In Our Own Words: Climate Change Education in Architectural Curricula in the United States

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This paper attempts to understand how National Architectural Accrediting Board (NAAB) accredited schools of architecture and their faculties have referenced climate change action in required published statements, including school mission statements and faculty biographies. This paper will limit its scope to the first phase of the study, focused on schools in NAAB Region 4, the East Central Region. The paper will present figures and statistics noting the frequency of key terms, while ranking the term value based on internationally recognized documents on climate change action. These findings serve as an initial indication of the level of engagement of architectural educators with climate change action in architectural curricula. The information collected by this study is intended allow the community of architectural educators to better understand the current state of architectural education with respect to this matter, to prompt departmental conversations and commitments, and to ultimately better prepare future architects to address the role of the built environment in the global climate crisis in this time of urgent need.

INTRODUCTION

Climate change is a cardinal issue in contemporary discourse. The recent release in March, 2023 of the United Nations Environment Programme's Climate Change 2023: Synthesis Report (often referred to as the UN Climate Change Report) received significant attention from global news sources. This report, based on years of work by hundreds of scientists in the international community, provides an up-to-date, thoroughly researched, and broadly-accepted understanding of the current state of the global climate, and outlines actions necessary to address climate emergencies. The findings of the report confirm that "humans are responsible for all global heating over the past 200 years leading to a current temperature rise of 1.1°C above pre-industrial levels, which has led to more frequent and hazardous weather events that have caused increasing destruction to people and the planet."[1] The report also indicates that it is still possible to limit temperature rise to 1.5°C to avoid more extreme, disruptive, and destructive consequences, but

states the "critical need for action that considers climate justice and focuses on climate resilient development" and is "required across sectors and by everyone at all levels" to achieve this aim. [2] Among the sectors that must take action is the building and construction industry, which is responsible for over one third of global carbon emissions, with building operations alone accounting for 30% of emissions in 2022.[3]

Some facets of the architecture industry appear to recognize its responsibility in contributing to climate change, and the last two decades have seen the rise of initiatives like Architecture 2030 and the Architects Declare movement. The American Institute of Architects ratified Resolution 19-11, declaring an "urgent imperative for carbon reduction" and have been developing various efforts and initiatives to increase climate awareness and climate action among members. [4] It is not clear, however, that this heightened attention has resulted in an increase in the ability of architects to effectively engage in carbon reduction in practice. In 2017, Architectural Record conducted an online poll of architects to measure their understanding of climate change. The answers from 547 respondents suggested that architects are in agreement about the need to address climate change. Over 86% of respondents answered that climate change mitigation was either "very urgent", or "the most urgent challenge of our time." [5] This same poll demonstrated, however, that respondents had an imperfect understanding of the causes of climate change, and fewer than 50% were able to identify that buildings are the primary contributor to climate change. [6] Architectural educators are perhaps best positioned to redress this knowledge gap and effect change in architectural practice by equipping students (the architects of the future) with the requisite knowledge of climate change and the tools to achieve decarbonization in building design.

THE PREMISE

Over the past decade, the authors have taught architectural design and technology courses at three different institutions in the United States, have served as visiting critics at several others, and have attended numerous academic conferences. From this vantage point, it is not readily apparent that a majority of institutions have made climate literacy and action a mainstream and integral part of architectural curricula. In order to test this

observation, the authors have undertaken a survey of the language found in the websites of accredited institutions.

THE APPROACH

The National Architectural Accrediting Board (NAAB) for architecture schools in the United States requires specific written statements to be publicly posted. This includes faculty biographies and the mission / vision / values statements of the academic unit which may be a college, school or department. This research surveys these required online documents noting language that indicates a focus on climate change in architectural instruction. Analyzing the words that educators and administrators choose to convey their priorities, beliefs and values serves as one way to reveal the prevalence and importance of climate action in current architectural curricula.

CAVEATS

It should be noted that, in the following survey, all published statements and language are taken at face value, as representing the self-identified values, and priorities of each respective institution, and the teaching and research foci of each respective faculty member. The scope of this work does not include qualifying or fact-checking any such language. It is understood that there are very likely some "false positives" included in the results - where terminology deemed to indicate a focus on or concern with climate education may not bear out in the actual instruction. On the other hand, negative results – the complete lack of language addressing climate action or decarbonization - will be a telling and a clear indication that climate action and carbon reduction are not high priorities.

It must also be stated that these findings are limited by the available information. It is noted, for instance, that not all faculty listed in an institution's website have a posted faculty biography. This is particularly common with non-full time faculty, such as adjunct faculty, lecturers and professors of practice. In several instances, only tenured and tenure track faculty are included in the faculty listing for the academic unit. Furthermore, it can be assumed that not all faculty biographies are regularly revised and updated. In some cases it is also apparent that non-architectural faculty that do not teach architectural courses, but are nonetheless administratively organized within the school, college, or department are included in these results due to a lack of obvious means of differentiation in some programs. As the authors had no clear and equitable means to differentiate the non-associated faculty in the conglomerated departments, the entire listed faculty for the architectural academic unit were included in the study.

Understanding these inherent limitations, these findings are presented as a "snap shot" in time. The study is intended to take the temperature of current priorities in schools of architecture in the United States regarding climate action instruction, not as an absolute assessment of the efficacy, depth or retention of student learning in these areas. The institutions and individuals within this study have been anonymized through a numbering system that is keyed to the data set. The intention of this report is not to finger pointing or name and shame individual institutions or faculty members. The report has been created with the hope of increasing awareness and fostering critical consideration and frank conversation about efforts to meet the urgent imperatives of the global climate emergency through architectural education.

SCOPE

This first phase of the survey is limited in nature. In order to test and refine the information gathering and assessment methodology, the scope is confined to a single geographic region – the East Central region as defined by the National Architectural Accrediting Board (NAAB). This organization provides independent accreditation and oversight of architectural professional degree education in the United States and Puerto Rico, as well as a select number of international institutions. The East Central region includes seven US states: Illinois, Indiana, Ohio, Michigan, Kentucky, Tennessee, and Wisconsin. Included in these states are twenty-three educational institutions: Andrews University, Ball State University, Bowling Green State University, Illinois Institute of Technology, Indiana University, Judson University, Ferris State University, Kent State University, Lawrence Technological University, Miami University, Ohio State University, School of the Art Institute of Chicago, Southern Illinois University, University of Cincinnati, University of Detroit Mercy, University of Illinois at Chicago, University of Illinois, Urbana-Champaign, University of Kentucky, University of Memphis, University of Michigan, University of Notre Dame, University of Tennessee-Knoxville, and University of Wisconsin-Milwaukee. [7]

This region was selected as the authors' home region within the accrediting body, and as a region with notable diversity in several categories. The East Central region encompasses states located in the geographic North and South of the United States, with a mix of industrial and agrarian economies. The included institutions contain examples of public and private institutions, large and small institutions, faith-based and secular institutions, and are situated in diverse locations representing major cities, suburban areas, and smaller towns. This sample of 23 of the 139 NAAB-accredited schools in the United States and Puerto Rico, represents roughly 1/6th of NAAB-accredited institutions.

METHODOLOGY AND HIERARCHY OF TERMS

This study was conducted remotely, and all documents were accessed through the official websites of the academic unit. The entire text of the element (mission statement or faculty biography) was copied into a large spreadsheet for later analysis. The date of information access as well as the full web address used to access the information are tracked, and associated with the text being analyzed.

As findings were compiled and analyzed it became clear that establishing a hierarchy of value for different terms would be

necessary. One of the initial concerns about the project was that generic terms would create a greenwashed result, implying greater engagement and commitment to climate change education in the built environment than was actually occurring in the classroom. The system adopted to attempt to deal with this issue involves the establishment of a hierarchy of relative term values. Terms referencing climate change action are divided into three value categories. The categories used are: high value terms, moderate value terms, and low value terms. This categorization approach allows for the differentiation of broad or generic terms associated with climate change education from terms that indicate either a clearer emphasis on climate change, or a more precise indication of education around specific concepts, strategies, and topics that directly address climate action. Brief descriptions of the weighting logic with example terms from each category are included below.

High Value Terms are those that clearly indicate awareness of and attention to climate change action, carbon reduction and resilience in the built environment. Terms deemed high value are those that align with the language used in the UN-IPCC Climate Change 2023 Report. [8]

> Examples of High Value Terms included in the study documents: *climate change, environmental justice, resilience.*

Moderate Value Terms are those that identify specific topics or concepts that play a role in climate change action, carbon reduction or resilience, without addressing the full breadth of the issue. Terms contained within this category include many measurable and quantifiable approaches.

> Examples of Moderate Value Terms include: *energy modelling, high-performance building design, renewable energy.*

Low Value Terms are those that indicate broad interest or support but are lacking specificity with regard to the problems and solutions. Terms in this category are associated with greenwashing, and noted as particularly suspect with regard to current and relevant content being included in classroom instruction.

> Examples of Low Value Terms include: *green, sustainable, ecological, environmental.*

FINDINGS: SORTED BY INSTITUTION
The authors view the inclusion of moderate value or high value terms (shown as Moderate+ terms in the graphics) as a likely indication that the program and/or faculty making the statements are aware of the issues involved with addressing climate change in the built environment and are committed to transferring this knowledge to students. In the graphics and analysis following, the term analyses are grouped to show this

distinction. Initially, all terms are included in graphics noted as using Any Term. This includes all terms of any value found in the analyzed texts. The second sorting eliminates low value terms, to include only moderate and high value terms, and is indicated as Moderate+ in the graphics. The final sorting only includes high value terms and is indicated as such in the analyses and graphics.

The two graphics on the following page are summaries of the study. The first graphic (Fig. 1) summarizes the term inclusion, frequency and quality of terms in architectural program mission statements by academic institution. The quality of the term is represented by color, with a darker color representing a higher value term. Of the 23 schools in the study, slightly better than 1/3 of the institutions (8/23) had any term mentioned. This count includes the low-value terms noted in the previous section as a dubious indicator of awareness and commitment to climate change action in the classroom. Read another way, 2/3 of the schools in the study have *no mention at all* of the role of architecture in climate change, or any environmental commitment or priority by the teaching unit. Three of the 23 schools (13%) include a Moderate+ term in the academic unit mission statement, and only two of the 23 schools (9%) include a high value term. One institution included two high value terms, which slightly inflates the count when aggregated as a whole region, instead of grouping by program.

The second graphic (Fig. 2) depicts the number of faculty biographies that mention a term related to climate change action relative to the number of faculty listed in the academic unit. The quality of the term is represented by color, with a darker color representing a higher value term. When a single faculty member included terms from more than one term value category, their biography was categorized according to the highest value term used.

Viewed as academic units, approximately 2/3 (15 out of 23) of the programs have at least one faculty member biography including a moderate or high value term. When sorted to only include high value terms, the number of academic units with at least one faculty member including a term drops to approximately 50% (11 out of 23 programs.) Of the schools included in the survey, more schools (8) have no Moderate+ value term listed in any faculty biography than schools (2) that exceed 10% of the faculty with any value term, or schools that approach this benchmark (four additional schools at nearly 10% of faculty.)

Of the 23 schools in the study, 30% of schools met or exceeded 10% of their faculty including a moderate or high value term in their biography. Read another way, for 70% of schools in the study, 90% or more of faculty members indicated no teaching or research interest in the role of the built environment in the impending climate crisis. Moreover, in 30% of schools in the study (7 out of 23) there is not a single moderate or high value term inany faculty biography.

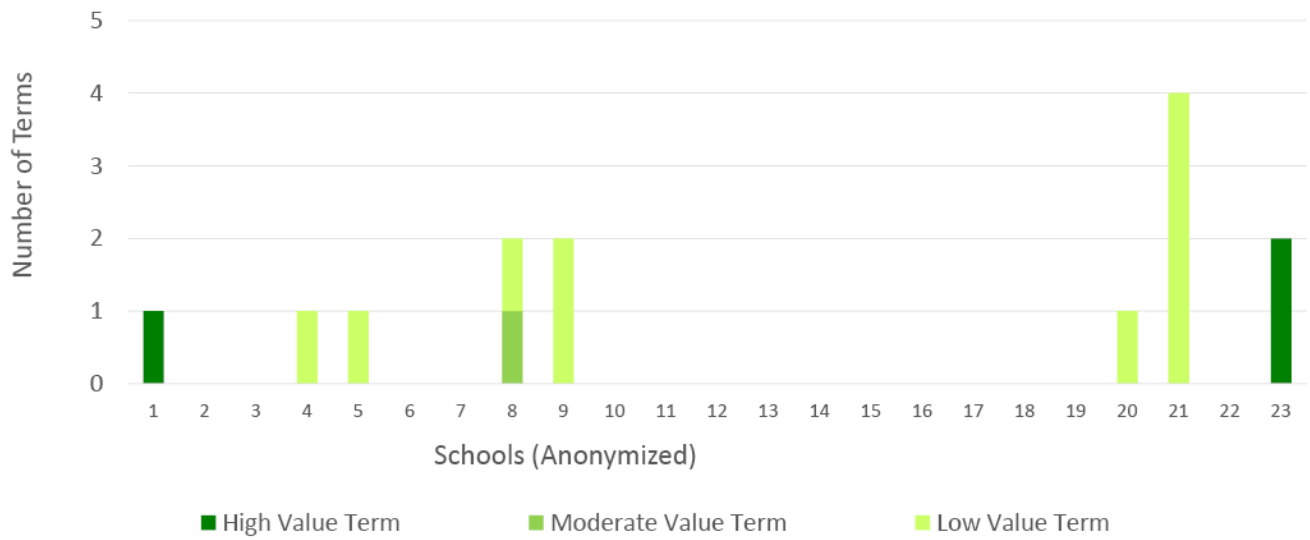## Terms Appearing in Mission Statements & Dean/Chair Statements

Figure 1. Bar chart noting the frequency and quality of climate action terms appearing in academic unit mission statements by institution. Image credit: Authors based on data gathered from [9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 27, 28, 29, 30, 31, 32, 33]
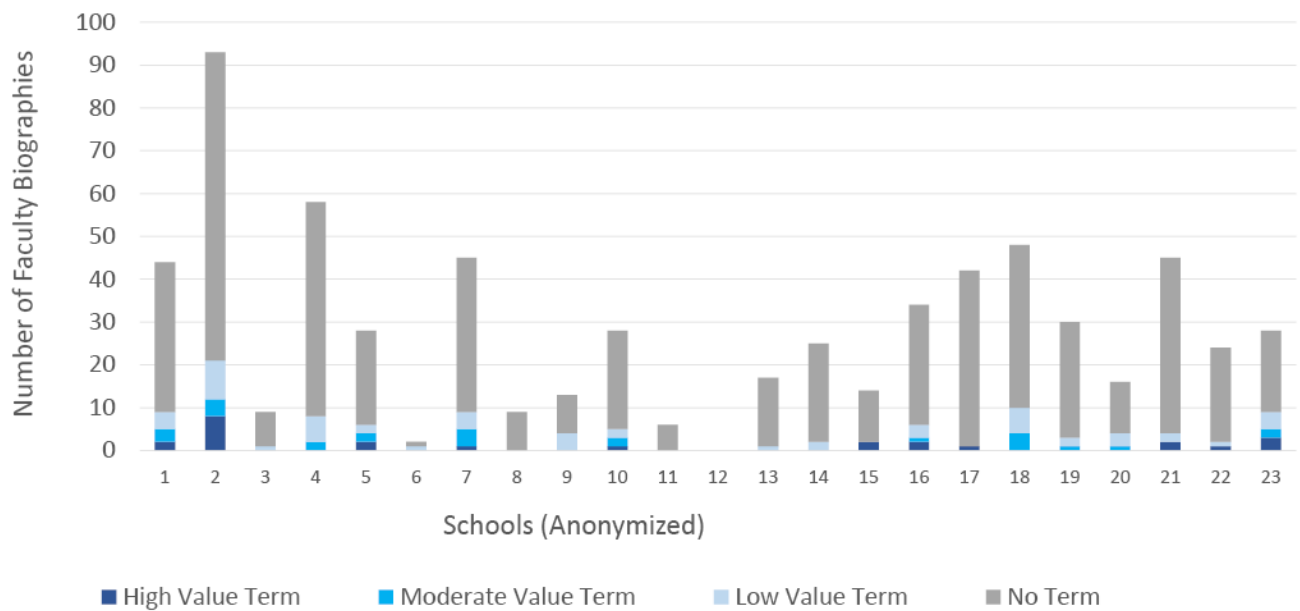
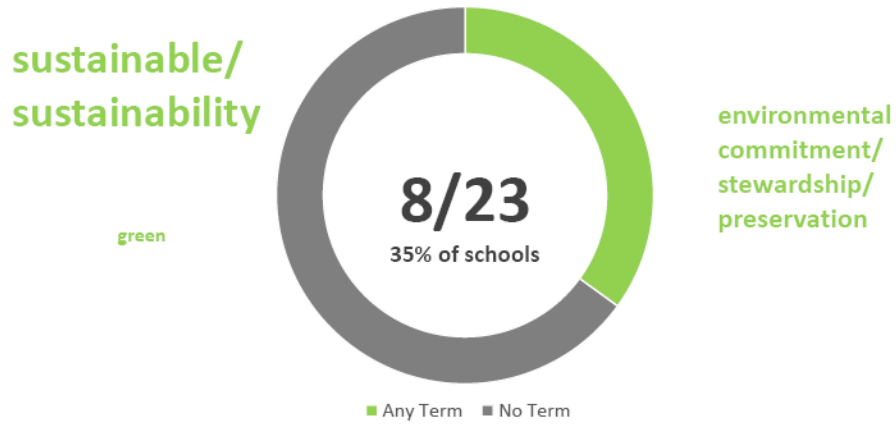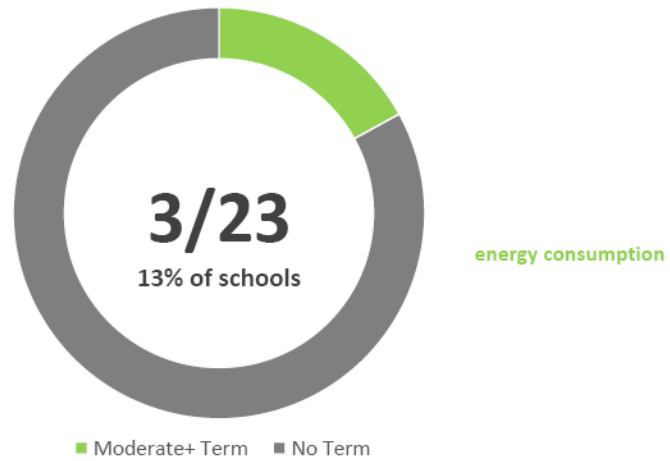## Faculty Biographies by Term Value

Figure 2. Bar chart noting the frequency and quality of climate action terms appearing in faculty biography statements. Image credit. Authors based on information gathered from [34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56]

Percentage of Schools with Any Term in Mission

**sustainable/
sustainability**

green

8/23
35% of schools

**environmental
commitment/
stewardship/
preservation**

■ Any Term ■ No Term

Percentage of Schools with Moderate+ Term in Mission

3/23
13% of schools

energy consumption

■ Moderate+ Term ■ No Term

Percentage of Schools with High Value Term in Mission

resiliency

**environmental/
climate justice**

2/23
9% of schools

climate change
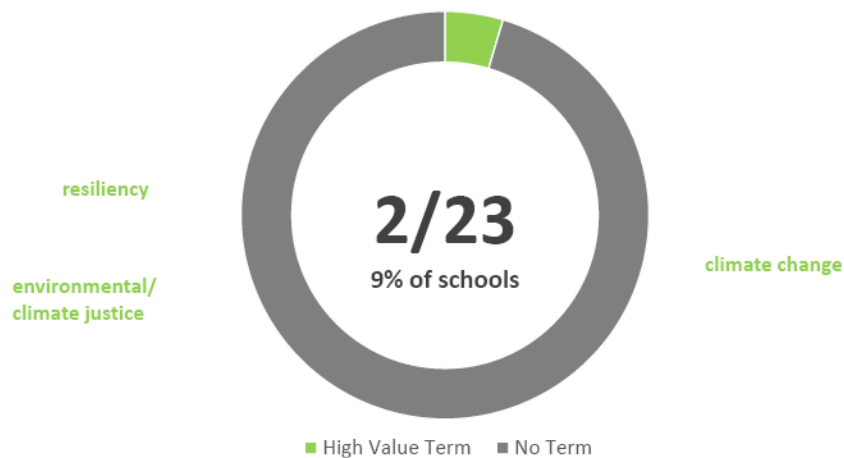
■ High Value Term ■ No Term

Figure 3. Pie charts showing the number and percentage of programs with terms by quality and word clouds of terms included.
Image credit: Authors with data gathered from . [9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33]

Percentage of Faculty with Any Term in Bio

sustainability/
sustainable...

stewardship

ecology/
ecological

16% of faculty
108/658 faculty

environment/
environmental...

low impact

green...

global resources

■ Any Term   ■ No Term

Percentage of Faculty with Moderate+ Term in Bio

climate refugees/
climate risk

low energy/
energy
efficiency/
energy
conservation

energy modeling/
simulation/analysis

solar

8% of faculty
51/658 faculty

building
performance/
high performance

energy modeling/
simulation/analysis/ life
cycle assessment

energy/ renewable
energy

passive

photovoltaics

natural ventilation

■ Any Term   ■ No Term

Percentage of Faculty with High Value Term in Bio

climate action/
climate change/
climate
adaptation

emissions/
greenhouse gas

environmental justice

4% of faculty
25/658 faculty

zero energy/
net zero

resilient/ resilience

carbon reduction/
neutrality/
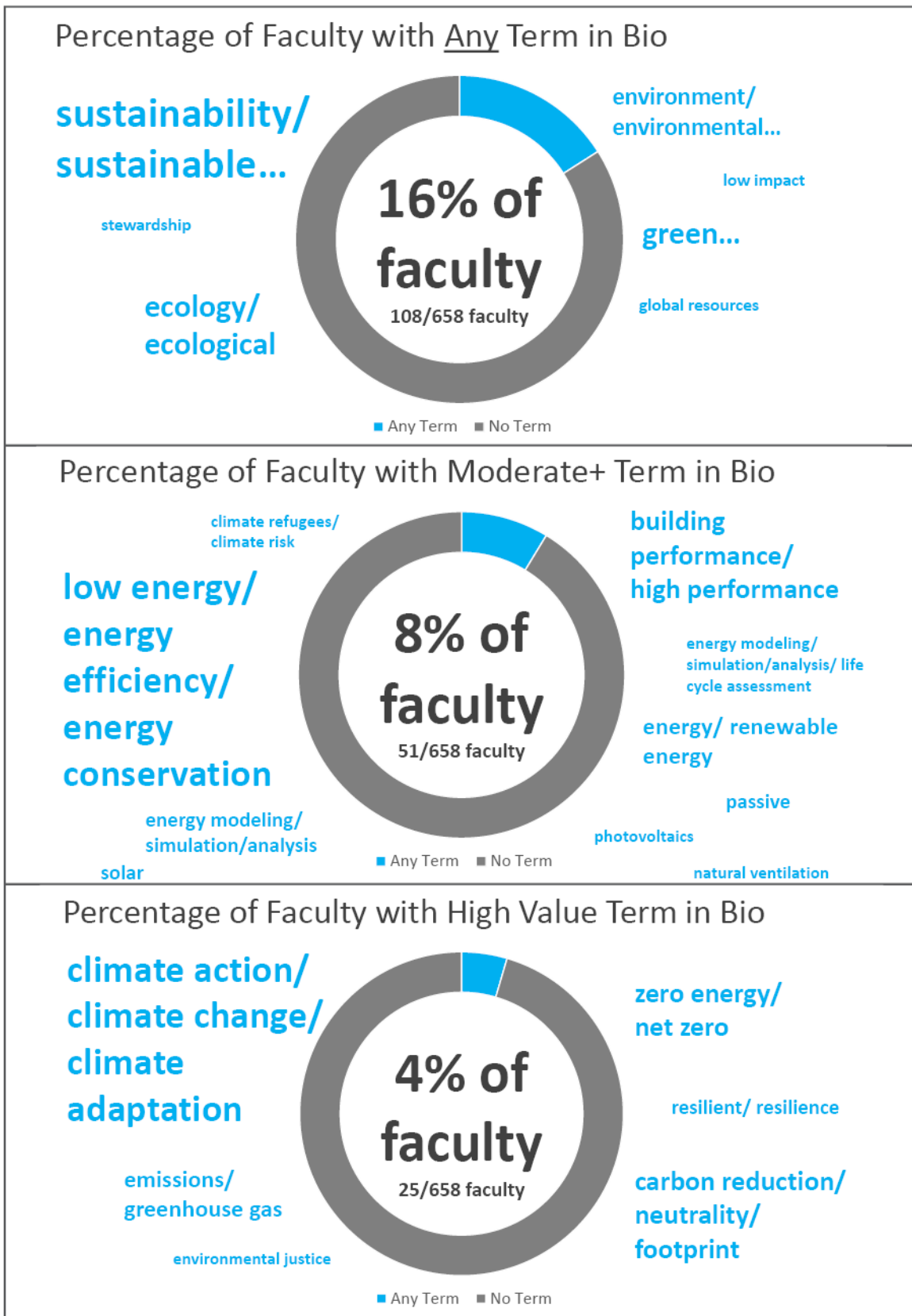footprint

■ Any Term   ■ No Term

Figure 4. Pie charts showing the number and percentage of faculty biographies with terms by quality and word clouds of terms included.
Image credit: Authors with data gathered from [34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56]
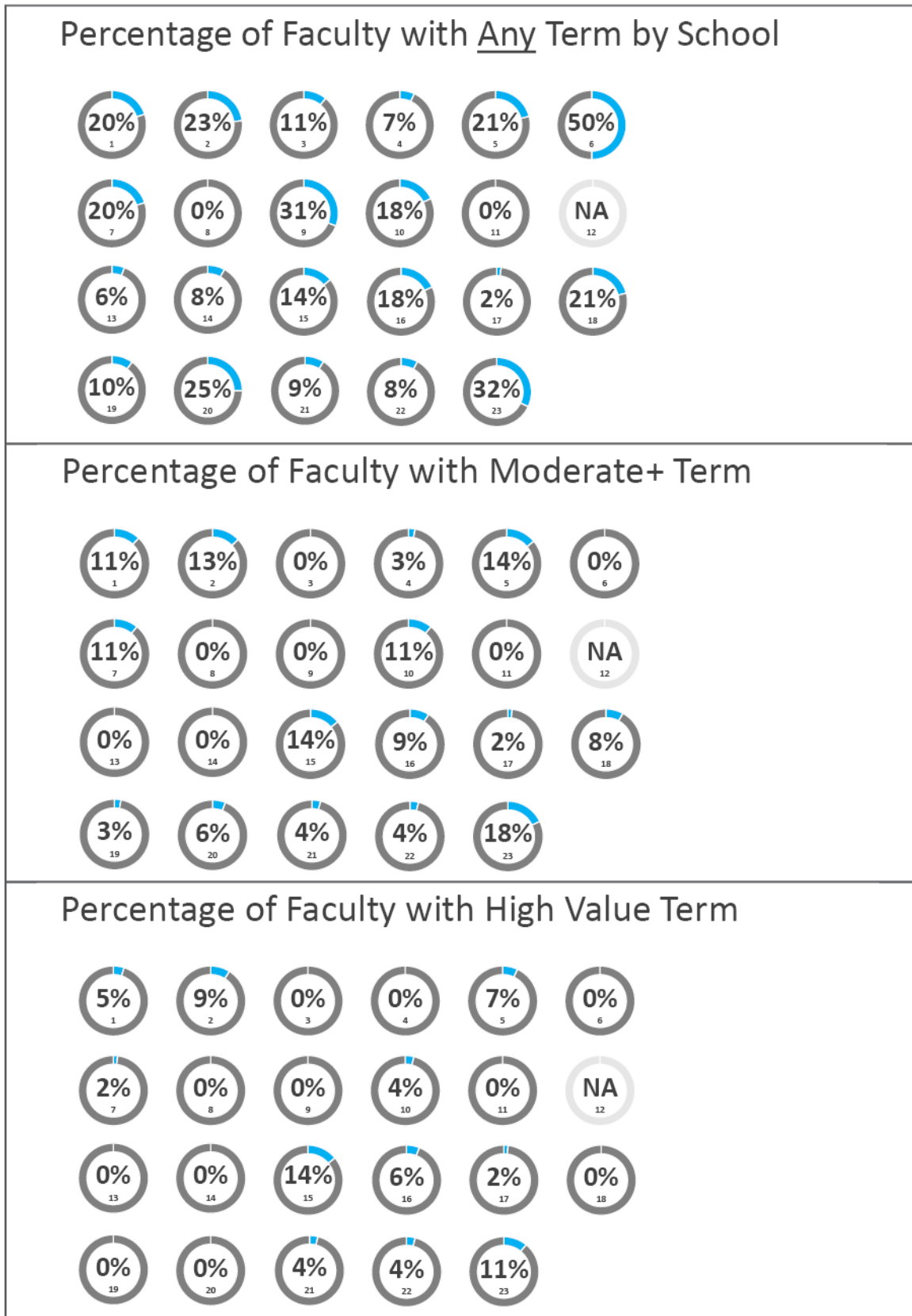
Figure 5. Pie charts showing the percentage of faculty biographies by program with terms by quality.

Image credit: Authors with data from [34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56]

FINDINGS: REGION CONSIDERED AS A WHOLE

To consider the state of the East Central region as a whole, institutional sorting was eliminated, and the faculties were considered as an entire cohort. These findings are graphically represented in Fig. 4. In this case, the percentage of faculty with any value term was slightly better than 16% (108/658.) When low value terms are eliminated from consideration, the percentage of faculty with a Moderate+ term is reduced to less than ten percent of the cohort (8%. or 51/658) Finally, when only high value terms are considered, the percentage of faculty addressing these terms is less than five percent (4% or just 25/658.) The word clouds used in each chart in Fig. 4 use text size to show the frequency of term use. Larger text size represents more frequently used terms, and smaller text represents uncommon terms within the study.

OUTCOMES: LESS THAN LIP SERVICE

An initial concern at the outset of the project was that the study would include many "false positives," presenting an overly optimistic picture. -During the data-gathering stage it quickly became clear that this was not a risk. As is evident from the previous analysis and graphic representations, there is a stark lack of commitment to climate education and decarbonization in the published statements of architecture schools and faculty. Given the large contribution of the built environment to the climate crisis, and the impact of continued inaction to global populations, this is an inexcusable omission. This study is intended to inspire self-reflection by individual faculty members and conversation in architectural faculties. Without an immediate and deep commitment to meeting this global challenge, our discipline risks missing one of the most important calls to action in human history.

FUTURE EXPANSION

The authors intend to expand this research to the other NAAB regions and beyond. The next phase of the research will involve the analysis of course descriptions for required courses within the accredited degree curricula. This expansion will allow for further analyses including comparisons between schools and regions, and to identify alignments or misalignments between the stated values and interest of the programs and faculty and course language.

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