

## **Education and Innovation Requirements for Design Thinking Jobs**

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### **Abstract**

Design thinking is a problem-solving approach based on design theory, design-cognition, social constructivism, and reflection. Since business and industry are seeking employees with design thinking knowledge and skills in order to infuse products and services with innovation, the purpose of the study was to understand the educational qualifications and innovation skills related to design thinking that are sought by employers seeking undergraduate business majors. Content analysis of a nationwide dataset of LinkedIn job descriptions was performed to discover attributes such as educational level, years of required experience in design thinking, and type of bachelor's degree sought. Findings showed an anomaly between the skills-first hiring trend and the results of the study which found that employers want hires to have a bachelor's degree, although not necessarily require a business degree. Additionally, innovation skills are important to employers hiring employees for design thinking positions. Management programs need to make the case that they are prepared to teach innovation and other skills that help students obtain jobs in design thinking.

### **Introduction**

It seems like pursuing a bachelor's degree is not the American dream it used to be (Lanahan, 2022). Global corporations like IBM, Accenture and Google are reportedly removing some bachelor's degree requirements and turning to skills-based hiring. LinkedIn recently reported that the number of job postings not requiring a four-year degree increased from 15% to 20% (Anderson, 2022). Similarly, the Burning Glass Institute analyzed 51 million U.S. job postings and reported a skills-first hiring trend. For example, IBM has stripped degree requirements from many IT job postings, now only requiring 29% of its IT postings to require a degree, and emphasizing skills over degrees (The Burning Glass Institute, 2022). Similarly, Accenture's postings requiring a degree have decreased from 54% in 2017 to 43% in 2021 (The Burning Glass Institute, 2022).

Part of the reason companies have reduced educational requirements is because of the current shortage of workers, accelerated by the COVID-19 pandemic, which forced companies to drop degrees as requirements (Lanahan, 2022). Enrollment in many bachelor's degree programs had already been decreasing and accelerated with the pandemic. Carnevale et al. (2010) predicted that the demand for college graduates in the United States would fall short of supply by 3 million individuals by 2018. The Society of Human Resource Management (SHRM) (2003) reported that

large numbers of employers in the early 2000s were preparing for a labor shortage predicted to occur by 2010. Their predictions came true, and as of March 2022, the United States unemployment rate is 3.6% with sales, office occupations, and service occupations leading the categories of highest unemployment (Bureau of Labor and Statistics, 2022). The shift from hiring based on degree attainment to hiring based on skill sets has come to be called *skills first hiring*, and is a new hiring trend (Roslansky, 2022).

There is evidence that design thinking has emerged as a high-priority skill to be attained by employees (Matthews & Wrigley, 2017; O’Keefe, 2017; Nakata, 2020). This creates a labor market for post-secondary graduates with business acumen to have design thinking skills. Design thinking is “a human-centered problem-solving method that mostly leads to radical innovative solutions in terms of the feasibility, desirability and viability of products or services” (Efeoglu et al., 2013, p. 241). While there are several approaches used to facilitate design thinking (Beckman & Barry, 2007; Design Council, 2023; Glen et al., 2015; Lawson, 2006), the Stanford Design Thinking Framework (Plattner, 2007) has emerged as the leader in business and academia. The five stages that define the Stanford Design Thinking Framework are Empathize, Define, Ideate, Prototype, and Test.

There are existing research studies showing how design thinking is embraced by educators because it offers students an innovative problem-solving approach that fosters the development of 21<sup>st</sup>-century skills (Callahan, 2019; Matthews & Wrigley, 2017). In addition to academia, design thinking has frequently been recognized for contributions to business and industry practices (Panke, 2019). Airbnb, PepsiCo and IBM are just some of the companies who are using design thinking in various areas of operations (O’Keefe, 2017; Nakata, 2020). Design thinking is becoming not only a new product or new service design approach (Utterback et al., 2006) but a part of business strategies (Camillus, 2008; Verganti, 2006, 2008). Companies have recognized the potential impact of design thinking’s contribution to successful business practices (Matthews & Wrigley, 2017). Unfortunately, research shows a gap between what higher education teaches and the skills employers see in their new hires (Denning-Smith, 2020).

### **Use of Design Thinking in Business and Industry**

Global companies such as IBM and others are using design thinking to improve their internal processes and design products and services more closely tied to customer needs. IBM has seen a huge impact on its return on investment by using design thinking. IBM sought to determine the return on investment realized by using design thinking practices. Key findings showed that design and execution speed doubled when using the IBM Design Thinking process, and this resulted in a projected \$20.6 million in value. Using design thinking also helped cut design defects in half which saved an estimated \$153,000 per major project. Additionally, unquantified benefits were that the workforce was more engaged and felt more empowered, and internal processes in HR and sales departments improved. Overall, IBM was able to report a return on investment of 301% over three years (Forrester, 2018).

Other organizations have also used design thinking in a variety of ways. Toyota used design thinking to redesign a customer service center to be a better experience for customers (Liedtka, 2014). IBM prototyped a new trade show model with real customers (Liedtka, 2014). The city of Dublin, Ireland, used design thinking to get input from the city’s residents for how to improve its

urban spaces (Liedtka, 2014). Samsung used design thinking to become a more innovative culture and increase their strategic thinking and even created a Corporate Design Center in the mid-1990s to centralize innovation efforts (Elsbach & Stigliani, 2018). Siili provides data analytics, design, and technology services to corporations. Among the consulting products they have done using design thinking were a pharmaceutical company that needed a service innovation and an insurance company that needed a new model for its wholesale business (Kuula et al., 2019).

There is a strong connection between design thinking and innovation, and, in fact, innovation is considered to be the core of design thinking (Brown, 2008). According to Luka (2019), “the growing popularity of design thinking in higher education in the last decade is usually explained by the fact that its tools are associated with innovation—a significant 21st-century skill” (p. 501). Applying design thinking to higher education curriculum develops skills that can be applied to solve complex real-world problems and also develops creativity, empathy for the end-user (Dam & Siang, year) critical thinking, collaboration, problem finding, problem framing, and problem-solving skills (McLaughlin, 2022). Empathy, the first stage in the Stanford design thinking process, has been called “the starting point of innovation and creativity” (Lor, 2017, p. 60).

Intuit incorporated new design thinking processes beginning in 2007 (Martin, 2020). In order to increase innovation in its organizational processes, the company took a more structured and organized approach to design. Ten people were asked to become innovation catalysts—people who would help managers across the organization use design thinking approaches to work on new initiatives. The innovation catalysts had to have good people skills and coaching skills, the desire to talk with customers, and the ability to influence others. The innovation catalysts helped managers and teams create prototypes, run experiments, and find ways to learn from customers. Two of the innovation catalysts developed a “painstorm” (Martin, 2020, p. 67) process where they would work to find out customers’ biggest pain points by observing and talking to customers. Intuit was so pleased with the work of the innovation catalysts that it hired and trained more of them to keep the design and innovation work going. Intuit credits the launch of several mobile apps leading to increased revenue and profits to their design and innovation initiatives.

### **Use of Design Thinking in Business Schools and Programs**

Currently, post-secondary business students wanting to learn about design thinking can do so in a variety of business schools and programs. Coursework is part of degrees, a short course, or a certificate. Individual corporations such as IBM, Cooper Professional Education, IDEO U, and LinkedIn Learning also offer training in design thinking (“Design Thinking”, n.d.) In the United States, the focus of this research study, approximately one million associate’s degrees and two million bachelor’s degrees were awarded in 2019-2020. At both levels, business was the most common field of study for all racial/ethnic groups (National Center for Education Statistics, 2022). At the same time, fewer students are enrolling in undergraduate programs, as enrollment in undergraduate programs decreased by 9.4% from 2019-2021 (Camera, 2022). The COVID-19 pandemic, questions about the affordability of college, and the rise of alternative credentials are contributing to the enrollment decline. According to the World Economic Forum (2022), only 11% of business leaders believe that students are graduating from college with the skills they

need for employment. This is one reason why many employers seem to be reducing the focus on degrees in their hiring criteria and increasing their focus on skills.

Design thinking has permeated the curriculum in some higher education management programs. For example, one Midwestern, private university uses design thinking in its business communication course. The course content was expanded to integrate the design thinking process in alignment with essential tenets of business communication. Discussions surrounding “wicked problems” in the workforce included effective communication, developing professional messages, credibility, employment messages, career development, and persuasion. The design thinking process was incorporated to expand student’s understanding of career readiness and professional development.

An American undergraduate business department used design thinking to teach empathy, which is one of the stages of the Stanford Design Thinking Process. Empathy helps to understand the customers’ needs so their problems can be solved. A 90-minute in-class exercise asked students to interview a class partner, write and rewrite a problem statement, prototype a solution, and receive feedback (Armstrong, 2016). An entrepreneurship unit was revised in a Portuguese undergraduate business course to use the design thinking process. Students used the process to solve the problem of ‘How can I improve the quality of life of our campus?’(Daniel, 2016). Additionally, a Norwegian university’s master’s level Corporate Entrepreneurship course used design thinking to solve a real company’s problem. It was found that students were able to embrace empathy, develop teamwork skills, improve their communication skills, and learn how to better handle ambiguity (Lynch et al., 2021).

### **Pedagogical Philosophy of Design Thinking**

Traditional teaching methods used in management education such as case studies, lecture, and guest speakers have been criticized for failing to address complex problems that do not have a clearly defined solution, and spoon-feeding information to students in order to help them solve a problem (Garbuio et al., 2018; Schoen, 1993). Design thinking uses both project-based learning and design education to uncover and solve problems and is based, in part, on theories such as design theory, design-cognition theory, social constructivism, and reflection. Teaching design thinking should embrace a problem-solving perspective, where real-world problems are grappled with by students using an experiential, hands-on approach. Previous research confirms that using traditional lecturing pedagogy should be limited to teaching concepts and principles, and most of the pedagogy should be experiential in nature. “Business schools integrating design thinking into their curricula should switch from traditional lecturing methods to more practice and project based, experiential pedagogy approaches” (Çeviker-Çınar et al., 2017, p. S985).

Also lending to design theory is the wicked problems approach (Buchanan, 1992) which was formulated by German Horst Rittel in the 1960s. He believed that the linear way design was being taught was too simplistic. Rittel argued that most design problems are wicked problems, defined as a "class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing" (Churchman, 1967, p.141-142).

While management education has focused on teaching design thinking tools such as brainstorming, journey mapping, and prototyping, design-cognition research adds cognitive tools such as framing, analogical and abductive reasoning, and mental simulation (Garbuio, 2018) to a design thinkers' toolkit. Design-cognition research consists of four cognitive acts: framing, analogical reasoning, abductive reasoning, and mental simulation. Framing refers to finding various ways to define the problem based on different users and situations (Dorst, 2011). Analogical reasoning is the act of "identifying and carrying over knowledge from prior situations to support the current one" (Garbuio et al., 2018, p. 47). The third cognitive act is abductive reasoning, where a hypothesis is used to explain observations. Design thinking professionals are encouraged to invent surprising hypotheses to explain user behavior, in order to challenge the status quo and expand on existing preconceptions of a solution (Garbuio et al., 2018). The fourth cognitive act is mental simulation, which is "imitative cognitive constructions of hypothetical events or reconstructions of real events" (Sanna, 2000, p. 1). Mental simulations involve thinking about what could happen in the future and what happened in the past in order to mentally try out strategies and tactics before making decisions.

It is recommended that design-cognition be used in a team-based, multidisciplinary, project-learning environment (Garbuio, 2018), which fits well with Vygotsky's (1978) theory of social constructivism. In social constructivism, learning is a social process that takes place in groups of people collaborating to construct knowledge from meaning. Instruction should be designed so that people can increase their knowledge from where they can solve problems with help to solving problems independently, and that gap is the zone of proximal development (Vygotsky, 1978).

Critical reflection is important in management education (Schon, 1983) as it has been shown to improve students' cognitive skills. Reflection is embedded into each stage of the design thinking process and is a core part of design thinking curriculum (Kolb, 1994; Schon 1987; Wickam et al., 2022). In the design thinking process, reflection can be student-led, such as writing or presenting, or teacher-led, such as facilitating a class discussion. Whether student or teacher-led, reflection helps students process the new knowledge that has been learned (Gagnon & Collay, 2001).

### **Purpose of the Study**

There is evidence that design thinking has emerged as a high-priority skill to be attained by employees (Matthews & Wrigley, 2017; Nakata, 2020; O'Keefe, 2017). This creates a labor market for post-secondary graduates with business acumen to have design thinking skills. Since business and industry are seeking employees with design thinking knowledge and skills, it is important to understand whether universities are preparing business graduates with the knowledge and skills employers need. Specifically, since some corporations are reducing degree requirements for positions, it is important to know what corporations are advertising as the academic qualifications for open positions where design thinking is required. Additionally, because innovation is a significant 21st-century skill (Luka, 2019), and a core skill for design thinking, it is important to know whether employers hiring employees for design thinking jobs place a high priority on innovation skills.

The purpose of the study was to understand the desired qualifications related to design thinking that are sought by employers seeking undergraduate business majors. The research questions were:

1. For job postings that state design thinking in the job description, what is the preferred educational level (i.e. bachelor's degree or master's degree) and/or previous design thinking experience requirement of the applicant?
2. For job postings that state design thinking in the job description and require at least a bachelor's degree, what percentage requires a business degree?
3. For job postings that state design thinking in the job description, to what extent do they also state "innovation" in the job description? (The word innovation must be in the job description not in the company description.)
4. For job postings that state design thinking in the job description, to what extent do they state one or more of the design thinking stages?

### **Methodology**

This study used a nonexperimental, descriptive research design. The methodology was quantitative conceptual content analysis using external data analysis of one existing dataset. LinkedIn was chosen as the dataset because it reports to have more than 600 million users worldwide (LinkedIn, 2020), has a national database of job openings, is widely used by job-seekers (Smith & Watkins, 2020) and is available free to job candidates. Additionally, LinkedIn has emerged as a useful dataset in several other research studies, including studying social capital attributes (Li et al., 2018), journalism skills (Marta Lazo et al., 2018), the impacts of higher education ads (Atkinson, 2021), and an analysis of the human resources analytics role (Kashive et al., 2022).

The search criteria for the dataset were as follows. Job descriptions needed to be in the United States, within the past week (as of February 2, 2022), and be full-time. The filters "entry level" and "associate-two years' experience" were chosen, and this returned 1,927 results. Exclusion criteria filters were set for job titles for instructional designer and senior instructional designer. Sometimes the same job title for the same company appeared more than once in the results because the same job was open in multiple geographic locations. In that case, the job was saved only the first time it appeared in the results. In the results, each job that was chosen to analyze had to have the words "design thinking" in the title. The job descriptions that met all of these criteria were saved, and after about 50, the job descriptions were becoming duplicative. At that point, five more job descriptions were collected, and then data collection was stopped. During the coding process, seven job descriptions were discarded because it turns out they were duplicative, resulting in a dataset of 48 job descriptions.

The researchers used the U.S. Bureau of Labor and Statistics to organize the job descriptions into nine occupation profiles. The top three occupation profiles for our job descriptions were the business and financial operations profile (44%), computer and mathematical occupations (15%), and office and administrative support occupations (10%) (see Table 1). The job descriptions were spread quite evenly across the United States, with 27% of the job descriptions coming from the Midwest, 27% from the West, 25% Remote, 13% from the Northeast, and 8% from the South. The state with the most job descriptions was California, with 17%. A master codebook was created to collect the data needed to answer the research questions. The three researchers

collected the data from the job descriptions together and agreed on how to code each job description. Institutional Review Board approval was obtained from all three researchers' universities.

Table 1  
*Occupations*

U.S. Bureau of Labor and Statistics' Occupation Groups	n	%
Business and Financial Operations	21	43.75
Computer and Mathematical	7	14.58
Office and Administrative Support	5	10.42
Healthcare Support	4	8.33
Not Listed	3	6.25
Production	3	6.25
Sales and Related	2	4.17
Architecture and Engineering	1	2.08
Education Instruction and Library	1	2.08
Personal Care and Service	1	2.08
Total	48	100

**Results**

The first research question asked, “For job postings that state design thinking in the job description, what is the preferred educational level (i.e. bachelor’s degree or master’s degree) and/or previous design thinking experience requirement of the applicant?” Data analysis found that the preferred educational level is bachelor’s degree or higher (71%) while 14 (29%) job descriptions did not state the educational requirements. We are unsure whether not stating the educational requirements meant that a degree was not required or if the employer just preferred not to state a degree requirement. None of the job descriptions required only a master’s degree even though sometimes a master’s degree was preferred. A majority of the time, a bachelor's degree was the minimum educational level of job postings that were hiring someone for a job that includes design thinking. Additionally, most job descriptions (85%) did not state the required number of years of experience in design thinking, even though design thinking was somewhere in the job description. Instead of requiring a specific number of years of experience, job descriptions were more likely to state something like, “Champion the importance of User-Centered Design and Design Thinking throughout the company” or “familiarity with design thinking methodology”.

The second research question asked, “For job postings that state design thinking in the job description and require at least a bachelor’s degree, what percentage requires a business degree?” For the 71% of job postings where a bachelor’s degree or higher was required, 40 (83%) did not require a business degree and 17% required a business degree. These results were unexpected, as even though these were all corporations who were hiring, they did not expect to hire people with business degrees. Although many postings required knowledge of business sub-disciplines such as behavioral economics, business administration, entrepreneurship, market research, marketing,

advertising, and project management, few postings required a business degree. Companies could be shifting to in-house training on business acumen and skills such as design thinking.

The third research question asked, “For job postings that state design thinking in the job description, to what extent does the job description also mention “innovation” somewhere in the description?” Because innovation is so linked with design thinking, we wanted to know to what extent job postings that had design thinking in the job description also included the need for innovation somewhere in the job description. As was anticipated, the majority (56%) of job descriptions had “innovation” somewhere in the job description that confirms that employers are seeking skills in innovation.

The fourth research question asked, “To what extent do the job descriptions state one or more of the design thinking stages?” The stages of the design thinking process we considered in our analysis were from the well-known Stanford Design Thinking Process: Empathize, Define, Ideate, Prototype, and Test (Gallagher & Thordarson, 2020). A majority, (75%), mentioned one or more stages of the design thinking process in the job description. This may show that having knowledge of the specific stages of design thinking is important to employers. The prototype (38%) and testing (23%) stages were mentioned the most, with the definition (7%) stage mentioned the least (see Table 2). This may be because the prototype and testing stages may need specific skill sets whereas the problem definition stage would need less specific skill sets.

Table 2  
*Design Thinking Stages Per Mention*

Design Thinking Stage	n	%
Prototype	27	38.03
Test	16	22.54
Ideate	12	16.90
Empathize	11	15.49
Define	5	7.04
Total	71	100.00

### Findings

There are two findings that emerged from the results. First, there is an anomaly between the skills-first hiring trend and the results of the present study which found that employers want new hires to have a bachelor’s degree. While these are businesses that desire a minimum of a bachelor’s degree, they do not usually require a business degree. But, they do desire many skills that are taught in business degrees. For example, one employer that did not require a business degree asked for candidates that could “work regularly with function owners to support product strategy, product development, strategic growth of new business and capabilities using creative design thinking methods”. Product strategy, product development and strategy are typically business-related skills. If people did not earn a business degree, they likely would not have the academic qualifications for these jobs.



Given overlapping demand for employees with bachelor's degrees and employees with design thinking skills, there is an opportunity for business and business education to partner together to teach design thinking skills. The literature review identified that there are business degrees and design degrees that are teaching design thinking, but they are not widespread, and many business schools and programs are not including design thinking in their curricula. Wickam et al. (2022) surveyed post-secondary business educators who were members of the National Business Education Association and found that 58% used design thinking in at least one course. For those business educators who reported that they did not use design thinking, the major reason reported was that they had a lack of knowledge about design thinking. Therefore, there is a disconnect between the needs of business and industry and the ability for post-secondary educators to respond to those needs because of their lack of knowledge about design thinking. A recommendation is for four-year degree programs to partner with employers who need employees with skills in design thinking to offer those skills. This study focused on bachelor's degrees but, it may also be that a two-year degree will replace a four-year degree for some jobs (Lanahan, 2022). A second recommendation is for two-year community and technical colleges to partner with employers to teach design thinking knowledge and skills to their students. Pathways such as short-term certifications and/or certificates would provide immediate and necessary skills.

The second finding is that innovation skills are important to employers hiring employees for design thinking positions. This has implications for university business schools and programs. Innovation is an important skill for employers hiring employees who can perform jobs using design thinking, so it is important to consider whether those skills are being taught in business courses that are preparing students for roles in design thinking. Nakata et al. (2020) researched innovation managers with job titles like chief executive officer and chief innovation officer and found that design thinking leads to successful new products and services. They suggested that as a result of this finding, managers should implement the approach in order to reduce innovation failure. They also recommended employee training on design thinking, especially training on the mindset that failure is necessary and acceptable (Nakata et al., 2020).

### **Limitations and Opportunities for Future Research**

A review of existing literature found several examples of how design thinking is being used in business and industry, but it is likely that there are other design thinking activities happening that have not been formally documented. Similarly, the list of business schools and programs offering curricula in design thinking is not exhaustive. Such a list does not exist, although it would be helpful for researchers and prospective students to have such a list. Using business schools and programs with specialized business accreditations such as AACSB and/or ACBSP to search course catalogs for design thinking programs would be useful to future researchers wanting to conduct research on design thinking in business education.

Additionally, LinkedIn was chosen as the data source for job descriptions because of its comprehensive database of job openings, wide use by job-seekers, and free availability (LinkedIn, 2022; Smith & Watkins, 2020). There are other online job boards such as Glassdoor and Indeed that contain job descriptions for jobs involving design thinking. As a result, readers should be cautioned to generalize findings to other job boards. Replicating this study using other electronic job boards would allow for comparisons. Also, since there is not a clear indication

whether employers hiring employees with design thinking skills prioritize skills or degrees, it would be insightful to conduct qualitative and/or quantitative research asking corporate hiring managers to define how they determine those priorities. Finally, while this investigation reports current uses of design thinking in universities and the desire for design thinking, degrees and innovation skills by employers, future research should outline an agenda for business schools and programs to follow in designing new design thinking curricula that aligns with employers' needs.

## Conclusion

The purpose of the study was to understand the desired skills related to design thinking that are sought by employers seeking undergraduate business majors. Content analysis of job descriptions found on LinkedIn and containing *design thinking* in the title was the chosen methodology to answer the research questions. Based on the results, there were two findings. First, there is an anomaly between the skills-first hiring trend and the results of our study which found that employers want new hires to have a bachelor's degree. This has implications for employers. Employers who desire to hire employees for business-related design thinking positions and potential employees seeking those positions now know that most businesses do require a bachelor's degree, but not specifically a business degree. Management programs will have to make the case that they are prepared to teach skills that help students obtain jobs in design thinking so that business students will find value in enrolling in design thinking courses. In addition to post-secondary degrees, business programs have opportunities to create certifications and certificates in design thinking, since the literature review revealed that a hiring trend is to prioritize skills over earning a bachelor's degree.

The second finding is that innovation skills are important to employers hiring employees for design thinking positions. Innovation requires a broad range of skills in a workforce (Tether et al., 2005) such as creativity, empathy, open-mindedness, experimentation, communication, and collaboration (Lee & Benza, 2015). Design thinking fits well with learning to use these skills; for example, empathy for users is the empathize stage, experimentation is key to the prototyping and testing stages, and using design thinking in communication and collaboration are key components to each stage. Furthermore, the study's results found that business acumen is listed in job descriptions seeking employees with design thinking skills. This creates a labor market for post-secondary graduates with business acumen.

Employers also now know that including the stages of the design thinking process in job descriptions is something their competitors are doing, and experience with the prototype and testing stages are the most requested. Employers are not being specific in the number of years of design thinking experience required, and just having employees who are familiar with design thinking seems to be enough. Design thinking skills are trending as desired qualifications for employers seeking potential candidates that have developed design thinking skills. As design thinking becomes a key component in higher education management curriculum, graduates are now better prepared to meet the skills-first hiring movement, but more work needs to be done that better prepares a workforce to use design thinking skills.

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