Critical Explorations of Architecture Education in a Rapidly Changing World: Cross-Cultural Considerations of the Double-Edged Sword of Professional Competency and Global Citizenship

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ABSTRACT: Our world is in dynamic upheaval, in part reaction to interconnectedness and virtuality and in part response to escalating crises, including a global pandemic, climate change, unbridled politics, regional conflicts and seemingly broken moral compasses. Within this cyclone of change, architectural education struggles to equip students to cope with uncertainty and compete internationally. While in many ways, across countless jurisdictions, architectural education continues building upon conservative Ecole des Beaux Arts foundations, the authors suggest new modes of operation are crucial. The study, initially informed by authors' experiences in administration, leadership, teaching and research, critically examines Pedagogy, Process, and Product, in accredited architecture education, in Canada and Qatar. Understanding the status quo proves insufficient and inadequate, the research deploys methods to build understanding and shape redesign of curricula: critical examination of literature, comparative curricular analysis in two cases (Canadian + Qatar programs), and cross-cultural assessment of context, conditions, regulations, and aspirations. Research then builds upon analysis, guiding formulation of a new model for design education tackling dual-pronged goals of instilling professional awareness, skills and knowledge while shaping global citizens who understand complexity, are versed in cultural difference, and equipped with ethical knowhow. Daunting challenges of preparing capable professionals while shaping informed citizens prove urgent, timely and consequential. The research considers accreditation, relevant in North America and the Middle East, with such objectives in mind, questioning key curricular content including liberal arts, international affairs, emerging technologies, digital making, cultural qualities, and development of student world and self-views. The paper presents a series of views, speculations and provocations that serve as a springboard for a broader research agenda. The authors, drawing on their extensive administrative experience and research interpretations, propose a conceptual framework uniting disparate subjects and considering ethos of intense uncertainty, while transcending local focus. While local knowledge remains vital to equations of design, increasingly architects regardless of location must deploy evidence-based design, understand the ways of others, accommodate change, and be willing to assume, articulate, exercise, and defend their modus operandi.

KEYWORDS: Architecture, Education, Pedagogy, Ethics, Systems, Innovation, Holism

PAPER SESSION TRACK: Inclusive Urban Landscapes.

INTRODUCTION

"In the beginning, new ground must be carefully prepared; the old growth and underbrush removed; the soil tilled and raked; seeds planted; fertilizer spread; water provided in adequate amounts; while the sun provides ultraviolet and infrared rays creating a warm environment. When all this has been done through long hours of labor and required intervals of germination, a new young tree emerges. Eventually this young tree will bear fruit to reward those who have labored in the vineyard. It would be foolish to chide those who are preparing the soil and planting the seed because there is yet no fruit. It would be unwise to water too much or allow the sun to parch the land. When the time has come, the fruit will be ripe and its substance will sustain those who harvest it. So it is with knowledge." Eberhard, 2007 [i]

Our modern ethos, both locally and globally, encounters rapid change, mounting pressures, and growing uncertainty and unpredictability. While in past eras there was a sense of certainty and stability, in part due to comprehensible levels of progress, today the realities are far different: flux is turbulent, growth is dramatic, and assaults are incessant. Of course, avoiding nostalgic posturing, not all these shifts have been negative or limiting. In fact, many of the societal shifts have been encouraging and inspiring, including heightened awareness around social + spatial justice, design equity, demographic diversity, tolerance, and inclusion. That said, there are of course many troubling trends that give us pause to consider our trajectories and the implications of our actions in both the short and longer terms. While on one hand global civilization leaps forward in realms such as technological inventions and medical advancements, on the other hand many regressive moves and disturbing directions seem apparent. Complexity is overwhelming and the scale of crises (often catastrophes) proves incomprehensible. Rising seas of data and tsunamis of information

do not automatically equate to growing knowledge and greater wisdom. In fact, the erosion of common sense and the degradation of understanding frequently seems real, dispiriting and disconcerting.

Into this rich mélange falls higher education, charged with the nurturing of future generations, the inculcation of expertise, the building of skills, the production of knowledge, the development of leadership and, hopefully, the cultivation of civil behavior. In a world where right and wrong become increasingly nebulous terms, higher education needs to provide guidance to future citizens who stand to inherit a profound, difficult, and threatening mess. While we commonly focus on skills before knowledge, and knowledge before wisdom, the tide must turn. The authors define wisdom as the coupling of head and heart. Universities, and their constituent programs, too commonly preference the head over the heart -- finding comfort and safety in the readily quantifiable, the quickly countable, and the overtly rational. However, the real leaps concerning our contemporary conditions, and advancement on our human journey, will come more readily and with greater impact only if we can bridge to the other side -- namely, a conscious embrace of the more qualitative, the less calculated, the more emotional, the more intuitive and the more subjective. Clearly the formula we espouse is not an either/or proposition but rather a both/and necessity. The modern mantra states, “If you can’t count it, it doesn’t count.” Such a narrow perspective has, in many ways, ushered in our present era of dilemma and disaster. Endemic fragmentation and heightened specialization have, undeniably and paradoxically, contributed to our inability to address modern problems easily and effectively. For example, while computational technologies have brought us great powers and introduced unimaginable capabilities, they have also contributed to an exponential burgeoning of often unmanageable problems (e.g., disinformation, predatory action, conspiracy theories, etc.). Considering this quagmire, it is vital to interrogate the mandates and methods of higher education, and to critically question the potential of the academy to right the ship. Universities hold positions of extraordinary privilege in societies around the globe -- with power and privilege comes responsibilities and accountabilities. When one wields exceptional force, as individuals and as institutions, the hope is that such might is used to realize progress, success, betterment, justice, enlightenment, and the like.

Embedded within higher education, and the central focus of the present paper, is architectural education. While humankind has in perpetuity sought shelter, only in recent centuries has the knowledge of design and construction migrated to institutions of higher learning. Shifting from the sanctum of the guilds to the classrooms of universities, architectural education has evolved to address and manage the growing technical demands of building. This path of formalizing education has been rich and productive. Enshrining professional competency in statues and legislation has afforded society protections needed for user health, safety, and welfare. Education, in response, has increasingly responded to demands and expectation inherent to self-governing professions, including architecture. In many ways the means to reconcile education and practice was through standardization and accreditation. Across the planet schools of architecture have sought, and subscribed to, rigorous ways of fostering quality, consistency, and efficacy in their curriculum. Debates have raged around the levels of standardization that are appropriate, reasonable, and effective. Over time the pendulum has swung back & forth from more liberal education to more technical training, and from more interdisciplinary posturing to more discipline-specific emphasis. The world, especially since the millennium, has transformed in dramatic ways and to unforeseen degrees. The present paper critically considers the state of affairs in architectural education, viewed through two distinct lenses based on culture, context, geography, and philosophy. It presents a series of positions developed by the authors and informed by research, experience, and argumentation.

2.0 DELIMITING THE APPROACH

Architectural education is very complex, bringing together an array of learning objectives while ultimately endeavouring to prepare graduates to enter the marketplace to pursue careers in the design professions, the construction industry, and associated fields. The present paper provides an account of the opening phase of a longer term, multi-faceted study of education in light of prevailing pressures and emergent forces. As such it is preliminary in scope and only moderate in depth, relying on available information. Future phases will include surveys, interviews, focus groups and more detailed analyses of policies, procedures, and principles across multiple global regions. For the purposes of this initial exploration the focus was placed on two regions and countries therein -- namely, North America with the case of Canada, and the Middle East with the case of Qatar.

2.1. Goals

As an exploratory project, the research was concerned most fundamentally with scanning the landscape of architectural education in two particular cases, with interpretation informed by an understanding of the parameters and forces in society that influence and shape behavior (e.g., individual, collective, political, legal, etc.). The goals for the present study were:

- Build awareness of societal forces to which architectural education should be reacting and responding;
- Critically consider the strengths and weaknesses of architectural education in light of such awareness;
- Develop a model (i.e., roadmap to competency) for guiding architectural education in a manner which synergizes with societal needs + expectations.

2.2. Research Methods

The current project comprises a pilot exploration deploying qualitative measures to illuminate dimensions and characteristics of a changing society, and of architectural education in arguable need of change, to better guide and structure future study

in this area. It is an initial series of probes, scans, and speculations intent on shaping a larger and longer cross-cultural study of architectural education. While the authors come from very different countries, contexts, and circumstances, they share common experiences, pedagogical posturing, and administrative acumen. The methods utilized in the present study were:

- Critical examination of literature pertaining to the big issues facing modern society (e.g., keywords such as climate change, social upheaval, public health, economic recession, social inequity, etc.);
- Comparative analysis of architectural curricula at selected schools in Canada and Qatar;
- Case studies of context, culture, regulations, and conditions prevailing in Canada and Qatar;
- Logical argumentation in the interpretation of the relevance of big societal issues to current architectural curricula;
- Synthesis, Inductive Thinking and Design of a Conceptual Framework for advancing architectural education.

2.3. Structure and Anticipated Outcomes

The present paper includes a summary of research into societal issues, followed by brief considerations of the cases of Canada and Qatar, and then culminates in the authors' Conceptual Framework. While the initial deliverables arising from the paper comprise a base understanding of society, curriculum, and a frame to bridge the two, the longer team impacts include the reform of architectural education (addressing robust and resilient pedagogy, reform of accreditation regimes, and the more potent preparation of graduates for practice and leadership in a changing profession, a transforming market, and a very different world).

3.0 DELINEATING THE CHALLENGES

> *"We perceive atmosphere through our emotional sensibility - a form of perception that works incredibly quickly, and which we humans evidently need to survive. Not every situation grants us time to make up our minds on whether or not we like something or whether we might be better heading off in the opposite direction. Something inside us tells us an enormous amount straight away." Zumthor,2010* [ii]

A high-level scan of the literature around key issues revealed a rapidly escalating milieu of change -- one that is turbulent, unpredictable and, in many ways, disconcerting and often frightening. In this section of the paper some of the more pressing and critical issues are presented.

3.1 Society

Over past decades societies around the globe have been rapidly transforming, in many ways in worrisome directions. The implications of escalating greenhouse gas emissions are well known, including of course global warming and climate change. Architects, and the associated building sector, have been major players in this environmental deterioration. Without question, architects must now play a key role in righting the wrongs and in moving from destruction to regeneration. Social unrest is another vital issue with many connections to architecture, planning and the phenomena of cities. In many countries the gaps between rich and poor are widening, with more people sliding into poverty and despair. Over much of the past century architects had limited impact on the lower ends of the income spectrum, with much of professional pursuits aimed at those with power and resources. In other words, the architectural profession was deemed to be providing luxury services, as opposed to the essential services rendered by other professions such as medicine and law. Given the gravity of environmental decline and the escalation of social inequity, architects moving forward need to nudge the needle from luxury towards essential services. Also of great significance is public and population health. Connections between the environment and health was thrown into the spotlight through the arrival of the global pandemic. It is no longer tenable for the architecture profession to turn a blind eye to the physical determinants of health. In fact, the pandemic has served to underscore the tremendous potential of design to foster wellness (physiological, mental, sociological, spiritual, and so forth) and to combat infectious disease (including water and airborne agents). The authors have written on the need for, and value in, comprehensive greenspaces & landscapes in cities as compelling catalysts for health and wellness gains. Without question modern society is in turmoil, with few moments of brightness on the horizon. That said, higher education presents a remarkable opportunity to face incomprehensible problems head on, and the prepare and equip next generations of leaders who can survive and thrive despite the bleak outlook.

3.2. Context, Culture, Hegemony and Place

While the literature review illuminated many large-scale and overwhelming challenges facing the planet, it also revealed many moments of hope, beauty, and brightness at local levels. However, in many ways even local ways are under threat, with pressures to standardize, generalize and work to lowest common denominators. In this regard, architects have key roles to play in reinforcing the uniqueness of place. The onslaught of hegemony is tough to tackle, and hard to counter. Products are pervasive, consumerism is rampant, greed is widespread, and the extraordinary is giving way to the commonplace. At the local level there remains cultural nuance that is essential to harness, preserve and promote. It is not, however, always clear who are the shepherds of such cultural richness and guardians of local personality. In some ways, due to the presence and potency of the built environment, architects are positioned to advance the cause and keep the character. Psychologists refer to the phenomena of place-attachment and place-identity. We shape the environment and it in turn shapes us. The places where we live matter intensely with respect to who we are, what we believe and how we feel. Place is space imbued with meaning. Meaning and memories, in many cases, make city dwelling magical. Even in areas fraught with conflict, or faced with devastation, place matters. Informal settlements, for example, despite their dire physical circumstances often have strong community bonds and networks of support that are remarkable. The human spirit is resilient.

As architects it is crucial to understand such dimensions of living and dwelling, including how design efforts can reinforce health, happiness, hope and promise.

3.3. Complexity + Systems

A part of the path to our contemporary quagmire was realized through intense fragmentation, endemic separation, and the erosion of holism. In earlier times problems were far more localized, far more comprehensible, and, in many respects, far more manageable. For many reasons, including most notably advances in technology, our world has been rendered smaller while our troubles have been made larger. Communication is faster. Loneliness is heightened. Mobility is greater. Stability is weakened. Sharing is easier. Misinformation is pervasive. Due to the compartmentalization of knowledge, people, disciplines, and so forth, problems grow in complexity and difficulties build in consequence. Our scan of the literature highlights problems with jargon, accountability, civility, legibility and even right versus wrong. Our world is overflowing with data and information yet faltering with knowledge and diminishing in wisdom. For sure the situation is daunting and perplexing. One remedy that is commonly noted is to pivot from fragmentation to integration. By this we mean a shift to systems thinking in an effort to both problem seek and problem solve. Many recent human-made disasters have come at the hands of highly competent professionals deploying state of the art technologies. That said, in an ethos of fragmentation the left hand fails to grasp what the right hand is doing. Modern problems are unfathomably complex, and as such warrant unreserved and intense efforts to connect the dots and piece together the puzzle. Most certainly this charge is not to a given profession, but rather necessitates a rich interdisciplinary approach to realize progress and success. It is interesting to note that many institutions in the western world, including universities, are parsed into discrete disciplines and bounded fields. However, to solve many contemporary crises such walls must drop -- permitting a creative collision of ways of seeing, thinking, and acting.

3.4. Values and Trajectory

In times of confusion, and a lack of moral clarity, there are compelling reasons to critically examine how society, and individuals therein, navigate waters of change. Recent disruptions to governance structures, and unrest within civil society, across the globe call into question the roles of higher education as commentator, as researcher, as teacher, as leader, and as reagent for constructive reform and positive change. The authors contend that such roles prove imperative at the present juncture -- the ways we educate students, and our efficacy in instilling values, developing skills, and inculcating wisdom now will determine our situations downstream. The present research aims to take a first step at understanding the conditions in place, good and bad, and to chart a path forward that better prepares architecture graduates to take the reins, welcome risk and assertively pursue better buildings, healthier spaces, nurturing communities, and higher quality of life (QoL).

4.0 EXPLORING THE CASES

In this opening stage of the research two regions were considered from a cross-cultural viewpoint -- North America and the Middle East. Within these areas Canada and Qatar were studied, with an objective to gain insights into the character of the countries and the nature of architectural education. It was accepted that these two cases differed in many ways, and in some instances to significant degrees. That said, there was also an understanding that examining distinct cases could shed light into facets that are shared and facets that vary. It was also deemed valuable to seek common ground, as pertains the need for reform in curricular and other academic spheres, that arguably transcend culture, context, geography, and philosophy. The following narratives describe some basic features of architectural education for the investigated two cases.

4.1. Canada

Architectural education in Canada, for all 14 accredited schools in the nation, is offered only at the graduate level -- there is a single accepted degree nomenclature of ‘Master of Architecture’ (M.Arch.). While there is a range of approaches to the delivery of the degree, all schools subscribe to a single accreditation regime administered by the Canadian Architectural Certification Board (CACB). The criteria for accreditation are stringent and the assessment of compliance is rigorous. Across the range of schools there are many shared qualities due to the imposition of accreditation, and an overall high level of curricular development and delivery. Arguably there is sufficient latitude within the accreditation system, such as liberal arts content provisions, to ensure each school can develop its own personality and areas of specialization or concentration.

4.2. Qatar

Architectural education in Qatar is offered via the undergraduate degree, with the degree nomenclature ‘Bachelor of Architecture’ (B.Arch). The arrival of architectural education to the country is relatively new, with curricular development following American models, and with a modified accreditation regime (International Certification) based on the National Architectural Accreditation Board (NAAB) model. It is noted that in the USA, a range of degree nomenclatures fall under the NAAB purview -- for example, B.Arch., M.Arch. and D.Arch. In Qatar the B.Arch. accreditation process, while novel, guides curricular develop and delivery, with formal adjudication based on procedures following in the accreditation of American programs.

5.0 CONCEIVING THE FRAMEWORK

"We must take on the work of facing our fears, opening to intimacy and vulnerability, and opening to the unknown, to surprise. We can learn to open to situations simply, without aggression or defensiveness. and open to the inside as well; the depths beyond the surfaces of all life." Glazer, 1999 [iii]

It is apparent that architectural education is, in many ways and across jurisdictions, unique, innovative, and effective. The studio, in particular, proves a potent pedagogical vehicle that equips students with the means to tackle very complex 'wicked' problems. In both the Canadian and Qatar cases, studio resides at the heart of the pedagogy and serves, quite effectively as the nexus for knowledge assimilation and application. In this way architectural education is an exemplar within the landscape of higher education. That said, changes in society, at all levels, are proving overwhelming, difficult and at times intensely troubling. Climate change, social inequality, and public health all stand as exceptional examples of emergencies in need of great ingenuity, understanding and resolve. While it can be argued that architectural education, and architectural practice beyond, has limited capacity to change the world -- approaching existential problems in a defeatist manner seems weak, worn, and waylaid. Instead, in the eyes of the researchers, architectural education must be reconsidered, reset, and redesigned considering shifting situations. Building from the literature reviews, considerations of global cases (North America | Canada + Middle East | Qatar), comparison of curricula + accreditation regimes, and deploying logical argumentation, the researchers proffer a conceptual framework to shape pedagogical reform.

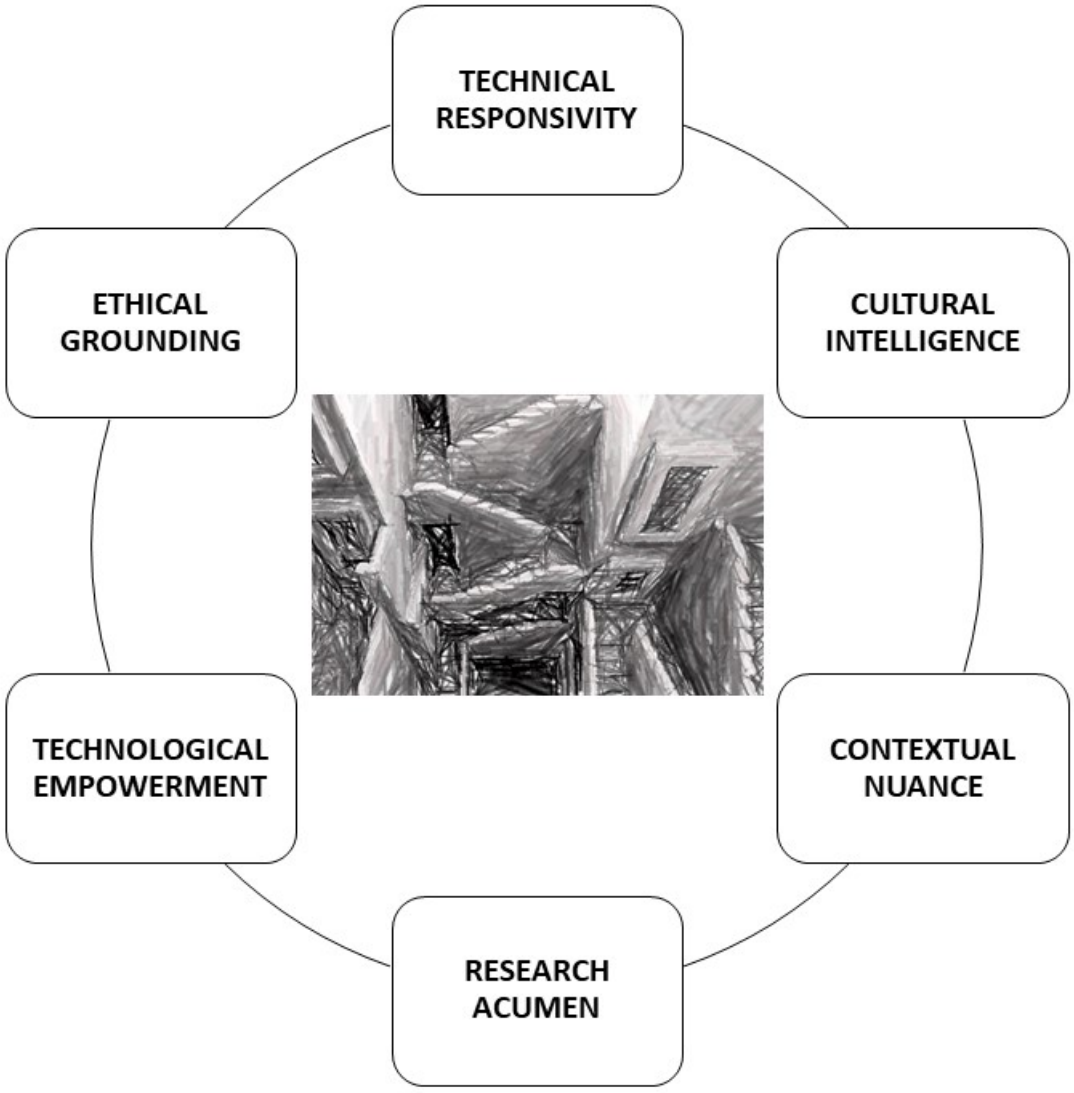

Figure 1. Conceptual Framework for Architectural Education Reset and Reform (Sinclair + Furlan 2022)

5.1 Technical Responsivity

While there have been great strides realized concerning international standards in construction (e.g., International Building Code), there remains a great need for situational responses based on climate, infrastructure, materials, oversight, etc. For example, Canada encounters intensely cold winter temperatures - which can be prolonged, damaging, and dangerous. The need for building design to respond to, and protect against, such extreme weather is profound. Conversely, Qatar sees intensely hot summer temperatures, which can prove as prolonged, damaging, and dangerous as the aforesaid Canadian winter scenario. It is important to underscore that students need training in international standards and practices in addition to being versed on local approaches and responses. Students with increasing frequency study abroad and then work abroad after graduation. Gone are the days when students work only in their home city, country, or region. Another good example of vital technological knowledge pertains to seismic design -- regardless of geological stability at home, it is critical for students to understand that some regions demand greater attention to seismic activity and deeper understanding of implications to building design. Also vital to address moving forward, in the realm of the technical, are emergent capacities around modularity, pre-fabrication, in-situ assembly/disassembly, flexibility and agility. The need for architecture to be mutable and responsive is no longer a point of debate -- sustainability concerns dictate a shift away from the static and fixed.

5.2 Cultural Intelligence

In earlier eras, when mobility was more restricted and communication more limited, nations were far more isolated and monolithic. Demographics were commonly homogenous and diversity, seen from multiple lenses, was constrained. Today, in contrast, the world is transforming in outstanding ways, with all countries encountering dramatic shifts in composition and character, in part through migration and in part through the fluidity of global commerce, trade and exchange. Seen through architectural education and its curricula, students need far more awareness of and facility with cultural richness, cultural difference, and culturally sensitive design. Canada, for example, is notable for its tapestry of backgrounds, its plurality of people, and its posture as a nation of immigrants. Regardless of location within Canada, architecture students must be able to design for diversity. Qatar, within its citizenry, is far narrower than many nations. That said, the country has a large and diverse expatriate population, drawing a workforce from around the globe. Students of architecture in this Gulf Region nation must be aware of the need to design to meaningfully accommodate people with different values, traditions, lifestyles and needs. The authors argue that regardless of location, whether Canada, Qatar or elsewhere, architectural education must introduce, cultivate and construct ‘cultural intelligence’ in students.

5.3 Contextual Nuance

A key dimension to design and planning of/in the built environment is context -- the situations and circumstances in which architecture is considered, conceived then constructed. While all schools incorporate courses that address site analysis, many schools arguably fall short in meaningful considering the melange of forces and factors that define place. For example, human behaviour, environmental psychology, and cultural anthropology are often limited as knowledge areas within the curriculum. That said, and in the minds of the authors, our grasp of context must embrace far more than physical dimensions of the places in which we design. From a systems perspective the variables in place and at play are breathtakingly many and complex. Students need to consider not only the tangible or hard features that influence design, but critically the more intangible and soft qualities that shape who we are, how we interact, what we feel, etc. From a learning perspective this includes, of course, architectural programming. However, in today’s demanding and moving milieu the knowledge imparted to architecture students must transcend site analysis and the program to also potently consider psychological, sociological, spiritual, legal, political, financial, and other dimensions that affect society and nuance situations. One of the key learning objectives in our schools, regardless of country, should be the education, development, and graduation of effective system thinkers.

5.4 Research Acumen

Societies around the globe are facing common pressures and shared expectations, propelled to act based on dwindling resources, the need for greater versatility, the demands for higher accountability, the urgency to reverse global warming, and so forth. As we are well aware, due to the gravity of global crises, there is no option for inaction. To this end, the production of architecture is increasingly under severe scrutiny with regard to such aspects as energy use, health impacts, financial viability, environmental effects, ability to be functionally modified, user accessibility (mobility, universal design, neurodiversity), etc. To meet such demands for responsibility and accountability, architects must operate on sound facts, robust knowledge, and indisputable evidence. Not only must students be educated in how to access and use the ‘right’ information, but they must also be trained in how to generate knowledge. In many schools there is limited curricular space afforded to research, including design, methods, development, and deployment. Architecture, as a discipline and profession, has an arguably shallow history of reliance on research, and especially when compared to other fields such as medicine, engineering, or law. For many students, and indeed for practitioners operating beyond the sphere of the university, there are limited contributions to and shallow reliance on peer-reviewed journals and other knowledge repositories. Students, in the authors’ view, should be well-versed around research -- the generation of knowledge, the understanding of questions, the harnessing of findings, and the reliance on evidence as fundamental to ‘good’ design. As we already witness, when the profession does not demand research acumen of its own accord, then clients, authorities with jurisdiction, the legal system, and others in positions of power and influence, will call for and demand accountability.

5.5 Technological Empowerment

Digital technology has had, and continues to have, profound impacts on higher learning, architectural education, the design & building sectors, and our world writ large. While the welcoming and embrace of computers and computation in the architecture business has been remarkable, less commendable has been our unwillingness, and perhaps inability, to critically interrogate impacts and implications of high technology on design outcomes. Plato explored the notion of the pharmakon, whereby a medicine is rendered as remedy or poison depending on application, politicization, etc. Digital technology is, of course, a pharmakon -- while it is undeniably capable of realizing positive change and improvements to our quality of life, it is also able to destabilize, prove destructive, and wreak havoc. In the view of the authors, the incorporation of digital tools and technologies within architectural curricula warrants a far more serious and consequential examination, especially in light of growing misinformation, weaponizing of knowledge, and unbridled reliance on computation as 'pervasive, infallible and all-knowing'. Without question advanced and emerging technologies hold remarkable promise to positively influence architecture and city building. That said, these same tools run the risk of negatively impacting our lives, and often in ways that are exceedingly difficult to quantify, characterize and contain. Consideration of the precautionary principle seems apropos.

5.6 Ethical Grounding

Overarching all components of our framework is the need to address ethics. Societies around the world are struggling to cope with shifting sands. While in earlier times there may have been more clarity, or at least greater shared understanding, around societal expectations, norms, and values, today there is a blurring of boundaries and growing uncertainties. While some indeterminacy, unpredictability, and uncertainty can be expected in eras and ethos of social upheaval, this lack of clarity raises the need for architectural education to wade more assertively into the debate. In previous times, where problems were arguably more bounded, society was less litigious, and cause + effect proved more legible, perhaps the education of architects could focus more on technical competency and less on philosophical, sociological, and ethical parameters of the profession, the industry, the environment, and civilization. However, it is now abundantly clear that ignoring such understanding is detrimental, unreasonable, and irresponsible. The authors contend that ethics, and the development of ethical ways of understanding and acting (the moral compass) is fundamental to architectural education in our contemporary times.

6.0 ANTICIPATING THE IMPACTS

Higher education is remarkable and commendable in many ways, not the least of which pertains to the ability of design to impact our world, including improving the built fabric, healing our natural environment, and raising quality of life positively and demonstrably. While many aspects of our education systems, and associated curricula (and notably accredited programs in architecture), have functioned well and have proven efficacious, the authors contend that structural and philosophical changes are urgently needed to better prepare students for a drastically shifting milieu and intensely uncertain future. Without question the profession of architecture is under pressure to respond to new conditions and react to unprecedented challenges. As is the case with many complex systems, professions can be slow to shift. We need to ensure we understand the changes underway, their root causes, and our options to act. Education of architects of course precedes professional practice, and as such has an overwhelming responsibility to anticipate change, grasp trends, and reform curricula to best equip students with the skills, knowledge, and values to succeed. And success, in today's turbulent and troubling times, cannot be measured merely on an individual basis but rather must aim for dramatic improvement system and society wide. While the present research is in its early phases, the aspirations of the authors is to build from the preliminary findings and understanding in an effort to influence and inspire educational reform. The issues delineated in the present paper are many, complex and intensely consequential. They will need meaningful discussion, exploration, and debate within both the academy and the profession. The conceptual framework developed through the current study is seen as a provocative starting point, and focus for, said conversations.

CONCLUSION + NEXT STEPS

> *"Equipped with the concept of heuristics and heuristic reasoning, we now can take up the task of identifying and attempting to elucidate the characteristic features of the problem-solving behavior of designers in action. Although a more phenomenological account may at times seem more appropriate to the spirit of design activity, a general adherence to the information processing paradigm of problem-solving theory will be maintained because of its breadth and precision." Rowe, 1992* [iv]

Operating within an increasingly uncertain and unclear milieu is difficult. In nations around the planet, we see destabilization, tensions, conflicts, and challenges at levels unanticipated and generally unwelcomed. It is difficult for us, at both individual and societal levels to understand how to react. Psychologists refer to the phenomena of 'learned helplessness', whereby being confronted with problems that seem unsolvable, or unchangeable, results in the giving up of hope. When people feel that they cannot influence a situation they will abandon efforts and direct energies + resources elsewhere. Architecture has been an undeniable player in several our planet's current crises. That said, design has unparalleled potential to act to good ends. Now is not the time for feeling helpless, disenfranchised, or disempowered. To the contrary, architectural education needs to seize the reins, develop relevant knowledge, instill leadership, and empower students to act. The present paper presented a series of pictures, preliminary in extent and speculative in direction, intent on characterizing global challenges,

illuminating opportunities to problem solve, and conceptualizing an education ethos that could make a greater difference. The current research aimed to develop a frame and associated understanding that could inform and influence a broader and deeper cross-cultural study of architectural education, especially considering our perplexing and demanding times. The research engaged in a scan of the landscapes of design education with an eye to culling out key areas of impact and value, which should be addressed as reset and reforms are contemplated. It intentionally aimed to raise more questions that it answered and seeks to construct a base for future work that aspires to improve the ways we teach and learn about design. The goal for today was to grasp the gravity of our challenges and better understand possible next steps. The aspiration for tomorrow is to enact modifications to curricula, adjust program structures, and transform education in ways that more fully accommodate and more effectively address a rapidly changing globe.

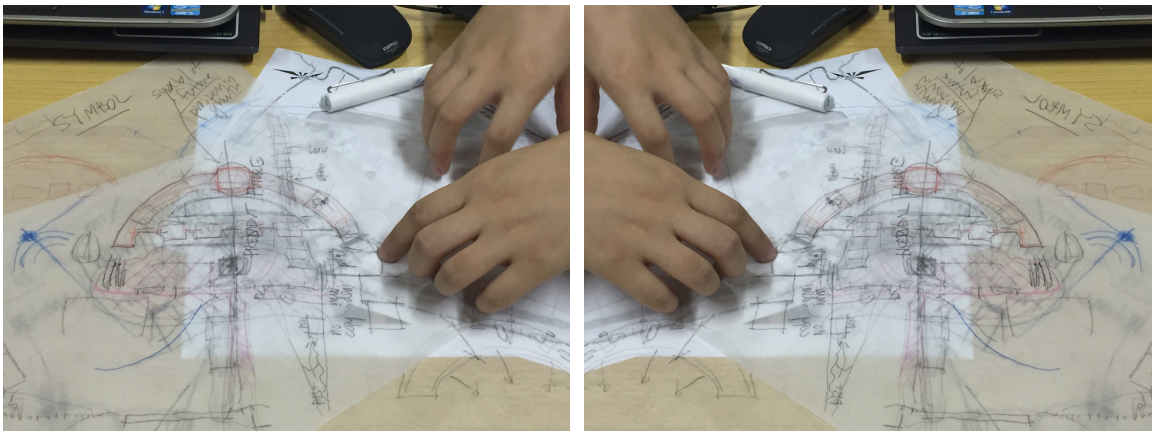

Figure 2. The Potency of Design and the Power of the Studio (Sinclair, 2022)

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