THE ROLE OF ARCHITECT IN INTERDISCIPLINARY COLLABORATIVE DESIGN STUDIOS

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VLOGA ARHITEKTA PRI INTERDISCIPLINARNEM ARHITEKTURNEM PROJEKTIRANJU

THE ROLE OF ARCHITECT IN INTERDISCIPLINARY COLLABORATIVE DESIGN STUDIOS

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IZVLEČEK

Arhitekturno projektiranje je kompleksni proces, v katerega so vključeni različni akterji. Med študijem arhitekture študentje le redkokdaj dobijo priložnost delati s študenti drugih disciplin. Posledično lahko med njimi opazimo pomanjkanje poznavanja dela drugih disciplin ter hkrati pomanjkanje veščin komuniciranja in sodelovanja z njimi. Glavni cilj tega članka je pokazati pomembnost interdisciplinarnega sodelovanja pri arhitekturnih projektih, vlogo arhitektov v tem procesu, ter različne načine sprejemanja odločitev tekom interdisciplinarnega sodelovanja. Predstavljena raziskava temelji na programu AEC Global Teamwork Course, ki poteka na Univerzi Stanford pod vodstvom prof.dr. Renate Fruchter. Študentje iz različnih delov sveta delajo na arhitekturnem projektu od začetnih stopenj dalje (od ideje do projekta za izvedbo). Na začetku in ob koncu projekta se študentje srečajo na Univerzi Stanford, v vmesnem obdobju pa delajo na daljavo s pomočjo različnih digitalnih orodij za virtualno sodelovanje. Članek prikazuje tri študije primerov, kjer je glavni poudarek na arhitektu in njegovem delu ter na izzivih in priložnostih, ki jim jih predstavlja interdisciplinarno delo.

KLJUČNE BESEDE

Interdisciplinarno sodelovanje, projektno učenje, sodelovanje na daljavo, odločanje

ABSTRACT

Architectural design is a complex process involving different actors. While studying architecture, students usually work alone, and they do not have many opportunities to collaborate with other professions. Consequently, they end up lacking the knowledge regarding other professions, as well as regarding communication and collaboration with other professionals. They become too proud of themselves, which eventually prevents them from engaging in active collaboration and accepting compromises. Furthermore, it is essential for their future professional careers that architects collaborate with other professions, adopt their ideas and requirements. Such collaboration is recommended from the early stages of the design process onwards. The main focus of this article is to determine the importance of interdisciplinary collaboration in architecture projects through the process of studying architecture, the role of the architect within this process, and the manner in which decisions are usually made within an interdisciplinary team.

The following research is based on the AEC Global Teamwork Course, which took place at Stanford University under the leadership of Prof. Dr. Renate Fruchter. Students from all around the world worked together on an architectural project from its initial stages. They met twice only: at the beginning and at the end of the project, otherwise they worked on a virtual basis, using different digital tools intended for long-distance interdisciplinary collaboration. There were three case studies examined for the purposes of this article in which the main focus was placed on architects, more specifically on the challenges and the problems they were facing, the knowledge architects gained through interdisciplinary collaboration, and lessons learned in such a course that could help them with their professional careers.

KEY-WORDS

interdisciplinary collaboration, problem-based learning, long-distance collaboration, decision making

1. INTRODUCTION AND PROBLEM BACKGROUND

During their studies, students of various disciplines or professions are currently getting familiarized with the basics of other disciplines, but they do not get many opportunities for active collaboration with students from other disciplines to work on concrete architectural projects. The knowledge of other disciplines is necessary for an architect to develop the quality of his/her architectural design. The lack of active collaboration between different actors from the early stages of design process onwards is also seen later in practice. We are facing a shortage of interdisciplinary knowledge and acquisition of communication skills through work on different projects in co-operation with other disciplines. The mentioned professionals are all very good in their respective fields, but they do not collaborate with each other.

Future architects are expected to possess a wide range of competencies, from mastering design to acting as technical specialists, they should be able to synthetize knowledge from different professions and work on an integrated project. As Lattuce (Lattuca & Knight, 2010) said, "interdisciplinarity can be defined as a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline or profession … and [that] draws upon disciplinary perspectives and integrates their insights through the construction of a more comprehensive perspective". Moreover, the integration process is initiated by a specific problem and its context the team should identify and align with the disciplinary contributions; coordination among disciplines is therefore very important. Because several professionals from different fields are solving specific problems in specific situations, we can describe this process as a problem-centred work where various professions with various types of knowledge work together in order to solve problems resulting from the ever changing situations and requirements. (Gnaur, Svidt, & Kaae, 2012)

Different firms like Arups and Buro Happold discovered that collaborative team-work, or team-work across several disciplines is essential in order to produce innovative work, and find new solutions as a result of collaborative efforts put forth by all players. As Dong states (Dong & Doerfler, n.d.), "the collaborative efforts can produce new and original ideas not possible in a uni-disciplinary settings", so the potential of developing integrated projects worked on by interdisciplinary teams should be taken into consideration. Based on the study involving architecture and interior architecture students, using web-based collaborative learning, Karakaya (Karakaya & Şenyapılı, 2006) states that integrating interdisciplinary work into the design curricula would be beneficial.

A number of collaborative interdisciplinary courses have been developed over the last decades in which students worked long-distance, geographically distributed over several countries, with the help of advanced information technology solutions. Students from different disciplines such as engineering, industrial design, urban design, landscape architecture, architecture, and interior design worked together, and at the same time, the authors of different courses studied students' interaction within the distributed teams, while the insights gained from such work helped them to improve distributed collaborative learning courses scheduled for each individual year. 21 years ago, Fruchter (Fruchter, 1999) developed a distributed learning environment and included different universities from Europe, Japan, and the United States. Also, Hussein and Peña-Mora (Hussein & Peña-Mora, 1999) created a similar class for distributed learning conducted jointly by MIT and by CICESE in Mexico, and Devon (Devon, Saintive, Hager, Nowé, & Sathianathan, 1998) developed a French-American collaborative design project. Several other universities developed their own collaborative design courses, e.g. the University of Sidney (Simoff & Maher, 1997), University of Illinois at Urbana-Champaign and the University of Florida (Brien, Ph, Soibelman, & Elvin, 2003), The Penn State Stuckeman School of Architecture and Landscape Architecture (Holland, Wing, & Goldberg, 2012), Notre Dame University – Louaizé in Lebanon (Asmar & Mady, 2013) etc.

This article focuses on interdisciplinary collaboration in architectural design projects with a special focus on the architect's role in them. It is a challenge for an architect to work on an architectural project together with other professions from the initial stages onwards. The AEC Global Teamwork course shall be presented at Stanford University as an example of interdisciplinary long-distance collaboration and project-based learning.

The study is based on experience gained through participation as a participant, owner and mentor in the AEC Global Teamwork Course (PBL project) over the last 6 years, which takes place this year for the 21st consecutive year under the leadership of Prof. Dr. Renate Fruchter, director of PBL laboratory at Stanford University, ZDA (Graaff, Kolmos, & Fruchter, 2003; Ožbolt, 2008). PBL Lab is the so-called educational laboratory, based on the problem, project, product, process and people involved in this process ("problem, project, product, process, people-based learning"). Based on a learning process that focuses on problem- and project-oriented work, the result represents an integrated project. The project involved students coming from different parts of the world: from Europe, Asia, Central America to the United States (e.g. University of California, Berkeley, University of Wisconsin - Madison, California State University – Chico, University of Puerto Rico, Bauhaus – University Weimar, TU Delft, Aalborg University, University of Ljubljana etc.). More than 20 different universities have already participated in this program; the University of Ljubljana has been involved since 1999 (more on www.pbl.si). In addition to basic student group work, various researches on intercultural cooperation are also taking place within the PBL laboratory, using various digital tools, innovative learning processes, interactive work environments, asynchronous collaboration etc. The program is based on team-work involving an international, interdisciplinary project team, which leads the project preparing a concrete building that meets all conditions of the client (owner). In each group, the owners guiding the group are also presented. The owners also convey their wishes, limitations and requirements to the group members. The aim of the project is to simulate real environment where designers have to be constantly ready to make changes to the project. The purpose of this program is to prepare students for interdisciplinary collaboration, which will present later in practice and in real life situations, adapting the architecture to other factors and overall design of various professions. One project team consisted of students of architecture, structural engineering, a construction manager, MEP and a life-cycle financial manager. The course also includes industry representa-

tives, designers from practice to which students can turn at any time for advice and opinion. The course is designed mostly as a long-distance type of collaboration, students meet at Stanford only at the beginning and at the end of the project. In the meantime, they meet virtually at group meetings or individual meetings (subgroup meetings). Students work six months out of a year remotely using modern tools for design and communication such as SketchUp, Revit, Skype, GoToMeeting, Brainmerge, Box, Dropbox, GoogleDocs, Terf etc., and they finally produce a comprehensive integrated project for public buildings. The results of the project are presented at the final presentation, which takes place every year in May at Stanford where industry representatives are also invited to express potential criticism of the proposed solutions and provide students with up-to-date guidance for their future work. The aim of the AEC Global Teamwork course is to educate architects and engineers who will tackle major projects, to promote international team-work to integrate and exploit the advantages of innovative technologies for the preparation of collaborative projects of higher quality. (Fruchter, 2003; Zolin, Hinds, Fruchter, & Levitt, 2004)

2. AIMS AND OBJECTIVES

This paper serves as a report on an exploratory study that examined the collaborative interdisciplinary course, more precisely, the architects participating in the AEC Global Teamwork course. The aim of the study was to determine whether architects learn anything new through interdisciplinary collaboration, and how such collaboration could be improved. At the same time, we wanted to find out how different professions can be motivated to work together from the beginning of the design process. The main objective is to determine the importance of the architect in the process of collaborative architectural design.

The study was guided by three main research questions:

1. Importance of interdisciplinary collaborative course for students of architecture: Should the Master's study program of architecture also include an interdisciplinary design studio? How much do the students learn for their future professional lives throughout the program?
2. Role of the architect in an interdisciplinary collaborative design studio: problems and challenges architects are faced with, impact of other members on architectural design, benefits of involving different professions from the beginning of design process.
3. The process of decision-making: How did the team make decisions? What was the role of the architect in the decision-making process?

3. METHODOLOGICAL FRAMEWORK

As a research method, we opted for case studies supported by a short survey among architects who participated in the interdisciplinary collaborative course (Fink, 1995; Flick, Kvale, Angrosino, & Barbar, 2007; Kristof, Brown, Sims Jr., & Smith, 1995). As a case study, we chose groups from the last three years, with a member from the University of Ljubljana, Faculty of Architecture, since as the mentor and owner of the groups, we were able to have a deeper insight into the dynamic of teams and into their team processes. The basic characteristics of all three teams are presented in table 1.

Students used digital tools for online collaboration such as GoToMeeting and 3D ICC (Figure 2).

Our research was divided into the following stages: (1) Results and evaluation: Our observations throughout the design process of the AEC Global Teamwork course, analysis of the final report prepared by the team, short survey at the end of the course. (2) Discussion and conclusion.

4. RESULTS AND EVALUATION

The results will be presented separately: first, the case studies which enabled us to analyse groups and team dynamics and the role of the architect through observation and a report students prepared at the end of the class; and second, a short survey, which is based on the architect's opinion and experiences.

4.1 Case studies

The following table 2 features a comparison between three case studies where we highlighted certain challenges the teams were facing. Each year,

Figure 1: Kick-off event at Stanford University at the beginning of the AEC Global Teamwork course

	Team Atlantic 2012	**Team Atlantic 2013**	**Team Express 2014**
Team members: number	6	8	7
Team members: discipline	A, SE 3x, MEP, CM	A, Aa, SE 2x, MEP, CM 2x, LCFM	A, SE 3x, SEa, CM, MEP
Team members: faculty	University of Ljubljana, Stanford University 3x, Bauhaus University, Wisconsin	University of Ljubljana, Stanford University 5x, Bauhaus University, KTH Royal Institute of Technology	University of Ljubljana, Stanford University 3x, Bauhaus University, Georgia Tech, Technical University of Denmark
Number of architects in the team	1	2	1
Architects: faculty	University of Ljubljana	University of Ljubljana, Stanford University	University of Ljubljana
Location of a project	Madison, USA	Madison, USA	Ljubljana, SLO
Owners: number	2	3	4
Owners: discipline	A, CM	A, LCFM, CM	A, MEP, SE, CM
Owners: faculty	University of Ljubljana, Stanford University	University of Ljubljana, Bauhaus University, Stanford University	University of Ljubljana, Stanford University 2x, KTH Royal Institute of Technology
Swinerton Sustainability Challenge	Biomimicry	Leapfrog Sustainability	Healthy Building
DPR Challenge	Product – Organization – Process (POP)	Value for Money	Total value for the Client

Table 1: Comparison of three case studies (A – architect, SE – structural engineer, CM – construction manager, MEP – mechanical, electrical and plumbing engineer, LCFM – life-cycle financial manager, a - apprentice)

a team had to create a building engineering design for a building at a specific location, and at the same time, it had to solve two challenges: Biomimicry and Product-Organization-Process (case study 1), Leapfrog Sustainability and Value for Money (case study 2), and Healthy Building and Total Value for the Client (case study 3).

In case study 1, the team did not have any particular problems with designing the building; they had a well-founded, compelling idea from the beginning, and the team provided the architect with support when making decisions. It can actually be said that the other disciplines served as support for the architect and not vice versa, like for example in case study 3 where the architect did not have any power to make decisions, and often, the architect was there to support others. The team dynamic in case study 1 was very good. They did not have any special problems with communication and collaboration, and they also remained friends after the conclusion of the project. Also, the presence of two owners was received really well, as they presented two different disciplines and together they offered complete professional support to the team. The coordination between the owners was easy, with their opinions being unified.

The process of designing their compelling idea was closely connected with the first challenge – biomimicry. The team members wanted to incorporate an organism that presented a special meaning for the University of

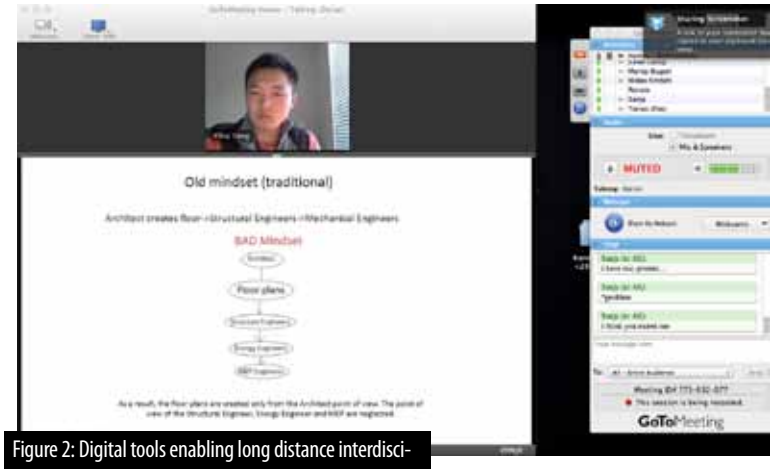


Figure 2: Digital tools enabling long distance interdisciplinary collaboration (GoToMeeting and 3D ICC)

	Case study 1 Team Atlantic 2012	**Case study 2 Team Atlantic 2013**	**Case study 3 Team Express 2014**
Challenge: the project	How to involve biomimicry into design? (Team members had to think about this challenge from the beginning of the project.)	How to design a wooden building? (Team members did not have any experience with wooden design.)	How to design a building as a piece of a entire urban network? How to connect the building with its surroundings and the entire city?
Challenge: team process	Interdisciplinary group.	Interdisciplinary group. Two architects, one of them was apprentice, how to divide work among them. Really big team: 8 members.	Interdisciplinary group. Different cultures and ways of communication: more than half of the team members were from Asia.

Table 2: Case studies: comparison through our observation

Winsconsin. Badger, the school mascot, uses the heat from the earth 90 per cent of the time during the winter to keep warm, and also use it in the summer to cool down. Thus, to save energy costs, they wanted to put the building into the ground. The second challenge was: Reduce, Re-use, Recycle. Their idea was to reduce on-site material storage through on-time delivery, pre-fabrication, and recycling of wood and concrete, as well as to re-use excavated soil for ramp construction, implement effective utilization of machinery and formwork to reduce or eliminate waste.

In case study 2, the biggest problem that was noticed was the presence of two architects (one architect and one architectural apprentice) who failed to define their roles in the team at the beginning, which lead to many problems later on. Decisions were made mostly by one architect while the second architect was not even aware of the reasons for decisions made. Consequently, the other team members did not know the reasons either. Sometimes they would spend a week or two working in circles before they would make a joint decision. The main problem was also that the second architect did not work on this project all the time, and he did not participate intensively in the design process from the beginning. The group had a lot of subgroup meetings, discussions with mentors from the industry, and through instant interdisciplinary collaboration, they designed an integrated project, which all the team members liked at the end and were quite satisfied with it.

The team members worked on two challenges and also managed to overcome both of them, which could be seen as a consequence of really good teamwork on the one hand, and a big interdisciplinary team on the other hand (8 members, they had also LCFM, which the teams in case studies 1 and 3 did not have). In the first Swinerton challenge Leapfrog, they came up with a disruptive sustainable technology, a new smart system (app), which could connect human activities and behaviour, especially in terms of how to design and operate their buildings, with the building itself, and the materials used within a linked system. The smart system within the building is meant to provide a living laboratory for the researchers. Its main purpose is to optimize the performance of the building and educate users on how their decisions impact that performance, and moreover, it can be used as a troubleshooting system. The second, DPR challenge, presented them with a task of finding a way to bring better "Value for Money" to the end users of the building by looking at the life-cycle of the facility. They stated that through the implemented technology they could reduce life-cycle impacts on the facility. They looked carefully at different user perspectives when deciding on the design, as well as construction and operation techniques for the building.

The third case study deals with the most challenging group, which was faced with more difficulties in terms of communication and collaboration than the teams in the first and the second case study. Firstly, the nationality mix of the team members was quite interesting: more than half of them were Asians who are used to being quiet, polite, and not as impulsive as perhaps their European counterparts (members from Croatia, Romania and Germany). During conversations, they would mostly step back and listen,

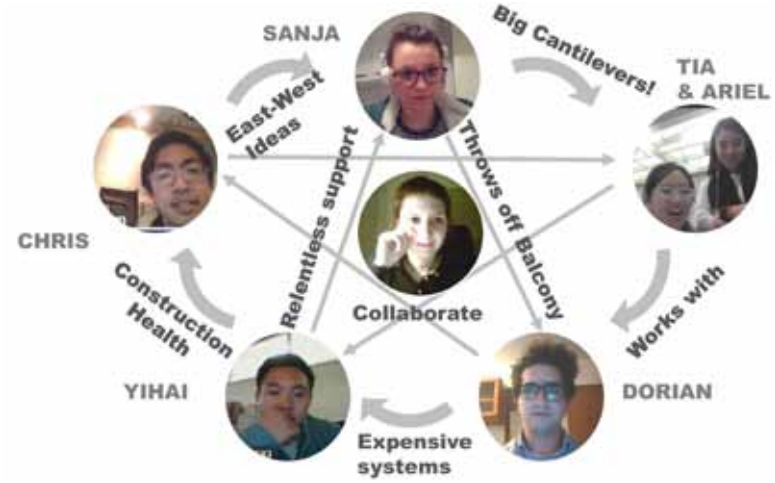
Figure 3: Case study 1, Team Atlantic 2012

UVODNIK
EDITORIAL
ČLANEK
ARTICLE
RAZPRAVA
DISCUSSION
RECENZIJA
REVIEW
PROJEKT
PROJECT
DELAVNICA
WORKSHOP
NATEČAJ
COMPETITION
PREDSTAVITEV
PRESENTATION
DIPLOMA
MASTER THESIS

Figure 4: Case study 2, Team Atlantic 2013

and they would not express their opinions, and sometimes the conversation would only unfold between the three members from Europe (especially at the beginning). Surprisingly, there were really strong characters noticed among them who were confident, with large egos; and even they did not express their opinions. They would behave in accordance with their personalities and were not ready for compromises. Through the process, the team learned how to listen, be patient, communicate, step aside and accept other members. It was a hard task, with a lot of fights and heated discussions, but in the end they learned several valuable lessons for their future lives, not only their professional careers.

In comparison to the first two groups, they spent more time on developing the first compelling idea, their first architectural concept, and consequently, they ran out of time for the second idea, which was therefore not developed as well as it could have been. They spent more time on communication rather than on the project. The biggest problem was that the design process switched from "architect-other disciplines" mode of operation to the "other disciplines-architect" mode of operation: structural engineers actually designed the grid first, followed by the structure, and then the architect designed the building. Architecture thus became a supporting element for the structure, and not vice versa. It was a decision made in stressful moments and was not thought through. However, they managed to design an amazing building in the end. Moreover, there were 4 owners in the team, telling them their wishes. Although they had separate conversations with the members, they did not hold a unified opinion, and this caused some additional problems.



The team worked mostly on the Swinerton Challenge Healthy Building, and they tried to transfer the health issue from urban design through architecture and interior to the furniture and other details. They formulated five ultimate design goals to achieve an overall health concept: impact health (health culture as in community gardens, injury prevention as in traffic calming and lighting, healthy environment as in air ventilation), influence health (health suggestions like recreational activities, recreational connections as in workout park, health culture as in healthy food options), reflect health (environment as in temperature sensing, emotion as in happiness meter, awareness as in collaborative space and interactive virtual wall), maintain health (recreational space as in bike connections and workout park, meditative space offering quietness and connection with nature, social channels like graffiti wall and community garden), generate health (connectivity as in social networks and bike paths, cohesion as in connection with community, visibility). They designed a system of health, which is in balance with its inhabitants and its surroundings through interrelated networks and connections. A health network should consist of different networks, encompassing physical, mental, social and community health. Moreover, they worked on designing a healthy building by using healthy materials, obtaining LEED certificate, following sustainable issues. In order to connect

Figure 5: Case study 3, Team Express 2014

this challenge with the second one, Total Value for the Client, they designed a new app for smart phones and iPads in which they combined the aspects of building and health: how you feel (your physical and mental health) depends directly on the inner conditions in the building (sound, air quality, temperature, light, colours of the walls, chosen materials) and outside the building (urban design, connection to the surroundings).

4.2 Survey

The results of the short survey conducted among architects showed that an interdisciplinary course incorporated in the study of architecture is very important for students' professional and personal lives, as it provides them with a variety of skills and knowledge, from communication skills, collaborative methods and tools for gaining knowledge from different disciplines. Overall, all architects described the AEC Global Teamwork as a great experience, "a great learning and networking opportunity", where they used advanced technologies and where they also managed to learn a lot about themselves. They learned about communication and organizational skills that were crucial for successful team-work. As one architect said: "If a good idea isn't communicated well enough, it can get misunderstood and even discarded." They also learned a lot about other disciplines, and how important it is to involve all disciplines in the project from the very start, as this reduces problems in the later stages, as well as about the importance of collaboration among all construction disciplines. Furthermore, one of them also mentioned that they learned a lot about themselves, i.e. how to handle different situations, cope with pressure, present ideas to others. The biggest challenges for the architects queried were: co-located teams (different time zones, schedules, habits, cultures, and languages), how to fit the entire requirement program inside the given footprint, how to stay calm in different situations, and how to compromise on things you know in your field that are wrong. Only one architect claimed that there were major problems in the team, associated with communication and poor response. The others did not notice any substantial problems, except things like adjusting to different schedules, habits, ways of doing things, which differ from what they were used to from previous experiences, and the collaboration with apprentice architect. They did not find it hard working with other professions. Actually, they thought it was crucial for all the professions to be involved in the construction process in order to have an insight into what each of the team members goes through. They said that rather than working with different professions, working with different cultures and characters was challenging for them.

All architects explained that they made decisions together with the team, within all disciplines, and they listened to the opinions of professionals and also made pros-and-cons charts. However, sometimes outcomes would depended on good argumentation – if the architect had better arguments than the other professionals, such architect would also have more power than the other professionals, otherwise not.

All of the architects agreed that the AEC Global Teamwork course will have a huge impact on their future professional lives, as they acquired several different skills and experiences: use of BIM technology, global cloud-based architecture practice, knowledge about collaboration, how to cope with other disciplines, how to communicate through different media, how to represent ideas. One of them later described one of the best personal final realizations: "It is important to be aware that the best design can be created when all the disciplines are working together since day one."

At the end, we asked the architects about the importance of interdisciplinary design studios for students of architecture and about the role of architects in interdisciplinary collaborative design studios. They all believe they should be integrated in the learning process at some point during the studies and they should be available for all students. An architect should be involved in all stages of the project, "overseeing the entire design/building process integrating ideas from all the professions and combining them into one logical, functional and aesthetical design". He should understand other disciplines, but at the same time, he should be faithful to his/her values and explain his/her idea to the other team members using compelling arguments.

Figure 6: The final presentation at Stanford University at the end of the AEC Global Teamwork course

5. DISCUSSION AND CONCLUSION

Through the interdisciplinary collaboration in the AEC Global Teamwork course, the architects gained new knowledge, which will help them in their future professional lives. If we look back at the research questions, we can conclude:

(1) The course about interdisciplinary collaboration is really important for students of architecture. Knowledge gained can be divided into two main levels: non-professional and professional level. Interdisciplinary collaboration can be seen as a method for preparing architects for their future professional lives, as it helps them learn the following things:

- communication skills: listening and hearing others, overcoming cultural barriers;
- collaboration skills: working together, deciding together (how you can work with other professions from early stages of the project onwards);
- personality features: respect, patience, tolerance etc.

Moreover, long-distance work can improve their computer skills and they can also learn about new digital programs for online architectural collaboration.

(2) Architects have a special role in interdisciplinary collaborative design studios, as they are the so-called mediators between different professions and they have to monitor the progress of the project from its initial stages onwards. By involving different professions from the beginning of design process onwards, we can shorten the duration of the project, and by working together and exchanging different pieces of knowledge, a project of higher quality (testing new solutions, materials, working on sustainability issues etc.) can be designed. Moreover, architects can also gain new knowledge from other professions:

- Working with mentors from around the world, from faculty mentors to industry partners, architects can improve their way of thinking, their ability to solve problems, and they can improve their argumentation skills (how to defend their proposals). Moreover, architects thus get used to being faced with requirements (the exact program of the building with exact square footage), building limits (ground floor) and wishes from the owners.
- They learn the basics of structural design of buildings; they learn about the different construction materials, and the entire process of construction, and about construction management. They acquire communication skills for collaboration with structural engineers and construction managers.
- They acquire knowledge of mechanical installations and the principles of sustainable construction of buildings.
- They get a deeper insight into the total cost of a particular investment; they learn how the choice of materials and the implementation of specific architectural details affect the price of the maintenance of the building.

(3) Special attention should be paid to decision-making, which requires participation of the whole team, every member should express their opinion. The best solution should be chosen by defining pros and cons of different options, and through quality argumentation. Teams should determine their respective leaders in the decision-making process. The leading position can either be assumed by an architect or any other team member, whereby it is recommended the person with best leadership skills be chosen.

Last but not least, we should mention that the process in this kind of courses is usually more important than the project itself. Also, the atmosphere within the team is really important; how the members work together, communicate, if they respect each other. This is why it is important that team members also get to know each other, spend time together and not work only on the project. The course should be fun, and not only full of stressful situations.

To conclude, the interdisciplinary long-distance collaborative course is important because of the following things: integration of various universities from all around the world; preparation of students for interdisciplinary collaboration, which will be present later in practice, real life; adapting architecture to different requirements and wishes of the owners; creation of designers who will be able to tackle major projects; exploitation of innovative technologies for collaboration; acquiring knowledge of other disciplines through active work on architectural projects; collaboration with representatives from other disciplines and creating interdisciplinary networks that will serve as support for further professional work; learning about communication and collaboration skills; learning to use different tools for interdisciplinary team-work; co-operation with designers from practice and representatives from the industry, as well as acquisition of their practical experience.

There were several important lessons learned which were mentioned by students at the end of the class, and they should be highlighted here: "be clear with communication; meeting time is precious; complex problems are easier to solve in a team; communicating at the right moment is crucial for success; compromises can sometimes result in better solutions; make sure everyone is aware of your perspective from your discipline".

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