AI in Practice: Professional Survey Findings from Landscape Architects in North America

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Abstract: Artificial intelligence (AI) is rapidly evolving and can potentially transform the design professions, including landscape architecture. It offers apparent design efficiency and supports big data analysis, yet it raises questions about ethics in practice and threats of automation to creativity and job security. This paper analyses 722 responses from a survey of landscape architecture professionals in North America (ASLA and CSLA members) on their engagement with AI. It provides a broad snapshot of AI adoption in professional practice, including general uptake, use by sector and design task, anticipated benefits, and concerns. Results show that despite ethical concerns and uncertainty about efficiency gains, nearly half of practitioners use AI and more anticipate using it in the near future. The results emphasize the need to better understand the future of workflows, business operations, and professional education with AI.

Keywords: Artificial intelligence, landscape architecture, professional survey, business operations, Design Process

1   Introduction

Artificial Intelligence (AI) provides new tools for increasing creativity and efficiency in knowledge work. Many legacy software tools used by landscape architects now include embedded AI, such as Firefly tools in Adobe Creative Suite products and Microsoft's integrated Copilot for 365. Meanwhile, newer Generative AI (GenAI) tools – offered through free or low-cost subscriptions and designed for ease of use – have sparked a wave of "disruptive tinkering" across various economic sectors. We use this term as a purposeful play on Christensen's theory of disruptive innovation (CHRISTENSEN et al. 2018), where "tinkering" refers to AI experimentation that is not yet fully integrated into business operations but is likely to drive market disruption once it is. In academia, AI-based landscape architecture research has grown significantly over the past decade (FERNBERG & CHAMBERLAIN 2023). Taken with meta-analyses of research in the architecture, engineering, and construction (AEC) industry (ABIOYE et al. 2021, DARKO et al. 2020), this growth suggests a potential technological paradigm shift for the profession.

Outside of academia, extensive professional surveys are beginning to reveal the impact of emerging technology on the design professions. One notable example is the 2019 software and technology survey carried out in partnership with the American Society of Landscape Architects (ASLA), which measured current use and intent to adopt a wide range of software, BIM tools, drones, and even AI (SUMMERLIN & GEORGE 2019). Though these touched on AI, understanding and availability of AI tools have grown precipitously in the past five years. Allied professional organizations such as the Royal Institute of British Architects (RIBA), American Institute of Architects (AIA) and the American Planning Association (APA) have all recently carried out surveys and released white papers to capture these changes in AI advancement (OKI et al. 2024, AIA 2024, ANDREWS et al. 2022).

While the support of recent webinars and educational sessions offered by professional landscape architecture organizations suggests the desire for training and, therefore, intended AI use (BRAIDEN 2024, LANDSCAPE ARCHITECTURE FOUNDATION 2023), little is still known about how ubiquitous AI tools are in professional landscape practice, how they are used and what benefits organizations gain from related tools. To fill this gap, we worked with North American professional landscape architecture associations to create the Artificial Intelligence – Landscape Architecture (AI-LA) online survey. The primary research question for this effort is: how pervasive is the use of artificial intelligence within practice? Subsequently, when is it being used, what are the benefits and concerns, and how might use change in the future?

2 Methodology

2.1 Survey

The research team, in collaboration with the Canadian Society of Landscape Architects (CSLA), the American Society of Landscape Architects (ASLA), and the Landscape Architecture Foundation (LAF), developed the AI-LA survey questions. The research team developed the original instrument, and then professional partners made organization-specific modifications and distributed it to members. The research team only has access to secondary, anonymized data. The survey was launched in two batches over 10 months. The CSLA distributed the first survey to its members via two E-blasts and one digital Bulletin. It ran between November 30, 2023, and January 17, 2024, and received 358 responses in English and 52 in French, all of which were included in the analysis. The ASLA distributed its version of the survey in an E-blast to members of the Digital Technology Professional Practice Network (PPN) and in the LAND newsletter. LAF widened the participant pool by sending an E-blast to participants from a highly attended webinar about AI (>2000 registered. Over 1,100 people logged on during the livestream) the Foundation hosted the previous year (LANDSCAPE ARCHITECTURE FOUNDATION 2023). The PPN distribution was in June 2024, and the LAF in July 2024, for approximately 3 weeks. The American survey generated 312 responses, bringing the grand total between the two versions to 722.

The AI-LA survey asked 20 questions to understand a range of sectors of landscape architecture that a participant practiced, their relationship with their corresponding professional association, and their level of education. Respondents who answered they were utilizing AI were asked about specific tools, uses, and impacts on practice. Below are some of the key questions included in the survey:
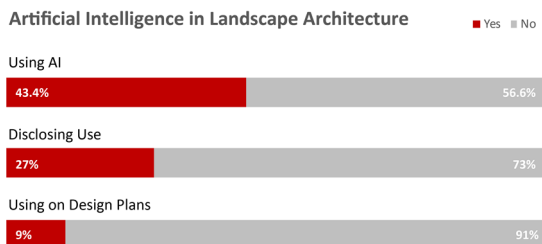
1. What is your membership within Landscape Architects?
2. In which sectors of landscape architecture do you practice?
3. Are you applying Artificial Intelligence (AI) in your practice or research?
4. How are you applying AI in your practice or research?
5. At what phases of the design process are you employing AI?
6. How are you hearing about new AI tools?
7. How are you learning to use new AI tools?
8. Do you feel AI is adding or cutting time to projects?
9. What affordances do you feel AI will have on the future of landscape architecture?
10. What reservations do you have about AI and the future of landscape architecture?

The research team combined the survey results into a single dataset and removed all information or facts that could reveal an individual through membership status. Next, we analyzed the descriptive statistics to understand the general situation, perceptions, and trends related to AI among practitioners.

We acknowledge that AI models have generally improved and integrated more into standard software than when the survey occurred after the survey dates. Additionally, new AI options are now available, and we recognize that the survey response today would likely differ. We designed the survey without focusing on specific models because of their rapid evolution. Furthermore, we did not ask respondents whether they used paid or unpaid AI tools, which we acknowledge could play a role in the perception of value.

2.2 Results

The survey received 722 responses. Over half of the respondents (74%) work in private firms, just under a fifth (18%) work in government or non-governmental agencies, and the remaining (8%) work in academia or other landscape architecture adjacent industries or are students. A significant minority (43.4%) of respondents report using AI in their practice, with 56.6% responding that they are not using AI (Figure 1).

Artificial Intelligence in Landscape Architecture ■ Yes ▪ No

Using AI
43.4% | 56.6%

Disclosing Use
27% | 73%

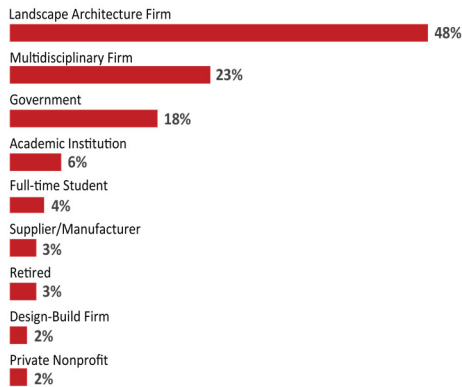Using on Design Plans
9% | 91%

Fig. 1:
Survey responses detailing the use and disclosure of AI by landscape architects

Figure 2 provides an overall impression of the various sectors of use where individuals learn about AI and the anticipated benefits and concerns. Of the survey respondents who say they use AI in their practice, most seem to be adopting applications for language processing (76%) or generative applications such as those based on models like Stable Diffusion or GPTs (Generative Pre-trained Transformers) for generating text or images (61%). The uptake of language tool use holds across different employment sectors. Respondents working for multidisciplinary firms reported the highest or second-highest use of AI tools, and substantially higher levels of use than those working for landscape architecture firms (Figure 3). Of those respondents, more than a third (23%) felt it was cutting time, while 55% of respondents were unsure if AI was cutting time, stating that "it depends on the circumstances." Only a tiny fraction (3% of respondents reported that it was adding time, and the remaining 19% did not respond to the impact AI has on their work time. AI also enhances tasks early in the design process, like responding to proposal requests (43%) and writing briefs (61%). Respondents are beginning to engage with AI to develop concept plans (37%). However, there is very little use in later design phases, like construction and post-occupancy reviews or performance evaluations (Figure 4).
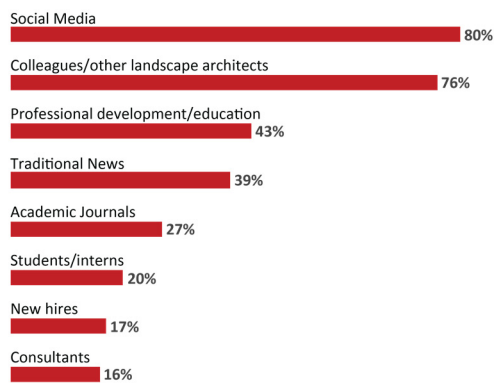
Figure 2 illustrates how respondents seem hopeful that AI has the potential to improve business operations (68%), stimulate creative processes (69%), analyze complex data (89%), enhance design exploration (50%), and generate design iterations (46%). However, the same

respondents cite uncertainty in modelling and forecasting data accuracy as one of their most substantial concerns (90%).
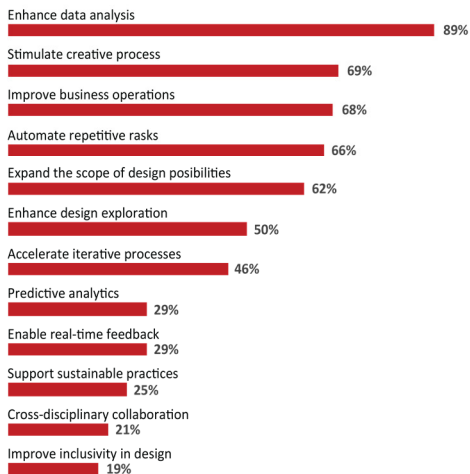
Response by Sector

- Landscape Architecture Firm — 48%
- Multidisciplinary Firm — 23%
- Government — 18%
- Academic Institution — 6%
- Full-time Student — 4%
- Supplier/Manufacturer — 3%
- Retired — 3%
- Design-Build Firm — 2%
- Private Nonprofit — 2%

Education Source About Artificial Intelligence

- Social Media — 80%
- Colleagues/other landscape architects — 76%
- Professional development/education — 43%
- Traditional News — 39%
- Academic Journals — 27%
- Students/interns — 20%
- New hires — 17%
- Consultants — 16%

Anticipated Benefits of Artificial Intelligence

- Enhance data analysis — 89%
- Stimulate creative process — 69%
- Improve business operations — 68%
- Automate repetitive rasks — 66%
- Expand the scope of design posibilities — 62%
- Enhance design exploration — 50%
- Accelerate iterative processes — 46%
- Predictive analytics — 29%
- Enable real-time feedback — 29%
- Support sustainable practices — 25%
- Cross-disciplinary collaboration — 21%
- Improve inclusivity in design — 19%

Concerns About Artificial Intelligence

- Uncertainty regarding accuracy — 90%
- Reduced human connection with design — 83%
- Losing control over intellectual property — 79%
- Business ethics — 76%
- Diluting the content of intellectual property — 76%
- Infringement of other's intellectual property — 71%
- Ethical concerns — 70%
- Reduced connection with nature — 55%
- Increased software costs — 55%
- Job displacement — 54%
- Social and environmental equity — 40%
- Increased project costs — 12%

Fig. 2: Survey responses organized by sector, education source, anticipated benefits, and concerns about artificial intelligence

The survey also indicates that respondents are concerned about ethical considerations, with 79% expressing concern over losing control over their intellectual property (e. g. copyright materials and patents) and 71% concerned about infringing on another's intellectual property (Figure 2). The survey answers show that landscape architects in North America predominately hear about tools from social media (80%) and colleagues (76%). It also shows that respondents are learning to use tools by trial and error (79%) or online videos (54%). These answers suggest that few invest in tools other than their time (71% report exploring tools during non-billable time), which aligns with allied design fields (AIA 2024).
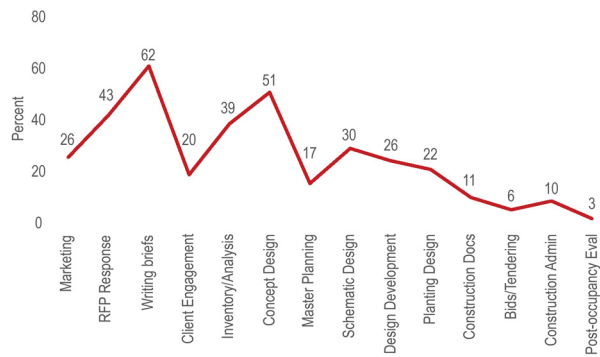
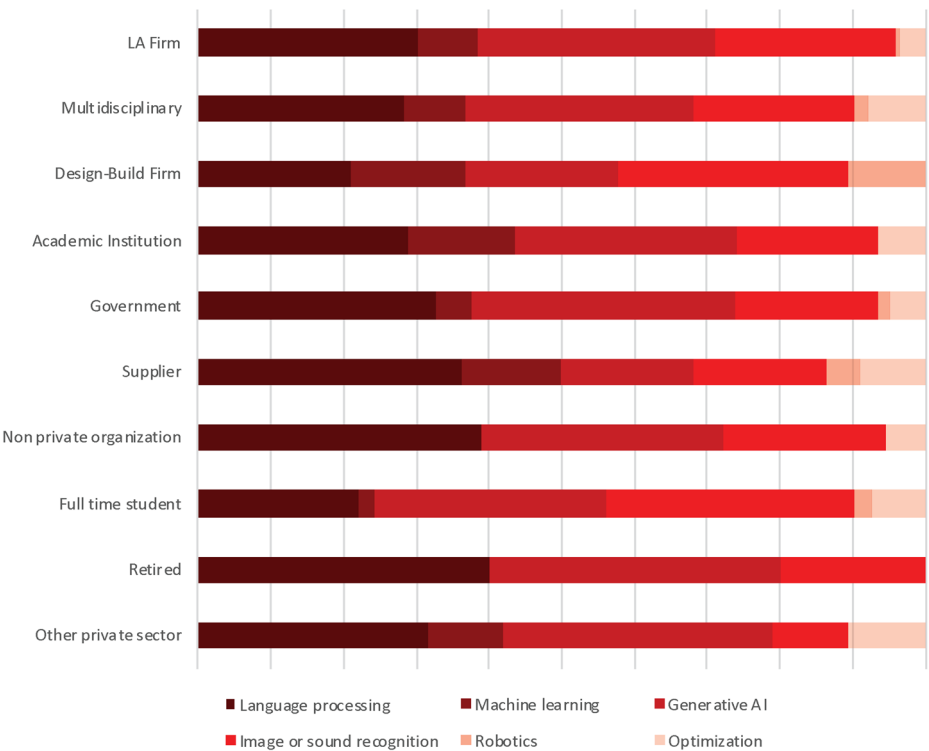**AI Use by Work Phases**

AI Use Type by Sector

Fig. 4: Types of AI used in different sectors: language processing, generative AI, and image or sound recognition are the three most prominent use types

3   Discussion

This study presents the first broad assessment of use, concerns, and perceived benefits of AI in professional practice. While AI is expected to improve efficiencies (DELL'ACQUA et al. 2023), only a quarter reported experiencing such benefits, yet with 40% unsure, the results also suggest that users may benefit from AI but struggle to achieve or track these efficiencies consistently – a common challenge observed among knowledge workers (DELL'ACQUA et al. 2023). This uncertainty likely stems from several factors: 1) AI integration in workflows may be too limited for measurable impact, 2) a lack of training or use could be inhibiting effective adoption, or 3) existing tools may not be capable enough across practice activities.

Despite a variety of concerns about AI, respondents continue to use it. This suggests they perceive that the potential benefits outweigh the concerns. The survey revealed a split among practitioners regarding ethical considerations, with 45% reporting concerns about the implications of AI for intellectual property rights. Scholars anticipate ethical divisions (SISON et al. 2023), especially those about generative AI, which are widely debated (FERNBERG, 2024). Our survey reiterates this topic is of high concern and will need further exploration.

The results offer four points of reflection on the survey design. First, the ubiquity and improvements of AI across the technology spectrum means the dates of this survey are likely to underrepresent the actual use of AI in practice in 2025. Second, the survey was limited to North America. One could only speculate if there is a similar use of tools in other regions of the world. Understanding geographical nuances is important because the emergence of academic publications extends beyond North America to Europe and China, the latter of which has contributed to a significant surge in AI research (FERNBERG AND CHAMBERLAIN, 2023). Third, integrating AI into professional workflows often blurs the distinction between AI- and non-AI-based tools so that some respondents may misclassify their use of AI. For instance, layout optimization in Microsoft Office tools is not AI, whereas Copilot predictive text uses AI. Further, the survey did not provide a specific definition for use (related to time, effort, and skill equivalency), which was open to interpretation. Fourth, the survey highlights how practitioners might generalize AI. The questions were general and did not delve into the specifics of the kinds of software or the interactions between users and software. Therefore, it is difficult to account for the unique benefits or limitations of professionals in different sectors and to what extent they use paid or unpaid tools.

As AI becomes increasingly embedded in standard drawing, writing, and planning applications, some users may be unaware of their interactions. This trend suggests that as technologies evolve, their visibility to end users may decrease, creating a challenge in understanding the source and extent of their influence on professional practices (GOODMAN AND FLAXMAN 2017). Addressing this ambiguity is crucial for fostering informed use and ensuring ethical accountability in the application of AI in fields such as landscape architecture.

4   Conclusion and Outlook

The 2024 AI-LA survey provides a high-level representation of the use of AI in practice within North America. The CSLA survey took place during a period that included the launch of Gemini by Google DeepMind and ASLA during the spring/summer of 2024, before the full integration of Copilot into Microsoft products. The advancement of these and other tools,

and a growing awareness of AI, means that results would look different if the survey took place today. Nevertheless, this survey shows that practitioners use AI. Landscape architecture-identifying firms reported significantly less AI use than multidisciplinary firms, indicating that landscape architects report a slower uptake than their peers. However, those who did not indicate the use of AI, foresee incorporating it into their work within the next two years.

For applications of AI in practice, nearly half of the respondents already use AI for at least one activity. Only a quarter of those who adopted AI feel it reduces their time; most are unsure of time savings. AI is primarily used in the early phases of the design process, including for proposals and gathering background information. This adoption suggests that large language models are an accessible technology that people can use with little cost or technological skills. The second most frequently used phases of AI are inventory, analysis, and conceptual design. For landscape architects, conceptual design emphasizes ideation and conceptual drawings, and respondents indicated using AI for image generation. The use of AI in these phases indicates that generative AI is shifting how we practice. AI use drops precipitously for design development, planting design, construction, and financial administration. There is little indication that landscape architects who responded to this survey are exploring AI for robotics, optimization and machine learning, which may be an untapped resource.

The survey results indicate that landscape architects mainly learn about AI through informal channels, such as colleagues and social media, rather than structured education training. Self-directed exploration, often outside of billable work hours, indicates that AI adoption is happening on an individual rather than institutional level. The reliance on trial and error reflects the lack of formal AI education within the profession, a space that educational or private institutions may see as an opportunity to educate practitioners. While this approach allows for flexibility and experimentation, it also raises concerns about uneven access to knowledge and the potential for misapplication. There is a need for more formalized learning opportunities and an awareness of how AI could make designers more effective.

The AI-LA survey shows the potential growth of AI in landscape architecture. It also demonstrates the need for additional research on the trends of AI use in practice and how it will impact the discipline. With more data, we can begin to address educational needs and training, as identified by respondents who are hesitant about the benefits of AI related to time, ethics, and resources. We also need a better understanding of how AI impacts business operations, where it is increasing (or decreasing) efficiencies, and the implications for future employment trends. This information will help our associations, accreditation, and licensing bodies anticipate and prepare for shifts in workforce needs rather than be blindsided by them. Undeniably, AI-driven technology has impacted landscape architecture practice, but it is too soon to understand the extent of those impacts.

Acknowledgements

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