Break to Build: Impacts of a Pandemic-Driven Shift to Digital Curriculum in Beginning Design

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This paper focuses on a particular Pre-Architecture program, one built around two models operating in parallel: a normative academic year course set—Foundations, and a competitive, summer intensive—Summer Design. The two sequences attract different demographics, and the course experiences markedly diverge. Their strongest commonality has been an emphasis on analog production in lieu of digital fluency - an untenable prospect in a newly virtualized curriculum. As a result of the pandemic, this long-standing analog beginning design curriculum had to be rewritten.

In Fall 2020, students in these two factions impacted by the COVID-19 pandemic—Foundations and Summer Design—converged as a single Second-Year cohort. Their divergent experiences and abrupt shift to a digital workflow provided an opportunity to assess the impact of opposing learning settings and methods. Through a description of the program setup, an analysis of the work completed, and an evaluation of the impact on preparedness, via a survey of students as well as a faculty discussion, this paper will assess the early ramifications of a pedagogical paradigm shift in a beginning design program.

INTRODUCTION

Among the myriad impacts wrought by COVID-19 are sudden reexaminations of higher education methods and curricula, including those of schools of architecture. The program central to this paper is no exception. Specifically, the foundational First-Year program adapted to new remote learning requirements, precipitating a fundamental shift away from long-standing manual techniques and towards digital ones.

In the years leading up to the pandemic, the First-Year program at Auburn University has evolved to reflect its unique set of motivations and ideals, still operating within the values system of NAAB. The program is built around a year-round setup, where two programs operate in parallel: one is a normative academic year course set, the other a seat-limited, summer intensive. They attract two different demographics, and, though their course experiences are distinct, students arrive at the Second-Year program with a similar set of skills. Their strongest commonality is an emphasis on analog production. When the two groups converge in the Second-Year program, this commonality is the bedrock on which the curriculum is structured, and it is typically not until the second half of that academic year that digital tools are introduced in earnest to a studio context.

If the incursion of COVID-19 was a stress test for entry-level programs, this setup broke under the pressure, its undoing brought about by the confluence of three things: the abrupt shift to remote teaching and learning, the intensely competitive Summer Design program, and lagging digital fluency. Suddenly, critical physical interaction among instructors and students was obviated, and a long-standing analog curriculum had to be rewritten. Moreover, it was determined that going remote meant going digital. In a competitive class, the physical studio has provided equity, with similar resources and support among students. With parity paramount, no student could fairly capitalize on the advantages provided by their retreat home. Thus, all project work became strictly digital, with curriculum that relied on provided digital tools.

Disruptive as it was, the pandemic-driven, mid-academic-year curriculum shift affords an opportunity to discuss the efficacy of remote, digital teaching in a First-Year program. This paper is not a comparison of Foundations and Summer Design programs per se but rather a comparison of pre- and mid-pandemic conditions. A unique cohort of students, having completed qualitatively different First-Year preparations, enter the same Second-Year program, providing a baseline for comparison. The purpose of this paper is to elucidate the impacts of a pandemic-driven curriculum change at the early stages of design education.

SETUP

The First-Year of the Architecture program at Auburn University is unique in its approach. Students in the First-Year of the program, technically labeled Pre-Architecture students, are split more or less evenly between two tracks—Foundations and Summer Design. Completion of either track allows for the

student to enter the professional Architecture program in Second-Year, where the two cohorts converge.

The Foundations track, reserved for students in the first year of their college education, is the more traditional architectural education experience and takes place over an academic year. The program consists of four courses - two representation seminars and two design studios—co-taught by instructors over two semesters. Within each semester, the courses are designed to work in tandem to deliver content using predominantly analog methods. The exception is the Spring representation course which introduces basic digital techniques.

The Summer Design track aims to recreate a similar experience within a shortened time frame. Students entering the Summer Design program have completed one or more years of University education, and some are pursuing a second bachelor's degree. This set-up typically creates a more diverse and mature Summer Design cohort. The Summer Design sequence includes the same two representation seminars and two studio courses. These courses, however, are condensed into a 10-week intensive, where the first half is a highly competitive program that results in a limited number of students advancing to the second half. Because of this, the structure requires parity amongst all students both in instruction and available resources. While the design studios and representation seminars also focus on analog techniques, they are taught sequentially in lieu of concurrently.

Despite the differences in demographic and time frame between Foundations and Summer Design, the two programs are typically aligned in terms of pedagogical approach. In both tracks, students are co-taught by two to three instructors as a single cohort, ranging from about 30-70 students at any given time. Instructors address the entire cohort when giving assignments, demonstrations, and/or project critiques in lieu of providing individual feedback. As mentioned, the delivery method is predominantly analog with a focus on physical modeling and hand drafting. Craft, resolution, and refinement are heavily emphasized through the implementation and development of building rigorous, consistent work habits.

Due to COVID-19, the approach to both First-Year tracks was significantly altered in the Spring of 2020. This unintentionally created two vastly different experiences for First-Year students. Students in the 2019-2020 Foundations program began their First-Year experience in the traditional studio environment. After spending about three-quarters of the academic year in a physical studio developing analog skills, students transitioned to remote instruction approximately halfway through the Spring semester. As an attempt to provide equal resources and opportunities to students in a variety of physical settings not intended for design instruction, the decision was made to operate digitally for the remainder of the academic year. Digital tools taught in the first half of the Spring representation course became critical when attempting to maintain the rigor and intensity established in the Foundations program. Previous knowledge of digital tools and pre-existing relationships between students and faculty allowed for a smooth transition to the remote setting with little time invested or lost.

In contrast to the rapid transition to remote instruction necessary in the Foundations program, the 2020 Summer Design program was able to be planned as a remote modality. The 2020 Summer Design students were the first cohort in the history of Auburn University's Architecture program to begin their architectural education in an entirely digital, entirely
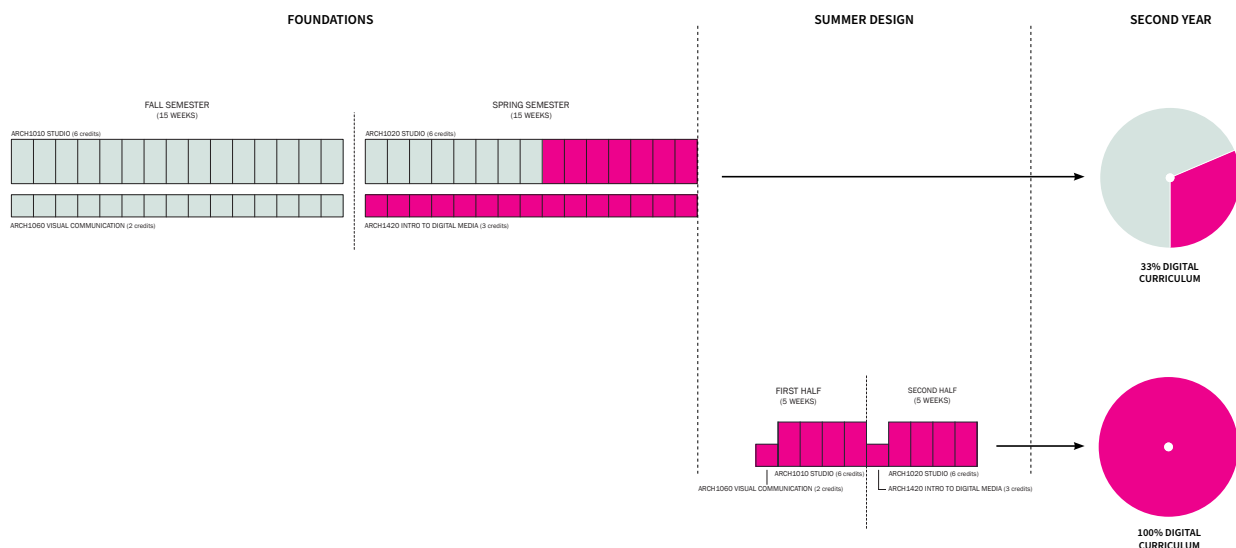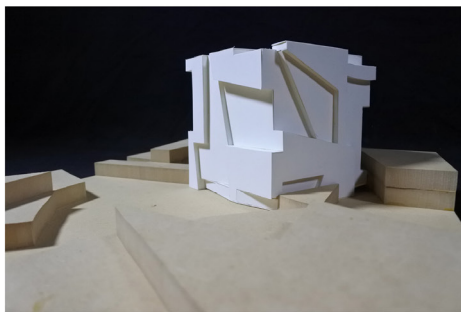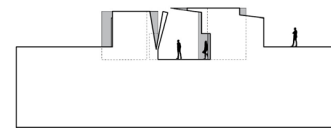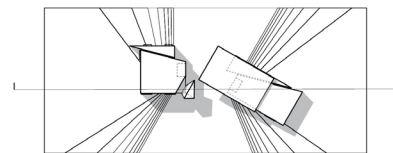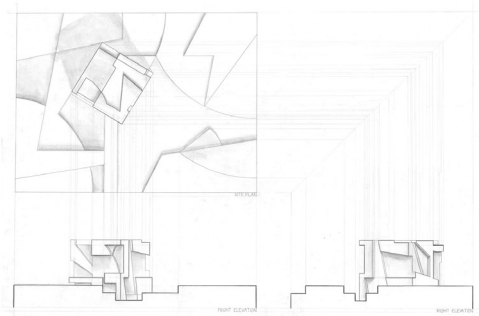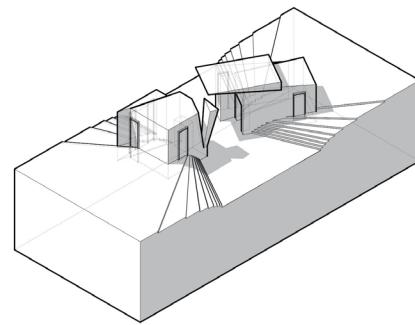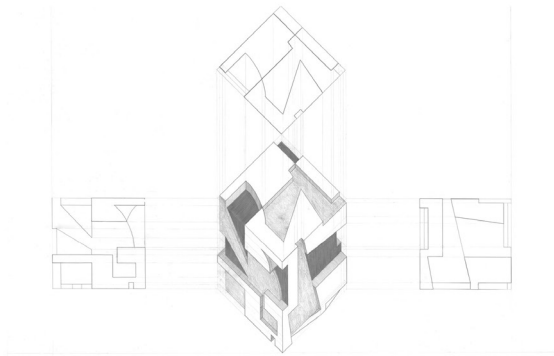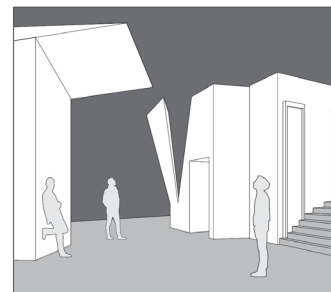

Figure 1. Pandemic-driven curriculum shifts for Foundations and Summer Design.

FOUNDATIONS
First Semester Design Studio
Project 02

SUMMER DESIGN
First Semester Design Studio
Project 02

Figure 2. Student work by Foundations student, Tatum Debardeleben. Foundations instructors Alyssa Kuhns and Gorham Bird.

Figure 3. Student work by Summer Design student, Ryan Smith. Summer Design instructors: Alyssa Kuhns, Gorham Bird, and Zoë Cope.

remotely format. The Summer Design group consisted of over 70 students, 6 faculty, teaching ten total course sections for the four courses, and 6 teaching assistants, brought onboard to ease the transition to remote learning.

In addition to the typical structural challenges of the Summer Design program, the remote format created significant logistical hurdles. The competitive aspect of the program required parity among students. But, because the students were no longer operating from a relatively controlled, campus-based studio classroom, the analog techniques integral to the identity of the program were no longer considered appropriate. Operating from their homes, both within the United States and internationally, not all students had access to the space, resources, and quietude afforded by the studio. Instead, parity was achieved through utilization of the same software,

and equal access to necessary software programs was provided by the University. Diverse geographies presented a potential for disadvantage, as some students were in time zones significantly far from U.S. Central Time. That said, the length of daily sessions obviated this problem by being long enough to overlap mutually normative working hours for all students and instructors or teaching assistants. All questions or comments had to be discussed in a large forum or made accessible to the entire group through written communication. Work had to be evaluated anonymously by all faculty through comparative methods. Instructors viewed and ranked the work without names so that any implicit bias formed by only limited, digital-only contact would have no bearing on evaluation. Similarly, students were not aware of their peers' ranking, lest unchecked, uninformed competitiveness festers among the group. Zoom took the place of the physical studio

environment, creating a virtual space open to all students after hours for peer-to-peer interaction, and interface tools such as Canvas and Conceptboard became critical to this process. These tools, as well as traditional studio-based workflows, had to be formatted to meet the complex demands of the Summer Design program. The result was a set of physical outcomes and developed skills that could be compared to the contrasting Foundations experience.

THE WORK
The logistical challenges of the remote setting in both the later portion of Foundations and the entirety of Summer Design became an added obstacle to achieving the primary pedagogical pursuits of the First-Year program - teaching spatial competency and literacy. While the Foundations cohort gained experience developing physical skills in a physical setting, the transition to remote learning caused a shift away from three-dimensions. The virtual studio space became a two-dimensional environment, a screen, and physical tools were replaced with digital equivalents. As a result, the projects too had to adapt to this new setting.

The projects slated for the Foundations program were planned in advance and developed over years of trial and error. They were traditional in their approach, focusing on introductory design concepts including primary elements, principles of design, and methods of form-making as well as physical modeling and hand-drafting techniques. With the onset of remote instruction, these projects, originally planned to be repeated in Summer Design, had to be quickly adapted to digital permutations for the remote Summer Design program.

While students can 'learn by doing' using traditional analog methods, the digital equivalent requires a foundation of basic tools and skills prior to any form of production. Therefore, for students to function in this remote, digital setting, the first week of the Summer Design program was dedicated to a representation course, teaching technical software skills. This week-long course was approached as a 'Skills Bootcamp' and allowed students to get up to speed with necessary skills prior to entering the competitive design studio. While this was an essential step in the process, Summer Design students often considered the mastery of the technology as the work itself in lieu of a tool within the larger design process. This was addressed through conversations focused on design concepts over technical skills and the encouragement of large quantities of iterative explorations.

The 'learning by doing' and 'Skills Bootcamp' methods employed in the Foundations and Summer Design programs, respectively, created divergent pedagogical approaches. This was less a symptom of the curriculum structure and more a result of the shift to digital curriculum. With a beginning design curriculum focused on analog techniques, instructors can rely on students' inherent understanding of paper and drawing

tools, and those media can be trained onto design problems. In a digital setting, baseline software skills are an existential problem for the digitally uninitiated, i.e., most of the matriculated Summer Design students.

As a result of the digital workflows taught in the Summer Design program, students were able to quickly iterate through the use of copy/paste and produce a significant amount of work over a short period of time. An example of this can be seen in the second project of the first design studio for each cohort. Both projects, while slightly different in approach, use action verbs to manipulate formal qualities of volume and site. The Foundations project (fig. 2) was completed over a 5-week period while the Summer Design project (fig. 2) was completed over 8-days. In the remote setting of Summer Design, the time typically spent on hand-drafting and physical modeling was instead used to iterate and advance the project to a level of refinement that considered detail and human scale.

This effect of increased work production over decreased time is a common result of the Summer Design program due to its compressed schedule. However, in the Fall of 2020, as both the Foundations and Summer Design cohorts converged in Second-Year, instructors saw an increased quantity of production and iteration from both cohorts, as noted in a discussion with Second-Year faculty. The continuation of the digital, remote environment in Second-Year allowed students to build on newly developed skills and work habits and created a setting uniquely formed by the impacts of a pandemic-driven shift in pedagogical approach.

ASSESSING IMPACT
The First-Year program is fundamentally designed to prepare students for the subsequent years, when they drop the 'Pre-' and become Architecture students. It follows that the work produced is important inasmuch as it represents a level of preparation. Students are taught both skills and design processes that they will deploy as their projects become more advanced. Because this preparatory knowledge is internalized, we can assess its uptake by going straight to the source, that is, asking the students.

The students captured in this assessment include the Fall 2020 Second-Year cohort, consisting of half Foundations and half Summer Design students. We conducted a survey of all Second-Year students, 60 in total, with questions couched in skills and design processes. Critically, this was not intended to be an assessment of their proficiency, but rather their preparedness. With little basis for comparison, we assume they are poor judges of proficiency in skill or process. That said, they are perhaps the best judges of how well the First-Year program prepared them, for two reasons: with only one year complete, their level of preparation is exclusive to the program, and, at the time of the survey, they have completed two-thirds of the Second-Year fall program.
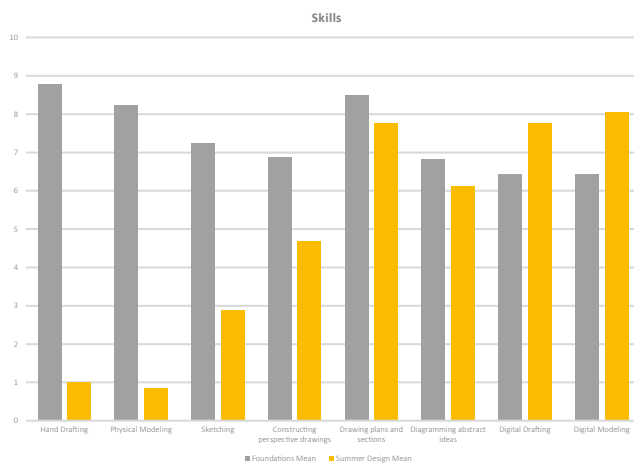
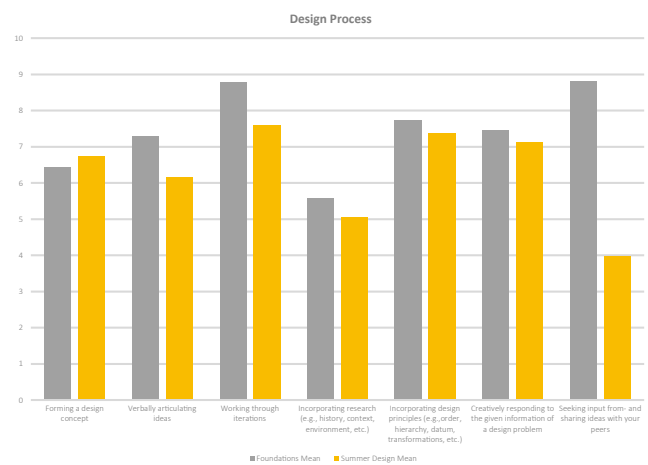Figure 4. Level of Preparation in Design Skills.

Figure 5. Level of Preparation in Design Processes.
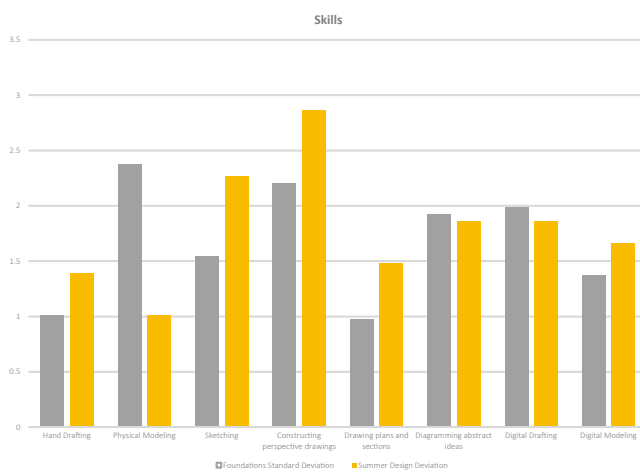

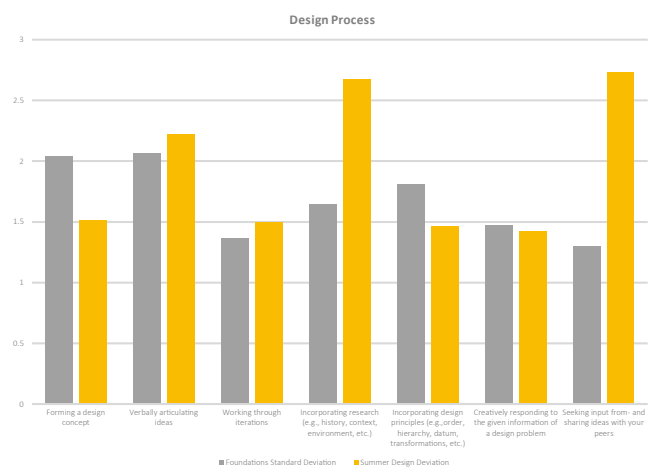Figure 6. Design Skills—Standard Deviation.

Figure 7. Design Processes—Standard Deviation.

Regarding the latter point, the students are able to reflect on their current performance while their previous experience is still fresh in their minds.

The survey was distributed to the Second-Year cohort and returned with a 90% response rate, or 54 completed surveys. Students were asked three questions. The first only required they state which First-Year program they completed. This allowed the authors to classify the next responses. The second asked them to numerically characterize their level of preparation in a series of technical skills, both digital and analog. For each skill, students provided a value (0-10) that represented how well-prepared they felt, having completed part of the Second-Year program. Those skills include: hand drafting, physical modeling, sketching, constructing perspective drawings, drawing plans and sections, diagramming abstract ideas, digital drafting, and digital modeling. Similarly, the last question asked about their preparedness in a series of

design processes, including: forming design concepts, verbally articulating ideas, iterations, research, incorporating design principles, creative responses, and peer collaboration.

Results that emerge from the 'Skills' questions are somewhat unsurprising, given the varying emphasis on analog and digital techniques. For the Summer Design group, manual drafting and modeling are largely foreign, while they enjoy significantly greater confidence in their preparation for digital drafting and modeling (fig. 4). Having spent more time engaging and working with physical media, the Foundations group is more confident in their sketching abilities, despite the Summer Design group having daily 'Sketch Assignments.' More nuanced reading emerges in topics not segregated by analog / digital divisions. Both groups noted high levels of preparation for crafting plans and sections, and the low standard deviation (fig. 6) suggests that there is consensus among each group. This congruity between responses belies the vastly different methods by

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which these groups were taught to craft orthographics. For a majority of their tenure, Foundations students drafted by hand, but the responses suggest that these efforts are not somehow 'wasted' by a digital transition. Orthographics are exclusively digital in the Second-Year pandemic curriculum, and their relativity narrow, high responses suggest that the Foundations students are actually slightly more consistently confident than the natively-digital Summer Design students.

Results from the 'Design Process' questions are less obviously parsed along curricular lines. These questions intentionally avoided analog or digital characterizations, and they are intended to more generally assess students' level of preparedness for complex design challenges. What emerges is an apparent near-agreement among both groups regarding their level of preparedness, save for one topic—peer-to-peer engagement (fig. 5). This is an unsurprising result. The Summer Design students were both isolated and uninitiated; unlike the Foundations group, they had not met each other prior to the pandemic conditions set it. Meaning, they had not yet developed the rapport that might enable productive, albeit virtual, interaction with their peers. Summing the topic rankings, the Summer Design group is only about 7.5% less confident, but for the question about peer engagement. If that number is included, the difference more than doubles to 15.5%. That said, this may be viewed as an endorsement of the Second-Year program as much as it is a liability in the Summer Design program; there may be high levels of engagement in the former for which the latter left them unprepared.

Comparing both sets of data, it's apparent that the Summer Design group feels consistently less prepared for the Second-Year program than the Foundations group. This is somewhat unexpected, as the pandemic-driven Second-Year curriculum more closely matches that of the all-remote, all-digital Summer program. Ignoring questions about hand drafting, physical models, and peer engagement, the Summer group still reports 11.9% and 7.5% lower confidence in both 'Design Skills' and 'Design Process', respectively. What's more, they also report less consensus among the group, with about 7% and 13.5% higher standard deviation, respectively. Further investigation may point to a correlation between consensus and confidence. The Foundations group, having spent a greater time period together, in a more immersive learning setting, is in closer agreement about their level of preparedness. This level of congruity may buttress their own confidence in their level of preparation.

CONCLUSIONS AND DISCUSSION

The COVID-19 pandemic continues to remake the ways in which we engage with students and deliver the content of architectural education. Some impacts are insidious and yet-to-be-revealed; others yet are urgent, productive disrupters that may bring about indelible change. This impact is particularly acute among First-Year programs, as they form the

genetics of a professional program. At play here are divergent emphases on digital and analog production. On their own, the advantages of manual and digital skills will remain a point of spirited debate among faculty. What we are concerned with here is less the merits of each in isolation, but rather the qualities of each inasmuch as they prepare undergraduate students for subsequent levels of architectural education.

One potential involves teaching methods and emphases. The question of 'manual vs digital' is only ostensibly about media; it invites us to discuss methods for teaching and learning. Sunil Bald describes the "four i's" of student work: intention, intuition, iteration, and integration. He suggests that analog work emphasizes the former two and digital the latter[1]. Freed from the constraints of physical media, students are able to more quickly engage in design workflows, as evinced by comparison of similar Foundation and Summer Design projects. An interview with the Second-Year teaching faculty corroborates this. They find that the copy/paste attitude of digital media accelerates the iterative and permits a deeper level of project development. At risk, though, are the first "i's": intention and intuition. Digital tools don't easily allow for indeterminate decision-making and can usurp these initial design reactions. Here again, the Second-Year faculty emphasized the value of rough, rapid sketching as an antidote to the precision of tools like AutoCAD and Rhino.

The combination of analog and digital tools suggests a renewed emphasis on workflow. Removed from the physical studio setting, students cannot easily engage in free-flowing shifts between media. In a remote, digital, and relatively isolated setting, students must be cognizant of the tools they select to compose a workflow. There are two demonstrable effects of this. First, because their decision-making is built on minimal experience, students may feel less confident in the workflows they construct. They cannot readily observe their peers engaged in similar activities and receive the affirmation by osmosis that the physical studio provides. This may help to explain why, per the survey results, the Summer Design students are generally less confident in their level of preparation despite, per the Second-Year faculty interview, having more consistent quality in their work. Therein lies the second effect, that more regulated workflows create a more consistent level of student preparedness. The Second-Year faculty corroborate that, compared with years past, the current cohort is remarkably consistent.

The shift to digital tools and remote learning may bear out as equalizers among otherwise disparate groups. Here, by obviating housing and relocation costs and the need for expensive software purchases, we endeavored to create an economically accessible program. This effort, intertwined with a renewed emphasis on digital literacy, will have a lasting impact on the First-Year program. The summer 2021 program has already been planned as an entirely remote, digital curriculum, and

this model may persist in a post-COVID-19 environment. Ultimately, this may impact both the skillset of a graduating class and its demographic composition.

If the pandemic-driven conditions have created parity among a single institution, there may be an analogous, trans-institutional impact as well. NAAB seeks to develop this consistency, to enhance "value, relevance, and effectiveness of the profession" while harmonizing "standards and processes" among U.S. programs[2]. The lack of consistency is made plain in entry-level curriculum, at turns called 'First-Year', 'Foundations', and 'Pre-Architecture' across institutions. Here, NAAB's reach is limited as schools introduce their bespoke pedagogy. And yet for all their idiosyncrasies, perhaps a great irony of COVID-19's impact is that isolation has fostered more similitude among programs as they work within newly-curbed toolsets. Far from homogeneity, this may foster empathy within the discipline, welcome now more than ever.

ENDNOTES

1.   Frank Melendez, *Drawing from the Model: Fundamentals of Digital Drawing, 3D Modeling, and Visual Programming in Architectural Design* (Hoboken, NJ: John Wiley & Sons, Inc., 2019).

2.   "2019 Annual Report on Architecture Education," National Architectural Accrediting Board, accessed October 1, 2020, https://www.naab.org/wp-content/uploads/2019_NAAB-Annual-Report.pdf.

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