IGRA USTVARJALNOSTI
teorija in praksa urejanja prostora
CREATIVITY GAME
Theory and Practice of Spatial Planning

ARCHITECTURAL EDUCATION ONLINE AND IN-CLASS SYNERGIES: RESHAPING THE COURSE AND THE LEARNER

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www.iu-cg.org

Znanstvena revija, št. 3 / leto 2015
Univerza v Ljubljani
Fakulteta za arhitekturo in
Fakulteta za gradbeništvo in geodezijo
Ljubljana, 2015

Scientific journal, no. 3 / Year 2015
University of Ljubljana
Faculty of Architecture and
Faculty of Civil and Geodetic Engineering
Ljubljana, 2015

Naslov revije:

IGRA USTVARJALNOSTI
teorija in praksa urejanja prostora

Title of the Journal:

THE CREATIVITY GAME
Theory and Practice of Spatial Planning

Urednici: Alenka Fikfak, Alma Zavodnik Lamovšek

Editors: Alenka Fikfak, Alma Zavodnik Lamovšek

Uredniki tematskega dela: Cristian Suau, Saja Kosanović, Carmelo Zappulla

Thematic section editors: Cristian Suau, Saja Kosanović, Carmelo Zappulla

Oblikovanje in naslovnica: Gašper Mrak
Lektoriranje: Mojca Vilfan
Prevod: Mojca Vilfan
Klasifikacija: (UDK) Renata Stella Čop, (DOI) Teja Koler Povh

Design and Title page: Gašper Mrak
Slovene text proofread by: Mojca Vilfan
Translation: Mojca Vilfan
Classification: (UDK) Renata Stella Čop, (DOI) Teja Koler Povh

Založila in izdala: Univerza v Ljubljani,
Fakulteta za arhitekturo in
Fakulteta za gradbeništvo in geodezijo

Published by: University of Ljubljana,
Faculty of Architecture and
Faculty of Civil and Geodetic Engineering

Spletna stran revije:
http://www.iu-cg.org/

Journal's Web Page:
http://www.iu-cg.org/

Spletna stran številke
http://www.iu-cg.org/paper/2015/iu03.html

Currrent Issue LInk
http://www.iu-cg.org/paper/2015/cg03.html

ISSN 2350-3637

ISSN 2350-3637

Univerza *v Ljubljani*
Fakulteta *za arhitekturo*

Univerza *v Ljubljani*
Fakulteta *za gradbeništvo in geodezijo*

THEORY BY DESIGN SYSTEMS

Olga Ioannou: SINERGIJE ARHITEKTURNEGA IZOBRAŽEVANJA PREK SPLETA IN V UČILNICI – PREOBLIKOVANJE PROGRAMA IN UČENCA

ARCHITECTURAL EDUCATION ONLINE AND IN-CLASS SYNERGIES: RESHAPING THE COURSE AND THE LEARNER

DOI: 10.15292/IU-CG.2015.03.030-037 ▮ UDK: 72.01:378 ▮ 1.01 Izvirni znanstveni članek / Scientific Article ▮ SUBMITTED: June 2015 / REVISED: September 2015 / PUBLISHED: October 2015

IZVLEČEK

Tradicionalno se arhitekturni programi načrtujejo v kontekstu fizične učilnice, kjer je neomajni pogoj za učenje neposredni odnos med učenci in učiteljem. Toda ta model učenja je nastal v času, ko tehnologija še ni vplivala na učenje. V arhitekturno prakso so digitalni mediji že prodrli, v arhitekturno izobraževanje pa še ne. Avtorica navaja, da vključevanje spletnih izobraževalnih praks v arhitekturne učne načrte koristno vpliva na izobraževanje na področju oblikovanja, saj veča medsebojno sodelovanje in zagotavlja, da študentje prevzemajo odgovornost za učenje. Za ponazoritev koristi sinergije arhitekturnega izobraževanja prek spleta in v učilnici smo pripravili mešani program na podiplomskem študiju nacionalne tehnične univerze atenske šole za arhitekturo. Skrbno smo preučili sodobne trende spletnega učenja v zvezi z njihovo združljivostjo s kulturo arhitekturnega oblikovanja v smislu »učenja skozi prakso«. Program je bil pripravljen v skladu s temeljnimi načeli konektivističnega modela, kjer je učenje povezano z zmožnostjo oblikovati omrežja povezav in se po njih pomikati (Downes, 2012). Ta pristop smo uporabili zaradi podobnosti s prakso oblikovanja, kjer morajo študentje iskati kritične povezave za ugotavljanje prostorskih pojavov in rekonstrukcijo realnosti. Vsebina programa je bila preoblikovana tako, da ustreza novemu mediju. Študentje so imeli na voljo več poti za komuniciranje. K vsebini so lahko tudi sami prispevali. Analiza podatkov je pokazala, da raven sodelovanja, izmenjava in zadovoljstvo študentov še nikoli niso bili tako visoki, kar so pokazale tudi ankete, ki so bile izvedene po koncu izvajanja programa.

KLJUČNE BESEDE

arhitekturni seminar, mešani programi, teorija konektivističnega modela, spletna orodja za učenje

ABSTRACT

Architectural courses have been traditionally planned in the context of a physical classroom where the direct rapport of the students with the instructor is an unswerving condition for learning. This model was formed, however, at a time when learning was not impacted by technology. Although digital media have infiltrated architectural practice, they still elude architectural design education. The author argues that the integration of online educational practices in architectural curricula can benefit design education immensely by raising interaction and making students assume responsibility for their learning. To demonstrate the gains of online and in-class synergy in architectural education a blended course was set up at the postgraduate program of the National Technical University of Athens, School of Architecture. Current trends of online learning were carefully examined in regard to their compatibility with the architectural design culture of "learning by doing". The course was eventually founded on the core principles of the connectivist model where learning consists of the ability to construct and traverse networks of connections (Downes, 2012). This approach was chosen because of its affinity to the design praxis where similarly students are required to make critical connections in order to map spatial phenomena and reconstruct the real. Course content was redesigned to comply with its new medium. Students were offered multiple channels of communication. They were also asked to contribute to the content material. Course data analysis demonstrated an unprecedented level of participation, exchange and student satisfaction as expressed in the surveys that followed the course's completion.

KEY-WORDS

architectural design studio, blended courses, connectivist theory, online learning tools, student interaction

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ARTICLE
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DISCUSSION
RECENZIJA
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PROJEKT
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DELAVNICA
WORKSHOP
NATEČAJ
COMPETITION
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PRESENTATION
DIPLOMA
MASTER THESIS

1. INTRODUCTION - THEORETICAL FRAMEWORK

Contemporary approaches in higher education often involve the integration of online tools. From Open Distant Learning (ODL) to Massive Open Online Courses (MOOCs) there has been an outbreak of new technology used to overcome the temporal and spatial vehicles of distant learning (Hollands & Tirthali, 2014; Barber, Donnely, Rizvi, 2013; Daniel, 2012, Comier & Siemens, 2010). Tools used for e-learning practices are also currently being tried in more flexible blended learning environments where the in-class sessions are supported by online features (Griffiths, 2013; Norton, 2013). The level of collaboration between the two mediums varies according to the objectives of each course.

In architectural curricula the incorporation of online tools of learning has been scarce so far (Bender, 2005). In most cases, the online presence of an architectural course simply reflects its in-class development (flipped classroom mode). The design studio in particular, the backbone of architectural education, is deeply rooted in the physical co-presence and interaction of professors and students and that is a habit that has resisted change. So far some isolated examples have been registered such as Susan Yee's MIT successful attempts coordination to form interdisciplinary and transcontinental synergies between architectural Institutions. Technology was used to support the social character of learning by bringing together people from different cultures. (Yee, 2001) Or the more recent venture of Petar Arsic's Design Studio at the Faculty of Architecture of Belgrade University. Here, the course's online aspect was mostly oriented to supporting the studio as it is, by incorporating MOODLE features and profiting from its repository character. (Devetakovic et al. 2011)

During the research, one theory in particular stood out because of its resemblance to the general framework of the predominant architectural pedagogy: the connectivist theory. In this model of self directed learning the major activities involve: aggregation, relation, creation and sharing (Kop, 2011). Likewise, the students of architecture are expected to collect information and reflect upon this material in order to eventually create something of their own. The outcomes of this mental or cognitive process are consecutively shared between classmates and often discussed openly between the network of professors and students (Salama, 2015). This is an affinity that was worth looking into. The course redesign was founded on the connectivist model of education.

This paper examines the process of the course redesign and assesses the outcomes of its implementation. It starts by describing the objectives that led to the decision of using online tolls of learning. Then it follows the changes made to the course's components: its content, its layout, the additional features that were used and its new deliverables. It continues by presenting student ratings and their evaluation of the redesigned format. In the final section, the author assesses student performance in regard to the course reform.

2. THE EXISTING COURSE - COURSE REDESIGN OBJECTIVES

The original course of "New Fields of Design and Construction"[1] had been formed by joining two distinct yet complementary units of content. The first part of the course examined Urban Homoeostatic Clusters (UHC). It presented students with a series of city mapping techniques and then illustrated ways of managing the data retrieved to shape integral strategies for urban interventions. Course content was based on a wide range of the most recent PhD dissertations and undergoing postgraduate research which dealt with ways of reading the city phenomena. The second part of the course had been based on the Urban Ecosystems of Innovation (UEI) and in particular the collection and management of urban data with the aim of forming digital networks and helping make a city smarter.

The course was originally held only in-class. Each week a new mapping tool was presented during a three-hour session along with examples of its application. Interaction with the students, however, was problematic. At the end of each presentation, students were given little time to ask questions and comment on the subject discussed that day. It was only at the end of the semester that students were asked to actively engage by using one or more mapping tools to read a specific urban area in Athens. What is more, students worked alone for their projects. Grading depended mostly on the performance of the students on their individual assignments.

The redesign of the course was primarily conceived as a way of dealing with the course's intrinsic weaknesses. As in-class sessions were mostly devoted to presentations, students did not have enough time to familiarize themselves with the course content. They were often overwhelmed by the quantity of the information. Class discussions were short, awkward and rarely exhaustive. Course duration needed to be increased, preferably without shrinking the content.

Switching to an online environment for the transmission of content material offered a way out of this impasse. The task that was eventually undertaken, however, did not solely involve the accommodation of the content in a digital online environment. The course redesign sought to find a way to increase the interaction between the parties involved in the process. Its revised version aspired to create a learning environment as indicated by the connectivist model where "knowledge is not transferred from educator to learner and where learning does not take place in a single environment; instead, it is distributed across the Web, and people's engagement with it constitutes learning" (Kop, 2011b).

All this led to the creation of a hybrid course that called for an extended participation of all parties in multiple learning environments. In this new setting the focus lay on the students as a learning community. Students were no longer considered as simple receivers of information; they became active agents in the process of creating knowledge by assuming responsibility for their learning.

3.0 COURSE REDESIGN

3.1 Content

It was decided from the start that the course content would be uploaded online prior to each in-class meeting as a prerequisite for the students' in-

1 For more information: https://www.arch.ntua.gr/en/node/1147 (official page of the course on the University's website)

-class presence. The first important step was to determine the course main subjects and then redesign their content in terms of online and in-class material (Hanna, 2012). It was decided that this pilot course would include the course content of the UHC only. Six content units were selected in that regard. (Fig. 01)

Conversion into online lecture material meant that a large part of the existing course content needed to be condensed and translated into various forms of online communication and resources such as video lectures, images, links to articles and software demonstrations (Fletcher and Bjerkass, 2012). Consequently, all participants of the teaching team engaged in an in-depth process of reconfiguring their material by adding more online resources. They also had to reduce the duration of their lectures[2] (Guo 2014; Siemens, 2012). A very important factor was also considered from the beginning: students would not necessarily view all weekly video lectures together or in sequence. Therefore, the viewing of the content material had to be planned both in the context of the videos of the same tool and independently.

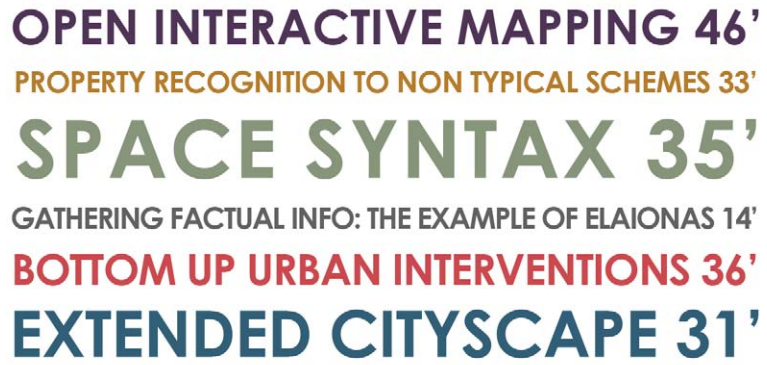

Figure 1: Content Units of mapping tools. Conversion of the former presentations into online content limited their duration.

The process of hammering the content material ensured short duration videos and a clear sequence in unit planning. The final order of the tools' presentation stemmed from a balanced succession of the units' level of difficulty. Additional administrative information was also configured at this point in the form of written instructions and introductive course material to help students navigate in the online environment.

So far the "atelier"[3] character of the connectivist MOOCs had begun to match the studio character of an Architectural Design Course. But "to learn in a connectivist course is to grow and develop, to form a network of connections in one's own self" (Downes, 2012). The need was not only to launch a ready-made environment of knowledge for dissemination, but to engage in a rich text-based, design-based and multi-media based interactive environment of practice. And there was also an immediate need to design the network within which this interaction could take place.

3.2 Layout

Students attending this postgraduate course come mostly from Architecture Faculties. But there are also a number of students admitted from relative disciplines like Fine Arts as well as students who have a second degree in Architecture and a first one from some other discipline, not always directly relevant to Architecture. As a result, the profile of the learners of the Postgraduate Course varies, along with their age, their professional life experiences and their individual competency.

Since students have different background knowledge, they do not share the same ability and skills to learn a subject. Students of the course would develop a personal learning path in the context of their former training (Kolb, 1981). But what if those paths were somehow open to all? What if the

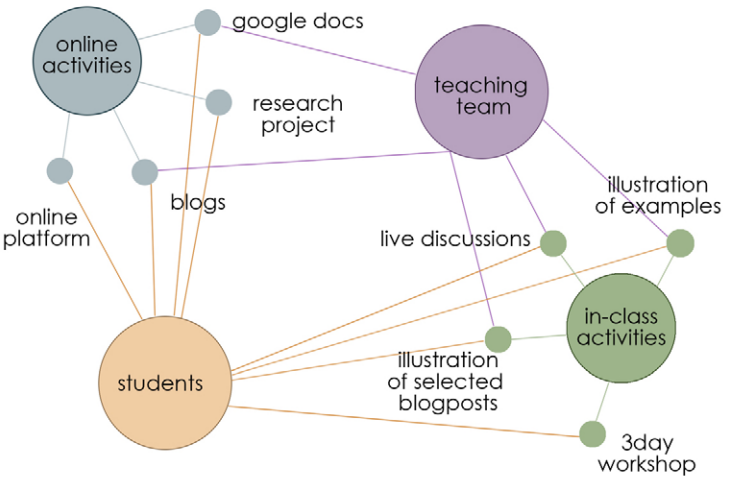

Figure 2: Course development layout. The figure illustrates the interaction between teaching team and students through the various channels of communication established for this course

students could keep track of each other's work outside the classroom and - why not - cross paths with each other?

In this context, the connectivist act of encouraging the establishment of student blogs was decided as the best way to create a network between the students that would enable them to monitor each other's work. There would be no prerequisites for the blogs' maintenance and no one would be obliged to report at a certain pace. The blog would be their individual contribution to the course content and the grade of interference would be up to them to decide.

The course layout that prevailed included that the teaching team would transmit an initial stimulus -one mapping tool for every week of the course-

2 Duration of the videos did not exceed 6-7 minutes. A ten page script was used as a size guide to the recordings.

3 This characterization is used to describe the fluid nature of cMOOCs, less directive in respect of process where the instructor plays the role of the facilitator and learning outcomes are unique artifacts. (Hollands, Tirthali, 2014)

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online. Students would watch it and add relative material on their blogs, their thoughts on the matter, and perhaps an application of the tool they know of or something they were reminded of while thinking about it. Both parties would have to consult each other's online presence before attending the physical classroom4. In any case, the enacted course could hardly shrink the intended one. If the students failed to engage in the process and contribute with their own material, they could still consult an enriched version of original course both in-class and online. (Fig. 02)

3.3 Additional Features

Despite the intended lack of direct online interaction a provision was made, for a series of open-to-all online pages for common use. Two additional online features were strategically used to enhance the sense of sharing in matters of course administration and content management. This allowed all participants in the course to have a say in all aspects of this venture. (Fig. 03)

ONLINE PRESENCE: VERSAL PLATFORM
STUDENTS BLOGS (BLOGSPOT, TUMBLR)
GOOGLE DOCS

IN-CLASS PRESENCE: PRESENTATION OF EXAMPLES
ILLUSTRATION OF SELECTED BLOG POSTS
LIVE DISCUSSIONS
3DAY DESIGN WORKSHOP

Figure 3: Online and in-class course features.

The first online feature has been the "Course Constitution" Google Doc as in the example of a practice adopted by Cathy Davidson in her "21st Century Literacies: Digital Knowledge, Digital Humanities" course, at Duke University (Davidson, 2013). The idea was to determine a mutually acceptable agreement on the terms of use of the online material from all parties involved and to help set the rules of online communication. Since this was a newly inaugurated type of collaboration depending on both parties, students and teachers should both be able to shape this class model and the conditions of co-existence. Just like in the Davidson case, the Mozilla Manifesto was adopted as an initial text on which the students and the teachers were invited to elaborate further.

The second online feature emerged from the complexity of the course content. Each mapping tool is described by a series of terms that define its inner structure and its properties. The words that are used to define those terms are mostly common but in the context of the tools they assume different meanings. Therefore, a type of lexicon was needed to facilitate communicating the terms' definitions to all students. But instead of introducing all those terms as definite entities of meaning, a second open to all Google Doc was set up under the title "Vocabulary of Terminology" to accommodate them. The students were invited to consult and reflect upon those terms' proposed definitions. They were also encouraged to contribute by modifying the definitions or by adding their own versions of what they thought each term represented exactly.

Course content was further enriched by the official report of a Research Program that was developed recently by the National Technical University of Athens that was financed by the city's Regional Administration. Its six hundred pages cover an extensive research of the city of Athens realized with the mapping tools that constituted the course content[5]. This material was handed over to the students at the end of the online presentations. The students were asked to browse through the report and start relating the tools to a realistic example of their direct application.

Furthermore, intermediate complementary material was prepared in the form of mini-presentations in between weeks to address issues that were brought up during class discussions. The flexibility of the course's configuration allowed the teaching team to intervene in case the students did not comprehend a particular aspect of the course content. This material besides being presented in-class was later uploaded on the platform as well to serve as a point of reference of the course's development.

The student blog posts also played an important role to the in-class material articulation. Every week, all posts from the student blogs were collected and evaluated by the teaching team for their relative importance to the course content. Taking into account the course's short life span, the teaching team made sure that the information of the students' research would be contextualized with the rest of the course's content. Some of these posts were consecutively presented in-class as they offered more insight into various issues raised.

3.4 Hosting platform

Recording lasted two days and the editing process lasted almost two weeks. During this time, the transcripts of each unit were deciphered. These texts were later used as the canvas for the editing process as well.[6] Images or snapshots of definitions were used to keep the rhythm of the presentation intact and highlight important parts of the narration. A series of graphics was also produced to signal the introduction and the conclusion of the units.

The internet platform selected to accommodate the course content was Versal[7]. After a trial period where a series of different platforms was tested,

4 It was firmly decided that the platform would not accommodate live discussions or forums and that exchange of views would only occur in-class and that this type of interaction would remain a structural part of the physical classroom.

5 The program and included the determination, the evaluation and the specification of a complex network of actions that would improve the conditions of urban life in selected areas of Athens, especially the city centre. It was held during the biennial 2012-2014. The whole program is available for download here: *https://www.arch.ntua.gr/node-resources/1147* (only in Greek).

6 Two providers' platforms have been used as prototypes: FutureLearn and Digital Leuphana. (*https://www.futurelearn.com* and *http://digital.leuphana.com*). Although they are xMOOC providers, they both aim at creating highly interactive environments for learning.

7 *https://versal.com/c/jxaqv1/summary*

Versal was chosen for its simplicity and the easiness of use both for the attending students and the contributing teachers. Most free online platforms have a rather commercial profile that did not suit the one of an academic classroom[8]. Therefore, while other systems available online guaranteed more insights and a considerable variety of analytics, the final decision was based on how the platform could fit in the requirements the team had set and not vice versa. (Fig. 04)

3.5 Deliverables

A design project was assigned to the students in a three-day workshop at the end of the tutorials. The students were encouraged to use one or more mapping tools of the course content to read an area indicated to them. The area selected for this semester was the highway overpass between Egaleo and Elaionas in the Western part of Athens. They were then asked to use this data to propose a strategy for intervention in the area. One of the course's outcomes was the representations, verbal and visual, of their endeavours.

The intention was to isolate the design workload of the program in a condensed creative and interactive experience. Therefore, the students shared their mapping outcomes in intermediate mini presentations throughout the workshop and their findings were openly discussed and analyzed by them all. At the end of the three-day session each student presented an autonomous personal approach to mapping and proposed a strategy of intervention that enhanced a certain aspect of the area they were able to map and evaluate. The results of the students' work were presented in full in-class on the last day of the course.

8 For more information on free platforms visit: Reviews of eLearning Platforms, Tools & Software for Teacher & Coaching, *http://bestelearningplatforms.com/software-tool-reviews*, Accessed 09 June, 2015.

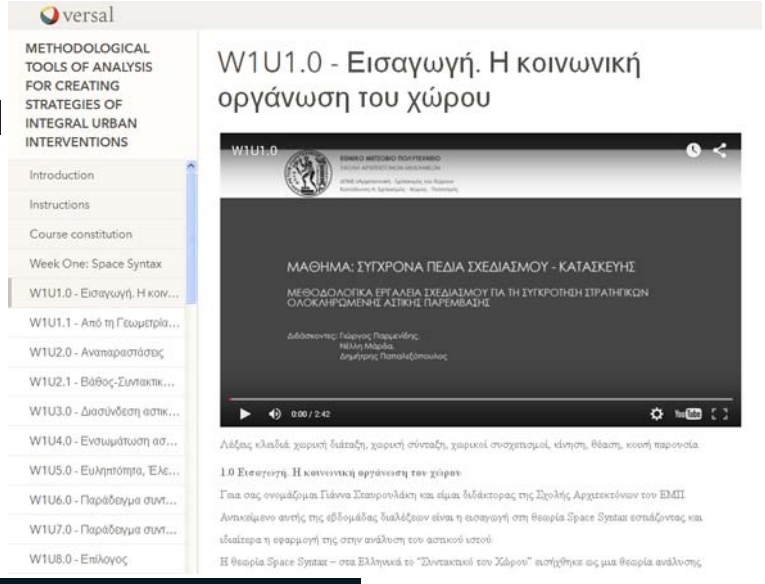

Figure4: Snapshot of the online Versal platform.

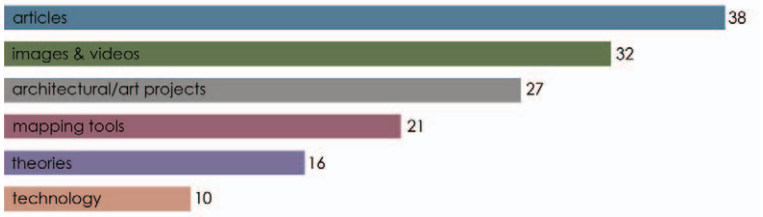

Figure 5: Types and quantity of student blog posts.

The students' constant blogging produced tacit manifestations for their engagement. From the 17 students who enrolled in the course 13 of them were active bloggers. A total number of 146 posts were accounted for within ten weeks' time with 38 articles, almost 30 architectural or art projects and more than 20 additional mapping tools the students had retrieved in their online research. The last month of the course's running, May, was also the most active one in terms of blog posts showing that in time this tool became an asset to the class. (Fig. 05)

The workshop design projects, the student blog posts and the students' registered visits to the online platform as these were registered by the platform's analytics compiled an integrated tool of summative assessments (Fletcher and Bjerkass, 2012). The teaching team and the supervising professors could therefore appraise students' performance and their degree of involvement during the course. Thus grading depended on these accurately measured components.

4.0 STUDENT RATINGS

The students were asked to fill in a questionnaire regarding the course. The four sections of the survey involved the evaluation of the online material, information about their online presence, the interaction between the different parties and their overall personal experience.

Video lectures were most highly ranked, gathering 6.57 out of 7 from the 14 students that responded to the final survey. So did most of the online features such the transcripts (6.29/7) the online articles (6.21/7) and the diagrams and charts (6.07/7). The lexicon was also highly ranked (5.57/7) despite the students' scarce interference. They consulted it but were reluctant to propose their own definitions. The Versal platform was also highly appreciated for its easiness of use (6.29/7) and the total duration of the video lectures (6.21/7). The six course content units were also appraised in regard to their appeal and their degree of difficulty. Space Syntax gathered an impressive 6.29/7 and 6.00/7 respectively.

Most of the students stated that they visited the platform at least twice each week and that the average stay for half of the them was from 30' to 60' while the rest stayed from 60' to 120'. Most of them watched the online lectures at home at their desk; most of them agree that the duration of the online lectures was sufficient.

In regard to the interactive aspects of the course, the students ranked the in-class discussions with a 5.93/7 and they also asked for the online inte-

raction to become more intense. The contribution of both the teachers and the students was also evaluated (6.21/7 and 5.64/7 respectively).

In the last section of the survey students were asked to give feedback. Some of them asked for more software presentations and examples of the tools' applications. Some students stated the blog made them feel uncomfortable while most were enthusiastic about it and decided to keep it and continue to use it. Finally, students have rated their overall experience of the course (6.25/7).

5.0 COURSE REFORM ASSESSMENT

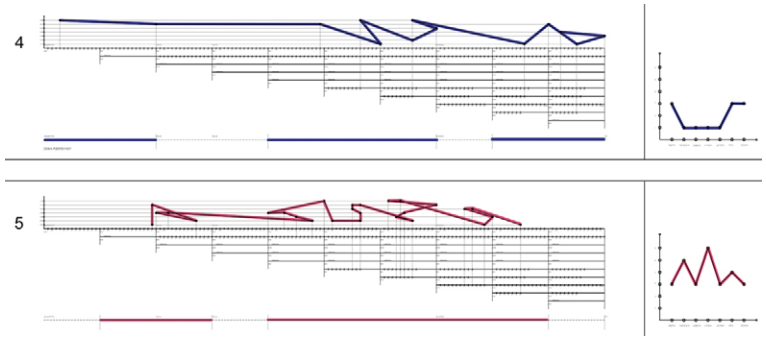

Figure 6: Individual User Activity Plots for the Online Material. On the left the colour line shows the student's overall attendance path. The chart on the right illustrates the students' daily attendance. The straight line at the bottom, illustrates their weekly attendance.

An important aspect of online learning resides in the possibility to quantify student attendance. The students' online visits were registered throughout the course through the platform analytics. The results reveal that students did in fact watch the material uploaded there before showing up in-class. That was a tangible result stating that the group supported this learning system. Students reciprocated the external stimuli they were given. The original intention to extend the temporal limits of the physical classroom has been successfully addressed.

Increases in the amount and kind of educational data offer researchers new opportunities to observe, analyze, and ultimately improve the learning process (DeBoer et al., 2014). The data gathered throughout the duration of the course allowed for the teaching team to monitor and assess student attendance habits. (Fig. 06)Their learning paths reveal their completely different

Table 1: Number of visits to each chapter of the first unit of the course. Colour blue signals the week of the unit's uploading. The grey cells indicate the times each unit was revisited at a later time.

	WEEK 01	WEEK 02	WEEK 03	WEEK 04	WEEK 05	WEEK 06	WEEK 07	WEEK 08	WEEK 09	WEEK 10	TOT VIEWS
W1U1.0	4	13	0	1	2	3	1	0	1	1	26
W1U1.1	3	9	0	0	2	1	1	0	0	1	17
W1U2.0	0	11	0	1	2	0	2	1	0	0	17
W1U2.1	1	19	0	0	1	0	2	0	0	1	24
W1U3.0	0	15	0	1	2	0	1	0	0	0	19
W1U4.0	1	13	1	0	1	0	1	0	0	0	17
W1U5.0	0	13	0	0	1	0	1	0	0	0	15
W1U6.0	0	8	0	2	4	0	1	0	0	1	16
W1U7.0	0	10	1	0	1	0	1	0	0	0	13
W1U8.0	0	9	0	0	1	0	1	0	0	0	11
	9	120	2	5	17	4	12	1	1	4	175

approaches to learning. Some student charts show a linear progression. Most charts, however, are formed by crooked lines. This fact indicates that these students kept revisiting previous units despite the fact that the course had moved on. This asynchronous use of the online platform is one of the most successful aspects of the course redesign. Related charts illustrate the number of clicks on each chapter of each unit. (Table 01)

Student projects were deeply influenced by the course reform. As it was described earlier, the conversion of the course content to online material made use of exchangeable units of meaning, both visual and verbal. The verbal units were mostly gathered in the Vocabulary of Terminology, a feature the students often consulted to navigate through each tool's presentation. In their projects they assimilated many of these terms to argue their own work. Some of the mapping tools presented in the course also made use of particular software. This was available on the online platform and students were given free access to these programs and their tutorials. Many of the students used this software in their endeavours to document their work. The visual representations of their projects were often founded on the diagrammatic structures produced by the software they used.

As it was previously mentioned, the course deliverables included not only the student projects' submissions but also their blog posts. This additional communication channel has helped the less active students to express themselves and share their views with the others. It also kept the in-class discussions running throughout the week until the next meeting as students uploaded more material related to the ongoing arguments. Besides registering the number or kind of blog posts another attempt was made to relate them to the course content. The blogs have proved beneficial in this regard by continuously linking individual student interests with the course content and with the rest of the class. The clouds of interaction vividly illustrate this constant exchange. (Fig. 07)

6.0 CONCLUSION

The switch from the passive receiver to the active participant creates the need to devise new behavioural patterns that will break the learners' inhibitions and help them renegotiate their role in learning. This course's reform was based on designing a mosaic of different settings to accommodate and nurture the active learner in the model of the connectivist theory of lear-

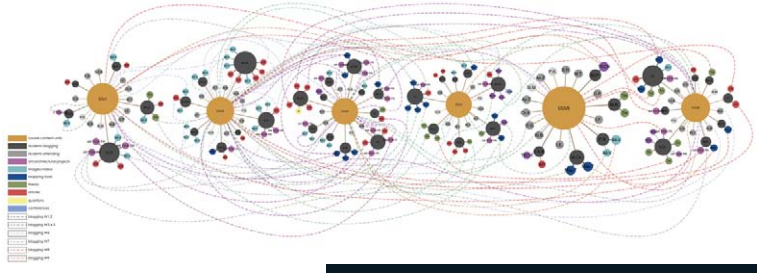

Figure 7: Student blog posts throughout the course and their interconnectivity with rest of the course content.

ning. The synergy of digitized online material and in-class live discussions promoted individuality and encouraged interaction.

The students' responsibilities were raised and so was the level of their interference with the course content in total. Their high reception and appraisal for this course is expressed in the high ranking that was depicted in the surveys following the course's completion. Student performance has also been improved and their attendance rates have doubled. The analytics provided by their monitoring showed -beside their extremely diverse learning paths- a consistent attendance rate throughout the duration of the course. Their contributions in the live discussions and their numerous contributions through their blog posts reveal their immense need to express themselves through more channels than the traditional ones.

This emergent type of learner matches the model set by architectural pedagogy according to which the designer is someone who seeks connections and relates collected bits of information to map and reconstruct the real. The self directed learner is in fact already the designer of his/her own learning path. Therefore, architectural courses and the design studio courses in particular, face a growing challenge of incorporating new technology.

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