementation and installation of resources. Following all the new types of innovative learning it is vital to implement the learning environment with a portion dedicated to informal activities. The space requires a flexible arrangement able to mold according to the users' needs in different situations and must be design with a high capacity of configuration.

## Configuration

Designing an innovative learning environment, it is necessary to introduce a configuration based on different thematic areas. Additionally to the didactic area, the portion assumed to teaching and learning activities equipped with specific furniture, is necessary to design a portion of space for the storage of all those elements and devices (such as smart boards, furniture, student's belongings and others) that are exceed or unused during a specific activity. Based on the argument previously presented, we introduced an informal area as an essential part complementary to the didactic one. In this case this area has the specific function to facilitate collaboration and working activities to support teaching which can be carried out at different times, in an unstructured and autonomous way compared to the teacher's action in the classroom. These three main functional areas are suggested a ratio of 70/15/15. The informal area, being a porous component, helps to facilitate the transition between the different activities connected to the classroom and the connective spaces within the campus. This different type of informal area can be used by all the users who need to interact or work in a space not strictly related to formal didactic activities in the same time.

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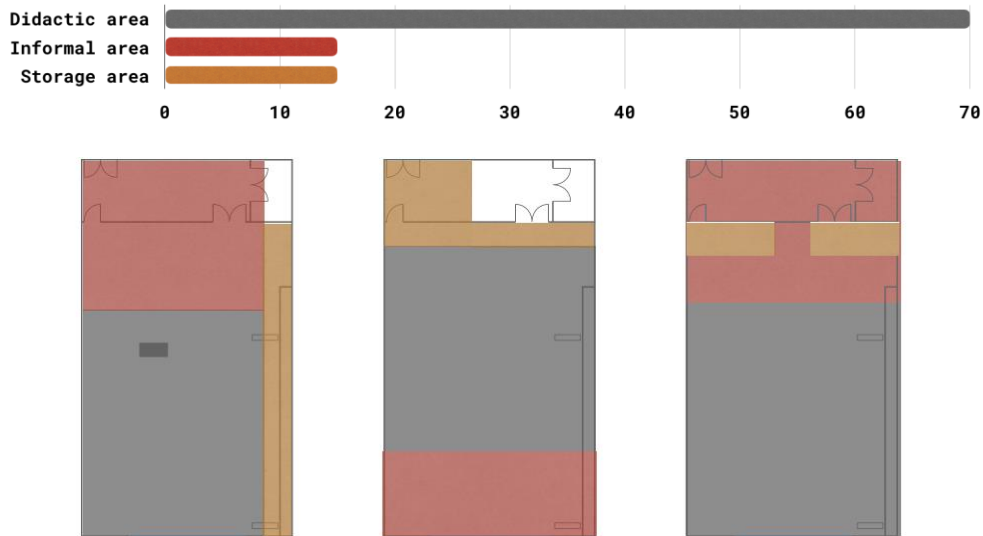


Fig. 4 Configuration element and sample of application

## Student-teacher relationship in informal spaces: democratization of roles

The choice of this type of intervention aims to create and emphasize the kind of interactions that can occur between student and teacher in hybrid and connective spaces. The informal conformation of space, and its quality as a connection area between the sphere of learning and leisure, favors the exchange between users with a significantly different role, democratizing the relationship between student and teacher. The space can indeed be used to implement all those revision or explanation activities existing in the teacher-student relationship but which still struggle to materialize in a defined space.

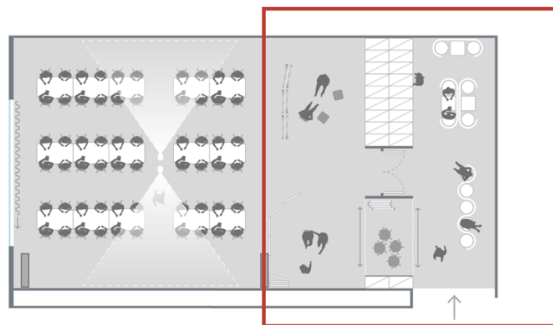


Fig. 5 Scenario of different activities in the same location

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The concept of a classroom as a space specifically designed for conveying knowledge is an idea that has developed more recently than the institution of universities. Initially most of the teaching was held in the private homes of the teachers, temporarily used as a place of teaching, for a small number of students<sup>6</sup>. For more important lessons, instead, the universities were forced to rent more spacious public or religious buildings, therefore subjecting themselves to the availability of the same<sup>6</sup>. Only from the 16th century onwards, thanks to the modernization and expansion of the universities, it was possible to design and define a series of spaces to be dedicated solely to teaching.

## Student-student relationship in informal spaces: interdisciplinary content

The informal space, in addition to providing an effective space for discussion between professor and student, is usually used as a space for both studying and decompression by the students themselves. The connection areas of the university campuses are increasingly emerging as spaces equipped for the continuous exchange between students, who find themselves in groups to operate both study and informal activities. The interactions between groups of users can therefore enrich individuals by encouraging the exchange of theoretical information and methodological skills. These informal spaces are not only focused on connective spaces but also include a wide range of non-conventional environments (such as cafeterias or student residences) where knowledge is exchanged through the study and cooperation of students based on cooperative learning<sup>7</sup> as show in the Figure 6.

The informal and connection spaces, if equipped with a series of furnishings and technologies, can be transformed into real interdisciplinary areas where students can operate a wide range of activities. The informal space must in fact provide adequate furnishings for the various activities to be performed: chairs, armchairs, pods, electrical sockets, tables, whiteboards and others, must be flexible and functional, also allowing a rapid configuration of the space in a short time.

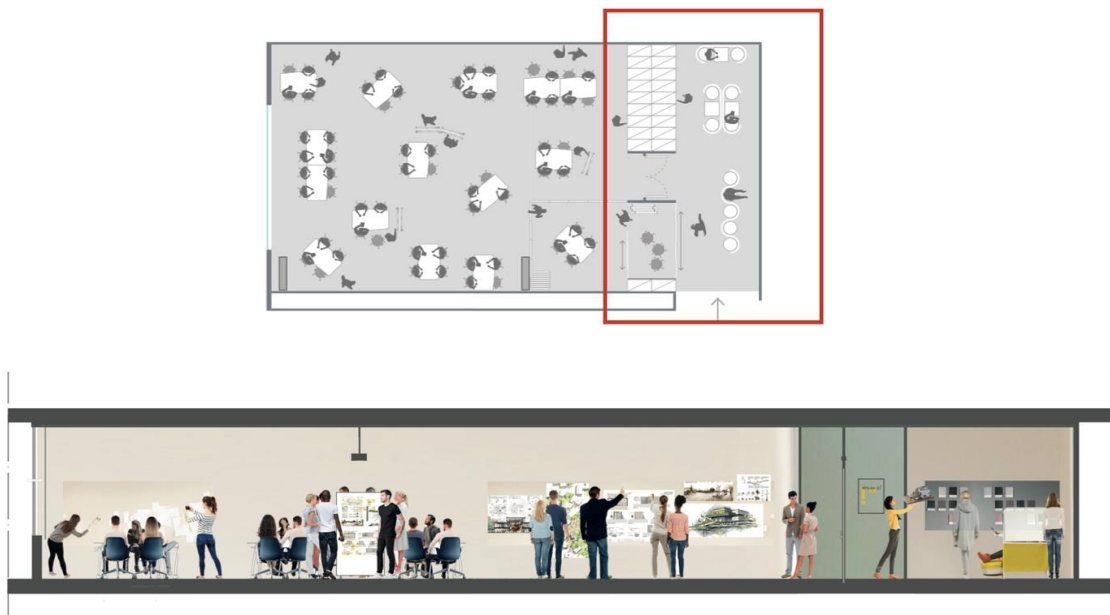
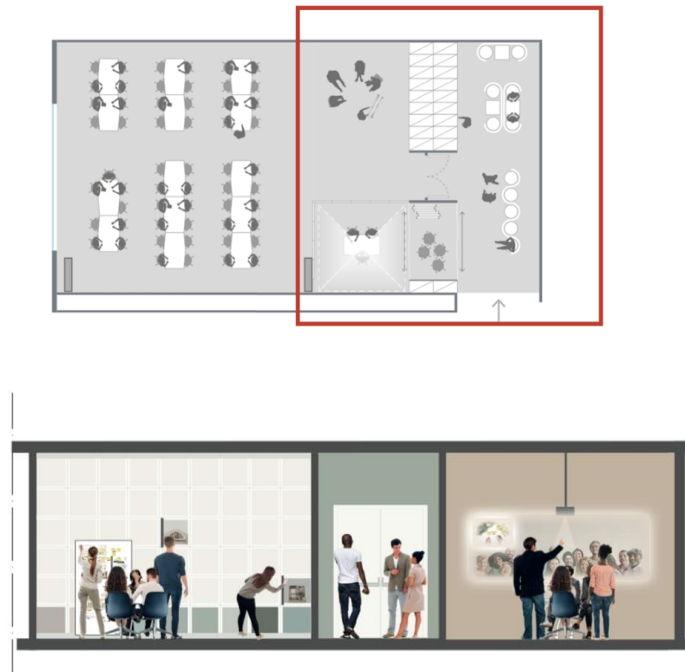


Fig. 6 Contemporary presence of the didactic and informal area

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*Fig. 7 Scenario of different activities in the same location*

## CONCLUSIONS

The learning environment is going toward new directions due to pedagogical approaches of the "active learning" strand, trying to stimulate new human behaviors and relationships that break down the definitions of roles and barriers in the campus within a total connection of the entire social system.

The very concept of education is expanded as an act that can happen anywhere and at any time<sup>1</sup> and new learning dynamics lead to the definition of spaces intended for formal learning, such as classrooms or laboratories, for a planned didactic conveyed through the traditional lesson of a teacher. Informal spaces, on the other hand, include a wide range of places where the exchange of knowledge takes place through the study and cooperation of students or researchers.

These areas are located in "the space between" or in those places characterized by a great design flexibility that allows the discovery of new environments devoted to group study and that act as a filter between the different functions in the campus.

The expected results aim at a rethinking of the spatial model that can support the learning environment within this continuous mechanism of interaction between people and space, to foster new forms of interaction, collaboration and multidisciplinary for the future growth of the Campus.

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