THE SECRET GARDEN VIA CAD EDUCATION
Online digital architectural information presentation

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ABSTRACT: Could information presentation on the digital platform aide knowledge formation to the extent that it changes the discourse of the overall architectural discipline? This paper discusses issues and possibilities related to architectural information presentations – how tradition has shaped our position and thinking today, and how architecture students could possibly redefine digital information presentation and its conventions tomorrow. The paper highlights an experimental approach to a CAD course reintroducing digital presentation where visual explanations in architectural presentations were emphasized while the strengths and indispensability of other abstractions acknowledged. The paper also discusses the process, challenges, caveats and outcomes of the course.

KEYWORDS: CAD education, architectural presentation, online delivery, architectural information, cognition

RÉSUMÉ: Est-ce que la représentation d’information sur une plateforme numérique pourrait aider la création de connaissances jusqu’au point de changer le discours de l’architecture en général? Cet article discute des problèmes et des possibilités liés à la représentation d’information en architecture: comment la tradition a façonné notre position et notre façon de penser d’aujourd’hui, et comment les étudiants en architecture pourraient éventuellement rédéfinir la représentation et ses conventions par les technologies numériques de demain. L’article présente une approche expérimentale dans le cadre d’un cours de CAO, qui réintroduit des représentations numériques, tout en soulignant la force et la nécessité d’autres abstractions. L’article discute également les processus, les défis, les limitations et les résultats du cours.

MOTS-CLÉS: Enseignement de la CAO, représentation architecturale, livraison en ligne, information architecturale, cognition

T. Tidafi and T. Dorta (eds)
Joining Languages, Cultures and Visions: CAADFutures 2009
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The architecture discipline seems to have been over-protective of its knowledge. Traditional literatures that lay claims to represent and explain buildings often raise more questions and puzzles than answers (Kwee 2007a). This trend should only be acceptable in traditional print media—understandably, due to the media limitations. Although the internet has provided a platform for architectural information presentation transformation, it has yet been fully capitalized within the discipline as a knowledge forming and thus, cultural linking instrument. Unconsciously and conveniently, we have been reapplying conventional information delivery concepts digitally, falsely assuming that they are interchangeable cross platforms.

Traditional schools of thoughts appear to prefer printed media when it comes to student academic presentations for reasons assumed of paramount validity. This leads to the ongoing emphasis of computers being used as a digital tool to create prints for presentations in many schools. This mindset, in turn, reproduces the rigidity of print conventions on digital flatlands. Despite the decade-long transition to digital, there still seems to be a lack of awareness within the discipline of the strengths, weaknesses, potentials and implications that the electronic platform has and promises. Those who have boldly ventured into full digital online presentations do not appear to be consciously exerting effective techniques to ‘massage’ the medium to effectively deliver the contents (e.g. Russell 1999)—this, as explained later, is not without justifiable, but self-created situation. Effectively, most information uploaded onto the web consists of searchable archives of organized abstractions (e.g. Stouff et al. 2001, Koutamanis 2007) which, although no doubt, are significant as well, cannot be relied fully to substantially increase knowledge formation. Up to a certain degree, the amount and speed of access to information will not necessarily contribute more to one's level of understanding. On the contrary, excessive amount of loosely filtered data may instead create confusion, thus prove detrimental.

2. CAD EDUCATION SITUATION AND DIRECTION

It is evident that the improvement of CAD education has been highly instrumental in the transformation of architectural practices, markedly in the last two decades. It seems that architectural schools have been much geared to produce graduates who are highly skilled in creating architectural abstractions and digital design to feed the needs of the industry. We have traversed far from the initial debates of how CAD curriculum should be steered in architectural education (e.g. Laing 1986; Stevens & Radford 1988) to the present movement—amalgamating CAD education within design teachings (e.g. Asanowicz 2007, among others). Architecture schools have been more than successful developing CAD skills among their students. As a result, the discipline has witnessed many
exciting formal architectural interpretations and escalating production speed of architectural abstractions. However, one thing that remains questionable and unanswered: has technology helped advance the understanding of architectural design and thinking as much especially among students? Judging from many online digital presentations, while the amount of architectural data has exponentially increased, the techniques of presenting such data or information are still static like their print counterparts. We appear to have overlooked the opportunities in this internet age that students’ digital skills could also contribute towards effective online communication of architectural design quality and thinking for the benefit of their peers and future students. Could this oversight eventually, if not already, hamper the growth potential of architectural knowledge formation? The author thinks so and argues that the paradigm for teaching computing in the discipline has to evolve to serve as a catalyst of change.

As suggested above, digital architectural presentations possess vast potentials to facilitate growth of architectural knowledge formation and dissemination. While similar calls for integration of digital presentation within CAD teaching have long been proposed, (e.g. Millet et al. 1991; Koszewski et al. 2002), there have been little to suggest strong basis towards or an approach to escalate such knowledge formation. This paper emphasizes that, at this transformation cross-road, a re-thinking of digital architectural information presentation is necessary and urgently needed to be introduced in the architectural education as a whole. It is due time that students are encouraged to move beyond merely generating and showcasing abstractions.

Many educators may argue vehemently that their graduates are already well-equipped with presentation skills. Agreeably, we must acknowledge the outstanding achievement of most, if not all architectural schools in training students to effectively show and explain their designs verbally with the aides of visuals in studio or critique settings. Most of student presentations are done in prints and/or digital slides with explanations delivered in person to a limited audience. This has the advantage over online presentations in that it allows (but not necessary welcome) the opportunity for verifications by the audience. A few have explored online presentations as well. In many online presentations, it is often found that architectural posters which were meant for print were shown on screen instead. This removes the possibility of clarifying any misinformation or misinterpretation.

The limitations posed by the printed media have resulted in many architectural publications in general carrying abstractions that embody mixed and sometimes contradictory messages (Kwee 2007a). This is contrary to the accuracy and precise quality that the discipline is perceived to possess. A 2006 survey indicated that readers of architectural publications believed that the performance of these publications—online and in print—had not contributed to their understanding expectation (Kwee 2006).
3. PRESENTATION AND COGNITION

In order to improve presentation on the digital platform, firstly, the term ‘presentation’ has to be accurately defined. The general perception of ‘presentation’ has been discussed and various typologies streamlined by Kwee (2008). There seems to be a need to shift the focus now to the level of presentation where information are contextualized and given tighter integration. We are no longer limited to the physicality of paper media, but only constrained to the real estate of screens in pixels and resolutions while at the same time, freed by its flexibility, speed of access and graphical dynamics.

Presentations of architecture rely heavily on its representations or abstractions. The process of translations from one abstraction to another—from/within cultural symbols (e.g. texts, drawings) to depictive visuals (e.g. photographs, 3D models)—may not only take more effort but could negatively affect the understanding of architectural subjects. Scott Johnson discovered that mental and physical (or digital) representations are deeply ‘linked to learning, the ability to use existing knowledge, and problem solving strategies’ (Johnson 1997). Forcing a reader to translate from one representation to another would affect the individual’s limited cognitive resources. In order that information of architecture is easily absorbed, its presentation should curtail such mental-visual translations. This is especially urgent since the production, availability and accessibility of information resulted from today’s digital technology are far exceeding what our limited cognitive resources could possibly process. Fortunately, today’s digital platform also allows a number of flexibilities to manipulate abstractions. These flexibilities missing in most digital presentations should ideally be capitalized towards presentation of information that limits excessive draining of cognitive resources like attention and short-term memory.

4. AN EXPERIMENTAL APPROACH TO ‘CAAD’ COURSE

In light of the above, once again CAAD education should consider a shift to address the current essential changes to render positive impacts forward within the discipline. Students need to be aware that producing and showcasing more abstractions or information is no longer sufficient to cater to our current and future needs.

In the following descriptions of the experimental approach to a CAD course that was of a semester in duration and three credit hours, students underwent the process of creating digital presentations explaining particular aspects of the architectural designs of their choice. The course aimed to instill a degree of sensitivity and sensibility in delivering digital architectural information—one with clarity in the medium that facilitates instantaneous online public access.
4.1. Student background

There were three classes of an average of 12 students each. Naturally, the skills and knowledge of the students varied. However, all enrolled students were relatively skilled in digital 2D drafting, and they were expected to be able to apply this skill in their projects, whenever required. Many still did not possess the skills in 3D modeling or faced difficulty to begin.

Most students had heavy total course workloads with an average of 20 credit hours while in addition, some were with family commitments. Although strong Islamic cultural factors were at play, they were no apparent influence in their learning. Some care, however, needed to be taken in the use of social network, online virtual world sites or similar since there was underlying concerns to allow male and female student interaction within the strict culture.

4.2. The Project

The assigned project dealt with the design of an online content presentation, explaining a particular architectural idea. Due to time and other constraints, students were expected to explain only selected aspect(s) of their own current or past design projects through a web-base presentation; this was to be submitted by the end of the course. By allowing students to use their own design projects, it was hoped that there would already be sufficient information available. In the absence of any needed information, the individual author of the project would be able to furnish it immediately. Some students eventually decided to use one of their friends’ design projects or an architect’s published work. This was permitted; however, the amount of relevant data had to be available.

In the initial phase, each student was required to provide an overview of the chosen design project and what he/she wished to explain. The common themes that were chosen by students included one or combinations of the following:

- Construction method
- Building components
- Materials
- Lighting
- Sustainability considerations
- Planning
- Formal design
- Design concepts

Having considered their chosen themes, students were guided to understand various architectural representations and their process of production. Students conducted three progress presentations to their colleagues in which
they were required to explicate their approaches, problems and rationales—
understandably, most seemed to have highlighted their technical problems as
their main issues. Besides learning through other’s experience, the presentation
sessions served as an individual reflection and evaluation process as well.

4.3. Topics and Processes

As mentioned, lectures were initially given to allow discussions about archi-
tectural abstractions and their properties. Students were also asked to search
and assess available websites and their contents in order to highlight the weak-
nesses and strengths of the designs and information deliveries. They were
couraged to consider the strategies or scenario(s) in which the techniques
they have studied would be most suitable in their own projects.

To achieve the objectives, a collection of information and abstractions
needed to be digitally created. In order to facilitate this content creation, stu-
dents were exposed to various architectural representation models, and their
production and editing processes—among which were:

- 2D images (excluding drafting)
- 3D models (animation and still images)
- text (including speech or audio)
- virtual reality (VRML, QTVR)
- augmented reality (ARToolkit)

Instead of detailed ‘how-to’ lessons, general overviews of software applica-
tions used and tips, followed by examples which may not be directly relevant
to their individual project. Students were expected to link abstract examples
with a possible applicability in their projects. As Colajanni et al. highlighted,
‘the maximum of instrumental usefulness can be obtained through the knowl-
dge at the highest degree of generality and, then, abstraction’ (Colajanni et al.

Currently, most software packages are still being developed in isolation.
The integration with other software packages to create a holistic presentation
tool seems unlikely to occur in the near future. Thus, it became necessary to
expose students to available technologies. Students should assess these packages
applicability in their projects.

Apart from careful choices of architectural representations, graphic com-
position and organization and in order that students think beyond slide-linked
presentation type, the course highlighted a set of presentation approach as
guidelines to treat these representations or abstractions. These concepts have
been derived from the author’s previous research project and practical applica-
tions in explaining an existing architectural work (Kwee 2007b). For the pur-
pose of this paper, they can be classified into the following categories:
• Visual components emphasis. Design education, Oxman Rivka (2001) argued, should shift more to ‘cognition-based approach to knowledge and visual content’ to fully accommodate ‘the construction of theoretical foundation’. Visual abstractions are less culturally bias, and since they tend to correspond readily with architectural elements they represent, they are more quickly absorbed than textual explanations. This does not imply the elimination of texts or other type of abstractions. As Glanville 1995 suggested, architecture is not totally visual art. Similar to architectural documentations, students were encouraged to give higher prominence to visual explanations whenever possible in their projects.

• Contextualization. This calls for the embedding of abstraction(s) within corresponding abstraction(s) to explain particular ideas. We are able to observe this in the concept of hyper-linking texts within texts which is much exploited by Wikipedia or similar.

• Layering. Interchanging corresponding visual abstractions containing different information at the same visual point reduces the problem associated with translating one abstraction to another. Examples of visual layerings can be observed in (Koszewski 1995; Ripper Kós 2003; Kwee 2007b). It appears that the approach is most useful in relating depictive to symbolic representation(s) in architecture (example Figure 1).

**FIGURE 1. AN EXAMPLE OF TWO CORRESPONDING ABSTRACTIONS WHICH COULD BE VISUALLY LAYERED TO ADD DEPTH AND CLARITY OF INFORMATION.**

• Visual continuity. Francisco Santos Agostinho describes this as an ‘ordered sequence of progressive change’ (Agostinho 2005). To better relate visual abstractions, whenever feasible, visual transformation of one component to
another should be considered. Spatial navigation in gaming environment has been successful because players have been able to relate to the simulated spatial continuity.

- **Legibility.** This has often been an issue when it comes to online or onscreen architectural presentations due to the limited real estate space of computer screens. The problem is further exacerbated by the less-than-accessible authoring tools currently available—tools which would increase readability of details in architectural abstractions. Some examples related to overcoming legibility issues may be observed from (Raskin 2005) where the use of high resolution images allows the possibility of magnification with lossless quality. Some online graphic tools like Zoomorama (zoomorama.com) and Cooliris (cooliris.com) hold a promising direction to addressing this issue.

An overall schema of the course is summarized in Figure 2 below.

**FIGURE 2. COURSE SCHEMA.**

4.4. Outcome assessment

The student projects were uploaded by the facilitator and their links may be found at: http://faculty.uaeu.ac.ae/Verdy_Kwee/Fall2008/index.swf. The university server was chosen for its quicker access and setup. However, only faculty members were able to log on to the system. This ensured that the contents were exactly as submitted for assessment purposes.

It appeared that exposure to current online examples have detrimentally effected student design decisions to a significant degree. It was considered especially challenging to stress the uniqueness of architectural presentations that commands special attention to the presented information, requiring them to be set apart from commonly found websites. Although the transition from
the typical linear 'PowerPoint presentation' too seemed to be a struggle for many students, some traces of successful disengagement from the convention could be observed.

Despite the fact that the outcomes may not have achieved the course intentions fully, a post-course survey which will not be discussed at length in this paper has indicated a general learning outcome satisfaction. Overall, students felt that they have gained much and improved in their online presentation techniques. The main concern voiced by students had been the limitedness of resources—i.e. time and tools. A well-designed digital presentation would require more than mere organizational skills. Students had to be able to assess effective, visual methods to link representations to be able to prepare the required components. Furthermore, in the absence of ready-to-use software applications, students were forced to understand basic computer coding and, equipped with sufficient background, to use available resources on the internet.

To facilitate peer assessment and feedback, students were requested to create personal blogs. While a few students already had their own blogs, it was new to most of them. Links to their presentation sites were added to their blogs. Each of these blogs should contain at least two student comments on the presentation project. Students that provided comments were chosen randomly in class and were encouraged to provide constructive comments especially pertaining to the clarity of information and to suggest further improvements. It was later realized that due to the amount of personal information that most students tend to disclose in their blogs and cultural sensitivity issues as mentioned in Section 4.1, the blog links were not shared amongst all students.

Any argument related to the process by which the course had been conducted specifically to the presentation approaches might be well justified. By exposing students to the limited list, although they were encouraged to investigate beyond these, may have resulted in limited self-explorations by the students themselves. On the other hand, without it, most students might have faced difficulty in understanding what was expected. It was also recognized that easy-to-use tools were still unavailable. The outcomes were hence determined by the students’ ability to use the tools and resourcefulness in seeking alternative approaches. Overall, however, the course had provided an opportunity for students to understand the concept of digital content production and explore delivery techniques as basis for further developments.

5. CONCLUSIONS AND ADDITIONAL THOUGHTS

Today, most of publications about architecture may still seem much too author-centered. The act of evading clear explanations about particular architectural designs has been conveniently rationalized based on media, economic and technical limitations. More complex than these limitations perhaps could have
been some deeper political reasons to exert authority over particular knowledge and/or mindsets ruled by habits. Few may question if architectural knowledge should be so accessible to and easily understood by the public. What would be the negative implications to the discipline and teaching in general? There are also perhaps parallel concerns between the implementation of architectural presentation concepts/techniques in the architecture curriculum now and when CAD was initially introduced: do we have sufficient staff resources that would have the skills or interest to explore the possibilities (Laing 1986)? On the other hand, it can also be argued that instilling awareness and understanding the concept need to be prioritized over teaching the skills at this point in time.

This paper does not claim to have the solution, but proposes that we ought to start cultivating this awareness within the architectural education. It holds the possibility of making architectural information more comprehensible such that we could more easily build upon what has already been done—an issue that was also echoed by Rivka (2001) and Anay (2006). Eventually, freeing the arduous tasks of deciphering abstractions and making sense of the fast and vast-growing amount of information may facilitate decoding the discipline’s secret garden towards greater understanding and higher order thinking essential to the development of the architecture discipline (Ataman 1999). Consequently it may also help improve the inherent quality of future architectural designs. Contrary to McLuhan’s belief (McLuhan 2001), our biggest anxiety will not be the result of trying to do today’s job with yesterday’s tool, but utilizing today’s tools with yesterday’s concepts for tomorrow’s sake.

Traditional presentations of architectural information have undergone centuries of established language and patterns. This establishment has been predominantly governed by the properties of the media that delivered the architectural abstractions—which has been substantively in print format. The established patterns appear to be setting roots on digital platform as well and are carried through to most architectural information deliveries today. This direct adaption of print conventions into digital platform unfortunately also inherits predictable shortcomings of the former in addition to those of the latter.

Digital architectural presentation will inevitably also move towards establishing its own language. This move still seems challenging as features in current digital tools are limited and still being developed. The direction of the development of these tools is dependent on our awareness of the possibilities and thus demands. By introducing concepts of effective digital presentation techniques, students would be more likely to rethink alternatives within the limitations of digital platform, thus creating demands. Its success will have tremendous potential not only in revamping the discipline but also the development of the tools. Furthermore, apart from redefining architectural presentations as we
know today, these tools will possess a promising potential to eventually affect the form of digital architectural documentations and thus practice standards of tomorrow.

ACKNOWLEDGEMENTS


REFERENCES


