

# “Hey Alexa, Would You Create a Color Palette?” UX/UI Designers’ Perspectives on Using Natural Language to Interact with Future Intelligent Design Assistants

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## “알렉사, 색상 팔레트를 만들어줄 수 있어?” 지능형 디자인 비서와 자연어로 협업을 수행할 UX/UI 디자이너의 생각

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**Abstract** Artificial Intelligence (AI) has been inserted into people’s lives through Intelligent Virtual Assistants (IVA), like Alexa. Moreover, intelligent systems have expanded to design studios. This research delves into designers’ perspectives on developing AI-based practices and examines the challenges of adopting future intelligent design assistants. We surveyed UX/UI professionals in Brazil to understand how they use IVAs and AI design tools. We also explored a scenario featuring the use of Alexa Sensei, a hypothetical voice-controlled AI-based design assistant mixing Alexa and Adobe Sensei characteristics. The findings indicate respondents have had limited opportunities to work with AI, but they expect intelligent systems to improve the efficiency of the design process. Further, majority of the respondents predicted that they would be able to collaborate creatively with AI design systems. Although designers anticipated challenges in natural language interaction, those who already adopted IVAs were less resistant to the idea of working with Alexa Sensei as an AI design assistant.

**Key words** : Artificial intelligence adoption, Artificial intelligence-based design, Intelligent Virtual assistant, Voice interaction, UX/UI design

**요약** AI (인공지능)는 알렉사와 같은 지능형 가상 비서 (IVA)을 통해서 이미 우리의 삶에 침투했으며 디자인 작업에도 도입될 가능성이 높다. 본 연구에서는 AI를 활용하여 개발될 지능형 디자인 비서에 (intelligent design assistant) 대해서, 디자이너들이 어떠한 생각을 가지고 있는지 이해하고자 한다. 이를 위해서 브라질의 UX/UI 디자이너들에게 지능형 가상 비서와 AI 디자인 도구에 관한 설문 조사를 실시했으며, 추가로 알렉사와 (Alexa) 어도비 센세이를 (Adobe Sensei) 결합하여 음성 기반 AI 디자인 비서인 알렉사 센세이를 (Alexa Sensei) 가상의 시나리오로 만든 뒤, 이에 관한 설문도 함께 실시했다. 설문조사 결과, 브라질 디자이너들은 AI와 협업할 기회는 제한되어 있었으나 AI가 디자인 프로세스의 효율성을 개선해줄 것으로 기대한다는 사실을 알아냈다. 또한 응답자의 대다수는 AI 설계 시스템과 창의적으로 협력할 수 있을 것이라고 예측했다. 자연어를 통한 의사소통에는 한계가 있을 것으로 바라보았지만, 이미 지능형 가상 비서를 사용한 경험이 있는 디자이너들은 음성 기반 AI 디자인 비서에 대한 거부감이 낮다는 점도 함께 밝혀졌다.

**주제어** : AI 수용도, AI 기반 디자인, 지능형 가상 비서, 음성 인터랙션, UX/UI 디자인

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## 1. Introduction

Although in the past, interacting with intelligent and autonomous computer systems might have seemed like a science-fiction scenario, the rise of Intelligent Virtual Assistants (IVA)—such as Alexa, Google Assistant, Siri, among others—has brought Artificial Intelligence (AI) to the center of an individual's life. Via mobile phones or smart speakers, interacting with IVAs is becoming common for people worldwide. One critical advantage of these gadgets is that we use natural language to interact with AI technologies.

Several industries already heavily rely on AI, which leads to intelligent systems' diffusion at workplaces. In this sense, voice-interaction is gaining ground, and Gartner [1] has forecasted that corporate employees will soon use voice-based virtual assistants. In the design domain, practitioners still lack the means and skillsets to work with algorithms as a design material [2]. However, a new context has arisen with the development of creativity support tools based on machine learning [3]; these will eventually utilize voice-user interfaces for computational assistance [4].

This paper explores the present context and perspectives on using AI in design practices by listening to practitioners. We conducted a scenario-based survey among UX/UI professionals working in Brazil, which hosts the largest and most dynamic UX/UI design community in Latin America. The two initial purposes of the survey were to investigate how they utilize IVAs and to map their activities supported by AI systems and tools. Based on recent literature, we probed attitudes concerning intelligent systems' application and capabilities, as well

as their role in creative collaboration with designers. The survey also looked at a scenario of future voice-controlled AI-based design assistants to anticipate the factors and barriers involved in adopting innovative products that integrate AI features into design tools.

In the following sections, we review studies on IVAs and AI-based design and, after describing our conceptual development and methodology, we present and then discuss the survey results. In addition to mapping IVA adoption among design practitioners, our main research contribution lies in using and applying AI design tools within a relevant UX/UI design community not included in similar surveys [4]. We identified a functional approach to AI adoption in UX/UI design by exploring their AI-based design activities. However, practitioners perceive future AI-integrated design tools will affect their roles in the design process by allowing creative collaboration with AI systems. Notwithstanding the limitations of scenario-based approaches, the research also offers fresh perspectives on how UX/UI professionals forecast interaction with intelligent design assistants embedding natural language features. Although unable to visualize future practices properly, UX/UI designers already realized that AI augments their innate human intelligence & abilities in the design process.

## 2. Theoretical background

### 2.1 Intelligent virtual assistants

With the diffusion of virtual assistance features embedded in mobiles, home appliances, and automobiles, individuals can currently interact with intelligent systems at

any time simply by using natural language. The number of monthly IVA users in the US has already reached a third of the population [5]. This illustrates how the pace of adoption is accelerating. AI-based gadgets are becoming omnipresent worldwide through their augmentation of individual capabilities and their ability to ease ordinary activities.

According to de Barcelos Silva et al. [6]—by integrating AI, speech recognition, semantic web, dialog systems, and natural language processing—IVAs turn a conversation into the primary mode of human-computer interactions. Investigating IVAs devices' design characteristics, Knotte, Janson, Sollner, & Leimeister [7] identified five product categories with which to interact: adaptive voice (vision) assistants, chatbot assistants, embodied virtual assistants, passive pervasive assistants, and natural conversation assistants.

Although IVA use has also extended to office workers [8], most interactions occur in personal contexts and home environments. In general, individuals use intelligent systems for music, search, and the IoT [9], but there are trade-offs between privacy and utility [10]. In this sense, privacy was identified by Burbach et al. [11] as the critical factor for IVA's acceptance. Individual concerns about security outweigh aspects such as an IVA's price or language performance.

Prior research has shown that the acceptance of smart speakers is affected by several factors. Besides the aforementioned security and privacy concerns, Kowalczyk [12] found that users pay attention to IVAs' perceived ease of use, perceived usefulness, quality, and the diversity of their intelligent

systems. Subjective issues such as a consumer's optimism about technology and the enjoyment of the IVA experience also matter. This adoption context is summarized by McLean & Osei-Frimpong [13] as the utilitarian, symbolic, and social benefits provided by IVAs.

In addition, developing natural language interaction with intelligent systems comprises challenges related to speech recognition. A system's capability in regard to primary experiential features such as correctness and natural feeling [14], perception of humanness [15], and linguistic coverage [16,17] tends to influence individuals' acceptance and adoption of IVAs.

## 2.2 AI-based design

Design disciplines are fast-changing as they encompass emergent technologies. In the context of the Fourth Industrial Revolution, practitioners have become intrinsically attached to computer systems to develop design activities [18]. In this sense, design processes are becoming computer-augmented [19], and algorithms are new design materials [20].

Although AI systems are not yet fully available to designers, algorithms open new avenues for their practices. In a so-called "AI design" context, intelligent systems are applied throughout the design process to deliver solutions. Current approaches involve using generative algorithms to support creative processes such as design ideation [21] or applying algorithms to automatize design tasks [22]. However, as these systems lack autonomy and humans still mediate the processes, Verganti, Vendraminelli, & Iansiti [23] describe this situation as "AI-powered design."

AI system functions offer advantages for practitioners. Liu and Nah [24] suggested that data processing and automation improve design process efficiency and that generative design approaches expand the imagination. Likewise, Cautela et al. [22] indicated that AI algorithms could enhance intelligent data processing activities, provide virtual assistance, and recommend solutions. Regarding design practices, the scholars pointed out that AI facilitates teamwork, empowers research development, and automatizes test and feedback phases.

Practitioners have different viewpoints on the contribution of AI technologies to design tasks. Researchers have found that designers perceive that AI systems may not benefit creative processes. Concerning AI capabilities, Main and Grierson [3] observed that creative tasks are understood to be less suitable for AI tools than tasks like project planning and management, problem research, and testing and feedback. Exploring attitudes towards AI-based creative assistants, Pfeiffer [4] noticed a similar perspective. Practitioners in the US, the EU, and Japan value AI for streamlining the operational aspects of practice rather than providing creative solutions.

Other researchers are more optimistic about the benefit of AI systems. McCormack et al.'s [25] study portrayed AI as a creative agent system that provokes, challenges, and enhances human creativity. Liao, Hansen, and Chai [26] proposed a pragmatic approach for using AI in design ideation. Their framework suggests AI's role is related to creating representation, triggering empathy, and promoting engagement. Verganti, Vendraminelli, and Iansit [23] further claimed that AI leads to more

creative solutions by reinforcing design principles such as people-centeredness.

Regardless of the expected contribution of AI technologies to design tasks, the designer role in the AI context faces probable challenges [27] because AI systems will allow the development of creative collaboration [25, 28]. In other words, intelligent systems will work with designers "on a moment-to-moment, real-time basis to generate creative outcomes, performances, and artefacts [25, p. 41]." According to Main and Grierson [3], AI can be an assistant, collaborator, researcher, or facilitator but might also perform as a co-creator in design practices. Conversely, Girling [29] suggested that the designer's role in future AI contexts will relate to the curation of AI design outcomes.

Current AI design tools are evolving and becoming integrated into systems such as Adobe Sensei [30]. Expectations are high that these will provide comprehensive tools beyond design assistance to boost designers' potential [31]. However, most AI design tools available to practitioners are task-oriented and based on generative design algorithms [32] or machine/deep learning engines such as Generative Adversarial Networks (GAN) and the Convolutional Neural Network (CNN). Concerning this latter approach, Main & Grierson [3] classified AI tools into divergent and convergent forms, aligning machine learning functionality with the design process.

### 3. Conceptual development

#### 3.1 Research context scenario

Ramirez, Mukherjee, Vezzoli, & Kramer

[33] defined a scenario as a structured conceptual system of possible future contexts. In the same vein, Kosow & Gaßner [34] noted that it presents paths of development that lead to a conceptual future. This research employs a scenario to explore how designers react to potential future AI-based design assistants. Here we refer to AI systems fully integrated into design tools that are currently exemplified by the features available in Adobe Sensei [30].

We developed a scenario based on Pfeiffer's [4] report, commissioned by Adobe, which interviewed practitioners to understand the role of intelligent technologies in their creative process, including attitudes towards voice interfaces. We forecast that Adobe Sensei will evolve and emulate IVAs such as Alexa, allowing design practitioners to interact with AI systems using natural language. In this situation, a voice-controlled AI-based design assistant would collaborate with practitioners in the design process. In other words, conversational bot's features would enhance the interaction process, but the intelligent system would be in charge of intervening in the design activity. For the sake of this paper, we simply refer to a hypothetical Alexa Sensei to summarize this scenario.

### 3.2 Research key concepts

Since AI design tools' development and adoption are in their early stages, literature on these topics is scarce. Therefore, the following marketing concepts were crucial to guide this research project's development and to explore scenarios. To address the use of future AI design tools, we built upon Ma, Gill, & Jiang's [35] investigation of the

adoption of core innovation (when integrated with a base product) and peripheral innovation (involving a detachable accessory).

Considering the current context of AI design tools, Adobe Sensei [30] is understood to be a core tool since it is integrated into Adobe software. Conversely, khroma [36] is a peripheral tool because it creates color palettes as a detachable accessory powering the design process. Therefore, this research elaborates on terms and uses "AI-integrated design tool" to refer to a core tool and "AI-powered design tool" to refer to a peripheral tool.

Marketing scholars have explored different approaches to investigate soon-to-be-launched products [37,38]. Claudy et al.'s [39] probed factors related to consumer adoption of innovation. They identified innovation attributes and resistance factors such as functional and psychological barriers. Since our study delves into a future scenario when practitioners might work with an innovative AI-integrated design tool such as the Alexa Sensei, we built upon these findings to report on adoption issues.

## 4. Method

This research design relied on recent literature on the topic of AI adoption. To observe UX/UI designers' use of IVA and AI design tools, we followed Dove, Halskov, Forlizzi, & Zimmerman's [2] and Main & Grierson's [3] survey strategies. Further, to explore perceptions about a hypothetical Alexa Sensei, we developed a scenario-based survey drawing on Biswas, Romeo, Cangelosi, & Jones' [40] approach.

Via LinkedIn, we invited Brazilian practitioners working in regions with an

established design industry to answer a 47-question survey. We prepared multiple-choice questions and open-ended ones covering topics such as AI's role [3] and application [22] in current practice and future scenarios involving the use of AI tools.

In total, 132 UX/UI designers participated in the online survey conducted between December 2020 and January 2021. We dropped nine participants. The criteria to select 123 participants in the sample (Fig. 1) included a minimum of one year of experience in developing UX/UI-related activities either as a hired worker or a consultant/freelancer. An open-ended question requiring them to describe their main UX/UI design activities helped us assess whether each potential participant was qualified or not.

Finally, a mixed-method research strategy [41] guided the survey results analysis. A grounded theory [42] approach supported examining responses to open-ended questions. Besides descriptive statistics on answers to multiple-choice questions, we used a non-parametrical method (the Mann-Whitney test) to probe differences in group perceptions based on Likert scale questions.

#### 4.1 Participants

Fig. 1 describes the participant profiles of Brazilian practitioners working in the local UX/UI design industry. They are characterized as Millennial professionals with a degree or training in a design-related area. The respondents develop activities mainly in mid-level positions in the in-house UX/UI design departments of large companies in the

southern part of Brazil. On average, they have five years of professional work experience.

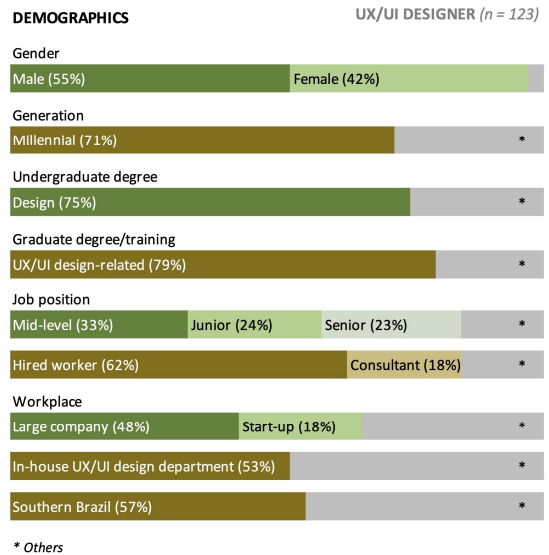


Fig. 1. Respondent Profiles

## 5. Findings

In the following subsections, we present the survey findings by grouping related to the survey questionnaire topics.

### 5.1 Current IVA adoption

Fig. 2 shows that most Brazilian UX/UI designers use IVAs. They are Google Assistant adopters that interact with IVAs mostly at home through smartphones and smart speakers. They seek general information, entertainment, and schedule management. However, regarding interaction frequency, while half of the respondents use IVA one to three times a day, a relevant percentage of users do not interact daily.

### 5.2 Current AI design practices

As shown in Fig. 3, most Brazilian UX/UI practitioners did not have any opportunity to work on a project where AI supports the design process or is embedded in the solution. Concerning the employment of AI design tools, a few used those that were AI-powered, such as khroma [36]. A small group worked with AI-integrated design systems such as Adobe Sensei [30].

### 5.3 Perceptions of AI design

The survey assumed that respondents might not have experienced working with AI systems. Thus, the questionnaire explored aspects of AI design use introduced in the literature to investigate respondents' perceptions of various topics through multiple-choice questions. As summarized in Fig. 4, the professionals considered optimization and automatization of processes to be the primary roles of AI systems in design practices. Concerning the application of intelligent systems in design activities, the majority of the respondents cited data processing.

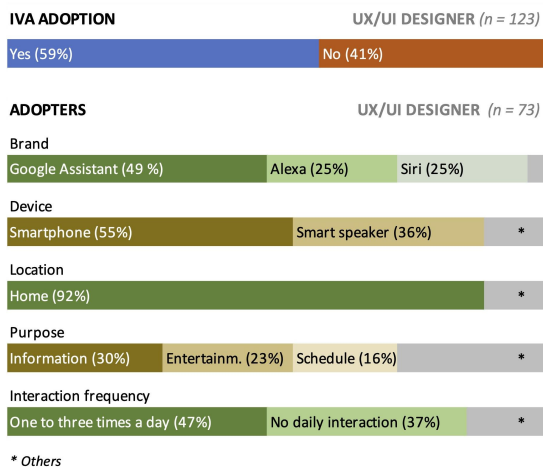


Fig. 2. IVA Adoption Among UX/UI Designers

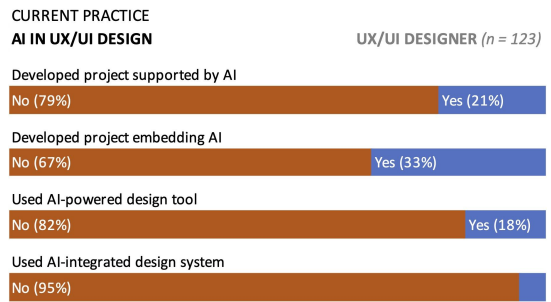


Fig. 3. AI Adoption in UX/UI Design Practices

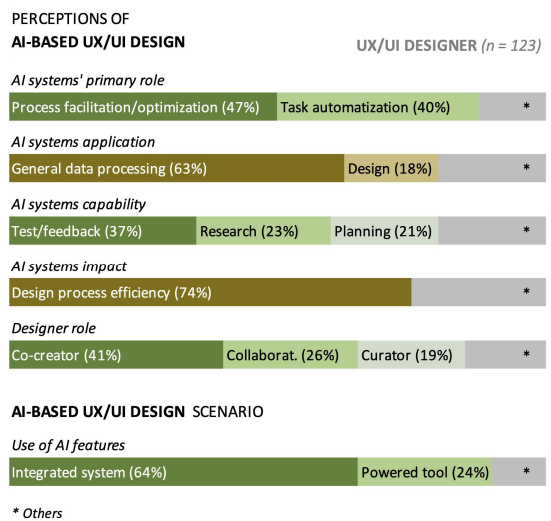


Fig. 4. Perspectives on AI-based UX/UI Design

A similar operational perspective was shown when the survey explored specific UX/UI design activities where AI systems might be helpful. Participants suggested that AI would primarily support testing and feedback phases but would also help with research and planning. In this sense, most practitioners considered that AI would impact design process efficiency.

Regarding the UX/UI designer's role when interacting with intelligent systems, most respondents expected that they would co-create or collaborate with AI to deliver designs. In the context of a future scenario,

the survey investigated UX/UI designers' perceptions of adopting AI features in their practices. The majority would choose to work with AI-integrated design tools.

#### 5.4 Perspectives on AI-based UX/UI design scenarios

Fig. 5 presents perceptions of three AI-based design scenarios. With respect to using natural language, i.e., Voice User Interface (VUI), to interact with computer systems, particularly when developing design activities, half of the UX/UI designers do not feel comfortable giving up a mouse and keyboard. Exploring a scenario that would take place within a decade, the majority reckoned they would be familiar with AI features and tools. However, concerning the possibility of using a voice-controlled AI design assistant, about half of the respondents might likely adopt a tool such as Alexa Sensei.

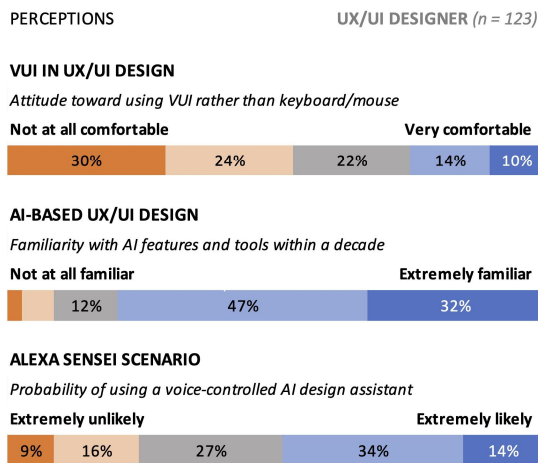


Fig. 5. Perceptions of AI-based Practices in UX/UI Design

We conducted a Mann-Whitney test to compare perceptions of AI adoption

scenarios between IVA non-adopters (n=50) and IVA adopters (n=73). The findings (Fig. 6) demonstrated that the difference in perceptions is statistically significant regarding giving up the mouse and keyboard and using natural language to interact with computer systems (U=1232, p=0.002). Similar results were found concerning attitudes toward future familiarity with AI-integrated tools (U=1334, p=0.006). The two groups' probability of adopting the Alexa Sensei also varied (U=1128, p=0.000).

GROUP PERCEPTIONS		UX/UI DESIGNER (n = 123)					
VUI AND AI-BASED DESIGN SCENARIOS		DESCRIPTIVE STATISTICS			MANN-WHITNEY U TEST		
		N	Mean	SD	Statistic	Z	p-value
<i>Attitude toward using VUI rather than keyboard/mouse</i>							
IVA non-adopter		50	2.06	1.185	1232.000	-3.141	0.002
IVA adopter		73	2.81	1.330			
<i>Familiarity with AI features and tools within a decade</i>							
IVA non-adopter		50	3.76	0.094	1334.000	-2.724	0.006
IVA adopter		73	4.14	0.990			
<i>Probability of using a voice-controlled AI design assistant</i>							
IVA non-adopter		50	2.80	1.229	1128.000	-3.715	0.000
IVA adopter		73	3.60	0.996			

Fig. 6. Mann-Whitney Test Results on AI Features Adoption Based on Respondent Profiles

#### 5.5 Perspectives on Alexa Sensei adoption in UX/UI design

The survey speculated on the adoption of Alexa Sensei and tried to map related issues (Fig. 7). Most respondents showed a neutral perception of its advantages as compared to an AI-powered design tool. A similar pattern was found as to whether it might fulfill practitioners' needs. The participants were divided when asked about difficulties in understanding and using Alexa Sensei in design activities. However, a considerable number of respondents perceived that its



use would require additional effort. In this sense, most UX/UI designers suggested that the Alexa Sensei would require changes in their working routine. Concerning its impact on job performance, Brazilian UX/UI designers were primarily neutral.

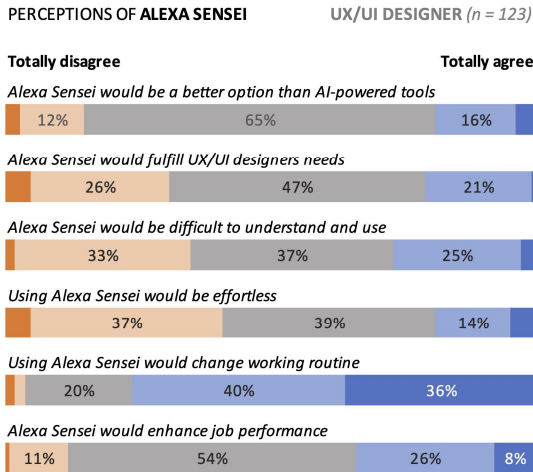


Fig. 7. Perceptions of Alexa Sensei Adoption in UX/UI Design

### 6. Discussion

Although IVAs are based on natural language interaction, they are sophisticated devices in terms of user experience that require adoption-related effort from laypeople. Conversely, one might suppose that UX/UI experts would adopt such gadgets smoothly. However, an initial research finding is that this assumption could not be fully confirmed in the case of a representative sample of Brazilian UX/UI designers (Fig. 1). In total, 59% of the respondents (Fig. 2) use IVAs primarily at home; but a significant part of this group (37%) does not interact daily with such systems. Notwithstanding this result, respondents adopting IVAs follow two of the usage patterns identified by Ammari et

al. [9]. As shown in Fig. 2, they use IVAs for information and schedule management (hands-free search) and entertainment (music). In this sense, UX/UI designers usage approach does not differ from ordinary users.

A second finding revealed that few professionals had experienced working with intelligent systems (Fig. 3) even though the Brazilian UX/UI design industry follows global practices. Only 33% had developed an AI-based project, and 21% used AI tools as supports. A small group used AI-powered design tools (18%) and AI-integrated systems such as Adobe Sensei (5%). In contrast, Dove et al.'s [2] findings in the US, UK, and Scandinavia showed that 63% of design practitioners had worked with AI. Indeed, AI does not reach half of Brazilian civil society and the business ecosystem [43]. This slow diffusion may reduce opportunities for Brazilian designers to work with AI systems in design tasks.

With respect to future AI-based UX/UI design scenarios, our research found that respondents perceive AI primarily as a functional tool (Fig. 4) for data processing. They suggested that intelligent systems impact design efficiency by facilitating and optimizing processes and tasks. When exploring activities to be shared with AI systems, Main and Grierson [3] identified a similar perspective. Nevertheless, Brazilian practitioner perceptions of the designer role in AI-based practices seemed to overcome AI application boundaries: 41% suggested they would consider co-creating, and 26% would collaborate with AI systems. These findings corroborate Pfeiffer's [4] research in the US, Europe, and Japan, in which the majority of respondents (62%) were willing to work with AI-based creative assistants.

But there might be shortcomings in this favorable perception of co-creating with intelligent systems. Main and Grierson [3] identified that designers rank AI low in the capability of generating concepts or final designs. In addition, because Brazilian UX/UI practitioners lack experience working with AI, they might overestimate the potential of computational creativity [25] to conceive solutions together with designers. Notwithstanding this context, we identified that participants' expectations of AI-based design practices go beyond current tools and lie in an innovative and integrated future AI design tool.

Concerning perceptions of AI design scenarios (Fig. 5), Brazilian UX/UI designers forecasted they would be accustomed to intelligent systems within a decade. These findings align with Main and Grierson's [3] research in which 68% of UK design practitioners believed that AI would impact their work. Interestingly, in a scenario of Alexa Sensei—despite not feeling comfortable using VUI with computer systems—respondents' perceptions lean toward changing their practices and adopting voice-controlled AI-based design assistants.

Despite IVA's limitations and poor usability [44], our study found evidence that experiencing natural language interaction via these gadgets might help design practitioners adopt intelligent systems in their practices. Observing adoption scenarios based on groups (Fig. 6), we noticed that the current adoption of IVAs affects perceptions of AI features' use in design activities. Moreover, UX/UI designers now employing IVAs are less resistant to using natural language to interact with

future AI design assistants such as Alexa Sensei.

Fig. 7, based on the work of Claudy et al. [39], reveals respondents' perceptions of adopting an innovative system like Alexa Sensei and possible resistance factors. Overall, respondents remained neutral regarding its relative advantage, compatibility, complexity, and usefulness. Such an attitude is plausible since Brazilian practitioners had not experienced Alexa Sensei. However, the results show that they could perceive that some effort would be required to use it. In this sense, they forecasted that Alexa Sensei would change working routines, which may be understood as a factor that could hinder adoption.

The survey revealed that the psychological barriers suggested by Claudy et al. [39] weigh on the adoption of AI features even for practitioners accustomed to computer systems. As one commented, "We do not feel naturally comfortable talking to machines, computers. I am skeptical about a behavioral change in the short and medium-term." This comment suggests that resistance to VUI might relate to people's feeling of strangeness and unease about technological devices embedding human-like features. Some practitioners who are used to work silently and lonely visualized that the natural language interaction component of Alexa Sensei might be inconvenient in design practices. They forecast this context as awkward and troublesome. To exemplify such barriers, respondents commented that using natural language to work with Alexa Sensei would require adaptation efforts and affect interaction pace. Besides possible misunderstandings of speech-based input,

UX/UI designers have concerns about the physical burden of talking all day long with AI systems and the noisy environment within offices. However, we claim the current development of IVAs such as Alexa for business [8] shows there are already means to tackle these workplace adoption barriers.

Voice interaction presents various challenges, and our research demonstrates even UX/UI practitioners face difficulties in dealing with it. Notwithstanding, the pace of IVA diffusion worldwide suggests that individuals are managing to overcome its interactive shortcomings. We expect that designers' concerns about adopting AI tools in their professional activities will take the same direction. Innovative approaches to integrating intelligent technologies into design practices, such as a voice-controlled AI-based design assistant, are on the horizon. Alexa Sensei will likely not be launched as configured in this study, but AI and voice interaction are expected to play a relevant role in future design practices.

## 7. Concluding remarks

This survey-based research expands the literature on professionals' perceptions of adopting AI in design practices, which has been probed only in the design industry's mainstream [2,4]. We added the perspectives of Brazilian UX/UI designers, exploring their thoughts about new AI design tool scenarios that employ voice-interaction. We expect our findings to guide further studies and foster the development of innovative AI design assistants, particularly regarding interaction with intelligent systems. Moreover, our research findings on adding voice-interaction features into AI tools used

at workplaces may interest practitioners in other domains.

However, this study is constrained due to its focus on UX/UI designers and its coverage of a specific geographical region. A comprehensive approach is further suggested to reveal the different demands of other design disciplines. Also, future research should cover other countries which have distinct design industries and technological development status to map current AI design practices and examine future AI adoption scenarios. Finally, although this study was built upon clues provided by design stakeholders as Adobe and currently available AI technologies, it is scenario-based research. As Kosow & Gaßner [34] claimed, the findings should be understood as directive of specific aspects [of designers' AI use], rather than a full representation of all future contexts.

## Acknowledgments

The survey findings related to the current adoption of AI tools (Fig. 3 & 4) were explored in-depth in a paper presented at the 14th EAD Conference. Although the research was based on the same dataset, the study did not explore natural language interaction issues.

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