Construction and Therapy | An Integrated Approach to Design-Build

In 2013, the Department of Architecture at the University of Strathclyde began work to develop a new area of research, provisionally named “Construction and Therapy”. Construction and Therapy (C&T) is a premise that construction, specifically the making of one’s place in the world, has the potential to heal.

SERGIO PORTA
University of Strathclyde, Glasgow

PETER RUSSELL
University at Buffalo, SUNY

OMBRETTA ROMICE
University of Strathclyde, Glasgow

MARIA PIA VIDOLI
University of Strathclyde, Glasgow

A NEW CONCEPT

This statement is so overstated that it is likely meaningless. However, the premise, in its purest form, is very common. Architecture and Urban Design as disciplines, the AIA, the Clinton Global Initiative, the EU, Un-Habitat, are all working in one fashion or another to harness the power of urban design as it relates to health and prosperity, and to re reassessing it in the new context of urbanization (UN-Habitat, 2010). It has become an accepted protocol that Design impacts public health.

Our interest is the relationship between space configuration and mental health. Environmental determinism is the ingenuous assumption that certain spatial configuration could determine certain sets of personal and collective behaviors, so that space could be purposefully shaped to produce more appropriate patterns of behaviors in our communities (where “appropriate” stands for “aligned with dominant ethic and political paradigms”). Behavioral approaches to therapy have informed the “golden age” of rational-comprehensive approaches to social engineering in the 50s and 60s across many areas of public policies including health, security and urban planning. The too often disastrous results of these had triggered sharp criticism by as early as the end of the Sixties both in urban planning and in the wider context of public policies studies (Jacobs, 1961; Friend and Jessop, 1969; Newman, 1972). Environmental determinism paired up in those years with a style of governance revolving around the exponential growth of central authorities’ control. The many failures of purely administrative response to social needs appears a manifestation of the paradoxical limitations of public action before the informal nature of many societal dynamics (Schon, 1983). From our point of view, in C&T we acknowledge that environmental determinism is the product of the historical deterioration of housing production as a process. It emerges in fact when a certain spatial configuration is created by some (the experts) for the benefit of others (the deviants, or the patients). The virus which has induced such deterioration is the separation between the various components of the process, i.e. between developers, designers

and end-users, the latter being effectively expelled from the process altogether. Conversely, C&T is based on the idea that what heals is the process, not the product, and more precisely the collective experience of conceiving and constructing your own place.

Therefore with "therapy" we refer here to any process designed to produce "healing", where the word "heal" holds the meaning of restoring from separation, or "to make sound or whole" (Merriam-Webster, 2014). The etymologic link between "heal" and "whole" is profound and deeply resounds in Christopher Alexander's use of this word, referred not just to the human beings but indeed to the land itself: "The idea of wholeness encompasses the idea of healing. When something is a whole, we consider it healed. If we wish to heal something, we seek to make it whole. The middle-English word hale, laying as it does halfway between whole and heal, gives us a sense of this connection. Healing is making whole; that which is healed has a stronger wholeness than that which is not healed. (…). We can reach understanding of wholeness only when we see the objective wholeness in the thing or place, and simultaneously experience the growth of wholeness in ourselves. These two must go together. That is the nature of the phenomenon" (Alexander, 2012, p.89).

A PROCESS CENTRIC APPROACH

C&T is designed to overcome the barriers that split conventional housing production in separate parts, where decisions are made by different people, in different moments, in different places, and end-users are mostly excluded. In particular in C&T: a) end-users are an integral part of the constructing community; b) end-users are protagonists of the process in all phases, including conception and construction; c) conception and construction are one single phase. This new, singular process of making relies heavily on Christopher Alexander's ideas; these can guide us to a means of working that simultaneously helps us to value and learn from local expertise, combatting the overly paternalistic tendencies of many design build projects of this nature .

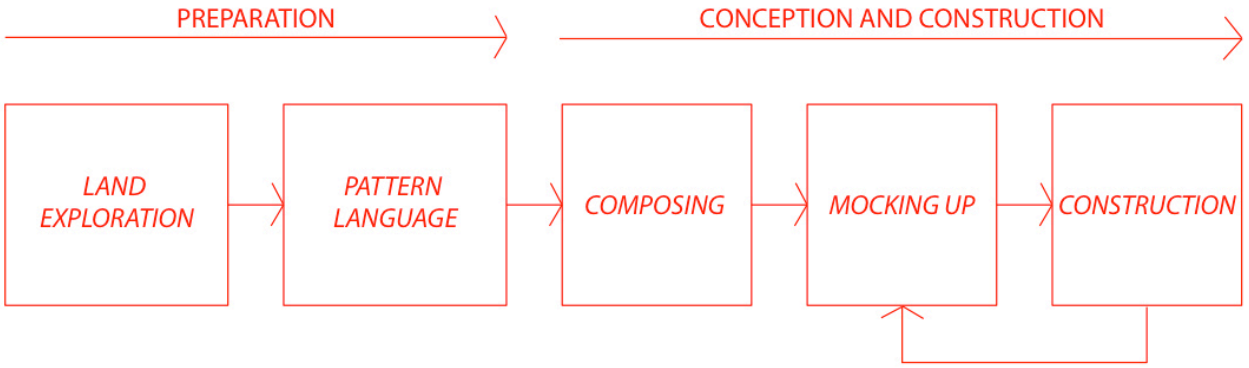
The general C&T process is organized in one phase of preparation and one of conception and construction of the Building , where the preparation phase is made of two necessarily sequential steps: Land Exploration (LE) and Pattern Language (PL) (fig.1). It is assumed that when starting the process the essential project framework (design brief, budget, constructing community, planning regulation) is known.

Both LE and PL are structured process of engagement with the end-users; however, LE focuses on the project site ("the Land") and produces the Wholeness Map PL,

1) The part often overlooked in Alexander's work is its potential to offer a more democratized approach to architecture, design, and construction. This puts Chris Alexander way ahead of his time, in parallel with the developmental approach of JF Turner (Turner 1968). A latest interesting declination of the same attitude emerges from cutting-edge technological innovation: Alastair Parvin and the members of the Wiki-house community have begun to synthesize a democratized means of production (Parvin 2013). What these have in common is the ability to deliver architecture for the 100% as opposed to the fee paying clientele that dominates the profession. An open and democratic process that can harness a rapidly opening and democratizing means of production show us that Construction and Therapy is viable as a process of making and building, and needs not be relegated to novelty or construction charity.

2) It is important to clarify that we are using here the word "building" only for the sake of brevity. C&T is designed for constructing buildings, public spaces, gardens, playgrounds, as well as any other ordinary construction

while PL focuses on the Building and produces the Dream Map (fig.2). In the successive Conception and Construction phase the two maps are overlaid and a common structure is sought. Effectively, this is a preparation to the subsequent mocking up and construction steps. In the mocking up, the constructing community conceives the fundamental elements of the building by directly mocking them up full scale on



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the land utilizing disposed or in any case zero cost materials like ropes, cardboard sheets, metal sheets, bricks or stones, timber pallets or the like. In short, all decisions regarding the Building's spatial reality are taken at this point by a continuous collective discussion on site; once the full scale model is completed it is recorded by accurately drawing it on paper. In the construction step, the actual building is constructed by the constructing community. It is important to highlight that mocking up and construction are actually integrated to various degrees depending on the skills of the constructing team, the complexity of the construction system, and various other factors involved: effectively, the constructing community does not finish mocking up and conceiving the building until the end of the actual construction, just getting deeper and deeper in scale. Similarly, drawings are used at various levels in the mocking up phase to help deciding on constructive details or visualizing elements that cannot be mocked up.

In the following chapter, we illustrate how the general structure of the process has been implemented in a pilot experiment conducted at University of Strathclyde in Glasgow during the 2012-13 academic session.

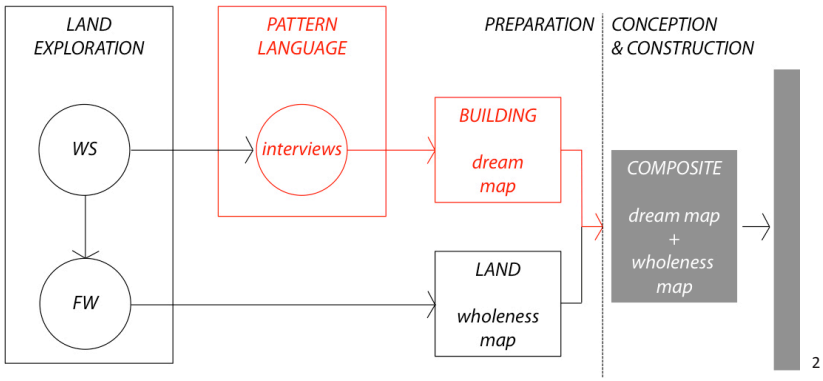

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Figure 1: Constructoin and Therapy, The two phases of the process

Figure 2: Construction and Therapy, the three phases of the process

THE PAVILION EXPERIMENT

Both concept and process needed experimented and tested when we embarked on the first C&T initiative at Strathclyde, with the ultimate goal of achieving proof of concept. Very interestingly though, the experiment itself became a full scale design build project that posed challenges to our group of University of Strathclyde architecture students that they had never been exposed to. About 20 year 2, 4 and 5 architecture and year 3 and 5 business students were organized in a Vertically Integrated Project (VIP) (http://www.strath.ac.uk/viprojects/) and worked for one year together on the construction of a timber pavilion for the exhibition of students' works, to be located in the central gardens of the University campus in Glasgow.

Students were divided in three different role-groups. Five year 5 architecture students acted as "design team": they spent on the project their final year design studio experience, and prepared a second C&T project in Rwanda, which was crowd-funded and initiated as part of the course . The other 15 students from earlier years in architecture spent significantly less time on the project, acting as "end-users" (for the first pat of the project, set in Glasgow; the Y5 students took the proof of concept and process to Rwanda to work with real "end users") and working only on the pavilion project. Finally, 5 business school students worked on both the pavilion and the Rwandan project acting as "business consultants" on preparation of business plans and helping with crowd funding.

In the following sections we briefly outline the Glasgow Pavilion project across the two phases of Preparation and Conception & Construction as experienced by students and staff between October 2012 and March 2013.

3.1. PREPARATION: LAND EXPLORATION (LE) AND PATTERN LANGUAGE (PL)

The LE consisted of two distinct experiences: the workshop, which directly informed the Field Work on the Land and indirectly prepared the PL. Both LE and PL are fundamentally about engaging with end-users. End-users are trained as to how getting to their own authentic dreams and feelings and express them openly in a way which is operable for construction. Whether or not this should be classed as a "participatory approach" is therefore highly questionable. The question is not really the extent to which the design team had respected the users' point of view (indeed, it is not about their "point of view" at all). The question is what kind of materials belonging to the users we want to reach. In most participatory approaches what is explored are the users' "needs", "perceptions", "ideas", "skills" or "experience"; in C&T these are

3) The pavilion work for the year 5 students (and for us staff) functioned as a pilot test in preparation of the much more complex Rwandan project aimed at regeneration of the orphanage village of St. Kizito, near Kigali; this included a visit to the village and the on site delivery of the whole preparation phase. Once back to Glasgow, students terminated their educational experience with a conventional masterplan for the lower part of the village, that was embraced by the village people and management. An initial part of it has now been successfully realized b the locals outwit the C&T framework, while the other parts are currently under fund-raising to be hopefully constructed in a next C&T visit in 2015.

4) Indeed, the psychotherapy side of C&T is of extreme interest for us and is currently under exploration in our research group at UDSU. However, for this as well as for art-therapy and movement-therapy, the space between the original disciplines and architecture is surprisingly to a large extent a virgin terrain still, indeed a very slippery interdisciplinary ground. Therefore we have limited our digressions in such areas to what remains strictly necessary to understand the C&T process, and focused this paper only on the project experience.

gathered conventionally through “hearing sessions” which are not described in this paper. The real point in C&T is getting with the users in their sacred territories where dreams and feelings sit, a land that is mostly concealed to the users themselves. By so doing, C&T moves farther away from community engagement or participatory design, which are branches of public policy research, and closer to psychotherapy . Only at that level in fact users can get to what they share as human beings: in a Jungian sense, dreams are the gate to (collective) unconsciousness.

On the other side, authentic feelings are part of what we get increasingly detached from in the process of growth and education along our way to adulthood. Everything in C&T is about putting feelings at the core of housing production all over the board. In Alexander’s words: “The process of this activity is indeed anchored in feelings, human feeling. It rests on a kind of feeling which may be verified. It is not feeling, as people sometimes use the word to refer to an opinion which they hold. It is a feeling that in large measure can be shared and will be shared” (Alexander, 2012, p.164). It is this level that we want to reach with the users, where feelings are not opinions nor irrelevant idiosyncrasies. The authentic level that we share is our target. This is the reason why across all the process we always start from the individual user to then “filter” individual materials to retain only what all or most of them share. Once this exercise is practiced at the appropriate depth, it is surprising to see how easy it is to converge towards solutions we can feel we “belong to” because they are in fact profoundly human and shared.

That is why the most important part of the work is establishing the relationship with users at the deep level of the dreams, a level which is mostly unconscious. Though everything across the process is constantly shaped and maintained to this aim, the Workshop is certainly the one bit of it that is entirely and solely dedicated to that.

LAND EXPLORATION (LE): WORKSHOP AND FIELD WORK

LE means exploring the participants’ inner space as well as that of the Land. People cannot acknowledge what feelings the Land triggers in themselves until they have developed a higher ability to acknowledge their own feelings. That is a skill which, even in young students, is in fact lost to a remarkable extent, thus must be trained and practiced. In the context of the Glasgow trial, students in both design and users group attended a three-day Workshop with this purpose.

Here, participants were progressively led to explore a) their own inner individual space, b) their individual space in relation with the space outside them, and c) their own space in relation to that of the others (group awareness). Techniques taken from psychomotricity and yoga were utilized, along with sharing their own experience and individual assignments like, for example, defining key-terms from Alexander’s textbooks (e.g. “Wholeness” and “Centre”).

Field Work on the Land was undertaken just after workshop’s completion. The Land has a structure that lays outside us. Everything that is done on the Land will change its pre-existing structure, by positively extending or negatively restraining (and ultimately jeopardizing) it. Understanding the structure of the Land is essential to act on it positively. During the workshop we required students to identify and qualify the “centres” in the land first of all through the recognition of their own individual feelings. They were given flags and instructed to pace the land across, stay in for as long as they wanted, and plant the flags where they felt OK. It is important to highlight that “centres” in the land are physical spaces perceived as complete and comfortable in some respect, i.e. they have a positive quality. Students then noted

on a jotter what feelings they felt along with their strength in a 1-5 scale. As one student planted a flag the flag's position and its associated feelings were recorded in a GIS (Geographic Information System) environment. At the end of the exercise, we produced a map of the site punctuated by dozens of flag points, linked to a database with all associated feelings.

Back in studio, students worked on the language to simplify the feeling's database. A statistical study of words frequency was visualized ("word cloud") and words most frequently used ("big words") of different meaning set apart to characterize distinct semantic areas. This language work was addressed in a collective session with all students involved. Eventually, students identified these 5 big words: peacefulness, protection, exposure, awareness and excitement; all annotated feelings were then gathered in these areas according to their semantic "vicinity" to the big words. Words falling in the lowest frequency quartile were dismissed altogether. As a result, the database in the GIS map was reworded and all relevant cases re-aggregated according to the 5 identified big words. Then we proceeded with mapping the density of feelings in the Land for each of the 5 feeling areas. The resulting set of "feeling maps" (fig.3) supported our comprehension of the "wholeness" of the Land, i.e. the Land's shared structure of centres and their emotional character. Again it is worth highlighting that both the disposition of centres and their character underwent a double filtering process (language work and spatial density calculation in GIS) to retain only what was shared by all or most the users.

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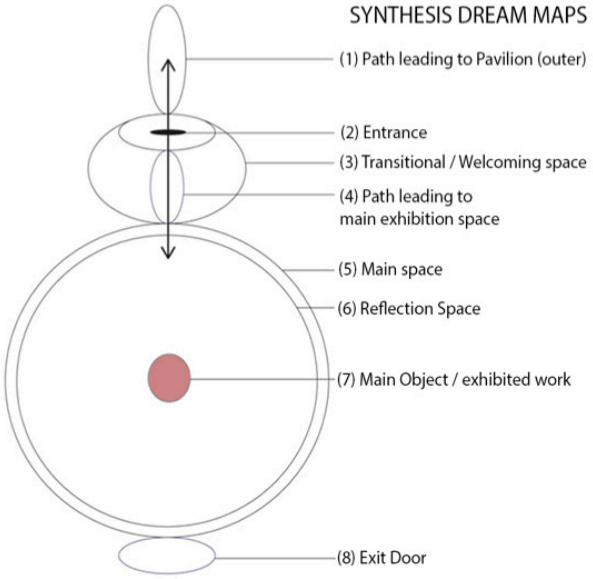
Figure 3: Land Exploration: examle of a feeling map of the Land: the protection map

PATTERN LANGUAGE (PL): INTERVIEWS

In the PL phase we ask the end users to describe what their dreamt Building is. We explore the Building's physical appearance after all constraintsare removed. In that sense, we are exploring the "ideal" Building, or its essential profound nature that sits in the users' soul. In order to do so, "design team" students were instructed to

ask end-users students to accompany them in their “Building in Heaven.” This was realized by means of 2-to-1 interviews, where 2 interviewers of the design team interviewed for one hour each end-user.

The essential leap was to set the right atmosphere for the interview. The whole point was to undertake a conversation on the interviewee’s sacred region of emotions, which is impossible if there is no trust and relaxation around. Disclosing such territory to a stranger is of utmost difficulty for everybody, consequently the process to get there is delicate and risky. The design team spent a remarkable amount of time discussing the physical setting for the interviews, as well as its structure. Ultimately, it was decided to run the interviews in a tranquil room within the department, remove chairs and tables and sit altogether on a warm carpet, prepare tea and coffee for the interviewees while they were already there and set up some music. Of the two interviewers, one was to remain silent all over the session and take notes, while the second was to interact with the interviewee. That was explained to the interviewee at the start of the session, along with the scope of the interview, reassurance regarding confidentiality, and a short illustration of what was going to happen. Then the interview began, starting with the question: “Let’s assume you have a pavilion, your dear beautiful pavilion, which is in Heaven, and that you proudly want to show it to me as a friend would do. You now accompany me visiting your pavilion-in-Heaven: what do you see?” Step by step, the interviewee described the ideal pavilion in form of an oneiric voyage in the land of beauty and peace where her/his dreamt pavilion contributed to the magnificence of the place. At the end of this process, more than 10 interviews were collected. It was unanimously recognized by the 5 students of the design team that having conducted the workshop before the interviews was remarkably important to allow proper conditions of confidence and trust being established at interviews .



SYNTHESIS QUALIFIED LISTS

(1)The path leading to pavilion (outer) : [surrounded by nature, warm, natural light, usually with steps leading up to pavilion – a sense of reaching to higher grounds / path to achieving enlightenment]
(3) Transitional / Welcoming Space : [simple with one or two feature eg: water feature / desk, smaller and darker than main space, with certain attraction towards main sorce, eg: only source of light coming from door to main space]
(2) Entrance : [usually a door – warm and wooden feeling, or an opening]
(4) Path / route leading to main exhibition / space : [directional , connecting and guiding the journey from space after entrance to main space]
(5) Main Space: [space of medium scale, enclosed, circular / square space, warm, with spotlight focusing on main object usually in the center, with views/ sound that gives a sense of connection to outdoor thought not directly accessible from main space, free moving space with little furniture /objects, quiet and calm with no background music]
(6) Reflection space: [dark, enclosed, private, individual, with seating, at the periphery of room, with direct view towards main object exhibited, a retreat space where one could quietly enjoy the exhibited object]
(7) Main object, exhibited work : [just one object, emphasized by light directly on object- giving off a sense of it being a sacred object, main focus in the space, usually in the centre of the room, elevated / lifted of ground- restricted from touching by visitors]
(8) Exit Door : [either through main door or another exit door, usually dark and hidden from sight]

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With the dreams now collected and recorded on paper, the design team embarked in a long work of text treatment. For each dream, a Qualified List (QL) was firstly

5) In Rwanda, a few months later, the same objective was successfully pursued by simply letting the students work for one entire week with the children of the village in doing their daily activities all day long, playing, cleaning, washing, writing, having meal, at the end of which a sufficient level of confidence was created.

Figure 4: Patter Language: synthesis dream map of the pavilion-in-heaven

created that included the dream's spatial elements. For example, one may have told of a large dark room with a white table in, surrounded by several magnificently decorated chairs where he sat and felt a good deal of confidence and relaxation: in this case the design team would have listed "room", "table" and "chairs", but would have not included "relaxation" which is not a spatial element. Secondly, spatial elements were nested according to their spatial disposition in the dream. For example, "chairs" would have been nested into "table" which would have been nested into "room"; this took the form of indented tree structure similar to that of folders in a computer archive. Thirdly, adjectives were analyzed and associated to their substantives. For example, "large" and "dark" would have been associated to "room", "white" to "table" and "magnificently decorated" to "chairs". The structured list of substantives with associated adjectives is what we called the "Qualified List", one for every dream. On this basis the design team created "Dream Maps" (DM) visualizing spatial elements with circles nested and connected to each other according to the dream structure exemplified in the QL. All DMs were then compared to retain what they had in common and dismiss what distinguished them; the resulting synthesis Dream Map (fig.4) was then reported to the users and discussed at length to understand the extent to which it did represent a shared idea of the pavilion-in-Heaven, or the collective dream of it. The outcome of the PL process is therefore again a map. Differently from the LE map, this is about the Building, not the Land. It is a conceptual map, but it does retain a spatial nature in the way circles are related to each other and adjectives characterize them.

Before passing to the next phase, it is important to make a short digression into a theoretical caveat. Obviously, when using the name "Pattern Language", the reference goes straight to Christopher Alexander's "A Pattern Language" (APL) book published in 1977 (Alexander et al, 1977). However, readers familiar with Alexander's book would probably struggle to see anything similar to the PL illustrated here.

APL was written to illustrate Alexander's early achievements in his life long exploration of what is the structure that makes buildings beautiful and liveable. The 253 patterns of APL are a demonstration of the extent to which certain configurations tend to recursively emerge in processes of construction driven by human feelings which – the processes, not the patterns – are where life comes to buildings. The clear message in all Alexander's work is that that "quality without a name" that later he called "wholeness", or "beauty", or simply "life", does not come by design. For Alexander, there are no ways one can design a beautiful building. What we can design is a process to engage with that will generate a beautiful building, and actually continue to do so in time as the building continuously hosts life and is shaped by it. Wholeness, in Alexander's words, "unfolds" in time. It does not "come" once and for all, in a design crystal.

Unfortunately, this message is naturally hostile to the design professions whose societal recognition sits entirely on design as a solution, rather than a process. As a result APL was greatly misunderstood since its very appearance. Its success did not please Alexander himself who knew too well where the problem laid: designers found it quick and easy to utilize patterns as design solutions, without bothering to put them in a process of construction that had to be shaped and conducted according to certain criteria and, crucially, include people. Maggie Moore Alexander, Chris' wife and life-long collaborator, said: "After APL was published, Chris could see from the way people used it that he had not gotten his point across, and that is why he spent the next 30 years writing The Nature of Order to talk about life and wholeness. It was typical for people to select, mix and match patterns, rather than understand

that they needed to be in a process" (Moore Alexander, 2014). Alexander's work on patterns has developed considerably from an understanding of patterns as mainly behavioral constructs, that need to be treasured as they represent the reality of community life, to a much deeper notion of patterns as ordered structures of nature that belong to human beings as natural creatures, and in fact express life in everything which is beautiful, organic as well as inorganic. This deeper understanding of patterns has been restlessly enucleated and explained in works like the Nature of Order (Alexander, 2002-2005) and The Battle (Alexander, 2012). Here, the identity in structure between life and the self is proposed, with the word "self" opening an entire territory to research. It is this deeper interpretation of patterns that we would rather reference to. In The Battle Alexander devotes an entire chapter to the detailed illustration of patterns emerging in the Eishin Campus project, and to the process of engagement with school students and staff through direct interviews that created them.

3.2. CONCEPTION AND CONSTRUCTION (CC): COMPOSING, MOCKING UP, CONSTRUCTING

COMPOSING

With the completion of LE and PL we had created two maps: a) the Wholeness Map (actually a set of maps) which gave us a picture of the emotional reality of the project site, and b) the synthesis Dream Map, the Building's concept plan. We would need to create a good match between the two, such that the structure of the Building completes and enhances that of the Land. We discussed this problem at length with students in a long session where all its various aspects were explored. For example, clearly the Land was weak in the south-west quadrant, where a strong centre at the corner between Richmond and Montrose Streets sat isolated from the rest of the ring-shaped structure of centres (fig.4). The need was identified to "reconnect" this centre to the rest of the space and specifically to the very strong centre right in the middle of the gardens: this is a place where a few chairs are fixed in the terrain in a protected panoramic spot, beautifully surrounded by greenery and flowers. The decision was taken to connect the path and the entrance to the pavilion (the spatial elements number 1 and 2 in the synthesis Dream Map in fig.5) to this strong centre: because of this new connection, the pavilion would have acted as a healing element to that weak area of the Land. At the same time, the presence of a strong centre in the Land's south-west corner suggested to create an open backyard there, which would have preserved the Land's strength and helped the Building's own strength.

MOCKING UP

Once the location of the Building was determined (let's not forget that the actual Building plan had not been laid out yet) we moved out on the Land to start the mocking up. This is the fun moment, when everything becomes concrete and takes shape and actual space comes to stage: a highly creative moment of a collective nature. Students gathered on the Land roughly where the entrance should have been constructed, and started a discussion on how to build it. They began picking up ropes and cardboard boxes, disposed timber boards and bricks, planting pickets and elevating sticks, trying to figure out how exactly the entrance would have been. Naturally three or four groups of students shaped up around different solutions, but after half an hour they seemed not converging significantly. One of the students then walked off to reach the very low west corner of the area, where the strong Land centre is, sat at the convergence of two perimeter stone walls, and after a few minutes called everybody to come over and see. Everybody agreed that that was

a great place, then this student said that rather than starting from the entrance, we should have started from the backyard in that location. The reason was not too clear, but what was clear to everybody was that he was absolutely right. From that point on everything rolled forward surprisingly smoothly. Students started mocking up the perimeter of the backyard in a rectangular form. Again, nobody could have explained why rectangular and not, for example, squared or circular, but effectively everybody agreed immediately that the rectangle was right. The question of what kind of geometrical shape we should have used for the backyard wall did not even come to discussion. Clearly, it should have been rectangular. In about four hours of intensive work on the land, all the fundamentals of the Buildings were completed full scale: general plan, section of the main exhibition hall with three naves and four pillars, shape of the roof and that of the entrance.

Indeed, the detailed description of every step of this extremely complex and sophisticated decision-making process would occupy a separate paper, What really strikes us was the smoothness of the human dynamics that emerged, the subtleness of the arguments, and ultimately the real fun of all that. Joy was there, a sense of great achievement in actually seeing the right section erected on the Land in timber sticks and elastic bands, the sense of pride in everybody. Students got it right, and they new that. Obviously, it was just a mock-test of a real process; it was very cold and we could only stay one day on the Land, and the building was technically and typologically elementary, and nonetheless the emotional energy created by the act of building collectively blew us away. Once you have tried it, even just thinking of conceiving the Building up in an office before a laptop screen becomes literally unthinkable. The complexity and the richness of the human material put at work by the actual experience of building together and "percolated" into the building shape makes a conventional process, by comparison, literally a joke.

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Figure 5: The completed pavilion in the University gardens

CONSTRUCTION

Once terminated the mocking up phase, we had to got back to the laboratory and started the construction. This is where our test-process moved a bit too far from the right principles. It was in fact a great experience for the students, but we were forced to build in large modular components that had to be crafted in the laboratory and then relocated on the Land in a second moment. It was in fact too cold to build directly on the Land, the Building had to be up in two weeks time on a budget of £2,500 only altogether. Students and technical staff worked magnificently, with a high spirit, spending an amazing amount of energy in the construction. The Building's component were actually built, transported on site and assembled on schedule.

The continued involvement of the end-users was crucial and their participation extended to the final stage of construction. Interestingly, drawings were used throughout the mocking up as well as the construction unconventionally. The working group used drawings and photographs during the mocking up to record the developments in the process. These drawings were then refined and used to present a more definite design proposal. Students drew a lot, particularly in the Lab, to discuss construction details, along with a heuristic process of trial and error, but they never use drawing to create anticipations of the Building overall layout or appearance. It is very important though to highlight that the distinction between mocking up and construction is purely instrumental. These were actually separated for functional reasons, but no doubts that a milder climate and a more relaxed timeframe would have allowed a much greater integration between the two.

CONCLUSIONS

The pavilion simulation yielded as many questions as it did answer; however, much needed experience was gained for taking similar projects forward. Through this process, the more mundane takeaways were a relationship with the University Estates Department that helped the Architecture Department streamline a process for delivering built projects including permitting, and health and safety concerns. This included but was not limited to reaching out to the University insurance underwriters as well as the city planning department. These relationships, while only related to the project in a limited capacity are integral to the future success of the project, and indeed to the department's building initiatives in general. These relationships and procedures are part of a larger set of learning that must be undertaken anytime design build projects move into a city and attempt to work within existing Design-Build-construction policies.

The particular process of construction implemented in the project, inspired by Christopher Alexander's life-long legacy and named Construction and Therapy, raised significantly the bar of the challenge. For example, the Estate department of the University wanted drawings to deliver their authorization to build, and we did not want to draw before mocking up and constructing in fact. That was essential to us. The dilemma was resolved simply by inviting the Estate officers to the site and talking to them at length, explaining why we would not have drawings for them. A compromise was found, and the authorization delivered on the basis of a simplified box-like footprint of the Building that told them its rough position and geometry, on the agreement that we could change it on the ground. The conundrum of how a C&T process can match current authorization practices is only resolvable when the object of the authorization shifts from the product to the process: the authorizing Authority would then license the process, whatever its product, obviously being part of it.

From the pedagogical point of view, C&T aims at transferring a type of knowledge that is built at the human level by means of human relations and collective experience. The project reversed the conventional framework by beginning with training the ability to be (emotional and relational skills), then on that basis developing the ability to act and make (learning skills) to finally enhance the ability to know (cognitive skills).

Further to these the educational and pedagogical outcomes were not surprising, but possibly unintended. Student survey results and informal conversations revealed a very tangible set of learning outcomes related to building technology and structures, that was measurably ahead of their peers in the department. Building technology was not the only unintended learning situation: a set of soft skills that was built into the project were achieved universally across our students, including project budgeting and costing, fundraising, website management, and the interpersonal relationships that come with a project involving so many players.

While there has been some resistance from the status quo – educational and professional - to this project, the educational framework for our students has never been in doubt. The resistance seems to be entirely related to the shifting paradigm of design and construction rather than the educational and pedagogical delivery our students were a part of in this case. This of course opens to further questions and the wider debate surrounding the true objective of this type of pedagogy, and whether the outcome or the education is the most valuable and thus most protected aspect of projects of this nature.

ENDNOTES

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