

# Growth of Undergraduate Education in Design in the United States, 1988–2012

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## Introduction

Design is a “new liberal art of technological culture.”<sup>1</sup> An increasing number of policy makers see innovation as the U.S. economy’s “only durable strength.”<sup>2</sup> Because the paired concepts of innovation and creativity are at the heart of design practice, discussions regarding the future of the U.S. economy are incomplete without the inclusion of design and design policy.<sup>3</sup> It follows that design education for professional designers matters profoundly.

Despite this growing significance, there are wide gaps in our knowledge regarding the position of design in the higher education system. A large portion of the extant literature about the growth and transformation of design consists of case studies that focus on practice.<sup>4</sup> The studies that focus on educational growth, on the other hand, are typically historical origin stories.<sup>5</sup> Such investigations yield important knowledge but do not tell us much about the contemporary state of the design disciplines at U.S. colleges and universities.

As a part of a larger project that analyzes disciplinary and interdisciplinary growth in the United States, this article aims to fill this knowledge gap by quantitatively investigating the expansion of undergraduate education in design at four-year colleges and universities between 1988 and 2012.<sup>6</sup> To do so, I used data from the U.S. Integrated Postsecondary Education Data Survey (IPEDS),<sup>7</sup> which is particularly suitable for investigating field-level change.

Why focus on undergraduate education to explain disciplinary growth? One researcher would respond, “The most consequential single disciplinary structure—in terms of extent and impact—is not the professional association but the college major.”<sup>8</sup> It also matters for disciplines because “many universities use student numbers in majors and in departmentally taught ‘service courses’ to allocate the most crucial of all—faculty positions.”<sup>9</sup> Understanding the future of a discipline therefore requires awareness of the evolution of undergraduate degree conferrals.

- 1 Richard Buchanan, “Wicked Problems in Design Thinking,” *Design Issues* 8, no. 2 (Spring 1992): 5.
- 2 Fareed Zakaria, “The Future of Innovation: Can America Keep Pace?,” *Time*, June 5, 2011, <http://www.time.com/time/nation/article/0,8599,2075226,00.html> (accessed January 15, 2017).
- 3 Tom Kelley, *The Art of Innovation: Lessons in Creativity from IDEO, America’s Leading Design Firm* (New York: Doubleday, 2001).
- 4 Bernard Michael Boyle, “Architectural Practice in America, 1865–1965—Ideal and Reality,” in *The Architect: Chapters in the History of the Profession*, ed. Spiro Kostof (New York: Oxford University Press, 1977), 309–44; Dana Cuff, *Architecture: The Story of Practice* (Cambridge, MA: MIT Press, 1991); Magali Sarfatti Larson, *Behind the Postmodern Facade: Architectural Change in Late Twentieth-Century America* (Berkeley: University of California Press, 1993); Grace Lees-Maffei, “Introduction: Professionalization as a Focus in Interior Design History,” *Journal of Design History* 21, no. 1 (March 20, 2008): 1–18, doi:10.1093/jdh/epn007; Harvey Luskin Molotch, *Where Stuff Comes From: How Toasters, Toilets, Cars, Computers, and Many Others Things Come to Be as They Are* (New York: Routledge, 2003).
- 5 Anthony Alofsin, *The Struggle for Modernism: Architecture, Landscape Architecture, and City Planning at Harvard* (New York: Norton, 2002); Joan Draper, “The Ecole Des Beaux-Arts and the Architectural Profession in the United States: The Case of John Galen Howard,” in *The Architect: Chapters in the History of the Profession*, ed. Spiro Kostof (New York: Oxford University Press, 1977), 209–37; Norman T. Newton, *Design on the Land: The Development of Landscape*

Results show that undergraduate design education is growing in absolute and relative terms, but this growth varies according to different institution types and conditions. In other words, variables such as control type (i.e., public versus private), Carnegie classification type, institution size, and institutional revenues have differential influences on the diffusion of bachelor's degree-granting programs and the share of bachelor's degrees.

This study provides valuable insights to policy makers, administrators, and design educators and will advance our understanding of the changing institutional organization of design education and the future of design disciplines in the United States.

### **The Context: The U.S. Higher Education System and the Ascendance of Applied Fields in the Late Twentieth Century**

The mid-1970s saw the beginning of a retrenchment period for U.S. colleges and universities. After the impressive boom of the postwar years, the U.S. economy was showing signs of weakness. North American manufacturers faced immense competitive pressure from Europe and the Far East. Economic growth slowed, while unemployment and inflation soared. These negative developments devastated not only the economy but also the finances of universities at every level.<sup>10</sup> The OPEC oil embargo of 1973 and the ensuing energy prices for the rest of the decade and the early 1980s further deepened the financial crisis in institutions of higher education. This was so because most of the infrastructural investments (e.g., central climate control) made at campuses during the 1950s and 1960s relied on a continuous supply of cheap energy. In addition, federal research money temporarily left the universities and colleges. As state appropriations for higher education declined, tuitions and fees rose in public institutions and, as in their private counterparts, donations, gifts, and external contracts became sought-after sources of income.<sup>11</sup>

The pressures felt by higher education institutions were not just economic. During the tumultuous cultural atmosphere of the 1970s, the inability of most university officials—including presidents and deans—to ameliorate student discontent alienated various constituents from the universities and colleges. Funding donors demanded more accountability, and higher education institutions were put under closer scrutiny in every regard.

Largely overlapping with these developments, an often overlooked yet equally significant transformation began to take place. This transformation was especially important for the field of design. Called “the rise of ‘practical arts,’” this transformation entailed “the gradual shrinking of the old arts and sciences core of the university and the expansion of occupational and professional

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*Architecture* (Cambridge, MA: Belknap Press of Harvard University Press, 1971); Jon A. Peterson, *The Birth of City Planning in the United States, 1840–1917* (Baltimore, MD: Johns Hopkins University Press, 2003); Arthur J. Pulos, *The American Design Adventure, 1940–1975* (Cambridge, MA: MIT Press, 1988); Mel Scott, *American City Planning Since 1890* (Chicago: American Planning Association, 1995); Frederick R. Steiner and Kenneth R. Brooks, “Agricultural Education and Landscape Architecture,” *Landscape Journal* 5, no. 1 (March 20, 1986): 19–32, doi:10.3368/lj.5.1.19.

6 For an outcome of this project, see Scott Frickel and Ali O. Ilhan, “Disciplinary and Interdisciplinary Change in Six Social Sciences: A Longitudinal Comparison,” in *Investigating Interdisciplinary Collaboration: Theory and Practice across Disciplines*, ed. Scott Frickel, Mathieu Albert, and Barbara Prainsack (New Brunswick, NJ: Rutgers University Press, 2016), 148–69.

7 U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics Integrated Postsecondary Education Data Survey (IPEDS): Institutional Characteristics, Completions, Fall Enrollment, and Finance Components, 1988–2012.

8 Andrew Abbott, *Chaos of Disciplines* (Chicago: University of Chicago Press, 2001), 127.

9 Ibid.

10 Roger L. Geiger, *Research and Relevant Knowledge: American Research Universities Since World War II* (Piscataway, NJ: Transaction Publishers, 2004); John R. Thelin, *A History of American Higher Education*, 2nd ed. (Baltimore, MD: Johns Hopkins University Press, 2011).

11 Steven G. Brint, “The Rise of the ‘Practical Arts,’” in *The Future of the City of Intellect: The Changing American University*, ed. Steven G. Brint (Stanford, CA: Stanford University Press, 2002), 231–59.

programs.”<sup>12</sup> Brint argues that this drive toward applied fields had important consequences. Among these were “support for the ethos of student utilitarianism, support for faculty entrepreneurship, and support for ‘social partnership’ models of problem solving.”<sup>13</sup>

Ethos of utilitarianism is a general tendency that affects all applied fields unequivocally. Massification, increasing access, and the credentialist tendencies altered students’ attitudes toward bachelor’s degrees pragmatically, and these degrees are now seen as a means to achieve financial security and upward mobility.<sup>14</sup>

On the other hand, the second and third impacts of the rise of the applied fields were especially significant for the design fields, perhaps more so than for other professional/vocational disciplines. Design discourse and the collective ethos of designers promoted an ethos of entrepreneurship based on innovations,<sup>15</sup> partly because design is a creative, problem-solving activity that is supposed to foster innovation in a capitalistic setting. It is even more advantageous for designers and design disciplines to present their professional activities within the context of community service and social partnership. The rising number of publications in prominent journals that position design as a tool to achieve positive social innovations and improve the human condition in general (especially after the 1990s) bears witness to this tendency.<sup>16</sup>

The expansion of professional/vocational fields continues, but the impact of the unique challenges and opportunities posed in the twenty-first century remains to be seen. Among these are “a) the new electronic technology; b) the biotechnology revolution; c) new demographic realities; d) competition for public sector sources; e) competition for students from the for-profit sector; f) globalization of the economy; and g) contention over the university model.”<sup>17</sup>

Where will design disciplines and education stand with regard to these larger trends? Some trends will affect education institutions in general, and some may have more specific influences on design disciplines. The greatest strength of design disciplines is their interdisciplinary and integrative character.<sup>18</sup> Whatever the challenges may be, this hybridity allows the field of design to be more flexible and adaptive compared to other fields. However, such an adaptation is not possible without a data-driven understanding of the past and current condition of design disciplines and education.

## Data and Methods

This study uses IPEDS (1988–2012). IPEDS includes over 7,000 degree and non-degree-granting postsecondary institutions that are eligible for Title IV aid (see <http://nces.ed.gov/ipeds/about/>).

12 Ibid., 231. “By the liberal arts, I mean the basic fields of science and scholarship housed in colleges of arts and sciences—physics, chemistry, history, English, political science, and others. By the practical arts, I mean occupational and professional programs often housed in their own schools and colleges—business, engineering, computer science, nursing, education, and other fields oriented to preparing students for careers.”

13 Ibid., 232.

14 Randall Collins, “Credential Inflation and the Future of Universities,” in *The Future of the City of Intellect: The Changing American University*, ed. Steven Brint (Stanford, CA: Stanford University Press, 2002), 23–46.

15 Tim Brown, “Design Thinking,” *Harvard Business Review* 86, no. 6 (June 2008): 84–92.

16 Richard Buchanan, “Human Dignity and Human Rights: Thoughts on the Principles of Human-Centered Design,” *Design Issues* 17, no. 3 (Summer 2001): 35–39, doi:10.1162/074793601750357178.

17 Clark Kerr, “Shock Wave II: An Introduction to the Twenty-First Century,” in *The Future of the City of Intellect: The Changing American University*, ed. Steven G. Brint (Stanford, CA: Stanford University Press, 2002), 2–5.

18 David Wang and Ali O. Ilhan, “Holding Creativity Together: A Sociological Theory of the Design Professions,” *Design Issues* 25, no. 1 (Winter 2009): 5–21, doi:10.1162/desi.2009.25.1.5.

For this study, I limited the sample to four-year degree-granting colleges and universities that hold Carnegie Foundation classifications. Because of missing data issues, I excluded from my sample institutions with fewer than 500 full-time-equivalent students, American Indian tribal colleges, religious seminaries, and institutions located in non-state U.S. territories. The final sample size for the twenty-five-year study period varies between 1,418 (1988) and 1,740 (2012), reflecting the births and deaths in the population of colleges and universities. In total, the data set includes 1,921 institutions and 24,973 university years.

Although IPEDS is a publicly available data set, extracting meaningful information and conducting analyses using these data poses significant challenges and requires considerable time and computing effort.<sup>19</sup> It is a complex database composed of different components (e.g., institutional characteristics, fall enrollments, finance, and completions), and each component has a different structure. Merging the data through years and components requires that various computational operations be conducted. To my knowledge, this study is the first of its kind to use IPEDS to look at design disciplines' evolution longitudinally. Numerous researchers used IPEDS successfully to analyze the growth and evolution of various fields.<sup>20</sup>

This study is interested in design as a field and not as individual disciplines. That is, I aim to chart the growth of design as an aggregate field, consisting of several design disciplines. Organizationally, a field is the sum of the departments and programs belonging to a family of disciplines (e.g., social sciences, engineering, humanities, and design) that are spread across different institutions in the United States.

The design disciplines that are coded in the IPEDS database are architecture, city/urban, community and regional planning, environmental design, landscape architecture, interior design/architecture, architecture and related services, other design and visual communications, general commercial and advertising art, industrial design, fashion/apparel design, graphic design, illustration design, game and interactive design, theater design, and other design and applied-arts. Each of these design disciplines has its own unique Classification of Instructional Programs (CIP) code developed by the U.S. Department of Education's National Center for Education Statistics (NCES).<sup>21</sup> The "other" categories, again assigned by NCES, reflect programs that do not fit into the classification structure. CIP codes allow a researcher to match conferred degrees with institutions.

19 Ozan Jaquette and Edna E. Parra, "Using IPEDS for Panel Analyses: Core Concepts, Data Challenges, and Empirical Applications," in *Higher Education: Handbook of Theory and Research* (Berlin: Springer, 2014), 467–533.

20 For some examples see Steven G. Brint, Lori Turk-Bicakci, Kristopher Proctor, and Scott Patrick Murphy, "Expanding the Social Frame of Knowledge: Interdisciplinary, Degree-Granting Fields in American Colleges and Universities, 1975–2000," *Review of Higher Education* 32, no. 2 (2009): 155–83; Steven G. Brint, Mark Riddle, Lori Turk-Bicakci, and Charles S. Levy, "From the Liberal to the Practical Arts in American Colleges and Universities: Organizational Analysis and Curricular Change," *Journal of Higher Education* 76, no. 2 (2005): 151–80; M. S. Kraatz and E. J. Zajac, "Exploring the Limits of the New Institutionalism: The Causes and Consequences of Illegitimate Organizational Change," *American Sociological Review* 61, no. 5 (1996): 812–36; Fabio Rojas, "Social Movement Tactics, Organizational Change and the Spread of African-American Studies," *Social Forces* 84, no. 4 (2006): 2147–66; Barrett J. Taylor, Brendan Cantwell, and Sheila Slaughter, "Quasi-Markets in US Higher Education: The Humanities and Institutional Revenues," *Journal of Higher Education* 84, no. 5 (2013): 675–707.

21 "CIP User Site," <https://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55> (accessed September 11, 2016).

I focus on two main variables, field diffusion and share of bachelor's degrees for design, and on their distributions across different types of higher education institutions. These concepts are different facets of growth. Field diffusion is the percentage of higher education institutions in my sample that have at least one bachelor's degree-granting unit in the field of design in a given year. Because the number of higher education institutions in IPEDS increases every year, absolute numbers do not reveal much about growth. If a field is growing at a rate smaller than that of the system, its diffusion is in relative decline. Charting these numbers over time allows a longitudinal trend to be obtained. Share of bachelor's degrees is calculated by dividing the yearly number of bachelor's degrees granted in the field of design by the total number of bachelor's degrees granted in all of the disciplines included in the IPEDS universe within the same year. This is an important comparative measure of the competition between disciplines. As one discipline's relative share increases, competing disciplines' fall. A field with a declining share can become anemic by failing to attract students but without losing existing departments or programs.

After charting these trends for field diffusion and share of bachelor's degrees, I coupled each variable with different institutional characteristics to graph the longitudinal patterns. These institutional characteristics are control type (public, private non-profit, private for-profit); Carnegie classification (doctoral/research universities, master's colleges and universities, baccalaureate colleges, other); institution size; and institutional revenue per full-time equivalent student (FTE).<sup>22</sup> Such a coupling allows me to see how different institutional characteristics affect the growth of the aggregate field of design in the United States.

### **Aggregate Patterns: Changing Field Diffusion of Design**

Here I present the results from longitudinal trend analyses for all design disciplines (i.e., the field of design), focusing on diffusion. Figure 1 shows the diffusion of the three fields between 1988 and 2012. For Figures 1 and 6 only, I compared the growth of design to that of engineering and visual arts. Historical and discursive development of the U.S. design education especially has close ties with those of engineering and visual arts fields and, hence, addition of these two closely related fields provides a basis for comparison. Because the other figures are more complex, I excluded engineering and art to make analysis simpler and more straightforward.<sup>23</sup>

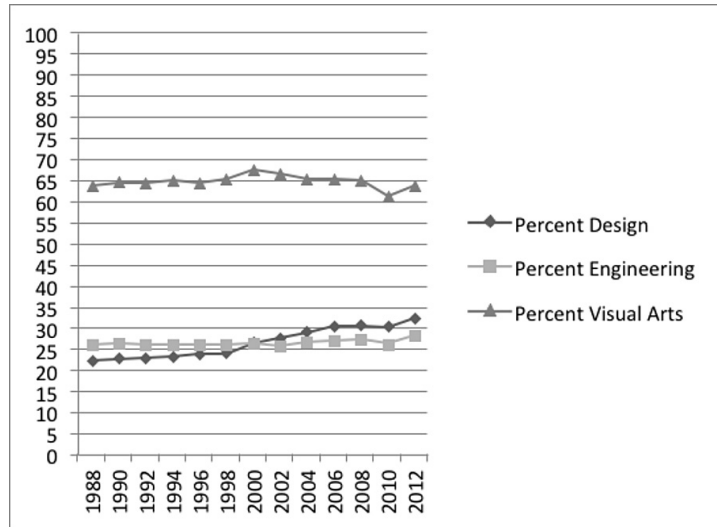
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22 Revenue per FTE student is adjusted for inflation using Consumer Price Index (CPI) and are presented in 2010 dollars.

23 Comparative analyses for the other figures including engineering and visual arts are available on request.

Figure 1

Field diffusion of design, engineering, and visual art disciplines in four-year colleges and universities, 1988–2012.



The vertical axis shows the percentage of schools in the sample that have at least one degree-active department or program in design, engineering, or visual arts.

Overall field size is the most obvious difference. In 1988, only 22.21 percent of the institutions in my sample housed any design disciplines, compared to 26.16 percent for any engineering disciplines and 63.75 percent for any visual arts disciplines. Over time, although the diffusion of visual arts and engineering remains almost stable, the size of the design field jumps to 32.47 percent. What makes this finding even more remarkable is the fact that the system is still growing as a result of the constant addition of new fields and the intense competition for institutional resources. This shows that schools are investing to establish new design programs. So where are these new programs?

Figure 2 disaggregates the diffusion of design according to the funding base—public, private nonprofit, or private for-profit. To make the chart more readable, the maximum value of the vertical axis is rescaled to 40 percent.<sup>24</sup> This makes it easier to see longitudinal change.

In 2012, less than one-tenth of design programs were in private for-profit institutions, while almost half of them were housed in private nonprofit institutions and 40 percent were in public institutions. This was not always the case. Between 1988 and 1998, public institutions offering degrees in design were more numerous than private intuitions. Yet the share of nonprofit institutions caught up with that of public ones in 1998, and slowly it surpassed the share of public institutions.

Figure 3 adds one more layer to this picture, depicting the percentage of schools that offered design bachelor's degrees segregated by four different Carnegie classifications: doctoral/research

24 Figures were rescaled when it was deemed necessary.



Figure 2

Field diffusion of design distributed according to control type in four-year colleges and universities, 1988–2012.

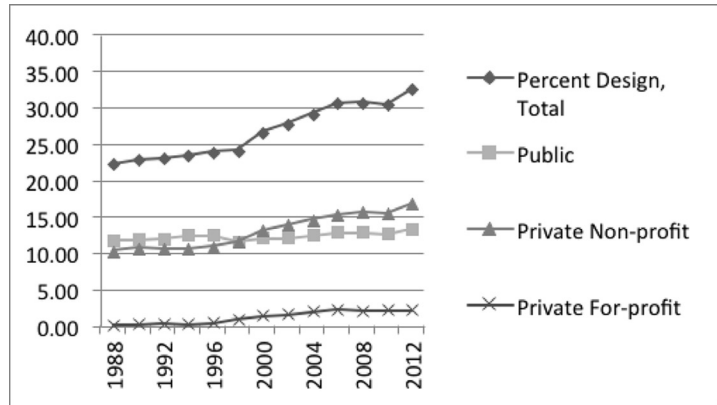
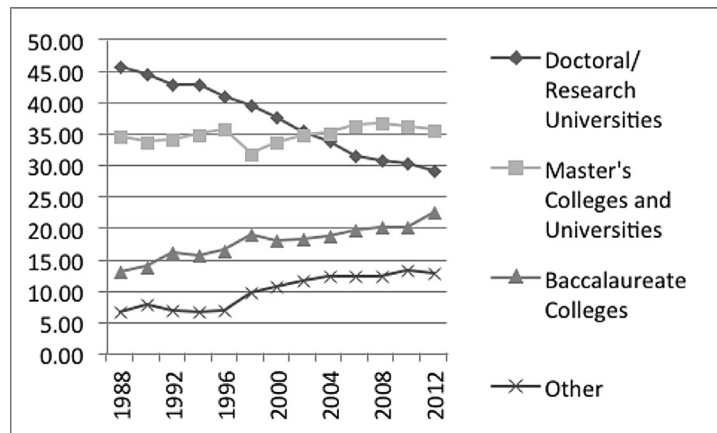


Figure 3

Field diffusion of design distributed according to Carnegie classification in four-year colleges and universities, 1988–2012.

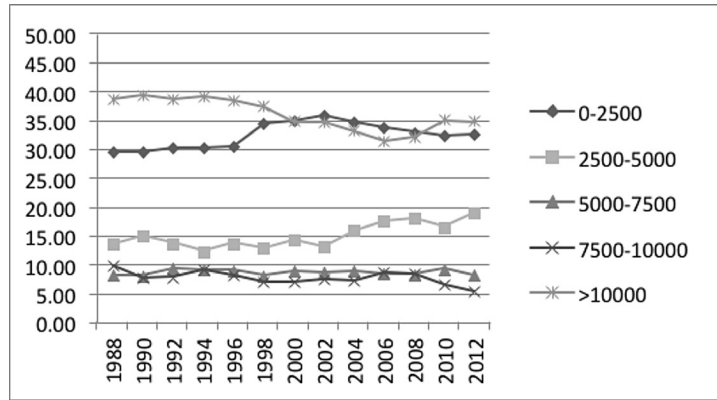


universities, master's colleges and universities, baccalaureate colleges, and other institutions. Carnegie classifications matter because they denote different access to material and immaterial resources such as funding, grant dollars, and prestige.<sup>25</sup> Also, whereas doctoral and master's institutions are more research-oriented, baccalaureate and other institutions typically focus on teaching.

Figure 3 clearly shows an important change in the distribution of institutions that offer undergraduate degrees in the design disciplines. At the beginning of the study period, 45.71 percent of these institutions were doctoral/research universities, 34.60 percent were master's colleges and universities, 13.02 percent were baccalaureate colleges, and 6.67 percent were other institutions. This is an interesting finding because the "other" category includes the numerous dedicated art and design schools. The number of these schools—within the population of higher education institutions in the United States—is relatively small. At the beginning of the study period, almost half of the design bachelor's degree-granting institutions were located in research-intensive institutions.

25 Frickel and Ilhan, "Disciplinary and Interdisciplinary Change in Six Social Sciences."

Figure 4  
Field diffusion of design distributed according to institution size at four-year colleges and universities, 1988–2012.



When the whole study period is considered, a more curious finding emerges. Within this period, the proportion of doctoral/research institutions dropped by almost half, to 29.03 percent. The proportion of master’s colleges and universities remained mostly stable; yet the proportions of baccalaureate colleges and other institutions rose to 22.48 percent and 12.92 percent, respectively. This dramatic decrease in the percentage of doctoral/research institutions begs explanation and further research. One possible explanation can be the increasing investments in research-oriented institutions toward fields that bring more grant money and generate more research output.

Figure 4 presents the distribution of design bachelor’s degree-granting institutions across different sizes, measured by the FTE student enrollments.<sup>26</sup> Here we see that in 1988, 51.42 percent of schools that housed at least one program in design disciplines were relatively smaller schools, with fewer than 7,500 FTE students.<sup>27</sup> In 2012 this figure increased to 59.65 percent.

Figure 5 depicts the distribution of design bachelor’s degree-granting institutions according to revenue per FTE student. This is an important marker of institutional wealth and well-being.<sup>28</sup> The vertical axis shows the percentage of institutions with at least one bachelor’s degree-offering program in design. On average, departments and programs are less prone to foreclosures in wealthier schools. Also, wealthier schools tend to invest more in fields that are deemed avant-garde or interdisciplinary.<sup>29</sup>

In the twenty-five-year period of this study, the percentage of design bachelor’s degree-granting institutions with more than \$35,000 per FTE student revenue increased from 14.92 percent to 18.05 percent. There was a small hike in the percentage of schools receiving between \$30,000 and \$35,000 per FTE revenue, from 6.03 percent to 11.03 percent. Despite these small changes, a large majority of design programs still resided in relatively “poor” schools by 2012 (32.92 percent in schools with less than \$20,000 per FTE revenue and 22.65 percent in schools with between \$20,000 and \$25,000 FTE revenues, summing to 55.57 percent).

26 In accordance with IPEDS guidelines (<https://nces.ed.gov/ipeds/glossary/index.asp?id=854>), to calculate the FTE of part-time enrollments for public institutions I multiplied the part-time headcounts by 0.403, and for private institutions I multiplied the part-time headcounts by 0.392.

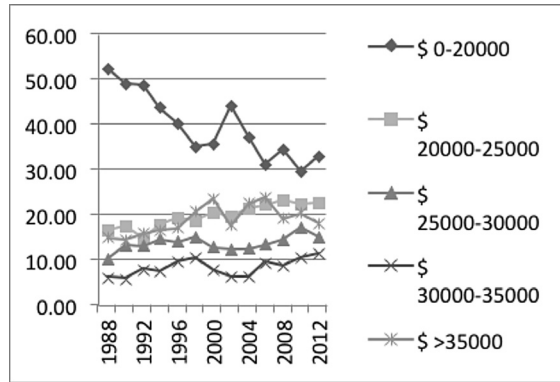
27 The two smallest size categories are combined.

28 Scott Frickel and Ali O. Ilhan, “Disciplinary and Interdisciplinary Change in Six Social Sciences.”

29 Brint et al., “Expanding the Social Frame of Knowledge.”



Figure 5  
Field diffusion of design distributed according to revenue per FTE student at four-year colleges and universities, 1988–2012.



### Aggregate Patterns: Changing Share of Design

Complementing the previous one, this section presents longitudinal graphs showing the changing share of bachelor's degrees for design and how they are affected by different institutional conditions. Whereas diffusion is a simple marker of presence, share is about the sustainable growth of a field, or its health. That is, a field can add new departments and programs in different institutions, but if students do not choose that field's majors and graduate from them because of the way the major system is structured, then the field and its constituting disciplines may become anemic.<sup>30</sup>

Figure 6 illustrates the change in the share of the total bachelor's degrees awarded in design, engineering, and visual arts disciplines between 1988 and 2012. Here we see that in 1988, of all bachelor's degrees awarded in the United States, 1.36 percent were conferred in design, 1.91 percent in visual arts, and 7.11 percent in engineering. Looking at 2012, we see a dramatic decline in engineering to 4.81 percent, and small increases in design and visual arts to 1.67 percent and 2.50 percent, respectively. Although the changes in design and visual arts seem minuscule, they are meaningful in the context of a period of system-wide expansion that continually added new schools, departments, and programs. This system-level growth included a nearly 75 percent increase in the total number of conferred bachelor's degrees (from just under 1 million to more than 1.6 million). However, the data also show that production of design bachelor's degrees increased a whopping 114 percent (from 13,063 degrees to 27,965), and that visual arts bachelor's degrees increased 127 percent (from 18,352 degrees to 41,770) in the same period. In this context, the upward change in the share of design and visual arts disciplines indicates that, though they are small, these fields have grown more rapidly than the mean growth of all fields that make up the system. Also note that these two curves are similar, peaking around 2006 to 2008 and then experiencing a small decline.<sup>31</sup>

30 Abbott, *Chaos of Disciplines*; Andrew Abbott, "The Disciplines and the Future," in *The Future of the City of Intellect: The Changing American University*, ed. Steven G. Brint (Stanford, CA: Stanford University Press, 2002), 204–30.

31 The high longitudinal correlation between these curves is striking and deserves a causal assessment. This is the topic of a future study.

Figure 6  
Share of design, engineering, and visual arts disciplines among conferred Bachelor's degrees, 1988–2012.

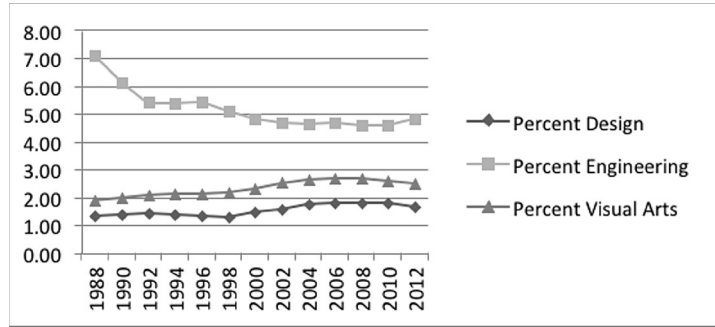
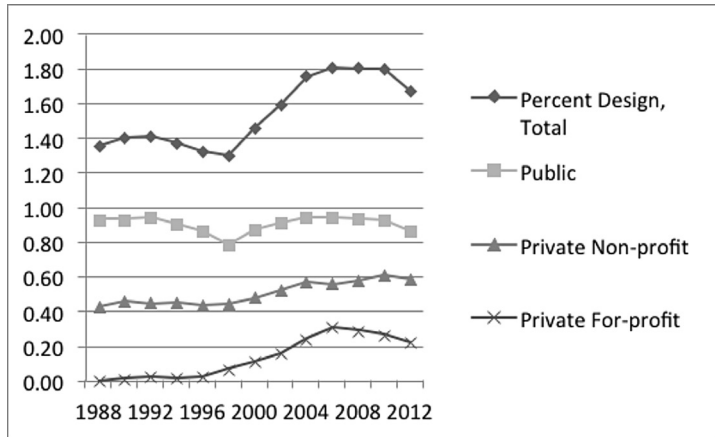


Figure 7  
Distribution of design Bachelor's degrees according to control type among conferred Bachelor's degrees at four-year universities and colleges, 1988–2012.



Similar to Figure 2, Figure 7 breaks down the total share of design according to the funding base of institutions. The largest share of design bachelor's degrees is conferred by public institutions, and this share remained largely stable during the study period (0.93 percent in 1988 and 0.86 percent in 2012). Small but important increases are evident in the share of private nonprofit institutions (from 0.43 percent to 0.59 percent) and of private for-profit institutions (from almost 0 percent to 0.22 percent). These numbers reveal that the leading edge of growth for design disciplines during these twenty-five years was at private higher education institutions.

Figure 8 is different, showing the distribution of design bachelor's degrees conferred between 1988 and 2012 among four major Carnegie classification types. A large decline in the share of doctoral/research universities is apparent. Whereas almost 70 percent of all bachelor's degrees granted in design were conferred at doctoral/research universities in 1988, this number dropped to 43.42 percent by 2012. Small increases are evident at master's colleges and universities (from 15.93 percent to 22.07 percent) and at baccalaureate colleges (from 2.60 percent to 7.24 percent). The largest increase is at other institutions, which includes specialized art and design schools (from 13.21 percent to 27.26 percent). I discuss the implications of this finding, along with the findings from Figure 3, in the following section.

Figure 8

Distribution of design Bachelor's degrees according to four major Carnegie classification types at four-year universities and colleges, 1988–2012.

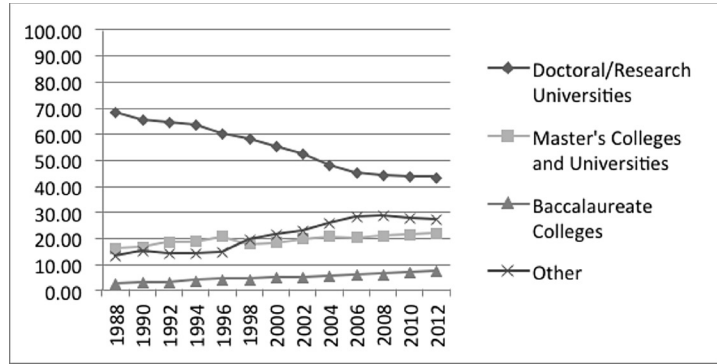


Figure 9

Distribution of design Bachelor's degrees according to institution size at four-year universities and colleges, 1988–2012.

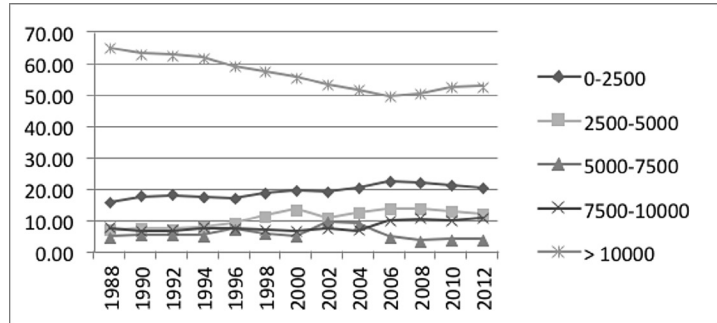


Figure 10

Distribution of design Bachelor's degrees according to revenue per FTE student at four-year universities and colleges, 1988–2012.

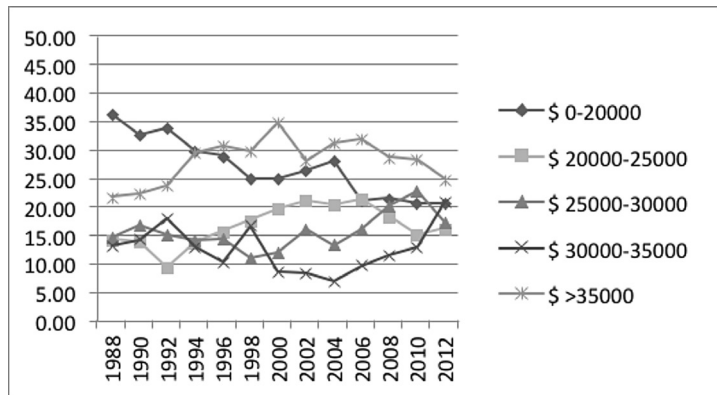


Figure 9 presents the relative distribution of the design bachelor's degrees across institutions of different sizes, measured by the number of FTE students. Although more than 50 percent of design bachelor's degrees stayed at very large institutions during the study period (64.72 percent in 1988 and 52.58 percent in 2012), the drop in the relative share of these institutions is remarkable. Except for this, and the decrease in the share of midsize schools (those 5,000 to 7,500 FTE students), all school types experienced modest increases in their share of design bachelor's degrees.

Finally, Figure 10 shows the distribution of bachelor's degrees granted in design across five different categories of institutional revenue per FTE student. In this graph, some positive changes for design can be seen. In 1988, the majority of design bachelor's degrees were conferred at the institutions within the

two lowest revenue categories, a total of 50.38 percent. By 2012, 45.77 percent degrees were awarded in institutions with more than \$30,000 per FTE revenues, and the aggregate percentage of the lowest two categories dropped to 37.14 percent. Bachelor's degree production was moving to relatively wealthier institutions within the study period.

### Discussion and Conclusion

This descriptive study attempted to chart the growth of undergraduate education in design during the years 1988 and 2012. In absolute and relative terms, design disciplines are growing. Comparing design with engineering and visual arts makes this point more obvious. Among the three, design is the only field that is growing in terms of both diffusion and share (see Figures 1 and 6). The real question, however, is where this growth occurs and whether it is sustainable.

This growth is not ubiquitous among different types of institutions. This heterogeneity presents unique challenges and opportunities for the future of design education and design disciplines in the United States. My study reveals that diffusion and share are different aspects of growth and that they need to be studied simultaneously to arrive at a more holistic picture of field growth.

First, comparing Figures 2 and 8, we can see that the leading edge of growth for design disciplines is at private universities and colleges. Public and private institutions typically differ in many important ways; alone, this finding does not mean much.

Second, the bulk of design undergraduate degree production is moving away from doctoral/research universities to other types of institutions. This finding is somewhat alarming if design disciplines want to move away from a traditional, skill-based education toward a more knowledge-based orientation.<sup>32</sup> This finding is also at odds with the increasing importance given to university-based research, doctorates, and "discipline" building within the design discourse.<sup>33</sup> The dissonance between the organizational realities and the discursive claims deserves further investigation.

Third, and more important, design is growing at smaller institutions at much faster rates than at larger ones (see Figures 4 and 9). Combined with the previous point, this issue poses a serious threat to the future of design within higher education if this trend continues as is. Previous research shows that odds of survival and healthy growth are much larger for interdisciplinary fields, such as design at larger institutions.<sup>34</sup> This is the case because larger institutions have larger critical masses of faculty, students, and various other resources that can support the continued existence of programs that are deemed avant-garde or less central by decision makers. Smaller institutions are also more prone to

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32 Jacques R. Giard, "Design Education in Crisis: The Transition from Skills to Knowledge," *Design Issues* 7, no. 1 (Autumn 1990): 23, doi:10.2307/1511468.

33 For some examples regarding these issues, see Nigan Bayazit, "Investigating Design: A Review of Forty Years of Design Research," *Design Issues* 20, no. 1 (Winter 2004): 16–29, doi:10.1162/074793604772933739; K. Friedman, "Creating Design Knowledge: From Research into Practice," *Proceedings of International Conference on Design and Technology* (2000); Victor Margolin, "Doctoral Education in Design: Problems and Prospects," *Design Issues* 26, no. 3 (Summer 2010): 70–78.

34 Brint et al., "Expanding the Social Frame of Knowledge"; Rojas, "Social Movement Tactics."

program closures and more vulnerable in times of economic downturn.<sup>35</sup> Moreover, most of the top research-oriented institutions are very large schools with more than 10,000 students. On the flip side, more than 50 percent (see Figure 10) of total design bachelor's degrees are still conferred at institutions with more than 10,000 FTE students, and the downward trend seems to reverse a little after 2006.

Fourth, more than 50 percent of bachelor's degree-granting design programs are housed in, and about 36 percent all conferred bachelor's degrees in design are awarded from, institutions with revenues of less than \$25,000 per FTE student. Not only is institutional wealth a marker of material resources, but wealthier schools tend to attract better students and faculty.<sup>36</sup> Once again, this finding brings forward the question of the long-term survival and sustainable growth of design.

Like all descriptive studies, this article provides some starting points for explanatory future research. That is, the findings presented here require further explanation. What sort of intra- and extra-institutional factors explain the trends observed here? What are the causal relationships that structure the field of design? Researchers using longitudinal statistical models can start answering these questions, and IPEDS and other databases available from the U.S. Census Bureau and the U.S. Bureau of Labor Statistics provide numerous variables that can be used in such analyses. For example, the effects of local labor market conditions and external economic shocks may have positive or negative impacts on diffusion and share in different institutional contexts.

Furthermore, this article presents an aggregate analysis. To understand design as a field, a more detailed analysis of the field's subcomponents is needed. This study should be complemented by analyses of the institutional trajectories of individual design disciplines such as architecture, landscape architecture, urban planning, interior design, industrial design, and so on.

IPEDS is not without shortcomings. Because its data are collected at the level of institutions, they provide a lot of breadth but little depth. Any meaningful long-term research program based on IPEDS should also contain qualitative case studies of institutional studies of disciplinary development in efforts to arrive at a more holistic picture of field growth and development. Furthermore, IPEDS data are sent to NCES by schools, and in each school variable measurements and how data collection works may vary. There may be missing data issues, inconsistencies in reporting, and numerous other sources for measurement error that are typical of data set of this scale. Despite these issues, IPEDS is unique, and it is our best source of reliable longitudinal quantitative information regarding the U.S. higher education system.

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35 Ibid.

36 Jerry A. Jacobs, *In Defense of Disciplines: Interdisciplinarity and Specialization in the Research University* (Chicago: University of Chicago Press, 2013); Sheila Slaughter and Gary Rhoades, *Academic Capitalism and the New Economy: Markets, State, and Higher Education* (Baltimore, MD: Johns Hopkins University Press, 2004).