

**Debate on the Presentations
First Theme, Part II**

Chair:
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The new digital era, which has a relation to other subjects in our schools, is always present in our discussions; the question is how we – in this case construction, but other subjects as well – relate to design studio and other subjects. For nowadays, when we have these new themes, these new materials, these new ideas, these new projects, we have to have a new relation with the other subjects taught in the schools. This, then, is the theme for our discussion.

Sabine Chardonnet

I was interested in the point that Emm. Tzekakis raised before, and in the last question about what is new and what is changing. I understand from what you presented that you are trying to understand new knowledge; and I would just put another question on the table: is it knowledge that is changing or is it the context, the way we capture and use knowledge? I, personally, would say it is the second. So I do not completely agree with the classification you made because, from my point of view, in most knowledge areas history and modernity cannot be separated. They cannot conflict, and you cannot say that contemporary culture today is a break from the past. There have always been breaks in history; and I think that historical knowledge and culture-based knowledge are fundamental – as fundamental as technology. So I think that the question, the classification you made, could perhaps be put in a different way. Even if you are brilliant in the use of Information Technology and brilliant in design forms, you will come a cropper on the question of energy and some other questions – just see what a hurricane has done in a few days in a fantastically technologically advanced country. We have to face different questions, I think, so the classification I would propose would be different. I would, of course, keep the classification of all the things that constitute a field in themselves: structure and stability and the internal logic of matter and forces and space. Then I would put beside that what I call immediate context, which is water, insulation, thermal problems, which form the immediate context of the building. Then there would be a larger context, larger in time, larger in environment and larger in goals, which would be energy exchanges, post-cost, security and risk. We have to face these questions and these fields; and the attitude of the architect is more comprehensive regarding these fields than that of the builder or the engineer or the civil engineer, because the architect has to think not only about how he is going to build that building now but also about how that building is going to live and, because metabolism can be another way of thinking, about how that building is going to be transformed. Because the first day the building is opened, it is going to be transformed, and this is a new change in context. It is a rapidity of transformation, of adaptation, of changing of use, which is something that has changed in the context. You speak about speed; but speed is not only in the resolution of calculations with a computer: speed is also in the rapid transformation of use and of organisation of society. But the building can remain, while the context is changing very quickly. So I think that we have to open doors now to these questions, if we really want to build construction.

And then we also have to be rooted in history, because it is fascinating to see how many of these questions have been considered in the past. Not resolved in the same way, but the questions were there – maybe in another definition, but there. I was telling my neighbour that last year in the North of Italy I came across a pre-his-

toric site where they have discovered engravings on enormous rocks, and they have tried to build a building that was designed on those rocks. This building, which might have been one of the very first wooden structures in Europe, is an incredible lesson in architecture and construction. Those people had nearly nothing, only the simplest of tools (this was in the Iron Age); but – and this is the point – they could build an incredibly self-sufficient building, a building that is a fantastic lesson. I took a picture of it and the next week I showed it to my students in the course of a lecture; and there was an engineer in the room, who was astonished, and said that it was an extraordinary example of resolution. Our classification is problem-solving, but problem-solving is not an addition of pieces that seem to change.

Another thing, on the list that you gave, for example in building skins, you did not really speak of the question of energy, which is an essential matter. Our students will have these questions in front of them, and in twenty years everything will be different. So how can we teach without having that at the very bottom of everything? I think that this is what is changing. It is not IT as a tool: it is the tremendous change of consumption, of energy, of space and of social resources. This is changing enormously, and we will perhaps have to reinvent ancient solutions with a completely new resolution. Because if you just think of building, that would be inadequately productive, positive. This solution used to be tried in the ancient past, by the Greeks and the Romans and other peoples who had few tools and little capacity for building but who had incredible resolution and reasoning. So that is why when you build a curriculum I think that you should think that way.

Emmanuel Tzekakis

Just a few words. First of all let me say that I am very happy that I stimulated this reaction. What we proposed as a new way to see a known structure of how to teach, how to see a building these days, is not unique, or closed: it is just a proposal to stimulate discussion. My idea is that it would be very good to start this discussion now, and perhaps finish it next year, to see what comes out of it, to see what new concept of building science we can come up with that represents the answer to today's problems. I totally agree with you that energy problems and material problems and environmental questions, etc., exist, are there. As for history, while I like history very much we have, however, to discuss whether we need today a new concept of what we know as construction teaching in order to give future architects a new concept of how they should see the building and not what we have known up to now.

Maria Voyatzaki

It is very difficult to really respond to all your points, there were so many of them; but I will try to tackle the ones that really struck me. Regarding the question of context, I think that context has a very important role to play; and one should not see changes in the context and in the building as two separate things, because the building is within the context, and so when something changes in the context the building is affected as well. If you only see it separately you think that the one changes and the other has to follow. That is one point. The second thing is the perception of the building as stable. If a building is a form that conveys, devours, digests and aborts information, then it is precisely this ability and property of the building to be able to adjust and change following the changes or implementing the changes

that Information Technology can offer. So it depends on how you see the building. If you see it purely historically and you decide to copy it as an example – and there is nothing wrong with copying, copying is a very useful exercise – that is one way to use or exploit the concept of a sustainable project. We saw that back in Seville, with Grimshaw's British Pavilion, where there was a simulation of how you cool a building by using water. This is an old practice, where you follow up a principle; but precisely because we have this discussion about information transfer, it is this concept that can be transferred through data. It is Information Technology, as neither a representation tool nor a designing architectural form tool, that enables you to use the building to transfer data in order to simulate from the history of architecture a sustainable attitude towards cooling, heating, etc. So I think that it is very difficult for most of us to say that thankfully we were not trained as an architect in the Modern movement, so we do not put things in pigeon-holes. Our students – to go back to our argument here – do not pigeon-hole things and do not classify them as either stable or unstable, historic or new, etc. Our students have layers in their lives; they can listen to classical music, while they also listen to rock and pop music, etc. And this also goes for their architecture, for the information systems of the buildings allow many things to happen concurrently, and they use the building as an assembly of nodal points where this information meets and gets re-directed.

Herman Neuckermans

I would like to address one question to Victor Echarri, our colleague from Alicante, and one to Professors Manou and Tzekakis from Thessaloniki, and it is about the depth of this course. First I will address our colleague from Alicante. You showed us a lot of diagrams on installations. My question is, how far do students understand what is happening? Because I can go in for – sorry for using the same term – a very fundamental approach, which starts from physics, fluid mechanics, hydraulics, building physics and then installations; that is the normal sequence, if you start from the real beginning. So my question to you, and you can answer me afterwards, is: where do the students come into this course? Do you teach right from the physics, or is it more technologically oriented?

For our colleagues from Thessaloniki, as civil engineers as well as architects the question would be similar. You say, in your diagram at least, that you incorporate building physics. Of course there is building physics and building physics, and some things are very simple while others are very complicated; but I personally feel very unhappy when I have to do things and use things that I do not understand. Of course, maybe other people have no problems with that; but let me come back to the model of the manager, or what was said yesterday about the role of the architect who has to play the director of all the participants in the game. I do not know if you saw last week in the newspaper that there was a report that the polyethylene tubes we use for supplying water to houses – the water that you drink – release phenols. Now, you could say "so what?" This is new knowledge, because we did not know it before. We could wash our hands of it, on the basis that we did not know and it is not our job. But the more we face these sorts of facts, the unhappier I feel and the more arguments I find for knowing things in depth. Using things with IT, pressing buttons in a PowerPoint – is that interesting knowledge? I think that it is not at all interesting. My argument is again in fact an argument for the fundamentals. I was hap-

pily surprised when you said building physics, because that governs where to put or not put a vapour barrier. Of course, on a philosophical level the vapour barrier is not in the discourse; but in your building it either is or is not, and it is either wrong or right. So I think that if we are talking about construction, and we can discuss construction on the philosophical level as well as on the tactical and practical level, but on the practical level I think that we have to know things. And we have to know what we do and why. That is the basis and that is the context. We still need to develop competences, and I am arguing that what will remain are the fundamentals, while the shapes, the materials, and so on, change.

Victor Echarrí

Students of architecture in Alicante begin to learn physics in the first and second year, and they have some courses in construction in their first two years, as well as later. Installations we start in the third year. They do not know anything about pipes and installations and such things before that. So we study that in classes with the other manuals I showed in my presentation; and I think that this one is just a complementary manual for the execution of the installations. They do not have any idea about installations.

Emmanuel Tzekakis

Let me start by saying that I am very happy with your comments, because after finishing my studies at the school of architecture, ages ago, I went to another university to study an area of building physics, and specifically acoustics. So I know the difficulties of what is described under the umbrella of building physics in general. And recently I have tried to understand thermal insulation, condensation, and things like that. It is truly very difficult. However, a building today is a complex thing, so we have to decide whether we are going to take fifteen or twenty years to produce architects who know everything or whether we will find a way to establish a balance between the knowledge they are going to need and what we teach them. In this we must be very careful, because there is knowledge that is dangerous not to be able to verify and there is knowledge that you can fairly safely delegate to others. Take this room, for example. I do not know who designed it, but although everything seems to work very well, nobody that knows anything about acoustics would have put up this ceiling, because although the room is small enough that we should not need microphones to listen to each other, we do need them because somebody put absorbant material in the ceiling, and as we constitute absorption down here, we find ourselves between two absorbing surfaces (top and bottom), plus curtains on either side. Thus the need for microphones, that you normally would not need in a room of, say, 500 cubic metres. So we have to make decisions about what to teach and what to leave out. My suggestion is that in this era of freely flowing information you can find – for acoustics, for instance – very nice and easy-to-use tools on the Internet, that will help you make some basic decisions so as not to have to leave everything to the specialists. Because if you leave everything to the specialists, it is they who will make the room, and not you, the architect. The same goes for civil engineers: if you design a very large room, the civil engineer will probably decide how to make it stand there; so your form will cease to exist. I think that the problem you set for us is very much to the point, and I am sorry I cannot answer every aspect of it, but I certainly believe

that it is a good basis for discussion.

Dimitris Papalexopoulos

I have a few comments to make. The first has to do with the three-part structural skin for interiors, which I liked very much. I do not think it is incompatible with energy problematics. I have an informal sort of proposition, that in fact we have skin interiors and structures, because structures are also part of the skins of the interiors, although they are different categories; the same action that poses a problem in construction also poses a design problem, that is, a problem of enclosure, of definition of locality. So we have skins, interiors, or a solution to the problem of the skin. My second note here relates to Victor, whose intervention I liked very much. I would like to propose to keep this for tomorrow, for the conclusion. With regard to what you proposed for an electronic manual: maybe in other schools of architecture they are trying to structure electronic manuals. I have been trying to make one for traditional construction in Greece, and maybe this is a trend for all of us here to emulate, and to try to see how we could put together an electronic form for circulating knowledge for all the schools of architecture, relating to both theoretical and practical questions, such as whether this information is local or trans-local, very practical questions, or if it relates to several countries, as for instance the seismic factor does in a certain area.

Then, to go on to my third point. I was really very surprised by the intervention of Professor Zamora about Knauf. I am still surprised, and my surprise will continue. I am all for connecting education with industry, but not with a particular industry. I could be very polemical about that, and I am trying to fight it. Evaluation controls for a huge industry, for 2000_ in the bus? Why do we need to do that? We face that in Greece. Have you had any legal problems yet? No? It is very curious, because another industry can sue you for making potential users. (That could be an idea, to make money here.) So I do not think that we have to enter into this problem. I repeat, we have faced that in Greece, twice in the Polytechnic of Athens. Once was with AutoCAD, when we had the lawyers of AutoCAD in our hair, saying that we were guilty of making users, and the other was with Renovat (Ceresit), who had a different approach. They had said that they would finance us for one project; and when we said that there were going to be other industries involved as well, Renovat said that as long as other industries could meet their standards, ISO standards, they would finance them all. So I think that we have a very delicate problem there that we have to look into. Thank you very much.

Joan Luis Zamora Mestre

I would just like to say something so that you will not be so worried. We have twelve years of experience in this, and the law is not after me yet. I explained it very fast and very simply, because there was so little time. I cannot explain my whole course in thirty minutes, but in it we do two evaluation problems. Each student has ten evaluation concepts, and this is only one of the aspects. This is only one small example of our experience with industry. The problem is that we must think of which industry to select. I can select a furniture industry that is behind the school, for example, and I am also in contact with MBT and SICA. I use every sort of expertise or every profile of industry in different aspects of my subject. This is good for competition,

and it may be good for our books, as well – it is good for everyone. I use the abilities of the industry. Of course there is a boundary, there must always be a boundary. But, and I suppose that this is true in Greece as well, we have no money. I have only 100_ for fifteen weeks to educate my students, so I often need some help from industry; but I must use this help within the limits of a deontology, so as not to have problems. It is very important, then, to have a good company; but do not be afraid, the chemical industry does the same thing, the furniture industry also – all industries do the same kind of thing. This is not America, you know, the ‘Coca-Cola Diversity’. We do not like this kind. But, for instance, the information technologies all have a sponsor, at least in Spain. It is impossible to do anything in computers, for instance, without the help of IBM. Our university has the third super-computer in the world. Who paid for it? Our ministry? No, IBM of course. If we are able to use such technology it is because of IBM. And I think that we must have an approach to industry, everyone from his own position, with a deontology, but without always being afraid of it. We must work with it. Industry needs us and we need it. I like to go from building to pedagogy, but also from pedagogy to building. We can talk more about it later if you wish. Thank you.

Emmanuel Tzekakis

I would like to add something if I may. To overcome such problems industry has invented associations. So, you have an association of window manufacturers, door manufacturers, whatever. If you use an association, instead of a specific industry, you are on safe ground.

Antonino Saggio

I would like to make a short contribution, following the lines of the end of the presentation and the first observation. Some of the key concepts are didactics, pedagogy, and how we can reshape the field of construction because of Information Technology. And this is what I would like very briefly to talk about, after the very inspiring presentations, particularly by Tzekakis and Voyatzaki of the Aristotle University of Thessaloniki of Greece. Now, before starting, I want to address a provocative question I heard yesterday. One of our colleagues said that he had yet to see software that can protect us from a thunderstorm. And within the context that certainly seems impossible. But in reality, of course, we know that exactly the contrary is true. We have buildings now that can react, through software, to different environmental conditions, not only thunderstorms but also sun, wind, etc. Already **we are already talking of a generation of buildings that can, again through certain software, cope with emotions, and are able to inter-react emotionally with users. So it is absolutely crucial to try to answer that question, because we are now in a different world; and as teachers I think that we have to decide how to position ourselves vis-a-vis the crisis of this new era that is already with us.** In the informal conversations we had yesterday different positions arose as to how to tackle these new things. There are many possibilities. One, which is my point of view, is that these changes create a major crisis in our universe and we have to reshape it.

The second thing that I wanted to say before beginning my little intervention is that we are at a point – and I agree with Maria’s description – where we are as close to God as we have ever been in our history. This fact, of being closer to God than

ever before, really has to do with information. **We are in an epoch in which the key aspect of thinking is the capability to create a hypothesis, to have key-words and interrogation. That is something that traditionally has to do with our relationship with divinity. Divinity was the entity to be interrogated, and we know how difficult it was to interrogate somebody in the past, how many efforts were made to interrogate an important person, and how complicated it was.** Many books were written about the difficulty of interrogation and how to get answers. Today, we are in an epoch when if we have a hypothesis we can interrogate Information Technology and get answers. This is really incredible, and it has completely changed the attitude of the new generation. It is important to start framing a question, and then we can get the information. We can get our answers, basically, through Information Technology and variations of interrogation systems. And you know, Google is one of the most important things that have happened in the past five or six years. This brings us to an important point, which you made clear during your presentation, and that is that we are in a changing paradigm. And this is clear, because all the systems that you depicted in the beginning were clearly analytical systems: there are different parts, components, that you then have to deal with in an analytical way. Basically that world is not our world any more. The old way of thinking, the amount of knowledge and the capability of interrogation systems are completely different. So I totally agree with you that we have to move our pedagogy towards a different system. What you proposed is certainly very fascinating, because when there is a reality everyone has to react to it. And that is why I liked your intervention in particular, because you react to something that is real. It is a proposal that is real, and so it is important to make a start. I think that yours was a very important contribution.

There is one more thing that I want to add. Another very important thing mentioned yesterday was 'blurred thinking', that we start to think in a blurred way. All our thinking today is like that: we start from hypotheses that are like clouds, and then the clouds come into focus, merge into reality, quite slowly. But at the start our thinking is blurred. I think that is a key concept, and a very insightful one, too. So, being closer to God than ever before, our hypotheses, our blurred thinking, our areas of thinking about building, do not start from the components but start as issues, large issues. And I may agree that these are the three largest issues we have to deal with. I do not have enough time right now to think about whether those are all, or if there are more than three; I will just accept what you said. So there are three large areas: the first is how the building stands, the second is how the building reacts to the outside, and the third is how the building is shaped inside. Now, we have these three areas: can we teach these as three different systems, and how do we separate them? If we use these three categories, what will be extremely interesting to understand is how buildings today break barriers even between these three fields. If I look, for example, at some of Gehry's buildings, he makes structures that become a skin in the old way and at other times he makes other buildings that are completely different, with skins that are kind of independent of the structure. So it will be very important to have that kind of critical thinking. I say large categories, because the students have to understand that there are issues, and there is physics and there is philosophical thinking, together, connected to this; but at the same time these three things, these kinds of clouds of thinking, can be constantly changed, even in their

nature. The only way that in my view we can start to rethink this approach is through the concept of individualisation. It is very difficult for us to face any kind of general system in these historical phases, while we can start from case studies. Case studies once again become the keys to the complexity of things. Many case studies, different case studies, showing us that these three different concept areas are constantly interrelated and changing. And also because we are facing a generation of persons who are completely different from us, and who are exactly the type of people whom you described, Maria. Basically, **if they start with curiosity, and then add the larger areas of understanding, the new tools, the new capability to interrogate and the sense to understand how many possibilities there are, they will be on their way.** As we were. Our teachers taught us only a small fraction of what we know. We basically did everything by ourselves, and they will do the same.

Alrun Jimeno

I want to congratulate Joan Luis Zamora, because I think it is a good idea to bring industry to the classroom and the classroom to industry, because if we want to build we need industry, so this way is a good way to gain experience, even with all the problems that could accompany it.

Athina Stavridou

I want to add one little thing. The question here, and the objective, is how to teach construction in the digital era, not how to bring companies into teaching. The new technologies change the way we teach, and we misunderstand the usage of the Web if we use it as a prospectus. I think that the Web is about relations; I do not really care about Knauf or other companies, but I do care about the relation of the three categories – the ceiling and the wall, the roof and the ground – so I believe more in the example of our colleague from Alicante that uses this kind of thing.

Ole Vanggaard

I just wanted to make some small comments on the question of industry being involved within the schools. I am sure that this is a trend that will expand everywhere; but I wanted to direct your attention to the fact that it is not only industry: there are examples of Apple, etc., in Britain and in Denmark and everywhere else, offering free advice to architectural students. This is not, of course, just because they really want to help: it is for the benefit of Danish or British architects, knowing that these firms have engineers who are very good at collaborating with architects. I think that this is something that we have to face, and therefore I think that it is also a good thing that it was brought up in this audience. I have no real answer. It is a nuisance, but I think that we will have to accept it and take the benefit of it when it is there.

Donal Hickey

I think the question is how we engage with industry, not whether we do. Can we engage with industry in such a way that we upset the apple-cart, in terms of how they think about how they do things? Certainly, the industry wants to engage with universities and students, because they are going to be the future. I know that in most schools of architecture you find architectural practitioners who will go and work in schools, because they want to get the pick of the next generation to work in their

offices; and the same goes for industry. The question is how we engage with them, and not whether we do. Thank you.

Maria Voyatzaki

I would totally agree with Donal Hickey on this. I think that it is not a black or white situation; it is just a matter of setting up the right rules for avoiding misconduct. That, I think, is the important thing, because we have to realise – and we will probably get back to this when we discuss research – that there are many occasions where research is funded by industry or is undertaken by industry – just look at medicine. With nanotechnology, aerogels and all sorts of nano- and micro- kinds of materials emerging, giving possibilities to this generation of architects.