Digital Cocktail

The earliest known printed use of the word ‘cocktail,’ as originally determined by David Wondrich in October 2005, was from ‘The Farmer’s Cabinet’, April 28, 1803, p [2]: “11. Drank a glass of cocktail - excellent for the head ... Call’d at the Doct’s. found Burnham - he looked very wise -drank another glass of cocktail.”

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Abstract. Digital design education has become, in a way, quite similar to Mixology, the art and science of mixing great drinks. Gone are the days when digital design educators only had a handful of ingredients to prepare their educational recipes. Today there are simply too many recipes. So, what should the core elements of digital education be today? What ingredients should be discarded? In what way should educators mix the ingredients? This paper presents highlights of a process followed by an experimental architectural digital design studio where students were served a special digital design cocktail exploring a new way to approach digital education today framed within the constraints of a typical architectural curriculum.

Keywords: Digital design education; education process; education core, pedagogy, teaching, design process.

Evolution of Digital Design Education in the College of Architecture and Planning at the University of Utah

This paper is based on digital design education experiences at the College of Architecture and Planning at the University of Utah. Since the early 1970’s the College has emphasized computer technology in all aspects of the architectural design and city planning process. For over thirty years students and faculty have explored, interacted, and built complete digital models of studio projects, community work, and all design-related work. They have also used the technology to collaborate with peers and to communicate the results of their work in an efficient manner.

Since its inception, the computer laboratory generated its own in-house software applications. The reason for doing this was rather simple: there were no applications available in the open market. The College faculty created one of the very first
Another application developed in-house created 3D perspectives automatically generated based on floor plans.

As challenging as these efforts were, the faculty soon realized that it was not possible to proceed along the same path in terms of software development. This was the time when large companies realized the great potential of software creation. At this point the College switched from being an independent software generator and creator to a software user and consumer.

Software – Then and Now – Curriculum Implications

It is a well known fact that in the early years of the digital revolution, applications were few and only addressed limited tasks. Nowadays, the software palette is extensive, with broad implications related to architectural education. These, in turn, have necessitated continued vigilance in terms of roles, extents, expectations and coordination with other components of the architectural education process.

At the College of Architecture and Planning these issues have been and are constantly discussed amongst members of the faculty and various curriculum committees. While the college does not have a final or definite policy in regards to the role of digital tools within the curriculum, it does have a highly flexible attitude that allows for wide maneuvering in terms of digital courses offered, their precise content, and links with other parts of the curriculum. Over the years, and beginning in the early 1970's digital courses have shifted almost constantly, with the overall goal of offering students a wide choice of alternatives in terms of direction and use of both
existing technologies as well as prospective upcoming approaches.

At the beginning of the 1990’s it became clear to the faculty in the College that, in order to continue to keep a leadership position in terms of digital technologies, fundamental changes in the curriculum had to be made. One of the most profound transformations occurred when the college adopted an integrated policy in regards to the use of digital tools. Such integration began to be implemented on day one, when students took their first design studios. Classes that involved the use of analog communication techniques were transformed into studios where it was difficult to ascertain if projects were done with an analog set or with a digital toolkit. Parallel to this decision, was that instead of the college dictating which tools were to be used for a particular task, students were put in the driver’s seat. It was the students who ultimately decided which set of tools were more appropriate for a particular task. This policy has proven to be quite successful over the past twenty years, as students have matured in the tool selection process. It has also been a decision that has accommodated both camps: those who feel more comfortable with the use of traditional analog tools and those who have sought to engage in the world of computing.

After Thirty Years of Experimentation

After some thirty years of experimenting with a variety of tools, techniques, and digital pedagogies, it has become quite clear in recent times that due to a variety of reasons, some re-focusing had to take place. Some of these reasons are related to the ‘window of opportunity’ in regards to the available time within the curriculum to offer classes and studios that are digitally oriented. In this respect the college has adopted a flexible policy. In other words, the curriculum is not set on offering a certain percentage of digitally based coursework. While the policy has had good results in general, it has limited the time that otherwise could be dedicated to further digital investigation, research and actual application of current and upcoming technologies. In other words, within any architectural curriculum, there is a finite amount of time that can be dedicated to digital technologies.

It is this last topic, the amount of time allotted for digital design education, that is at the core the present paper. Colleges cannot continuously increase their credit hours. Curriculums cannot keep expanding. Given a limited amount of time, what should be done? What are the core elements? What are the essential elements? What are important items that can or should be discarded from the curriculum? These
and other similar questions are tougher to answer these days because, unlike the situation some twenty years ago where hardware and software choices were limited, nowadays there is quite an ample selection of items and approaches to choose from.

The college conducts regular faculty meetings where these central issues are presented and discussed. Faculty involved in digital design technologies are often asked to present to the college faculty what the current approaches and expectations are. In these meetings key questions are discussed, in order to arrive at core issues that will be treated in both traditional and digital studios as well as other classes in the curriculum.

**Experimental Design Studio**

Following a series of meetings in which the previous issues were discussed, it was decided to open a ‘window of opportunity’ within the present curriculum to create an experimental studio that would attempt to determine:

1. Which components within the larger digital education palette were deemed essential in aiding the College architectural education process.
2. Which components within the same palette, even though interesting or fascinating in terms of their actual output, did not offer substantial rewards to studio operation.
3. The order in which particular digital approaches had a better opportunity of success.
4. Specific pedagogic strategies that seemed to enhance the digital education process.

It is extremely important to point out that the creation of this experimental studio is only at the very early stages. Measuring, validating premises and outcomes is certainly not an easy task, and probably not worthwhile in terms of precisely validating final outcomes simply because the cause-effect depends on causes (the ever changing nature of hardware/software) that are in constant flux. What the process has clearly demonstrated is that having the experimental studio situation available offers faculty involved at all levels of instruction the opportunity to make and suggest changes. As a faculty communication mechanism it has proven to be invaluable. This paper focuses on item four above: specific pedagogic strategies that proved to augment or significantly enhance the overall quality of projects. Again, this was not determined through rigorous validation mechanisms, but through a good amount of discussions between faculties and juries involved in design projects.
Digital Cocktail Ingredients in the Experimental Design Studio

To lighten the discussion, the paper uses similarities between cocktail preparation and digital design instruction. Like Mixology, digital design education depends on two key items: the actual drinks – the available hardware and software tools, and Mixology itself – the art of picking and preparing the best combination of ingredients. Because of an ever expanding list of digital tools, and an ever shrinking time window of time to get involved with digital technology instruction, it is quite critical to master the art of picking the best available tools and of course using them in the most efficient, innovative and practical way. The experimental studio applied a series of approaches organized around the five following topics:

1. Basic, fundamental, or core elements in digital design education (shaking cocktails).
2. Ordering, sequencing or how to muddle digital design education elements (muddling cocktails).
3. How to build digital design education elements (pouring ingredients directly into the serving glass).
4. How to float tasks and concepts (carefully pouring a small amount of liquid over the back of a spoon to balance as the top of a drink).
5. Rolling tasks (simple techniques for rolling the ingredients from one glass into another and back again).

Basic, fundamental, or core elements – Observations

Rather than fully describing all the different actions and propositions that were set at the beginning of the experiment – which were quite numerous – selected observations are herein included. These are deemed more to the point in relation to the essence of this paper.

Core elements – Which digital tools and how should they be used.

It is a known fact that not only digital design tools are quite numerous, but their use has become not as ‘user friendly’ as their developers would like to see them. In fact, most current design applications are bloated with an ever increasing number of features that for the most part are useless. So what should a studio situation propose? When shaking a rather large list of available design tools, it is quite important to not overfill the shaker. Applications, like Photoshop, AutoCAD and the like, have literally hundreds, if not thousands of options that easily overburden even the most digitally savvy student. From day one, it is of paramount importance to make it clear to students that knowing everything about an application will not result in the best grade in the class. It is also critical that instruction be focused on actions and strategies, rather than step-by step recipes. For example, it is more critical to emphasize the importance of transformation actions than to spend precious digital studio time in just one type of operation.

While there are certainly hundreds of potential components at the core of digital design education, from the onset it was decided to severely limit these to only three. This was done because the present curriculum of the College only offered a limited time to present topics. Also, by limiting the number of topics, it was easier to evaluate later their impacts on other design tasks.

The core components and issues related to them were:

a. Image manipulation

This core component was deemed essential. It included every potential action that can be performed on an image, from its acquisition from a variety of forms, its myriad possible transformations to its ultimate destination whether in print form or displayed electronically.

b. 3D Design

The faculty involved in the experimental design studio deliberately decided to skip two-dimensional
digital design instruction in order to present, from day one, three-dimensional architectural design approaches. The approach allowed a good amount of time to explore a variety of approaches using extruder type of applications, standard solid and non-rational B-spline modelers. Because most current 3D applications are capable of generating automatically projections of the 3D model, students quickly understood how their schemes looked like when projected as elevations and plans. This, in turn, offered additional benefits because the instructors did not have to take valuable time explaining the use of architectural symbols; these were being generated automatically at every step of the design process. Students were also made aware of building information management (BIM) issues as they proceeded with their designs. Obviously, due to their limited amount of knowledge on structural and construction systems, they had to make a good number of assumptions. However this issue was also quite positive because it made them aware of not only the complexity of current building technology, but the need to learn about how buildings are assembled.

c. Visualization

The third core component ran almost parallel to the three-dimensional approach described above. At every turn, once a preliminary three-dimensional scheme was developed, students were asked to visualize it immediately. The task involved definition of tectonic qualities and exploration of lighting. For every scheme in progress, there had to be a number of explorations involving different points of views or perspectives, and several attempts at defining colors, textures, and qualities of surfaces such as transparency and reflection. In some instances, students were asked to develop a minimum of ten different views revealing ten completely different tectonic/lighting potentials. Once these ten different vantage points were accomplished, students proceeded to develop one minute animations. These walk-through presentations proved to be invaluable to students, because they prompted them to make adjustments to their initial schemes in terms of scale and volumetric relationships. Once the animations were completed, the cycle began again by refining schemes and selecting final tectonic qualities.

At the beginning the participants in the experiment were quite overwhelmed by the huge number of options presented to them. However, this factor turned to be quite positive too because students had to quickly select strategies that ended up in tangible results rather than spending a considerable amount of time on software issues that led nowhere.

d. Issues related to the core components

First things come first, like ice cubes in a cold drink. By placing ice cubes in the shaker first, this will chill the shaker and cool the liquids as they are added. From day one, students were informed that there were key digital actions that would affect other secondary actions. For example, they were warned that it is more productive to quickly present three or more ways to generate a patch, heightfield or drape surface using three different applications than to focus and elaborate on all the detailed particulars of the steps a particular application required. At the end, it was more beneficial for students to discuss the pros and cons of how applications deal with particular tasks than to deal with the often overrated intricacies of just one procedure.

Students were also advised to shake software vigorously. This meant not spending time demonstrating useless tasks. There seems to be a tendency, mainly due to software manuals and other resource publications to demonstrate actions that at the end do are not related to a desired final outcome. For example, one of these publications, the 3DS ‘Bible’, has 1255 pages. On page 848 there is a highly detailed three page long fourteen step procedure to make checkers move. Is this an action that a designer or architect would actually use?

Finally, instructors made students aware about the importance of shaking software to a rhythm. This implied that the rhythm should be dictated by the design task at hand and not the software application itself. This is yet another trap that digital instruction often falls into. Again, the culprit is software
manuals and resource applications concentrating on step-by-step recipes. Students were informed that a more successful strategy was to get involved in transformation experimentation within the range of the design task at hand. At the end, it was not only more fun, but also more satisfying to have arrived at a range of imperfect attempts, than to end up with a perfect, but mediocre single uniform solution dictated by the digital instruction manual. The group realized, after all, that a range of solutions enables the creator to pick the best or more suitable approach that most likely at a later stage will have its final quality upgraded.

**Muddling Digital Design Education**

To muddle is to combine ingredients at the bottom of a glass, by pressing them in order to obtain their essence. This is done before the majority of the liquids are added. In digital design education we face the same condition. First we need to extract the essence of the various applications. Only then we can proceed.

As was pointed out earlier, a key factor in the process of delineating and eventually reaching the best connection between digital design education and architectural studio production is focusing only on key core components. This is essential in the case of the beginner design student. A first strategy to reach the essence is to severely limit instructional time. This forces both the instructor and student to critically and efficiently use their time. In other words, the more time is given, the higher the chances for individuals to wander aimlessly. A second strategy is to increase the number of applications available to students. The outcome of this mode of action is that it directs users to quickly find what the tool can actually do. Due to time constraints, if the tool does not provide answers immediately, the user looks for another one. A third strategy used quite successfully in the experimental studio was to schedule quick competitions within the studio setting where students were challenged to complete specific tasks as quickly as possible. The winners in these short competitions were then asked to demonstrate to the whole group how they achieved results quickly.

**How to build Digital Design Education (pouring ingredients).**

The key item here is the ‘building’ of the process or the order in which the ingredients are added. The critical component here is not related to actual software applications or the order they are to be presented. What is fundamental is the clear listing and prioritizing of tasks related to the particular process followed by a particular design studio task. Because most schools of architecture follow different models of thought in the operation of design studios, it is important to mirror those prioritized tasks. And again, it is important to set aside potentially misleading software manuals.

Students are always hungry in terms of staying current and testing new approaches and technologies. In many cases, they are even ahead of the faculty in this respect. The only issue here is that sometimes the energy spent by students is misguided. While web surfing quite often students download applications that promise miraculous results. After many unsuccessful attempts, they realize that what was promised did not match the task at hand, and worse, the time spent trying the new application was not productive at all. Therefore, it is of paramount importance to constantly monitor the order in which the different components of the digital process are being added, whether these are provided by normal class instruction or by individual students on their own.

**How to float tasks and concepts**

Digital design education could benefit from the theories of specific gravity where heavier items sink and lighter liquids rise. Yes, digital design education needs to include ‘heavy’ items such as the ability to use and apply architectural symbols appropriately, or to use Building Information Modeling (BIM) to the best extent. However, carefully pouring a small amount of special unique action brings the benefit
of adding excitement and curiosity to the learning process. This strategy was used in the design studio under consideration, where students were asked to design a house for three teenagers and seven crocodiles. The Irish had the right idea when they combined robust Irish whiskey with hot black coffee!

**Rolling tasks**

Rolling applications is a seldom used mixing approach that is easy to do. It consists of mixing only a few tasks within one application with another limited task in a different application to then continue the process with yet other applications. At the end, the tasks come back to the original application for full visualization of results. It should also be noted that the experimental studio also asked for the creation of one minute animations with full visualization qualities not only to finally present the project, but to study its process. In the studio under consideration, students at first had great hesitation undertaking this approach, but at the end were quite amazed at the final results. This too, brought a great sense of control in the digital design process.

**Summary**

The results of the pilot project whose key parts were presented above were astounding as measured by student evaluations and peer review of the faculty of the College. One student summarized the feeling of the studio quite well... “We LEARNED a lot – I don’t know if we were TAUGHT very much”. All of us really enjoyed the cocktail!

**Further reading**


![Figure 4](image_url)  
*Example of the output of the experimental studio.*