Hello CAVA: Assessing the Potential of Voice-Interactive AI in Supporting Creativity

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Figure 1. Participant drawing with CAVA

Abstract

This research investigates the role of voice-interactive artificial intelligence tools, particularly designed to foster creativity. Therefore, we are examining our self-build prototype known as the Creative AI Voice Assistant, or short CAVA. The effectiveness of CAVA in stimulating creativity was evaluated across five key dimensions using the Creativity Support Index. Preliminary findings suggest that CAVA shows substantial potential in enhancing exploration and expressiveness in the creative process, whilst also indicating potential areas for development in enjoyment and immersion. By focusing on the underexplored field of voice-interactive AI tools for creativity support, this study bridges a crucial research gap, providing valuable insights into their efficacy within creative processes.

Keywords: Artificial Intelligence (AI), Voice Assistant, Creativity Support Technologies (CSTs), AI-powered Creativity Support Tools (AI-CSTs), Voice-Interactive AI Tools, Creativity Support Index (CSI), Human-AI Collaboration, Voice Interaction

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1 Introduction

Creative Thinking is a beautiful and complex process that's often difficult to unravel. It involves the fusion of imagination, knowledge, and critical thinking, resulting in unique and valuable creations [2]. While this intricate process can be challenging for technology to fully replicate, it hasn't stopped the humanity from finding ways to use technology to enhance our creative capabilities. This is where Creativity Support Technologies (CSTs) come into play. These tools combine technology and creativity in a unique way - their sole purpose is to bolster the creative abilities of their users [4]. The emergence of these tools showcases how technology can be harnessed to foster and augment human creativity.
CSTs are designed to boost an individual's creative productivity by providing a platform to express ideas, experiment with new concepts, and in some cases, collaborate with others. Examples of these include tools like Adobe Photoshop for graphic design, Procreate for digital art, and platforms like Pinterest for inspiration. The growth and spread of Artificial Intelligence (AI) have led to the creation of a new type of creativity support technology, known as AI-powered Creativity Support Tools (AI-CSTs) [5]. These AI-CSTs leverage AI to augment the creative process, offering features such as

generative designs, prediction algorithms, and user behavior-based personalization in various ways of interaction [5].

In our investigation, we concentrated on voice-interaction as the communication medium between the user and the AI. Voice interaction offers unique benefits in the creative process, facilitating hands-free, intuitive engagement [12]. The rapid, real-time exchange allows for a dynamic flow of ideas, potentially promoting creative brainstorming and thought structuring [12]. Furthermore, the use of voice commands can enhance the accessibility of technology, providing a more inclusive environment. Given these advantages, we pursued the idea of a creative AI voice assistant. In this study, we introduce "CAVA" the Creative AI Voice Assistant, a self-developed prototype of an AI-CST which works with voice-interaction. Built around the GPT 3.5 AI, CAVA aims to assist in creative processes by offering creative insights and professional feedback. The exploration of voice-interactive AI-CSTs like CAVA is still in its early stages, primarily due to the nascent stage of the technology and the multifaceted complexities of effectively integrating AI into creative processes [15].

As said creativity is hard to measure, especially the amount of support a CST offers to the user. To our advantage Cherry et al. introduced the Creativity Support Index, to indicate the level of support a CST delivers to a user [4]. The Creativity Support Index (CSI) was used to measure the potential of CAVA to stimulate creativity among its users [4]. We recruited participants from a range of professional backgrounds, with a particular emphasis on those from the creative industry, to examine if the effectiveness of CAVA's support varies with the participants' creative work experience.

To answer our research question, to what extent a voice-interactive AI-CST can support individuals from and outside the creative industry in a drawing task, this paper will provide a comprehensive overview of our research process and findings. Initially, we present an in-depth review of the existing literature, followed by a clear explanation of our methodology. Subsequently, we deliberate on the findings, discussing their implications in the context of AI-CSTs and the broader field of creativity support. In doing so, we aim to contribute valuable insights to the currently under-researched area of voice-interactive AI-CSTs, shedding light on their potential and areas for future exploration.

2 Related Work

Creativity Support Tools (CSTs) are crucial in HCI research with the objective of studying how technology can foster the user's creativity [7]. Frich et al. defined CSTs in 2019 as a Tool that runs on multiple digital systems, encircle multiple creativity-focused features, and is employed to positively influence users of varying expertise in multiple phases of the creative process [7].

Several projects have attempted to merge AI with CSTs. For instance, a novel AI algorithm that displays unexpected algorithmic behavior intended to surprise and inspire users. However, this unpredictability also led to user irritation [5]. This unexpected behavior was also a drawback of the project, since the users were more irritated by it than they could benefit from the output [5].

Villalba argued in 2012 that precisely quantifying creativity might remain an unachievable goal [14] but there are indeed tools to measure the support a tool can provide to creativity. One example would be a psychometric survey called CSI (Creativity Support Index) invented by Erin Cherry and Celine Latulipe [4]. With the CSI it is possible to measure the support in six dimensions: exploration, expressiveness, immersion, enjoyment, results, worth effort, and collaboration. Cherry and Latulipe [4] created the Creativity Support Index (CSI) to analyze how well a creativity support tool (CST), such as CAVA, aids a user in performing creative tasks.

We excluded the collaboration dimension for our study in accordance with the paper by Cherry and Latulipe [4] because CAVA, being a voice-interactive AI-CST designed for individual usage, does not promote collaborative work.

The CSI includes a rating scale as well as paired-factor comparison sections. Each of the remaining five dimensions has two agreement statements that users rate on an 11-point scale. Each dimension is paired against every other dimension in the paired-factor comparison section, for a total of ten comparisons.

Scoring for the total CSI for one participant involves summing the agreement statements for each dimension to get a dimension subtotal. Each subtotal is then multiplied by its respective dimension comparison count. The total is summed and divided by 3 to derive a final score out of 100. Higher scores indicate better support for creativity.

For a good and fair study about creativity Klaus K. Urban suggest a drawing activity, since drawing provides culture-fairness and a broad applicability [13]. Therefore, this paper focuses on drawing with a CST.

The voice as an input modality is as many paper states fast and easy to use [9–11]. Therefore the are some projects, like an automatic endoscopy system [9] or TriControl, a tool for air traffic controllers [10], where the voice assistant is built in to get a faster, easier and saver work environment. Ruan, Wobbrock et al. did a research with the result that a text with a voice input has less errors than written in a shorter time [11]. Moreover, research has shown that voice input for text has fewer errors, is quicker, and leads to lower cognitive effort and higher enjoyment [12]. Therefore, the artifact used in the study is built with voice as an input modality.

Chuadra, Goedricke, and Zamfirescu conducted a study in which users instructed a voice assistant to create a holiday ornament based on their descriptions [6]. The voice assistant utilized a Wizard-of-Oz-backend [6]. Participants were given the opportunity to view a book of ornaments crafted by artificial intelligence. Initially, they sketched their ideas, then instructed the voice assistant to recreate the ornament by detailing its appearance. However, half of the participants could not see the actions of the voice assistant on the screen. Despite this limitation, 15 out of 16 participants expressed a willingness to use a voice assistant for future design tasks[6]. The study demonstrated that people are capable of effectively instructing a voice assistant to create a specific design on their descriptions, implying that voice interaction can be a useful feature for your project.

3 Design and Development of CAVA

3.1 Creating the Prototype

The design and creation of CAVA unfolded over several stages. Our initial phase involved extensive academic research, wherein we studied the intersection of artificial intelligence, voice-user interfaces, and creativity support tools. Armed with this knowledge, we sought to develop a prototype that was more than just an AI tool – a creativity assistant that fosters idea generation and development.

Our technical implementation involved using the Amazon Echo device as a primary voice assistant. We coded an Alexa skill in Python, which allowed us to convert user voice input into readable strings. This user input was processed using the MQTT protocol by a Python script, which ran locally on a designated computer.

The next phase involved integrating our system with GPT-3.5, a cutting-edge artificial intelligence model. Our aim was to facilitate real-time interactions between users and CAVA, which necessitated swift response generation from the AI model. This was a vital feature to ensure users could converse with the AI and receive feedback instantaneously.

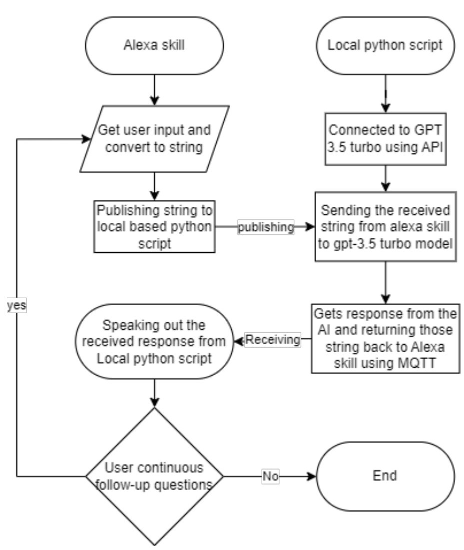

Figure 2. Flowchart of implementation

3.2 Motivation

Our goal in designing CAVA was to create an intelligent design guide that offers unique insights and assistance to users in their creative tasks. The system's architecture was developed with this key intention in mind. We incorporated GPT-3.5 into our system due to its ability to generate human-like phrases. This AI model played a critical role in creating an interactive experience for the user. CAVA's voice-interactive feature was designed to facilitate a more immersive and dynamic creative process, as opposed to a conventional text interface.

3.3 Empirical Evidence

Our design approach was greatly influenced by the following academic sources: We were inspired to develop a tool with the user in mind by Chung's [5] research on artistic expressions in AI-powered Creativity Support Tools. Their advice assisted us in developing CAVA into a tool that fosters and supports user innovation. The benefits of voice assistants over chatbots as described in Rzepka et al.'s [12] research had an impact on our choice to include a voice interaction feature in CAVA. This function was designed to improve the innovative information retrieval and search operations. The creation of CAVA's capabilities was influenced by Zhang et al.'s [15] investigation of "Inspiration Evolution" in integrated AI-based creative support tools. We developed a prototype that could help in the evolution and development of these ideas as well as providing creative prompts because of the study we conducted.

4 Study Design

4.1 Participants

A total of 16 participants, aged between 18 and 35 years, were recruited for our study. Eight of them are working in the creative industry, as classified by Oxford Reference [1]. These industries are characterized by the generation of novel cultural contributions, encompassing various fields such as art, music, film, performance arts, games, architecture, design, designer fashion, craftwork, books, publishing, software, television, radio, advertising, and public relations. The remaining eight participants came from a spectrum of non-creative sectors, including finance, real estate, and software development. In their daily work these participants don't have contact with creative tasks. We must note, however, that the specific non-creative industries represented in our study have minimal relevance to the experiment's conduct and outcome, that's why we won't delve deeper into these.

4.2 Participant Recruitment

For our recruitment strategy we were using social media advertisements and our email networks. Interested individuals were invited to complete an online questionnaire that asked about their age, english proficiency, and a self-assessed creativity level. Additionally, we confirmed their physical ability to participate in a drawing activity, a crucial part of our study. Once selected, we made sure participants were fully informed about the study's purpose, the tasks they would be undertaking, the expected duration, and their privacy rights.

4.3 Apparatus

The study used CAVA as the primary tool to facilitate the drawing task in a controlled laboratory environment to minimize potential distractions.

4.4 Creativity Support Index (CSI)

In our study, the CSI score provides a holistic evaluation of CAVA's potential to stimulate creativity among participants from diverse fields. To complete the CSI, users must complete a task using the tested tool. The task's complexity varies depending on the specific characteristics of the CST under inquiry. To capture all of the CSI dimensions, our study chose a rather abstract and open-ended task that allowed a full investigation of CAVA's potential for encouraging creativity among participants from various areas. As a result, the CSI score and individual dimension scores give a comprehensive evaluation of CAVA's usefulness in boosting creativity in our study.

4.5 Task

We selected the drawing task, "create a picture themed around nature," based on Torrance's reasoning [8] that drawing is an effective measure of creativity across multiple levels. The theme of “nature" allowed us to cover all dimensions of the Creativity Support Index (CSI). Out of the six CSI dimensions, we excluded the Collaboration dimension for this study due to the solitary nature of the task. The decision to evaluate CAVA individually rather than in collaboration was guided by the structure of the Creativity Support Index. By assessing each dimension separately, the CSI permits a granular analysis of how a tool like CAVA can impact different facets of creativity. This individual testing approach offers a more definitive and direct interpretation of CAVA's effect on each participant's creative process, enhancing the comparability of results across different participants. Consequently, we chose this method to establish clear attributions of observed effects to the use of CAVA, ensuring the reliability of our findings.

4.6 Ethics and Privacy

The study was conducted following the ethical guidelines outlined by the Association for Computing Machinery (ACM) [3]. These guidelines uphold principles of respect for individuals' privacy and aim to ensure fair and equitable treatment of all participants. In line with these guidelines, we secured informed consent from all participants prior to their participation, and their confidentiality was strictly maintained throughout the process. All collected data was securely stored and used solely for the purpose of this study, reinforcing our commitment to data integrity and participant privacy.

4.7 Procedure

Participants underwent the following steps after providing their informed consent. Each step was designed to stimulate creativity across different dimensions of the CSI.

1. Introduction to CAVA: A brief overview and guidance on utilizing CAVA effectively were provided.
2. Familiarization Tasks: Participants performed tasks to get comfortable with the tool.
3. Drawing Task: The primary task involved creating a drawing inspired by the theme of "Nature". Each subtask resonated with unique dimensions of the CSI:
   a. Gathering Inspiration (exploration): Participants used CAVA to explore different aspects related to the theme of "Nature".
   b. Choosing a Subject (expressiveness): Participants chose a specific subject for their drawing.
   c. Gathering References (exploration and results worth effort): Participants collected reference images or information related to their chosen subject using CAVA.
   d. Learning Techniques (results worth effort): Participants utilized CAVA's resources to learn or refine drawing techniques.
   e. Creating the Drawing (expressiveness and immersion): Participants created their final drawing, synthesizing the ideas, techniques, and references gathered.
4. CSI Questionnaire: After the drawing task, participants completed the CSI questionnaire.
5. Post-Task Interview: A semi-structured interview was conducted to gather qualitative feedback.

4.8 Data Analysis and Post-Task Interview

Following the guidelines from Cherry et al. [4], we analyzed the CSI values for each dimension as well as the overall CSI score. In previous tests of the CSI across six different creativity support tools, Cronbach's alpha values for the factors ranged from .707-.930, indicating good internal consistency [4]. Post-task, each participant was interviewed, where we asked general questions about their experience with CAVA. We investigated on their views on what they liked or disliked, and whether they could envision regularly using CAVA. Following this, we conducted a qualitative content analysis of the interviews. We created themes and codes from the responses, intended to understand and interpret the CSI measurements better. This mixed-method approach bridged our

CSI score observations with participants' subjective experiences, providing a more comprehensive understanding of CAVA's influence on the creative process.

4.9 Hypotheses

Our overarching research question aimed to explore how well an AI-based voice assistant, like CAVA, could support individuals from and outside the creative industry in a drawing task. Derived from this primary inquiry, we constructed the following three hypotheses that closely tie with the specific characteristics of CAVA, the requirements of the creative task, and the backgrounds of our participants.
H1: CAVA may provide less assistance to participants in the creative industries than to those in other sectors. The hypothesis is based on the assumption that individuals in creative sectors have already established a high level of creative skills and hence may benefit less from external aids such as CAVA.
H2: CAVA is expected to perform well on the CSI dimensions of exploration and enjoyment. We anticipated that CAVA's voice-interactive feature and AI-driven suggestions would successfully promote interest and inquiry while also making the process more fun.
H3: CAVA may underperform in expressiveness, immersion, and results worth effort. These dimensions represent the more personal components of creativity, such as the task's depth of engagement and sense of personal expression. We hypothesized that because CAVA is an AI-based tool, it may not adequately support these qualities when compared to human interactions or more intuitive and expressive mediums.

5 Results

5.1 Statistical Analysis

For each CSI dimension, statistical parameters including mean, median, standard deviation, as well as minimum and maximum values, were calculated. Participant demographics such as age and their self-perception of creativity were also recorded. Independent samples t-tests were used to compare the creative and non-creative groups for each variable, setting a significance threshold of 0.05. Tables 1, 2, and 3 present the statistical findings for the creative group, the non-creative group, and a combined analysis respectively. In table 4 the results of an independent samples t-test listed. The t-test is split by the groups, who works in a creative profession and who don't. We used the open-source software jamovi for these computations and for generating boxplots. These plots offered a comprehensive view of the score distribution across different CSI dimensions and participant groups.

	Mean	Median	SD	Min	Max
Self-perception of creativity	7.63	7.50	1.061	6	9
Age	27.75	27.50	3.196	24	33
Results Worth Effort	5.19	5.00	2.419	2.00	8.50
Immersion	4.13	3.75	2.031	2.00	8.00
Expressiveness	5.25	5.50	2.550	1.50	9.00
Exploration	5.38	5.00	2.387	2.50	10.00
Enjoyment	4.19	3.00	3.058	1.50	10.00
CSI-Score	41.00	35.50	20.866	19.67	76.00

Table 1. Working in creative industry

5.2 Hypotheses Testing

Equipped with the statistical analysis results and insights from the interviews, we examined the three hypotheses proposed at the beginning of the research.

H1: Participants from creative industries would experience less support from CAVA than participants from other industries. Participants from non-creative professions received a mean CSI Score of 55.95 [Table 2], which was higher than the mean CSI Score of 41.00 [Table 1] for those from creative professions. The p-value for the difference in overall CSI Score is 0.207 [Table 4] based on our t-test study. Given that the p-value is higher than 0.05 [Table 4], we do not reject the null hypothesis that there is no significant difference in the CSI Scores of the two groups. However, the higher mean score for the non-creative group may point to the fact that participants in the creative sectors received less support from CAVA, possibly due to their already strong imaginative faculties. Although the statistical evidence is not significant, this finding offers some empirical support for our initial hypothesis.
H2: CAVA would score high on the exploration and enjoyment dimensions of the CSI. The combined mean score for exploration was reasonably high (5.75 [Table 3]), showing a general positive tendency. The overall mean score for enjoyment was lower than anticipated (4.84 [Table 3]), however. With standard deviations of 2.27 and 3.13 [Table 3] for exploration and enjoyment, respectively, there was a notable variation in responses, highlighting the variety of user experiences. Our t-test analysis shows that the p-values for enjoyment and exploration are 0.528 and 0.420, respectively [Table 4]. As both p-values are more than 0.05, we do not reject the null hypothesis of no significant difference between the groups in terms of exploration and enjoyment scores. While CAVA appears to foster exploration more effectively than enjoyment across the sample, this hypothesis is not supported by statistically significant evidence.

H3: CAVA would score low on the expressiveness, immersion, and results worth effort dimensions of the CSI. The combined mean scores for immersion (5.44), results worth effort (5.34), and expressiveness (5.44) were not significantly low [Table 3]. The results showed significant variation with

	Mean	Median	SD	Min	Max
Self-perception of creativity	6.50	7.00	0.756	5	7
Age	25.00	25.00	1.927	22	27
Results Worth Effort	5.50	5.25	2.577	2.00	9.50
Immersion	6.75	7.25	2.252	3.00	9.50
Expressiveness	5.63	5.25	2.264	3.00	9.00
Exploration	6.13	5.50	2.248	2.50	9.50
Enjoyment	5.50	5.50	3.262	1.00	9.00
CSI-Score	55.95	47.67	24.203	28.00	93.00

Table 2. Not working in creative industry

	Mean	Median	SD	Min	Max
Self-perception of creativity	7.06	7.00	1.06	5	9
Age	26.38	26.50	2.92	22	33
Results Worth Effort	5.34	5.00	2.42	2.00	9.50
Immersion	5.44	5.00	2.48	2.00	9.50
Expressiveness	5.44	5.50	2.34	1.50	9.00
Exploration	5.75	5.25	2.27	2.50	10.00
Enjoyment	4.84	3.75	3.13	1.00	10.00
CSI-Score	48.48	44.17	23.16	19.67	93.00

Table 3. Combined

standard deviations of 2.48, 2.42, and 2.34 respectively [Table 3]. The p-values for immersion, results worth effort, and expressiveness are 0.028, 0.806, and 0.760, according to our t-test study [Table 4]. For results worth effort and expressiveness, p-values are greater than 0.05, indicating that we do not reject the null hypothesis of no significant difference between the groups for these dimensions. However, the p-value for immersion is less than 0.05 [Table 4], indicating that we reject the null hypothesis and there is a statistically significant difference in immersion scores between the groups. This suggests that while CAVA did not score significantly low on the expressiveness and results worth effort dimensions, it did perform differently across groups on the immersion dimension. Consequently, this hypothesis is partially supported.

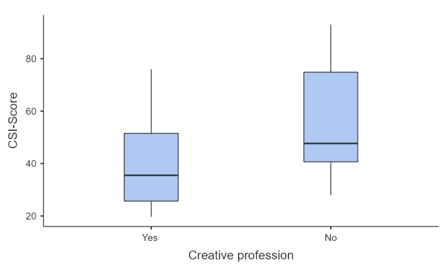

Figure 3. Plot 1: Box-plot of CSI Score splitted by creative profession

6 Discussion

6.1 Interpretation of Results

The influence of our self-developed voice-interactive AI-CST prototype, CAVA, on enhancing creativity throughout the

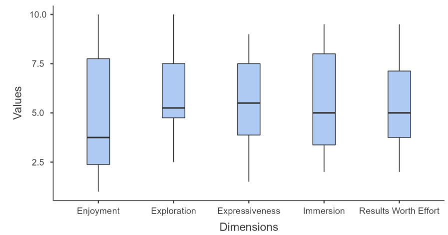

Figure 4. Plot 2: Box-plot of CSI dimensions

	T	p
Self-perception of creativity	-2.443	0.028
enjoyment	0.830	0.420
exploration	0.647	0.528
expressiveness	0.311	0.760
immersion	2.448	0.028
Result Worth Effort	0.250	0.806
CSI-Score	1.324	0.207

Table 4. Independent Samples T-Test on the two groups split by creative profession

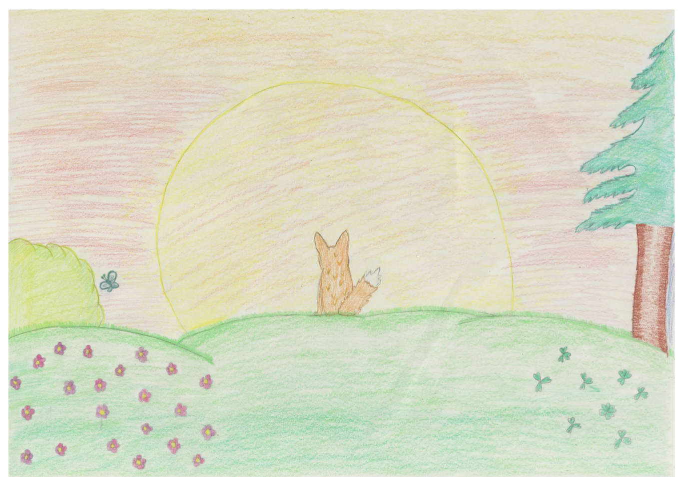

Figure 5. Picture drawn with the Help of CAVA

design process has been revealed as notable through our research. Rather than just a limitation, the varied statistical significance of our data also offers intriguing insights into the intricate nature of creativity and its interplay with AI support technologies. Our first hypothesis (H1) was validated, demonstrating that individuals from industries not conventionally associated with creative tasks benefited more significantly from CAVA. This corroborates our initial postulation and indicates that those working in sectors typically seen as creative, who are often exposed to and trained in enhancing their creative abilities, may require less support from AI-CSTs. Although our second and third hypotheses

(H2 & H3) didn't achieve statistical significance, they yielded critical information. The vast diversity of responses concerning the exploration and enjoyment components underlined their highly personalized nature and dependency on individual choices, illustrating the variable and complex aspects of creativity [14]. Meanwhile, the variations in immersion levels across participant groups underscored the relevance of a user's background and level of creative expertise in their interaction with AI-CSTs [7]. It is important to note that this does not imply an innate capability, but rather the skills developed over time in creative fields. Frich et al. reinforces our findings, presenting a similar conclusion on the impact of user background on engagement with AI-CSTs.

6.2 Addressing the Knowledge Gap

Our study offers a significant contribution to the HCI field by enhancing our understanding of how voice-interactive AI-CSTs, specifically our prototype CAVA, can bolster creativity. Prior research in this area, while extensive, has not fully addressed the potential of voice-interactive AI tools in promoting creativity. While previous studies have explored a variety of CSTs, they have not thoroughly investigated the specific role and potential of voice-interactive AI-CSTs. Moreover, we discovered that a user's professional experiences with creativity can influence the level of support they receive from an AI-based Creative Support Tool (AI-CST). Chung [5] provides a theoretical basis for this discussion, presenting an examination of how AI-CSTs can support creativity and suggesting a need for more targeted studies, like ours, in this field.

6.3 Comparison with Prior Research/Related Work

Our findings align with previous research examining how different CSTs could stimulate creativity [4, 5, 8]. Cherry and Latulipe quantified the creativity support of digital tools, suggesting how technology could serve as a catalyst for creative work [4]. Similarly, our study with CAVA supports this, demonstrating the role voice-interactive AI-CSTs can play in enhancing creativity. In line with the work of Chung [5], which explored artistic expressions in AI-powered CSTs, our findings also reveal a strong relationship between AI-CSTs like CAVA and users' creative expressions, particularly for those from non-creative industries [5].

Furthermore, our work complements the efforts of Frich et al. [7], who mapped the landscape of CSTs in HCI. While they offered a broad overview of creativity support tools, our study delves into a specific, relatively less explored area of voice-interactive AI-CSTs and provides evidence of their utility [5]. In summary, our research uniquely concentrates on voice-interactive AI-CSTs, an area that has been relatively under-researched. We enhance the existing body of knowledge on AI-CSTs by demonstrating the potential of voice-interactive AI-CSTs like CAVA to foster creativity. This involves showing the variable impact CAVA has on people from creative and non-creative industries, the nuances of user engagement with voice-interactive AI-CSTs, and the importance of user background and creative support. Additionally, we highlighted the individualistic and dependent nature of creativity in the context of AI-CST interactions, further expanding our understanding of the complex interplay between creativity and technology.

6.4 Real-World Implications

Our findings hold significant implications for fields that heavily rely on creative thinking and problem-solving. By assessing the effectiveness of voice-interactive AI-CSTs like CAVA, organizations can make informed decisions on whether to integrate them into their workflows. Our research findings can serve as a valuable resource for designing future AI-CSTs, providing insights for the development of more efficient and user-friendly AI-CSTs that demand a wide range of needs and preferences [5]. These findings offer a steppingstone towards creating perhaps a design manual that outlines best practices and guidelines for the development of AI-CSTs, ensuring their effectiveness in supporting creativity and enhancing user experiences.

6.5 Limitations

Our research has some limitations. A drawback is the lack of statistically significant data to support several of our assumptions, which limits the generalizability of our results. Given the absence of substantial empirical support, we should proceed with caution when assessing the significance of our findings. In addition, the applicability of our findings to diverse contexts and tasks may be constrained by our small sample size and concentration on a single theme within the creative activity. Biases could also have been introduced during participant recruitment, selection, and administration of the CSI questionnaire and post-task interviews. When assessing the larger implications of our study, these potential biases should be considered.

6.6 Future Research Directions

Future research could evaluate the efficacy of voice-interactive AI-CSTs in larger, more diverse samples, and across a range of creative tasks and domains based on our findings and the constraints of our study. The creation of more individualized and adaptive AI-CSTs could benefit from research on the elements influencing unique user experiences, such as cognitive preferences, artistic skills, and preferences for voice-interactive AI-CSTs [5]. Although our results partially confirm the potential advantages of CAVA, more research is required to fully comprehend the variables affecting its efficacy and to guide the creation of new AI-CSTs.

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