



Exploring the future of design tooling: The role of artificial intelligence in tools for user experience professionals

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ABSTRACT

Recently, artificial intelligence (AI) has been introduced into a variety of consumer applications for creative work. Although AI-driven features in design tooling are nascent, there is growing interest in utilizing AI to support user experience (UX) workflows. In this case study, we surveyed industry UX professionals to understand how they perceive AI-driven assists in their tools, their concerns about accepting AI in design tools and which design-related workflows could be promising for future research. Our results suggest that UX professionals are overall positive about AI-driven features in design tools; looking to AI as a *creative partner* to iterate with and as an *assistant* with mundane tasks. We offer practical directions for the future of AI in UX tooling, but caution against developing tools that do not sufficiently address UX professionals' concerns around bias and trust.

CCS CONCEPTS

• Human-centered computing → Empirical studies in HCI.

KEYWORDS

Design tools, artificial intelligence, product design

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1 INTRODUCTION

The user experience of numerous consumer applications has dramatically shifted in the last decade as artificial intelligence (AI) has become ubiquitous. Many users of these applications have come to rely on AI to assist them in their work (e.g., auto-correct for word

processors, predictive text in email composition, or voice translation). However in tools for product design, AI-driven experiences are still nascent, e.g., the “auto-layout” re-sizing features¹ in design tools such as Figma². Yet progress in this area points towards increasing adoption for user experience professionals (hereforth called “UX professionals”) of AI-driven features in their tools. Previous work suggests that AI-enabled tools can help automate repetitive tasks in design [9], engage in creative work at the early design exploration stage [6, 8], and even support user experience professionals at the co-creative stage through a human-AI collaborative approach [4].

Our team, Material Experience Research, conducts research on Google’s design system, Material Design, as well as design tools for creating digital experiences and improving designer-developer collaboration. Over time, we have begun to investigate novel experiences for the future of design tooling including tools to address the hand-off problem between designers and developers,³ tools to manage design systems, and the emerging role of AI in the design process [5].

In this case study, we investigate how UX professionals perceive various forms of AI assistance (hereforth called “assists”) in product design tools and under which design-related scenarios AI could provide useful support. We conducted a survey with UX professionals who work for a large multi-national technology company. Specifically, we seek to answer the following research questions: 1) How do UX professionals perceive AI-driven assists in design tools, 2) what are their concerns around accepting AI in their day-to-day tools, and 3) which design-related workflows are promising for the future of AI-driven design. Our results contribute to the Human-Computer Interaction (HCI) literature by showcasing how AI could serve as a *creative partner* in support of product design-related creativity and as an *assistant* to take care of mundane or repetitive tasks. We consider trust in design-related AI output and bias in training data, even in data that the user consents to provide, as key challenges around the acceptance of AI in design tooling. Implications drawn from speculative vignettes suggest promising areas for future work in the design tooling space. Finally, we provide practical directions for designers and researchers who work on design tools.

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¹<https://www.figma.com/blog/announcing-auto-layout/>

²<https://www.figma.com/>

³<https://relay.material.io/>

2 METHOD

Our goal is to gain a rich understanding of UX professionals' (e.g., designers, researchers, and writers) perceptions of AI in design tools which support design-related work. We conducted a survey of UX professionals at a large multinational technology company. 71 UX professionals began the survey out of which 51 completed the survey (71.8% completion rate). All of the participants were full-time employees of the company. We recruited a diverse sample of participants to include a variety in role and tenure (See Table 1). We included a screener question at the beginning of the survey to screen out potential respondents who did not fit our recruiting criteria, i.e., those who were not currently working in a UX-related job role.

2.1 Survey design and distribution

The survey consisted of 18 questions (9 close-ended; 9 open-ended), divided into four categories: demographics, attitudes towards AI, speculative vignettes for designing with AI, and use of personal data. In the first category, we aimed to understand who our respondents were through demographics (e.g., length of time in role, tenure at company). We then asked about general familiarity with AI products and beliefs about AI (e.g., familiarity with AI devices, AI's impact on society, trust in AI-output). Next, we gauged their level of interest in a hypothetical design tool with an AI-driven feature that would support a common UX workflow through one of three speculative vignettes (e.g., likelihood of using the proposed tool). Each respondent responded to one randomized vignette. In these vignettes, we explored scenarios common to discussions about design tool functionality. The final category asked about attitudes towards using personal data to improve AI-driven design tools (e.g., types of data that are okay to share). For each category of questions, we asked both qualitative (i.e., open-ended) and quantitative (i.e., close-ended, Likert scale) questions. To recruit UX professionals to participate in the survey, we utilized internal UX-related email list-servs to distribute the survey over a period of two weeks in May 2022. After sending the initial invitation to complete the survey, we sent multiple follow-up reminders. No compensation was provided for taking the survey.

2.2 Data Analysis

For the open-ended responses, we coded each response for each question iteratively using the constant comparative analysis method [2]. To begin, one researcher coded all of the responses for each question inductively to develop an initial set of codes. Next, an additional member of the research team went through each response and independently assigned one or more codes. After all of the responses were coded by two researchers, the research team met and discussed any discrepancies in the codes until an agreement was reached. Across questions, four high-level themes emerged from our data: *AI for creativity support*, *AI for mundane tasks support*, *use cases for AI in design tools*, and *challenges around AI acceptance*. For the Likert scale responses, we obtained the percentage of users that responded to each option and specifically explored the total percentage of users who responded positively or negatively to a scenario or question.

3 RESULTS

AI-driven features are entering software products en-masse, increasing the importance of understanding how end-users, in this case UX professionals, perceive AI-driven assists in design tools. Almost all survey respondents (97%) felt that they were familiar with AI concepts, and 70% felt comfortable around AI-powered devices, i.e., did not think they were "creepy". Almost three-quarters (73%) believe that AI contributes positively to society, e.g., as an extension of human knowledge or support for creative processes. However, some were wary of negative outcomes due to bias in AI algorithms. Given these perceptions of AI, we dive into how UX professionals specifically view AI in the design tools space. In the following subsections, we present data on how UX professionals think AI could support their work, challenges around accepting AI in a design tool, and which areas of design-related work could be fruitful for future AI-driven assists.

3.1 How UX professionals think artificial intelligence could help them in their jobs

In analyzing the data across questions, we uncovered two areas where UX professionals are positive about utilizing AI-driven assistance in design tooling: 1) for creativity support (e.g., ideation) and 2) for mundane task support (e.g., tedious or repetitive tasks).

3.1.1 AI-driven creativity support in design tools. Support for the creative process was frequently brought up in open-ended responses to various questions in the survey (such as *How would you want AI to support your creative process, if at all?* or statements such as *My work could never be done by AI*). When talking about creativity support, respondents were optimistic about AI as their *apprentice* or creative *partner*, whose role it was to provide suggestions, organize information and refine ideas. AI was not considered as an independent agent in the design process whose work did not require human intervention. As an example, an AI *partner* could cluster user feedback into themes for a researcher to then tweak or correct.

Within the theme of creativity support, ideation support emerged as a coveted future AI-driven feature in design tools, in particular amongst designers. Designers could see AI providing inspiration by finding and summarizing others' work in the design industry and beyond. AI could also help designers learn how other designers have approached similar problems in the past, "If I don't know how to do something, maybe AI can point me in the right direction[...] [by] giving examples of how other designers have approached similar problems". Next, AI could be used to generate variations for designers to choose from, such as a designer who imagined an "AI assistant to spit off numerous layouts/options with pros and cons for a given problem statement". In addition, some designers felt that AI could support ideation during brainstorming when they were tasked with coming up with a new design, by helping "record, iterate, triage, categorise and suggest ideas in brainstorm".

On the other hand, UX researchers and content writers were more keen to have AI support their writing process via *review and refinement*. AI could be used to review a body of work and create a summary. As an example, AI could review designs that were tested in a study and provide "natural language descriptions". UX researchers also thought AI could help them focus on the creative

Table 1: Participant demographics

Role	UX Designer	16 (42%)	Tenure	<6 months	3 (8%)
	UX Researcher	15 (39%)		6 months - 1 year	6 (16%)
	UX Content Strategist	3 (8%)		1-2 years	1 (3%)
	UX Manager	3 (8%)		2-3 years	3 (8%)
	UX Engineer	1 (3%)		3-5 years	9 (24%)
				5-10 years	12 (32%)

aspects of writing research reports by refining their existing work. For example, AI could fill in the details based on the high-level conceptual work that the user inputs into the system or provide assistance around generating text in slide presentations. A few respondents mentioned flow as integral to their creative process, and these types of assists could help keep users in the *flow* state (i.e., Csikszentmihalyi [3]).

Notably, UX professionals across roles wanted to be able to step in and review the AI's work, as well as have control over the final outcome by accepting / declining or adjusting the AI's suggestions. Specific to designers working in design tools such as Figma, they wanted AI to warn or course correct. As an example, one designer explained that AI could "help me understand when I'm making a poor design decision that would impact the user experience negatively, e.g. if my design isn't correctly accounting for internationalization or RTL layouts" or it could "check against guidelines" such as accessibility.

3.1.2 AI could drive mundane tasks. UX professionals across job roles similarly wished for AI that could take care of mundane design-related tasks for them so that they could focus on the work that excited them the most: the creative, strategic or holistic parts of their job. Designers explained, "[A tool] should help me by lowering the redundant work and help me focus on thinking through the experience and strategy." and "Reduce the legwork. Let me think while it does the tedious stuff". For UX engineers, i.e., those who employ UX principles to front-end engineering, AI could support creative work by "automat[ing] things that are normally drudgery". To accomplish this, UX professionals expressed a desire for AI-driven support that could be easily automated, such as repetitive tasks and easy tasks (i.e., those with few steps or with uncomplicated logic). When employed to reduce repetitive tasks, respondents felt that the use of AI should save them time and with human guidance, be able to improve over time. Repetitive tasks were most frequently brought up as something for AI to take on because many respondents felt that AI is currently most powerful when employed to remove "the tedium of things that take a lot of manual effort". Across roles, UX professionals considered repetitive tasks "boring" yet "essential", and noted that AI could support these tasks because the frequency of the task could provide enough training data for the AI to learn from.

Next, tasks that could be easy for the AI to learn given the current state of AI are another way that AI could free up time for creative endeavors. These types of tasks were frequently categorized in terms of organizing language-based data. In one example, because large language models are becoming increasingly sophisticated, a UX researcher felt that "AI might be able to do qualitative coding

in the future", which could support robust data analysis. Similarly, a designer thought that AI could easily find themes in their data – for instance, during a design sprint "where we affinity map the sticky notes we have written. In a virtual design sprint this is not easy, but a program could do that for us." Essentially, AI could help them synthesize insights more efficiently.

Finally, many designers mentioned that design work comes with a lot of "monotonous, time-consuming stuff" that is currently done manually. Time-saving AI-driven support could be based on suggestions, where the AI would propose something for the user to accept or decline, similar to current spelling or grammar checks. Similarly, A UX researcher said that AI-driven support in a design tool could save time by "annotating and transcribing user sessions[...]" or if I could use an AI to query the [research session] videos."

3.2 Concerns around accepting AI in a design tool

Respondents expressed concerns around acceptance of AI-driven assists in design tools. Some people were not sure that current AI capabilities would be advanced enough for design work, having a "[...]long way to go before it can perform the day-to-day tasks of being a UX designer. There are just too many variables at play which are difficult to quantify". Similarly, a researcher said their job involved "too many unique events or new partner engagements for AI to be able to learn the workflow [because] every engagement feels new". Outside of this, two overarching concerns were AI perpetuating bias and the reliability of AI output.

Respondents expressed concerns about potential AI in their design tools perpetuating existing biases into their design work, i.e., that use of AI could unintentionally lead to negative patterns which could "impact people in under-served communities[...]" Like a lot of revolutionary tech it has the potential to help us immensely or hurt us just the same." Others expressed concerns about the ethical development of AI, particularly the misuse of AI, e.g., a UX researcher citing its use as a tool of "oppression" or a designer who fears "that not enough questions and red teaming will be done and the implications will not be fully understood even as it gets launched". As such, some respondents would need the AI system to have "very clear guarantees of state-of-art private computing... to be comfortable with [training data] being used" in design tools.

The reliability of AI output was widely expressed as a concern by UX professionals across roles. A high percentage (70%) of respondents were either neutral or disagreed when we asked them to react to the statement *AI is a reliable partner in the work that I do*. From the qualitative responses associated with this statement, this could be attributed to a lack of existing tools that are relevant to respondents' work. For example, one respondent who strongly

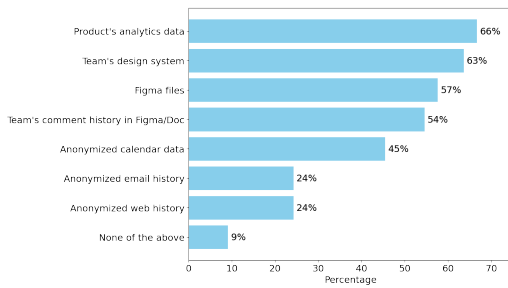


Figure 1: Proportion of participants that were willing to provide different design-related personal data

disagreed with the statement told us that “Existing AI tools don’t play a strong part in any of the work I do”.

Respondents find it difficult to fully trust the quality of AI output, which is suggested by the nearly half of respondents (49%) who agreed with the statement *I do not trust the quality of the output of most AI tools*. Some UX professionals have a higher standard for quality of AI output. For example, a UX writer who somewhat agreed with the statement commented that “It’s just not to the level of quality that I’d expect from a human collaborator. My hunch is that AI will always require some human intervention or curation in order to be useful in creative fields.” Some rationalized that it is a limitation of AI that makes the data unreliable, such as the UX researcher who said, *In particular, if there are no patterns in the data, no AI tool in the world can learn anything from it*. A designer who also somewhat agreed with the statement added that they desired “a better understanding of what decisions went into generating the output” so they can have more confidence in the output.

Related to reliability, respondents expressed concern around the types of design-related personal data that a system would need to provide them with useful recommendations. We asked how likely respondents would be to share various work-related data and the percentages of respondents who selected each of the options are reported in Figure 1. We specifically mentioned Figma, as it is the most commonly used design tool [7]. Not surprisingly, respondents were least inclined to provide highly personal data such as their web history (24%) and email history (24%) - even if it was anonymized. Respondents were most inclined to share analytics data from the tools/products they use (66%), their team’s design system data (63%) and their Figma files (57%). Some respondents expressed concerns around the quality of data in their files, such as a UX researcher who would want “the AI to pay the most attention to the local context (e.g. current Figma file or current presentation), not historic ones that are probably full of bad patterns and/or design bugs”. Only 9% participants declined to share any data with an AI, which indicates that most respondents were receptive to the idea of sharing at least some of their personal data with an AI system.

3.3 Vignettes where AI could provide support for design-related workflows

We used short vignettes to probe respondents to consider hypothetical AI-driven assists related to common UX workflows in a hypothetical design tool. Each respondent saw one of three vignettes

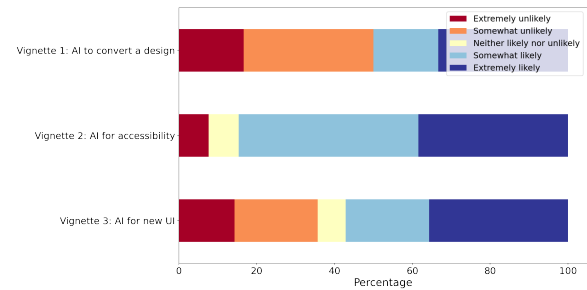


Figure 2: Likert scale responses for the three vignettes we provided

that used AI to address a common challenge in design workflows: 1) converting a design to additional layouts or devices, 2) ensuring design meets accessibility guidelines, and 3) coming up with new ideas for UI. Figure 2 shows the results of the five item Likert scale responses (extremely likely to extremely unlikely) for each vignette.

Vignette 1: AI to convert a design. *Imagine you had a design tool that could recreate your design for any layout or device. So when you use this tool, you can automatically convert a design for iOS into a design for a large-screen display.*

Respondents who saw this vignette were split (50% exactly) on whether they would be likely or unlikely to use this tool. Many felt that the use case for this AI-driven assist is fairly narrow, i.e., mainly for designers working across multiple surfaces or platforms. Respondents who said they’d be likely or extremely likely to use it mentioned that it could make their work of recreating their UI for the other surfaces they work with easier. Those who were unlikely to use it mentioned that it wouldn’t be helpful because they designed for single surface or for a single platform (e.g., Android or iOS).

Vignette 2: AI for accessibility. *Imagine you had a design tool that could make suggestions to ensure your design is accessible to a wide variety of users. So when you use this tool, you can see suggestions for improving color contrast or updating the layout to accommodate different writing systems.*

Almost all respondents who saw Vignette 2 said they were either likely or extremely likely (85%) to use a tool that helps make UI designs accessible. When asked to explain why they felt this way, respondents spoke to the importance of accessibility in design, yet mentioned challenges around understanding how and when in the design process to apply accessibility guidelines. For example, one designer told us that “having more accessible design in my opinion is a must in our design process. However I believe it’s still often overlooked.” Furthermore, manually checking for accessibility is an inefficient process which is prone to error, especially for designers who are less proficient in accessibility standards. While some participants have used plugins that helped them adhere to Web Content Accessibility Guidelines (WCAG) guidelines⁴ (e.g., text or color contrast), they were required to run the plugin each time

⁴<https://www.w3.org/WAI/standards-guidelines/wcag/>

they updated their design to re-check whether their new design meets guidelines. Respondents felt that the AI-driven feature in the vignette could save them time by suggesting how to improve the design's accessibility, correcting errors early in the design process, and that the AI could help them *learn* more about accessibility standards, e.g., how to spot inaccessible patterns in future designs from the AI's previous suggestions.

Vignette 3: AI for new UI. *Imagine you had a design tool that could automatically create a UI for you based on basic input you provide.*

Over half of the respondents (57%) who saw this vignette were either likely or extremely likely to use the tool because it could help them generate new ideas. For example, the AI could provide a *template* or starting point to help designers to arrive at a usable solution faster than if they had to start from scratch. Along this line, the tool could expand the design space by taking in basic input and configuring an array of options based on the user's design system. Although optimistic about the tool, one respondent brought up the challenge around properly training the AI to work for them, "I don't think it would be extremely useful unless it could be trained to map to our specific team needs, patterns, components".

Respondents who were unlikely to use the tool were wary about the AI stifling their creativity or taking away the uniquely human aspect of craftsmanship. A designer said, "Design is an art. A craft. Just like glass blowing, a machine can mass produce a mason jar, but a glass blower is the only person that can make their unique art". Additionally, there were some concerns around the AI providing too easy of a path to an output, which could result in less innovation in the design space over time. Finally, some respondents did not work in a designer role and therefore wouldn't have much use for this type of tool.

Given the three vignettes, Vignette 2: AI for accessibility provides the most promising way forward. Firstly, it is the tool that UX professionals said they would be most likely to use of the three. Secondly, respondents felt that accessible design was very important to their work, and finally that accessibility guidelines can be complex and manual checking can be time-consuming. Vignette 3, AI for new UI could be another promising area for future investigation, given that users were interested in AI-driven assists for ideation when coming up with a new design. Finally, in the case of the first vignette, the limited use case constrained how supportive AI could be for a large amount of users.

4 DISCUSSION

Through this research we have seen specific areas where AI might be useful to UX professionals in their roles. While there were concerns about training data or bias, most were positive towards at least one concept in its ability to improve their workflows.

4.1 AI as a partner in the design process

UX professionals want to see AI as their *assistant* that can help with tedious tasks or their *collaborative partner* on creative tasks that could work like a teammate to help them explore the range of possible UX outcomes.

When it came to tedious tasks, participants spoke about AI with specific capabilities that could be trusted for a specific, often repetitive, task. There are many opportunities for such assistance that could help users to go beyond their areas of expertise (e.g., with accessibility checking or internationalization tips) or to do the grunt work of design (e.g., checking values such as color or spacing). Much of the design or research process is not the glamorous ideation phase, but rather repeated and often predictable tasks. Respondents saw a huge opportunity to help them speed through this tedium and catch errors in their design that they might not otherwise see.

For creative tasks, AI was seen as a way to help UX professionals uncover new opportunities in the design or research process. For example, AI could generate templates for specific types of screens (e.g. a prototypical "login screen"), showing designers inspiration to continue in their process. Or AI could automatically adapt layouts to different form factors, showing a designer how they might adjust their content for a large tablet or television screen. A true AI collaboration for design could work similar to pair programming, where AI works as the partner to interject ideas or help explore different ways of accomplishing a task.

There is still much research needed here to determine the exact feature sets that would be most likely to be adopted as well as how to introduce these AI-driven assists to UX professionals. Understanding current reactions to AI, as explored above can help to avoid many potential pitfalls of poorly trained systems or systems that remove user agency in the design process.

4.2 Developing trust in new interactions with AI

One aspect of end user acceptance relies on trust in the AI system. This theme emerged in numerous sections above. First, users must trust that the tool itself is competent at the task it is designed to perform. Gaining user trust may be difficult with tools that cannot recognize the context in which they are embedded or provide effective explanations for their interactions [1]. Tools that are highly focused on specific tedious assists might be the easiest to engender trust if they are properly trained. However, accuracy must be high with these tools, as if they miss a critical accessibility issue, they may lose the designer's trust forever.

Tools that serve as creative partners do not have to be as precise, as an "error" in this case could be seen as a creative judgement on a proper solution to a problem. If an AI tool generated 10 possible login screens, and 8 looked reasonable, this system could still be a useful tool for a designer to have in order to more fully explore the field of design possibilities for a task.

4.3 Practical directions for working with AI in the design tools space

Overall, we found a large appetite for the use of AI in design tools, with AI helping in multiple aspects of the design, research, and writing process for different UX roles in industry. Investing in this area can lead to many useful solutions for a wide range of UX professionals. We see opportunity in the accessibility and internationalization spaces for the use of AI. These are often areas where designers or researchers have limited training, yet guidelines and laws for accessibility as well as examples of good and bad accessibility or

internationalization implementations abound. This can create a perfect recipe for an AI-driven solution to enter the design process, as it could teach UX professionals these important topics through examples as they complete a design.

It is also important for these tools to be humble and to state known limitations. A creative support tool, for example, might show many options for potential designs, but caveat the presentation in terms of how it thinks it understood the prompt, or allow users to mark specific designs as irrelevant to improve future concept generations.

Limitations. In this case study, we surveyed UX professionals who are employed at a large, multinational technology company. Future work could involve surveying a broader set of UX professionals to find out how common the themes presented in this study are across a larger population and discover additional opportunities for AI to be beneficial in design tooling. Qualitative studies could focus on further understanding how user context, past experience and comfort with general design tools influence perceptions of AI and willingness to adopt AI-driven features in design tools.

5 CONCLUSION

We hope that this survey can inspire the creation of AI-driven tools that can help UX professionals in the design process. Our participants highlighted the promise, and potential pitfalls, of developing solutions in this space. In the process, we identified multiple problem spaces where AI can help, both as an assistant with tedious UX tasks and as a creative partner in the UX journey.

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