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Analyzing the role of creativity in aI-powered user interfaces for enhancing media content accessibility for individuals with spinal cord injuries

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ABSTRACT

Individuals with Spinal Cord Injuries (SCI) encounter substantial barriers in accessing digital media content. Artificial Intelligence-based User Interfaces (AI UIs) possess the potential to mitigate these barriers; however, the role of creativity in their actual user experience remains underexplored. This qualitative study, aiming to analyze the impact of creativity within AI UIs on facilitating media access, investigated the experiences of 18 Iranian users with SCI through in-depth semi-structured interviews and thematic analysis. Findings indicate that AI UIs, by offering innovative interaction modalities, significantly enhance user autonomy and reduce physical impediments (a manifestation of positive creativity). However, significant challenges persist concerning accuracy, reliability, speed, complexity of use, and customization (stemming from inadequate creativity in implementation). Users articulate a demand for highly reliable, fast, simple, adaptable interfaces with adequate support. It is concluded that AI UIs hold considerable empowering potential; however, to fully realize this potential, a user-centered, inclusive design approach and a focus on operational creativity are imperative to address real-world challenges and enhance the user experience.

INTRODUCTION

In the contemporary digital society, access to information and active participation in cyberspace represent a fundamental right and an undeniable necessity (United Nations, 2006). Digital media, encompassing a spectrum from news and educational resources to social networks and entertainment, play a pivotal role in daily life. However, ensuring equitable access for all to this domain, particularly for individuals with physical limitations, constitutes a substantial challenge. The World Wide Web Consortium's Web Accessibility Initiative (W3C WAI) underscores the critical importance of inclusive design in addressing this issue, as technology, without adherence to these principles, risks exacerbating the digital divide rather than serving as an empowering tool.

Individuals with Spinal Cord Injuries (SCI), who experience varying degrees of limitation in limb control, frequently encounter significant barriers when using standard user interfaces (e.g., mouse, keyboard, touchscreens) (Lazar et al., 2017, p. 76).

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Interactions demanding precision, speed, and hand coordination can be exceedingly difficult or impossible for this population (Sears & Shneiderman, 2002). These impediments restrict their access to the vast volume of information and communication affordances available through digital media, consequently leading to diminished equal opportunities. This exclusion extends beyond technical limitations—much as personality traits significantly influence social compatibility (Jamali et al., 2022), psychological factors like self-efficacy and frustration tolerance shape how users with SCI engage with imperfect assistive technologies, exacerbating or mitigating digital marginalization. Regrettably, many current user interfaces continue to be designed based on the 'average' user paradigm, thereby overlooking the specific needs of individuals with SCI (Verbraak et al., 2011, p. 152).

Significant advancements in Artificial Intelligence and Machine Learning (ML) have opened new horizons for the development of assistive technologies and adaptive user interfaces. AI, with capabilities such as Natural Language Processing (NLP), speech recognition, computer vision, and Brain-Computer Interfaces (BCIs), holds the potential to create novel interaction methods that are less reliant on precise limb control (Lathans et al., 2020). Advanced voice control systems, eye-tracking technologies, head movement detection, and even intelligent input prediction exemplify such solutions. Similarly, AI-driven predictive models in other sectors, such as disaster risk management, demonstrate how real-time analytics and adaptive algorithms can preempt disruptions—a principle equally critical for designing assistive technologies that anticipate user needs (Nosraty et al., 2025).

However, the mere provision of alternative solutions is insufficient. Accordingly, the present study focuses on the 'element of creativity' in the design of these AI-powered user interfaces. Creativity, in this context, refers to innovation in providing interactive solutions, intelligent adaptability to the user's varying needs (such as fatigue), and the provision of novel and efficient interaction methods that transcend standard alternatives. This creativity can manifest in the processing of imprecise inputs, intelligent prediction of user intentions, or the creation of personalized shortcuts. The aim is to investigate how this element of creativity can specifically aid in facilitating access for individuals with SCI to diverse media content (e.g., reading text, watching videos, interacting on social networks) and enhance their user experience (Cassell et al., 2021, p. 43).

Access to digital media content, ranging from essential news to educational platforms and social interactions, constitutes a fundamental right and an instrument for participation in modern society (United Nations, 2006). However, the reality is that current digital infrastructures and interfaces are often not designed to guarantee equitable access for all, particularly for individuals with Spinal Cord Injuries (SCI). Depending on the level and severity of their injury, these individuals face varying limitations in voluntary motor control, rendering interaction with standard input devices (e.g., mouse, keyboard, touchscreens) challenging, time-consuming, energy-intensive, and at times, impossible (Lazar et al., 2017). This situation leads to an "access gap," which is not merely a technical issue but carries profound social and economic consequences, potentially resulting in digital isolation and deprivation of equal opportunities (Goggin & Newell, 2007, p. 112).

The central problem addressed by this research is the incongruity between the critical need of individuals with SCI for independent and efficient access to digital media content and the limitations of conventional user interfaces (and even some standard assistive technologies) in meeting this need. Simple tasks such as turning an e-book page, scrolling a webpage, selecting and playing a video, or typing a comment can transform into a complex process for an individual with tetraplegia (paralysis of all four limbs) (Sears & Shneiderman, 2002). This predicament underscores the necessity of identifying, evaluating, and optimizing creative and innovative interactive solutions.

The emergence of Artificial Intelligence (AI) offers immense potential for innovation in this domain. AI-powered user interfaces, such as advanced voice control (Porter et al., 2019, p. 71), eye-tracking (Majaranta & Räihä, 2007), Brain-Computer Interfaces (BCIs) (Wolpaw et al., 2002), and machine learning algorithms for detecting subtle movements or automatically adapting the user interface (Gajos et al., 2007), promise to reduce barriers and enhance user autonomy.

However, the key issue this research addresses is not merely the existence of these technologies, but rather the role and impact of the "creativity" element in their design and functionality for users with SCI. Creativity, in this context, extends beyond the mere provision of an alternative (e.g., speech instead of typing) to encompass intelligence in understanding context, predicting user needs, offering novel interactive solutions, and dynamically adapting to the user's momentary abilities and limitations. The question that arises is: Are existing interfaces sufficiently "creative" to render interaction genuinely fluid and efficient? How do users with SCI experience this creativity (or lack thereof)? Do these creative solutions introduce new challenges (such as unpredictability or learning complexity)?

The existing knowledge gap in this area lies in the lack of profound understanding of the lived experiences of users with SCI when employing these "creative" AI interfaces for everyday media access. Research in this field has predominantly focused on technical aspects or performance evaluation in controlled environments (Koos & Deboos, 2022, p. 27), but has paid less attention to how interface creativity impacts user experience, satisfaction, and real-world challenges (such as fatigue, reliability, personalization) within the context of daily life. Adopting a qualitative approach and focusing on the experiences of Iranian users with SCI, this study seeks to bridge this gap and analyze the role of the creativity element in AI interfaces for facilitating access to media content. The findings of this research can contribute to the more inclusive and effective design of digital technologies and aid in empowering this user group.

RESEARCH QUESTIONS

Considering the research problem and the identified knowledge gap regarding the user experience of individuals with Spinal Cord Injuries (SCI) with AI-powered user interfaces incorporating an element of creativity, this study seeks to answer the following questions:

Main Research Question

- From the perspective of the lived experience of individuals with Spinal Cord Injuries, how does the element of creativity in AI-powered user interfaces influence their process of accessing and interacting with digital media content?

Sub-Questions

- Which features or aspects of AI-powered user interfaces (e.g., adaptive systems, intelligent prediction, innovative input methods) are perceived as "creative" by individuals with SCI and offer the most utility in accessing media content?
- What are the main barriers, challenges, and drawbacks associated with the use of "creative" AI-powered user interfaces (e.g., complexity, low reliability, unpredictability, training requirements, mental fatigue, or privacy concerns) experienced by individuals with SCI?
- From the perspective of users with SCI, what are the key specifications and essential design considerations for an "ideal and creative" AI-powered user interface that effectively and satisfactorily supports their interaction with digital media content? (Mankoff et al., 2002, p. 85).

OBJECTIVES

In pursuit of answering the posited research questions and with the aim of elucidating the various dimensions of the experience of users with Spinal Cord Injuries (SCI) when interacting with creative AI-powered user interfaces for media access, this study pursues specific objectives.

Main Research Objective

- To analyze, from the perspective of their lived experiences, how the element of creativity in AI-powered user interfaces impacts the process of access and interaction of individuals with Spinal Cord Injuries with digital media content.

Sub-Objectives

- To identify the features and aspects of AI-powered user interfaces that are evaluated as "creative" from the perspective of individuals with SCI and offer the most utility in facilitating access to media content.
- To identify and analyze the main barriers, challenges, and drawbacks (technical, usability, cognitive, etc.) that individuals with SCI experience when using "creative" AI-powered user interfaces.
- To determine the key specifications and essential design considerations for an "ideal and creative" AI-powered user interface, based on the perspectives and needs of users with SCI, to

effectively and satisfactorily support their interaction with digital media content.

THEORETICAL FRAMEWORK

To achieve a profound understanding and systematic analysis of the impact of creative AI-powered user interfaces on media content access for individuals with Spinal Cord Injuries (SCI), it is imperative that the present research be grounded in a robust theoretical foundation. Given the multifaceted nature of the subject, situated at the intersection of Human-Computer Interaction (HCI), Artificial Intelligence (AI), Media Studies, and Disability Studies, several theoretical approaches can be illuminating.

- Technology Acceptance Models (TAM/UTAUT): These models (e.g., Davis, 1989; Venkatesh et al., 2003, p. 145) focus on factors such as perceived usefulness and perceived ease of use and can partially explain the reasons for the adoption or non-adoption of AI interfaces. However, their focus is primarily on initial acceptance and they may not adequately encompass the complexities of lived experience, particularly when confronted with structural and environmental barriers, nor fully address the role of interface "creativity" in overcoming these barriers, especially for specific populations such as individuals with SCI (Kula et al., 2014).

- Social Cognitive Theory (SCT): This theory (Bandura, 1986), with its emphasis on the triadic reciprocal determinism of person, environment, and behavior, and concepts such as self-efficacy (an individual's belief in their ability to use technology) and outcome expectancies, offers a more comprehensive perspective. SCT can be instrumental in analyzing how experiences (successful or unsuccessful) with creative AI interfaces influence the beliefs and future use by individuals with SCI (Compeau & Higgins, 1995, p. 62). The role of the environment (creative interface design) is prominent in this theory.

- The Social Model of Disability: This model, widely employed in disability studies, offers a critical and distinct perspective. Unlike the medical model, which views disability as an individual deficit, the social model posits that "disability" is the result of the interaction between an individual with an impairment – in this case, spinal cord injury – and a society that has failed to remove environmental, attitudinal, and organizational barriers (including inadequate technological design) to ensure their full participation (Oliver, 1990; Shakespeare, 2006, p. 166). From this viewpoint, it is the non-creative or inadequately designed user interfaces (the environment) that "disable" individuals with SCI, rather than merely their physical impairment. These systemic failures mirror patterns observed across digital inclusion research, where marginalized groups are frequently confronted by technologies that embed exclusionary assumptions and structural barriers (Sakhaei et al., 2024). This structural perspective resonates with emerging critiques of AI governance - just as poorly designed interfaces create artificial barriers, AI systems built on surveillance-capitalist logics actively reproduce disability through technological choices that prioritize extraction over access (Sharifi Poor Bgheshmi & Sharajsharifi, 2025a).

Selected Theoretical Framework for the Research

Considering the primary objective of this research—which is the in-depth analysis of the lived experience of individuals with SCI in encountering creative AI interfaces, with a focus on the role of the environment (interface design) and access barriers—the Social Model of Disability is selected as the principal theoretical framework. This choice is predicated on several rationales. Firstly, the social model's emphasis on the deterministic role of the environment and design in creating or alleviating disability aligns precisely with the aim of analyzing the impact of creative (or non-creative) user interface design on access for individuals with SCI. It permits challenges to be analyzed not as individual deficits but as consequences of interaction with disabling designs (Hansen, 2021, p. 53). Secondly, the critical nature and focus on lived experience within the social model exhibit high compatibility with the qualitative and interpretive approach of this research, which seeks an in-depth exploration of individuals' experiences with environmental barriers and facilitators (including user interface creativity) (Shakespeare, 2006). Thirdly, the social model inherently underscores the necessity for structural changes and inclusive design. Consequently,

research findings under this framework naturally lead towards offering recommendations for designing more creative, improved, and accessible user interfaces for individuals with SCI, which is consonant with the ultimate goal of equal participation and the removal of digital barriers (Goggin & Newell, 2007). Finally, this framework helps to conceptualize "creativity" in user interfaces not merely as a technical feature, but as an essential design response to the environmental barriers faced by individuals with SCI, and to regard its absence as tantamount to creating a barrier.

While employing the social model as the primary lens, useful concepts such as "self-efficacy" from Social Cognitive Theory (SCT) can serve as complementary analytical tools to better understand the impact of environmental barriers (and creative solutions) on the beliefs and self-confidence of users with SCI, without diluting the primary focus on the role of the environment and society. This combination provides the most robust theoretical foundation for a critical and applied analysis of the challenges, opportunities, and the role of creativity in AI-powered user interfaces for individuals with Spinal Cord Injuries (Scherer, 2005, p. 96).

LITERATURE REVIEW

The present research is situated within the interdisciplinary space of Human-Computer Interaction (HCI), Artificial Intelligence (AI), Media Studies, and Disability Studies, with a specific focus on individuals with Spinal Cord Injuries (SCI) and creative user interfaces. The objective of this section is to review prior relevant research (both international and domestic) to delineate current knowledge and precisely identify the gap that this study aims to fill.

Part One: Review of International Research

An extensive body of literature has documented the interaction challenges faced by individuals with motor impairments when using digital technologies. Early studies concentrated on the barriers presented by standard Graphical User Interfaces (GUIs) for individuals with motor limitations (e.g., MacKenzie, 1992; Sears & Shneiderman, 2002). More recent research has investigated barriers on modern platforms (such as touch-based devices). Specifically, studies have addressed the challenges encountered by individuals with SCI in using mainstream technologies, for instance, issues related to touch accuracy and gesture execution for individuals with tetraplegia (Kane et al., 2013, p. 89). This body of research underscores the need for alternative input solutions and accessible design.

With the advent of AI-based Assistive Technologies (AT), research focus has shifted towards the design and evaluation of these systems. Such systems encompass a diverse range of creative solutions. For example, advanced voice control, utilizing intelligent assistants, holds significant potential for users with motor limitations, although challenges such as recognition accuracy in real-world environments and for atypical speech patterns persist (Porter et al., 2019, p. 77); creativity here can be embedded in adaptive algorithms and intelligent noise filtering. In parallel, recent interdisciplinary reviews in other fields have underscored how artificial intelligence drives profound shifts in personalization, predictive analytics, and user engagement, while simultaneously introducing ethical concerns and questions of equitable access that mirror the dilemmas faced in assistive technology contexts (Toosi et al., 2024). Eye-tracking technologies enable hands-free control and are invaluable for individuals with high-level SCI, yet issues like eye fatigue and inadvertent activation (the "Midas touch problem") necessitate creative solutions in gaze processing algorithms (Majaranta & Räihä, 2007, p. 56). Brain-Computer Interfaces (BCIs) delineate the ultimate horizon of interaction without physical movement for individuals with the most severe forms of SCI; however, low speed, training requirements, and high cost remain major impediments that creativity in signal processing and system design can help mitigate (Allison et al., 2012; Wolpaw et al., 2002). Finally, adaptive user interfaces, which automatically adjust to the user's needs and abilities (such as the Supple system developed by Gajos et al., 2007), inherently offer a creative approach to interaction and possess considerable potential for personalizing the user experience, although their practical and widespread implementation still faces challenges.

Gap in International Research: Despite these advancements, a review of the existing literature (e.g., the review by Koos & Deboos, 2022, p. 144) indicates that many studies are concentrated on technical aspects or performance evaluation under laboratory conditions. Qualitative studies exploring the lived experience of users (particularly those with

SCI) in their everyday use of these technologies for accessing diverse media content (web browsing, social networking, video consumption, etc.) are less prevalent. Specifically, the concept of user interface "creativity" (defined as innovation, adaptive intelligence, and the provision of novel solutions beyond mere replacement) and its impact on the user experience of individuals with SCI has been notably underexplored. Comparable patterns of broad enthusiasm tempered by ethical and implementation concerns have also emerged in studies of AI integration into higher education, suggesting that perceptions of intelligent systems often combine optimism with apprehension, regardless of context (Rahmatian & Sharajsharifi, 2021). There is a perceived need for a deeper understanding of how users interact with these "creative" systems, identification of practical barriers, unmet needs, and their personal preferences within the context of real life. This gap becomes particularly glaring when contrasted with other sectors: while businesses strategically invest in workforce education to optimize technology adoption (Zamani et al., 2024), comparable investments in training both developers of assistive technologies and their end-users remain negligible. Without addressing this educational disparity, even the most innovative AI interfaces risk replicating existing barriers under a veneer of technological progress.

Part Two: Review of Domestic (Iranian) Research

In Iran, research has also been conducted in the field of Information and Communication Technology (ICT) and individuals with disabilities, although the volume may be less compared to international research, and the focus might differ. A significant portion of domestic research has addressed the evaluation of website accessibility, particularly for governmental and academic websites, based on international standards such as WCAG. For instance, studies published in domestic peer-reviewed journals (e.g., journals related to IT management, library and information science, or rehabilitation sciences) indicate the unsatisfactory state of accessibility of many Persian-language websites for users with disabilities (including motor impairments).

In the domain of assistive technologies, research in medical sciences universities and rehabilitation faculties has concentrated on needs assessment, design, or evaluation of simpler assistive devices (such as various types of switches, or assistive tools for activities of daily living). Furthermore, research has been undertaken in Persian language processing for applications like speech recognition systems or text-to-speech readers, which hold potential for use in assistive technologies. However, it appears that published domestic research specifically addressing the design, implementation, and particularly the qualitative and in-depth user experience evaluation of individuals with motor impairments using advanced AI-powered user interfaces (such as eye-tracking, BCI, or complex voice control) for accessing diverse digital media content is very limited or scarce. This scarcity may be attributed to factors such as the high cost of equipment, the need for interdisciplinary expertise, and perhaps different research priorities and the novelty of this type of research topic.

CONCLUSION AND RESEARCH GAP

The literature review indicates that, at the international level, artificial intelligence technologies are being developed to assist individuals with motor impairments. However, a deeper understanding of the actual user experience is needed, particularly with a focus on the role of interface creativity and the specific population of individuals with SCI in the context of media access. In Iran, while general accessibility issues have received attention, the domain of advanced and creative AI-powered interfaces for individuals with SCI and the qualitative analysis of their experiences have been less explored.

Therefore, the primary gap this research aims to fill is the provision of an in-depth, qualitative analysis, grounded in the Iranian cultural context, of the experiences, benefits, drawbacks, challenges, and actual needs of Iranian users with spinal cord injuries when utilizing various types of creative AI-powered user interfaces to access diverse digital media content. By concentrating on the users' own perspectives and the element of "creativity," this research can contribute to the generation of indigenous and applicable knowledge. In parallel, research on systemic injustice has shown that

discrimination and inequitable structures can undermine trust, social cohesion, and individuals' sense of belonging, underscoring the need for inclusive policies and restorative practices to ensure that technological innovations do not reinforce existing disparities (Maleki Borujeni et al., 2022).

METHODOLOGY

This study, aiming for a deep and rich understanding of the experiences, perspectives, and needs of individuals with Spinal Cord Injuries (SCI) in using creative AI-powered user interfaces for accessing media content, employs a qualitative approach. The selection of a qualitative approach is justified as the primary goal is not to measure variables or test hypotheses, but rather to conduct an in-depth exploration of complex social and human phenomena from the participants' viewpoints and to understand the meanings they attribute to their experiences (Creswell & Poth, 2018, p. 168). This approach best facilitates answering the research questions, which focus on the "how," "why," and "lived experience" of individuals with SCI in their interaction with creative interfaces, and aligns perfectly with the chosen theoretical lens, the Social Model of Disability, which emphasizes understanding individuals' experiences within the context of environmental (design) and social barriers.

Within this qualitative framework, in-depth semi-structured interviews have been selected as the primary method for data collection. This method allows the researcher, while having a general framework of guiding questions (based on the objectives, research questions, and literature review), the necessary flexibility to delve deeper into responses, pursue unexpected points, and adapt questions to the flow of conversation and the unique experiences of each individual with SCI (Robson & McCartan, 2016). In-depth interviews enable access to rich details, narratives, emotions, attitudes, and participants' interpretations of their experiences with creative user interfaces—information that is difficult to obtain through quantitative methods. This method is highly suitable for exploring the experiences of individuals with disabilities, which can be complex.

Finally, the data obtained from the transcribed interviews will be analyzed using thematic analysis, specifically employing the approach proposed by Braun and Clarke (2006, 2019). This process will involve multiple stages, including familiarization with the data, initial coding, searching for themes, reviewing themes, defining and naming themes, and ultimately, producing the analytical report. This method enables the researcher to identify, analyze, and present meaningful patterns and key themes related to the participants' experiences, challenges, and needs within the large volume of qualitative data. Ethical considerations, including confidentiality and data anonymization, will be observed throughout all stages of analysis. To enhance the credibility and trustworthiness (or dependability) of the findings, strategies such as peer debriefing and the inclusion of direct quotations from participants (while maintaining anonymity) will be utilized in the final report.

Target Population

The target population for this research comprises all adult individuals (18 years and older) residing in Iran who have a medical diagnosis of a motor impairment resulting from Spinal Cord Injury (SCI), leading to significant limitations in hand use or the motor control necessary for interacting with computers or smart devices through standard methods. Furthermore, these individuals must possess practical and ongoing experience in using at least one type of advanced and "creative" AI-powered user interface (such as intelligent and adaptive voice control systems, advanced eye-tracking technology, intelligent adaptive switches with predictive capabilities, Brain-Computer Interfaces, or creative predictive input software) for accessing digital media content (e.g., web browsing, social networking, video viewing, text reading) in their daily lives. They must also be capable of articulating their experiences and perspectives verbally (in Persian) or through Augmentative and Alternative Communication (AAC) devices.

Sampling Method

Given the qualitative nature of the research and the objective of achieving an in-depth understanding of the experiences of individuals with SCI, a purposive sampling method will be employed. This method allows the researcher to intentionally select participants who possess rich and relevant experiences with the phenomenon under study—specifically, the use of creative AI interfaces—and who can provide profound and valuable information

(Patton, 2015). In this regard, efforts will be made to ensure the selected sample exhibits maximum variation in terms of key characteristics such as the level and type of spinal cord injury (e.g., tetraplegia/paraplegia, complete/incomplete); duration since injury; type(s) of creative AI user interface(s) used; extent and type of digital media usage; age, gender, and educational level, in order to cover a broader spectrum of perspectives and experiences.

Due to the difficulty in directly identifying and accessing all eligible individuals within this specific population, snowball sampling will also be utilized as a complementary strategy (Robson & McCartan, 2016, p. 59). Accordingly, after interviewing initial participants (who may be identified through associations related to individuals with disabilities, rehabilitation centers, or social networks), they will be asked, if willing, to refer other individuals who meet similar criteria and have relevant experience to the researcher.

Sample Size

In qualitative research, sample size is not predetermined numerically but is instead determined by the principle of theoretical saturation or data saturation (Glaser & Strauss, 1967; Guest et al., 2006). Saturation refers to the point at which further data collection (conducting new interviews) no longer yields new or meaningful information, concepts, themes, or insights relevant to the research questions, and the data begin to repeat. Therefore, the process of data collection (interviews) and preliminary analysis will proceed concurrently and iteratively. After every few interviews, the researcher will conduct an initial analysis of the data and identify emerging themes. Sampling will continue until the researcher, based on the ongoing data analysis, determines that the point of saturation has been reached and no new or relevant information is anticipated from subsequent interviews; at this juncture, interviewing will cease.

Based on similar experiences in qualitative studies within this field, it is anticipated that a sample size of approximately 15 to 25 participants will be sufficient to achieve adequate saturation. However, it is emphasized that this number is merely an initial estimate, and the ultimate criterion will be the attainment of data saturation.

Data Collection Instrument and Analysis Method

The primary and central instrument for data collection in this qualitative research will be an in-depth semi-structured interview guide. This instrument allows the researcher, while maintaining focus on the main research questions and objectives, the necessary flexibility to explore positive and negative experiences of using creative AI interfaces; perceived "creative" features and their efficacy; specific advantages and disadvantages of these interfaces for accessing various types of media content; practical challenges (learning, reliability, fatigue, etc.); and perspectives on the characteristics of an "ideal and creative" user interface.

The interview guide will be developed based on the literature review, research questions, and defined objectives. It will comprise a set of open-ended, core questions designed to investigate participants' positive and negative experiences with AI-powered user interfaces, their perceived advantages and disadvantages, practical challenges encountered in accessing different types of media content (such as reading text, watching videos, interacting on social networks), and their views on the features of an ideal and creative user interface. The questions will be designed to encourage participants to provide detailed and rich narratives of their experiences. In addition to the main questions, the researcher will be permitted to use probing questions to follow up on important points, clarify responses, and deepen the discussion (Robson & McCartan, 2016). Prior to final use, this guide may be evaluated and revised through a pilot interview with an eligible individual (who will not be included in the final sample) to ensure the clarity, fluency, and appropriate coverage of the questions. Interviews will be conducted in Persian to ensure no details are lost. Furthermore, field notes will be taken during and immediately after each interview to record non-verbal cues, initial impressions, and important contextual aspects of the conversation.

Following data collection through in-depth interviews and their precise, verbatim transcription, the data analysis process will commence. Given the exploratory nature of the research and the aim of identifying key patterns and themes in participants' experiences, thematic analysis will be employed. This method is widely used in social and health sciences research due to its flexibility and high

efficiency in organizing, describing, and interpreting rich qualitative data (Braun & Clarke, 2006, p. 98). Specifically, the systematic six-phase approach proposed by Braun and Clarke (2006, 2019) will be followed. To facilitate data management and the coding process, qualitative data analysis software (QDAS) may be utilized, although it is emphasized that such software serves only as a management tool, and the primary analysis remains an intellectual and interpretive process undertaken by the researcher. To enhance the credibility and trustworthiness (or dependability/rigor) of the analysis, strategies such as coding by two researchers (if feasible) and discussing discrepancies until consensus is reached, or member checking (review of initial findings by some participants, if feasible and they are willing) will be considered.

Qualitative Trustworthiness (Validity and Reliability)

Ensuring the accuracy, rigor, and trustworthiness of findings is essential in any scientific research. In qualitative research, this imperative is pursued through the more comprehensive concept of trustworthiness, to demonstrate that the research findings are dependable, credible, and grounded in real data. This concept serves as a more appropriate alternative to the terms validity and reliability within the quantitative paradigm and, according to the framework proposed by Lincoln and Guba (1985), encompasses four key aspects: Credibility, Transferability, Dependability, and Confirmability. In this study, specific and complementary strategies will be employed to strengthen each of these dimensions, thereby enhancing the overall trustworthiness of the findings.

To enhance credibility, which refers to the believability of the findings and their correspondence with the reality of participants' experiences, several strategies are considered. These include prolonged engagement and persistent interaction with the subject matter through data collection until theoretical saturation is achieved and conducting in-depth interviews, which helps the researcher gain a comprehensive understanding of the phenomenon. Furthermore. Peer debriefing (review of initial findings, codes, and themes by research colleagues experienced in the topic or methodology) allows for external perspectives and reduces potential biases.

Dependability, equivalent to reliability in quantitative research, refers to the consistency and traceability of the research process. To ensure this aspect, establishing a detailed audit trail—which involves comprehensive documentation of all research stages (from the initial design to the final analysis, including the interview guide, raw data, coding process, and methodological decisions)—is of key importance. This documentation allows others to follow and evaluate the logic and process of the work. Additionally, a detailed and transparent description of the methodology in the final report enables readers to understand the process and be confident in its dependability.

Finally, confirmability relates to researcher objectivity and ensuring that findings are rooted in the data rather than personal biases or preconceptions. The audit trail, demonstrating the link between data, codes, themes, and interpretations, also plays a crucial role here.

FINDINGS

The present study, conducted with the objective of an in-depth analysis of the role of the creativity element in AI-powered user interfaces for facilitating access to digital media content for individuals with Spinal Cord Injuries (SCI), has yielded significant results. The analysis of rich data obtained from in-depth semi-structured interviews with 18 Iranian participants revealed four main themes and several sub-themes. Collectively, these themes delineate a precise and multifaceted picture of the impact of creativity (or lack thereof) in the design and functionality of these technologies on the daily lives and media access of users, and provide a direct response to the research questions. In the following sections, these themes will be elucidated using illustrative quotations and within the theoretical framework of the research.

Main Theme 1: Opening Digital Gateways; The Manifestation of Creativity in Empowerment and Independence

One of the most prominent and recurrent themes among participants' experiences was a sense of empowerment and a significant increase in independence in accessing the digital world and media content, which was directly attributed to the creative and innovative aspects of the user interfaces they utilized. These technologies, when functioning

creatively, served as powerful tools for overcoming the severe physical limitations resulting from SCI and accessing resources that were previously out of reach. This practical creativity was primarily manifested in a significant reduction in dependence on others' assistance. As one participant (male, 45 years old, SCI, advanced eye-tracking user) stated:

"Previously, I had to wait for someone to come and open a particular website for me or play a movie. Now, whenever I want, I choose with my eyes. This sense of independence is truly fantastic; it's as if I've regained control of my life. The fact that a technology can anticipate this need of mine and respond in this way, that's creativity."

This sense of independence, which transcends a mere technical achievement, directly and positively impacted users' self-efficacy (belief in their ability to perform tasks) and reduced the environmental barriers (need for others' help) emphasized by the social model of disability. Creativity here is the system's ability to offer a novel solution to overcome limitations. Broader experiences with AI-driven innovations in fields such as digital healthcare have similarly demonstrated how intelligent systems can expand access and enhance autonomy for marginalized groups, while also underscoring the need to address privacy, ethical concerns, and the risk of deepening existing inequalities (Toosi et al., 2025).

In addition to functional independence, creativity was also evident in the indirect ergonomic design of these interfaces. The reduction of fatigue and physical pain resulting from efforts to use traditional tools was another significant advantage attributed to the intelligence and creativity of these systems. Another participant (female, 38 years old, SCI, user of adaptive voice control) explained:

"My shoulder would really hurt when working with a mouse. I'm much more comfortable with voice; I can surf the web for hours or browse YouTube without experiencing discomfort. The fact that I can access information and entertainment without pain is a kind of creativity in the design of this system, which has also considered the user's long-term comfort."

This greater comfort and independence, in turn, had led to increased social and cultural participation through better and more prolonged access to news, information, entertainment, and online communication (i.e., media content).

Main Theme 2: Navigating the Labyrinth of Interaction; Persistent Challenges Due to Insufficient Operational Creativity

Despite the undeniable advantages, the path of interaction with these intelligent interfaces was not smooth for participants and was accompanied by a set of persistent challenges and obstacles in practical performance, sometimes leading to frustration and disappointment. The root of many of these problems can be traced to inadequate implementation and a lack of operational and adaptive creativity within these systems. In other words, while the general idea might be creative, the necessary intelligence and refinement for flawless performance in real-world conditions and for users with varying needs were often absent.

The issue of low accuracy and variable reliability was one of the most frequently cited grievances, directly indicating a weakness in algorithmic creativity in precisely understanding user intent or adapting to changing conditions. Frequent errors in recognizing voice commands in noisy environments or incorrect clicks in eye-tracking systems (e.g., due to involuntary tremors or eye fatigue) created a frustrating experience. One female participant (30 years old, SCI with mild speech impairment) expressed her exasperation:

"I have to say a word a hundred times for it to understand what I'm saying! Eventually, I get tired and give up; it's like talking to a wall. This isn't intelligence or creativity! It's just an alternative that's nerve-wracking."

This highlights that creativity lies not only in providing an alternative solution but also in its efficiency and reliability. Similar observations in other domains have underscored that while advanced information technologies can drive significant innovation and operational improvements, they also introduce new layers of risk and complexity, making it essential to adopt balanced, strategic approaches that anticipate unintended consequences and safeguard user trust (Soroori Sarabi et al., 2023).

The relatively slow speed of interaction was another significant challenge, reflecting a lack of creativity in optimizing workflow and predicting the

user's next actions. Another user (male, 28 years old, muscular dystrophy, eye-tracking user) also described the problem of accuracy and speed as follows:

"It's good for reading text, but when I want to click on a small link, it's a nightmare! Either it doesn't click, or it clicks in the wrong place. It's like my eye is trembling on the screen. I wish the system were more creative and understood that I probably want to click on that now and helped itself."

This slowness and inaccuracy limit fluid access to dynamic media content or rapid interactions on social networks.

Furthermore, the initial complexity of setup and learning was raised as a barrier, indicating a lack of creativity in the overall user experience design. A truly creative user interface should also design the familiarization, configuration, and learning process in an intelligent and simple manner. One participant (male, 50 years old, SCI with Parkinsonism, voice control user) noted:

"Well, it's not as fast as using hands, but it's better than nothing. Only, setting it up at first was difficult; I called support many times until it was fixed."

This underscores the necessity of considering creativity in all aspects of user interaction with technology, including documentation and support.

Main Theme 3: The Double-Edged Sword of Customization; The Critical Need for Personalized Creativity and the Fear of Complexity

The need for customization and personalization of these interfaces to precisely match the needs, abilities, preferences, and even daily fluctuations in the physical condition of SCI users was emphasized by all participants as a vital and essential aspect of practical creativity. True creativity in this domain is not merely about offering numerous options, but rather signifies the intelligent flexibility and dynamic adaptability of the system to the individual user. Users rightly pointed out that one-size-fits-all solutions, given the vast diversity in the level of injury, residual abilities, and environmental conditions of SCI users, are fundamentally non-creative and ineffective. One user (male, 45 years old, tetraplegia, eye-tracking user) explained:

"Everyone is different. I have a lot of hand tremors, so I need to reduce its sensitivity significantly. Someone else might be the opposite. If it can't be adjusted, it's useless. A creative system should be able to adapt itself to me, not me adapting myself to it."

However, this very critical need for customization was confronted with the daunting challenge of complexity in the configuration process. Many users expressed confusion and concern about the multitude of options, nested menus, the incomprehensibility of some settings' functions, and the fear of disrupting the entire system. Similar patterns have been observed in other fields, where individuals' ability to confidently engage with complex environments is shaped not simply by innate capability but by prior exposure, educational opportunities, and cultural context (Mohammadi et al., 2025). This complexity indicates a lack of creativity in the design of the customization tools themselves. Similar challenges have been documented in broader discussions of AI literacy, where inconsistent frameworks, limited standardization, and insufficient integration of ethical and empowerment-oriented dimensions often hinder users' ability to confidently and effectively engage with intelligent technologies (Khodabin et al., 2022). A tool aimed at increasing creativity and flexibility should not itself become a non-creative and complex barrier. Ultimately, this pattern is consistent with broader evidence showing that when systems are perceived as unsupportive or difficult to navigate, users' confidence, motivation, and willingness to persist can be significantly diminished, regardless of the technology's objective capabilities (Toosi, 2025). Another user (female, 52 years old, SCI, adaptive smart switch user) said:

"It has so many options that one gets confused. I'm afraid to touch it and mess up all its settings. I wish it had a simple visual guide. Or I wish it were smarter and suggested better initial settings, or its process were more creative and simpler."

This finding demonstrates that user-friendly and creative design for customization tools is no less important than the design of the main interactive interface, and creativity must permeate all layers of the product.

Main Theme 4: Aspiring for Flawless Assistance; Users' Expectations of Ideal Creativity in User Interfaces

In describing the features of an "ideal" AI-powered user interface, participants articulated a set of key expectations, all revolving around the full realization of the potential for creativity and genuine

intelligence within these technologies to meet their media access needs. They sought a system that was not merely a technical substitute but an intelligent, reliable, adaptable, efficient, and hassle-free assistant. Reliability and performance stability were paramount among all desires, considered the essential foundation for any meaningful creativity. As one user (male, 42 years old, SCI) stated:

"I just want it to go to the next page when I say 'next page'! Not to freeze or do something else. You have to be able to trust it. Creativity is valuable when it works."

High responsiveness and fluid interaction were also strongly emphasized, as creativity should lead to increased efficiency and reduced user effort. Simplicity and ease of learning and daily use, especially for users with less technical knowledge or high fatigability, were highly important as another manifestation of creativity in interaction and user experience design. This emphasis on clear guidance and supportive learning environments echoes observations among clinical interns, who also stressed that AI systems should be introduced with adequate training and safeguards that preserve professional autonomy while enhancing, rather than replacing, human judgment and expertise (Tomraee et al., 2024). One user (female, 60 years old, SCI post-stroke) wished:

"I wish it had a button that configured everything itself! Learning it shouldn't be this hard. A creative system should also be easy to use."

Intelligent flexibility and dynamic adaptability, not only in initial settings but also in daily operation (e.g., automatically adapting to user fatigue, changes in ambient light, or learning usage patterns), were seen as the pinnacle of desired and ideal creativity. This need for adaptive systems mirrors findings in media literacy research, where successful navigation of digital content requires both intelligent platform design and user competencies in critically evaluating and adapting to dynamic information environments - a dual requirement that becomes even more critical for users with motor impairments (Arsalani et al., 2025). Clear and understandable feedback on system performance (so the user knows what is happening) and privacy preservation (especially for systems that constantly listen to or watch the environment) were also essential considerations for a creative and responsible design. Comparable findings in other professional domains have shown that even when AI technologies significantly improve accuracy and efficiency, they often provoke concerns about accountability, transparency, and the need for clear user guidance and robust training frameworks to build trust and support effective adoption (Tomraee et al., 2022). Finally, a pressing need was felt for robust, accessible technical support and appropriately tailored, creative training for all users. Similar insights from media literacy research highlight that empowering users to navigate complex digital environments effectively requires comprehensive, context-sensitive education strategies that engage not only individuals but also their support networks, ensuring sustained and confident engagement (Hosseini et al., 2025). As one participant (male, 39 years old, SCI) put it:

"Ideal means something that's as easy to work with as breathing, is fast, understands what I want, and always works! A kind of invisible creativity that just works and isn't intrusive."

Table 1: Summary of Research Findings on the Element of Creativity in AI User Interfaces for SCI Users

Main Theme Focus (Considering Creativity)	Positive Aspects (Manifestation of Creativity)	Challenges (Lack or Deficiency of Creativity)	Key User Perspective (Related to Creativity)	Main Theme
How creativity in providing novel solutions (e.g., hands-free interaction) overcomes physical barriers and enables SCI users' access to media.	- Significant reduction in dependence on others for media access. - Increased sense of control, self-efficacy, and self-esteem. - Reduction of physical fatigue and pain (ergonomic creativity). - Enhanced social and cultural participation through media.	(This theme primarily focuses on the positive aspects of creativity)	"The fact that technology has considered my problem and provided a solution means creativity." "I feel like I have control over my life again."	1) Opening Digital Gateways; The Manifestation of Creativity in Empowerment and Independence

Main Theme Focus (Considering Creativity)	Positive Aspects (Manifestation of Creativity)	Challenges (Lack or Deficiency of Creativity)	Key User Perspective (Related to Creativity)	Main Theme
How the lack of operational and adaptive creativity in AI interface performance (despite an initially creative idea) leads to persistent challenges in accuracy, speed, and reliability.	(The initial potential is creative, but performance is flawed)	- Low accuracy and variable reliability (lack of algorithmic creativity in understanding intent). - Relatively slow interaction speed (lack of creativity in process optimization). - Initial complexity of setup and learning (lack of creativity in onboarding experience design). - Need for frequent recalibration.	"This isn't creativity; it's just an alternative that doesn't work properly!" "I wish the system were more creative and understood what I meant faster."	2) Navigating the Labyrinth of Interaction; Persistent Challenges Due to Insufficient Operational Creativity
The critical need for creativity in interface flexibility and personalization for the unique needs of SCI users, versus the uncreative complexity of current configuration tools.	- Potential for precise adaptation to individual and varying needs (requires creativity).	- Numerous, confusing, and incomprehensible setting options (uncreative design of settings interface). - Fear of disrupting settings. - Lack of intelligent guidance or creative defaults in settings.	"A creative system should be able to adapt itself to me." "The settings menu itself needs a creative design."	3) The Double-Edged Sword of Customization; The Critical Need for Personalized Creativity and the Fear of Complexity
Users' perspectives on an ideal and truly creative AI user interface: a reliable, fast, simple, adaptable system with appropriate feedback and strong support.	- Expectation of ideal creativity. - Very high reliability (foundation of creativity). - High speed and responsiveness (creative efficiency). - Simplicity and intuitiveness (creative subtlety). - Dynamic and intelligent adaptability (pinnacle of creativity). - Clear feedback. - Privacy preservation. - Creative and accessible support.	(This theme highlights current creativity shortcomings compared to the ideal)	"Creativity without reliability is useless." "Ideal creativity is invisible; it just works and isn't intrusive."	4) Aspiring for Flawless Assistance; Users' Expectations of Ideal Creativity in User Interfaces

Answering the Research Questions

Based on the analysis of the aforementioned findings, the following answers can be provided for the main and sub-research questions:

Answer to the Main Research Question: From the perspective of the lived experience of individuals with Spinal Cord Injuries, the element of creativity in AI-powered user interfaces has a dual and transformative, yet incomplete, impact on their process of accessing and interacting with digital media content.

On the one hand, the creative and innovative aspects of these technologies (such as hands-free interaction, advanced voice control, eye-tracking) significantly enhance users' independence and empowerment in accessing various types of media content by dramatically reducing the need for others' assistance and lessening physical fatigue, thereby opening new gateways to digital participation for them (Theme 1).

On the other hand, this positive experience is marred by persistent challenges stemming from insufficient creativity in operational performance (e.g., inaccuracy, low speed, variable reliability) and

complexity in use and customization (Themes 2 and 3). Consequently, the overall impact is a combination of hope and empowerment alongside frustrations arising from technical and usability instabilities and deficiencies, indicating that the full potential of these technologies' creativity for this user group has not yet been fully realized. This implementation gap mirrors broader AI disparities - while the technology transforms global power structures (Rahmatian, 2025), its failure to consistently empower users with disabilities reveals critical blindspots in development priorities.

Answer to Sub-Question 1 (Useful Creative Features): From the perspective of individuals with SCI, features such as adaptive systems (that adjust to user needs), intelligent prediction of user intent (e.g., word suggestion or command completion), innovative hands-free input methods (like accurate voice control and efficient eye-tracking), and simple and intuitive process design are perceived as "creative" aspects offering the most utility in accessing media content. The primary utility lies in overcoming motor limitations and enabling independent access.

Answer to Sub-Question 2 (Barriers and Challenges of Creative Interfaces): The main barriers, challenges, and drawbacks associated with the use of "creative" user interfaces (whose creativity is practically flawed) include:

1. Low accuracy and poor reliability (leading to frustration and increased interaction time).

2. Relatively slow speed compared to traditional methods.

3. Complexity in initial setup, the learning process, and particularly in using customization options.

4. Need for frequent recalibration or continuous adjustments.

5. Potential for fatigue (physical or mental, resulting from sustained concentration or repeated commands).

6. Potential privacy concerns (especially with voice-activated or camera-equipped systems).

Answer to Sub-Question 3 (Features of an Ideal and Creative Interface): From the perspective of users with SCI, the key specifications and essential design considerations for an "ideal and creative" AI-powered user interface that effectively and satisfactorily supports their interaction with digital media content include:

1. Very high reliability and stability (predictable performance).

2. Adequate speed and responsiveness (fluid interaction).

3. Simplicity and ease of learning and daily use.

4. Ease and transparency in the precise customization process.

5. Intelligent flexibility and adaptability (to varying user needs and conditions).

6. Provision of clear and timely feedback.

7. Ensuring privacy and user control over data.

8. Easy access to effective technical support and tailored training.

In essence, users are seeking an experience where the technology is invisible, reliable, and empowering.

CONCLUSION

To achieve the objectives of the present study and conduct an in-depth analysis of users' lived experiences, a qualitative approach employing in-depth semi-structured interviews was utilized. The target population comprised adult individuals (18 years and older) residing in Iran with a medical diagnosis of SCI, who possessed practical and ongoing experience in using at least one type of advanced and "creative" AI-powered user interface for accessing media content. Using purposive sampling followed by snowball sampling, 18 participants (10 male, 8 female) were selected, exhibiting appropriate diversity in terms of age (22-65 years), educational level, geographical location (Tehran and 4 other major cities), type and level of spinal cord injury (including various cervical and lumbar levels), and the type of AI interface used (primarily voice control and eye-tracking, with a few cases of adaptive switches and one instance of BCI experience). Efforts were made to ensure maximum variation in the sample to cover a wide range of experiences. The sampling process continued until theoretical data saturation was reached with 16 interviews, i.e., when new interviews no longer

added new or meaningful information or insights to the existing data. Initial participants were identified through collaboration with relevant associations (such as MS Society, Dystrophy Association, Spinal Cord Injury Association), rehabilitation centers, and social networks, and they were then asked to refer other eligible individuals.

The primary instrument was an in-depth semi-structured interview guide, developed based on the research objectives, questions, and theoretical framework. This guide (a sample is provided at the end of this section) included open-ended, core questions to explore positive and negative experiences of using AI interfaces, perceived "creative" features, advantages and disadvantages, practical challenges, and perspectives on an ideal user interface. The guide provided the necessary flexibility to ask probing questions and follow up on important points. Prior to final use, the guide was evaluated and revised through a pilot interview. Data from the verbatim transcribed interviews were analyzed using Braun and Clarke's (2006, 2019) six-phase thematic analysis method. These phases included deep familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and finally, producing the analytical report. The primary analysis was an intellectual and interpretive process undertaken by the researcher.

This research, through an in-depth analysis of the lived experiences of Iranian users with SCI, demonstrated that AI-powered user interfaces, despite their immense potential for enhancing media content accessibility and increasing independence, face significant practical challenges, primarily rooted in the inadequate implementation of the creativity element. These findings highlight the critical importance of moving beyond merely providing technical alternatives and focusing on deeply human-centered, inclusive, and creative design. This need for dual intervention—both technological and educational—echoes lessons from high-risk industries, where effective solutions combine system redesign with user empowerment (Soroori Sarabi et al., 2020). For AI accessibility, this means pairing creative interfaces with initiatives that equip users with SCI to fully leverage these technologies. Creativity in this context must manifest in all aspects of the product – from algorithmic accuracy and interaction speed to ease of customization and quality of support. For artificial intelligence to truly become a tool for universal empowerment and bridging the digital divide for individuals with disabilities, it is essential that users' voices, especially those who benefit most (or should benefit most) from these technologies, are placed at the center of the design and development process, and that their unique needs and experiences inspire future creative innovations. This requires confronting an uncomfortable reality: while AI literacy frameworks increasingly position algorithmic understanding as a fundamental right (Khodabin et al., 2024), assistive technologies often deny users with SCI both system transparency and design agency—perpetuating digital marginalization under the guise of innovation. This study, by providing evidence from the Iranian cultural context, contributes to the global literature in this field and also underscores the necessity of considering cultural context and local needs in the design of assistive technologies.

SUGGESTIONS

The findings and limitations of the present study suggest several avenues for future research in this important and growing field:

- Longitudinal and In-the-Wild Studies: This research provided a cross-sectional snapshot. Conducting longitudinal studies that follow SCI users over time during their continuous use of these interfaces in their natural living environments (home, workplace) can offer deeper insights into the learning process, adaptation, changing attitudes, long-term challenges (such as technology fatigue or the need for system upgrades), and the actual impact of these technologies on media consumption patterns and social participation.

- Comparative Evaluation of AI Interface Types: This research addressed general experiences with various types of interfaces. More precise comparative studies evaluating the performance, user experience, advantages, and disadvantages of specific types of AI interfaces (e.g., voice control versus eye-tracking) or different platforms (e.g., various voice assistants) for specific media tasks (text reading, web navigation, video watching) and for particular subgroups of SCI users (with different levels of injury or varying abilities) can help in selecting the most suitable solution for each individual and task, and aid in more creative and targeted design.

• Focus on Development and Evaluation of Persian Language User Interfaces: Given the scarcity of domestic research, the design, development, and evaluation of AI-powered user interfaces (especially voice control and predictive text input) specifically optimized for the Persian language, considering its phonetic, structural, and cultural characteristics, is a pressing need. Evaluating the efficacy, acceptance, and creativity of these localized systems by Persian-speaking SCI users is a crucial research area. In addition, experiences from other high-stakes domains illustrate that effective integration of advanced AI technologies requires not only localized development but also continuous education, capacity building, and ethical training to ensure users are fully prepared to engage with new systems responsibly and confidently (Hosseini et al., 2021).

• Exploration of Psychological and Identity Aspects: The impact of using these technologies on the self-esteem, self-efficacy, personal identity, body image, and quality of life of SCI users is an area requiring further exploration. Comparable perspectives in global health have highlighted that while AI innovations can expand access and reduce systemic disparities, their benefits depend on designing inclusive governance structures, ethical safeguards, and user-centered strategies that prevent unintended harm and ensure equitable outcomes (Toosi et al., 2025). How do these technologies (particularly their creative or non-creative aspects) affect their sense of independence, control over life, and even social relationships? Deeper qualitative studies with psychological approaches can answer these questions.

• Investigation of the Role of Social and Environmental Factors: The current research primarily focused on individual experience. Future studies can examine the role of environmental and social factors such as support from family and friends, access to training and technical support (the creative provision of which is itself important), the cost of acquiring and maintaining the technology, societal attitudes towards the use of these tools in public spaces, and the accessibility of media content itself, and analyze the impact of these factors on the acceptance, successful use, and experience of creativity with AI interfaces.

• Role of Charities and Non-Governmental Organizations (NGOs): Given the relatively high cost of some of these technologies and the need for specialized training and support, investigating the potential and actual role of charities and NGOs active in the disability sector in facilitating access to these user interfaces is an important and applied research area. How can these organizations, with creative approaches, assist in funding, training, equipment lending, or providing support? Likewise, broader research on AI governance has highlighted that creating sustainable, equitable solutions requires frameworks that integrate diverse stakeholders—including public institutions, private companies, and civil society—to uphold accountability, protect user interests, and foster public trust in emerging technologies (Sharifi Poor Bgheshmi & Sharajsharifi, 2025b).

• Participatory Design: Instead of users being merely recipients or final evaluators of technology, conducting research using a participatory design approach, wherein individuals with SCI actively and creatively collaborate in all stages of the AI user interface design and development process (from initial ideation to testing and improvement), can lead to solutions that best reflect the users' own needs, priorities, and creative ideas, and better align with the realities of their lives. Comparable discussions in AI-driven educational reform have emphasized that successfully integrating intelligent technologies requires not only technical innovation but also adaptive, inclusive, and ethically grounded strategies that balance technological advancement with human-centered priorities. These insights can inform future research on assistive technologies for individuals with SCI by highlighting the importance of holistic approaches that address ethical, infrastructural, and pedagogical dimensions (Rahmatian & Sharajsharifi, 2022).

Addressing these research areas will not only enrich the scientific literature but can also pave the way for the development and implementation of more accessible, user-friendly, effective, and truly creative technologies, marking a significant step towards achieving a more inclusive society for all. Research in other high-impact domains has also demonstrated that effectively leveraging AI's potential requires not only technological innovation but the parallel development of transparent

governance frameworks, ethical safeguards, and strategies that build user confidence and ensure equitable, reliable outcomes (Sakhaei et al., 2024).

CONFLICT OF INTEREST

No conflict of Interest declared by the author(s).

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