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Case Story

ChatGPT as a Universal Design for Learning Tool Supporting College Students with Disabilities

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Abstract
The potential of ChatGPT is explored as an assistive technology tool within the framework of Universal Design for Learning (UDL) to provide targeted support for college students with disabilities. As colleges and universities strive to promote inclusive practices, the implementation of UDL principles has gained significance. ChatGPT's interactive conversational interface aligns seamlessly with UDL, offering personalized assistance, promoting comprehension, and creating engagement opportunities among diverse learners. Numerous examples are provided, which align with both the universal design framework and the needs of learners receiving accessible and assistive services on a college campus. This paper identifies the possibilities for ChatGPT as an accommodation tool to significantly impact and improve the inclusive and equitable learning experiences of college students with disabilities.

Keywords: ChatGPT, universal design for learning (UDL), assistive technology, college students, disabilities

Background

Ensuring equal access to education for all students is a fundamental principle of higher education. College and university campuses strive to create an inclusive environment where students with diverse abilities can succeed academically and personally (Weiss et al., 2016) Accommodations play a pivotal role in supporting students with disabilities by offering tailored support across four main categories: cognitive, sensory, physical, and social-emotional.

Cognitive accommodations may support students with learning disabilities, Attention Deficit Hyperactivity Disorder (ADHD), autism and other cognitive differences. These accommodations range from extended time on assignments and exams to specialized formats for course materials (TOC, 2013). Also available on most campuses are assistive technology tools such as text-to-speech software, speech recognition programs, mind-mapping applications, flexible testing options, readers, and distraction-free environments. Some campuses, through Disability Services, offer students a reading software program called Read/Write Gold in addition to screen reader machines (Roussey, 2023)

Sensory accommodations may serve students with hearing and visual impairments, neurodiversity, and other similar disabilities. Colleges and universities typically provide real-time captioning and sign language interpreters for lectures and events, making educational content accessible. Yuja and Verbit are two common programs used for real time captioning. Students with visual disabilities are typically supported by the provision of Braille materials, audio, screen readers, or tactile graphics (Farrand et al., 2022). Quiet study areas and sensory-friendly spaces help individuals manage sensory sensitivi-

ties.

Physical accommodations may address the needs of students with mobility impairments, chronic health conditions, and other physical disabilities. These accommodations may include wheelchair-accessible facilities, parking, adaptive technology, and accessible technologies (Deckoff-Jone & Duell, 2018) and are considered essential to the success of students. Additionally, personalized accommodations may involve note-taking software and assistance, and extended time for exams. Some campuses, including my own have a team of employed students who travel with students who request and qualify for such services as note takers and classroom assistants.

Social-emotional accommodations may include counseling services, disability services centers, mental health resources, and support groups to address emotional needs. Flexible course scheduling and reduced course loads can also alleviate stress and provide a better balance for students navigating mental health challenges (Jehi et al., 2022). By offering accommodations that address these four categories, institutions demonstrate their commitment to fostering an inclusive learning environment. These accommodations empower students with disabilities to succeed academically, engage socially and contribute to the campus community (Gilmour et al., 2017).

Following the principles of equity and access under Universal Design for Learning (UDL) colleges and universities are able to address the needs of diverse learners ensuring that all students have opportunities in pursuing higher education. In addition to this foundation, the integration of accessible technologies and accessible digital educational support systems has further expanded the range of accommodations available for college students with disabilities. This paper will explore how ChatGPT—a cutting edge language model program can effectively serve as a personalized accommodation and support system within the framework of UDL for students with disabilities. By embracing the principles of UDL, ChatGPT has the ability to greatly enhance the learning process by catering to ways of presenting information methods of response and instructional settings.

In the subsequent sections of this paper, we will delve deeper into the role of ChatGPT as an innovative tool in addressing the diverse needs of students with disabilities within the Universal Design for Learning framework. We will explore the functionalities and potential benefits of ChatGPT, including its ability to adapt content delivery, offer personalized support, and create inclusive instructional environments. Furthermore, we will examine a case study and real-world applications where ChatGPT has made a significant impact on the educational experiences of students with disabilities. Additionally, we will discuss the ethical considerations and challenges associated with integrating AI-driven accommodations into higher education. Finally, we will conclude with a reflection on the future possibilities and implications of ChatGPT as an integral part of promoting accessibility and inclusion in higher education.

Universal Design for Learning (UDL) and Inclusivity in Higher Education

Many of today's college campuses utilize the framework known as UDL as a means of making instruction equitable, accessible and inclusive. The framework of UDL recognizes learner variability and aims to create flexible learning environments that can accommodate these differences (www.cast.org). UDL is based on three key principles: providing multiple means of engagement to foster interest and motivation in learning, multiple means of representation to present information in various formats; and offering multiple means of action and expression to allow students to demonstrate their knowledge in different ways. By integrating these principles into instructional design, UDL aims to eliminate barriers and ensure opportunities for educational success (Smith et al., 2019). Essentially UDL encourages educators to design accommodating and inclusive learning experiences (Rose & Meyer, 2002). Applying the principles of UDL, educators can better address the unique needs of students with disabilities and diverse learning profiles, ensuring that all learners have equitable access to course content, study opportunities and the pursuit of their educational goals. It is a comprehensive approach to curriculum design

aiming to maximize success for every student (Smith et al., 2019).

Implementing Universal Design for Learning (UDL) in college classrooms brings advantages for both students and instructors. One major benefit is the creation of a positive learning environment that promotes self-determination leading to improved outcomes and higher retention rates (Balfe & Trepagnier, 2019; Mazzotti et al., 2023). This becomes especially crucial in the COVID era when many students experience feelings of isolation and anxiety upon returning to campuses (Jehi et al., 2022). By offering multiple means of expression and engagement, UDL supports students in developing skills like critical thinking, problem solving and creativity. Furthermore, UDL empowers instructors by providing them with a framework to design and deliver instruction tailored to meet their student needs. As a result, it reduces the necessity for accommodations specifically related to accessibility for students (www.Cast.org)

Making a commitment to inclusivity and accessibility in education through the adoption of the Universal Design for Learning (UDL) framework is progressive for any university. This proactive approach ensures that all students, irrespective of their learning needs, are provided with an equitable opportunity to succeed. Some ways campuses may demonstrate effective use of UDL include providing faculty with a design template for webpages that already adheres to exemplary standards for accessibility, minimizing potential barriers right from the outset.

Additionally, an accessible course design template can be made available within the institution's learning management system, promoting consistency and ease of use. Beyond these foundational resources, faculty and technology centers on campus can rigorously advocate for UDL principles within the framework of workshops throughout the year integrating UDL principles into pedagogy, emphasizing student-centered decision-making. In recognition of the changing educational terrain, more recent workshops have explored the potential of integrating large language models, like ChatGPT, into instructional methodologies. This commitment to exploring innovative technologies underscores a forward-thinking approach to holistic, accessible, and universally designed diverse pedagogical strategies.

Creating an inclusive and accessible learning environment is a crucial aspect of fostering a positive learning environment in academic settings. Inclusive environments not only value diversity but also create a sense of belonging and empowerment among all students, encouraging active involvement in their education (Nieminen & Pesonen, 2022). Students can easily recognize when their campus prioritizes inclusivity as it is reflected through posters, websites, the learning management system and various activities and events on campus. These efforts contribute to promoting an inclusive positive school culture. Accessibility plays a role alongside inclusivity by ensuring that educational resources, technologies and facilities are designed to consider the needs of all students including those with disabilities. This ensures universal access. By embracing both inclusivity and accessibility educational institutions can nurture an environment of respect, empathy and understanding. This creates a community where every student can thrive and achieve their potential (Burdette, 2019). And as campuses begin to embrace artificial intelligence (AI) and tools such as ChatGPT, it will be important to align them with accessibility at the forefront.

The Role of Assistive Technologies in Supporting Students with Disabilities

Despite the amazing availability of assistive tools aimed at supporting today's college students, those with disabilities still encounter distinctive challenges when it comes to their educational experiences. Learning disabilities can impact processes and hinder reading, writing or mathematical skills (Shaywitz et al., 2019; Swanson, 2019). Visual impairments can vary from sight to blindness necessitating specialized formats, accessible technologies or assistive technologies for accessing educational materials and visual presentations (Jones & Hensley Maloney, 2015; Salleh & Ali, 2010). Hearing impairments vary in severity and individuals may require accommodations such as sign language interpreters or

captioning during lectures. These impairments can also create challenges when it comes to understanding spoken instructions and actively participating in class discussions (Cheng & Zhang, 2015; Mitchell & Karchmer, 2004). Physical disabilities may limit mobility making it necessary to have facilities and technologies on campus for navigation between services and classrooms (Burgstahler & Gleicher, 2015). Intellectual disabilities can affect executive functioning as well as adaptive behavior often requiring personalized support to ensure academic success (Spooner et al., 2012).

It is important for universities to acknowledge the nature of these disabilities and adopt practices like UDL as a framework for instruction ensuring equal access for all students. Additionally, students themselves should advocate for the tools and accommodations they need. Many university campuses offer disability support services centers and accessibility initiatives in line with Section 508 of the American with Disabilities Act (2018) which further promote inclusivity and equity among learners. These accessibility laws guarantee that eligible students receive appropriate accommodations and modifications provided by the university.

Existing support tools and accommodations for students with disabilities cover a range of technology options. These include software, devices and tools that aim to improve accessibility and enhance learning experiences for individuals with disabilities. For instance, text to speech software can be utilized to assist students with impairments or difficulties in reading by enabling them to access written content through spoken words (Hetzroni & Banin, 2017). Screen readers are another tool that converts on screen text into words making it easier for visually impaired students to navigate accessible digital materials (Betts et al., 2013). Furthermore, speech recognition software provides assistance to students with disabilities by allowing them to control computers using voice commands or assist with using speech for writing (Sharma & Wasson, 2012). Other accommodations may include time during exams, note taking support, captioned videos and classrooms designed for accessibility (Page et al., 2021). Additionally in the age of Covid, students with disabilities had to learn how to navigate assistive supports via computers, Zoom, and asynchronous course assignments. It was a significant amount of work for faculty to learn how to get their courses up and running online not to mention getting them prepared to support students with disabilities. The supports included creating small insect videos to provide instruction for assignments and captioned videos as part of assignments. In the spring of 2023, an AI tool name ChatGPT come on the horizon and started to provide options for college students who needed support with writing assignments. I took a look at this tool, along with colleagues in the disabilities services center and knew that this new technology was going to play a significant role in supporting college students with disabilities.

Introducing ChatGPT: A New Horizon in Assistive Technology

OpenAI's innovative language model known as ChatGPT utilizes state of the art intelligence and learning techniques. ChatGPT, which belongs to the GPT (Generative Pre-trained Transformer) family of models is a groundbreaking advancement in natural language understanding and generation (Beaver, 2022). It possesses the ability to engage in human like conversations with users. ChatGPT can grasp queries, provide explanations, generate text and offer tailored responses based on conversational context. Its extensive pre-training on a mass amount of text data (175 billion language items) empowers it with a vast comprehension of language and context. This makes it highly valuable for other applications, including those that provide support for college students with disabilities. For instance, campuses equipped with Kurzweil screen reader tools for students with visual impairments will discover that ChatGPT already offers an extension to assist this software effectively (Beckman et al., 2018). ChatGPT aligns seamlessly with the principles of UDL (Universal Design for Learning) fostering inclusivity and ensuring equitable learning experiences. Researchers have already demonstrated the potential of AI language models like ChatGPT in enhancing accessibility for individuals, with disabilities (Tajik & Ta-

jik, 2023). By offering multiple modes of representation, ChatGPT can convert written text into speech providing support to students with visual impairments or reading challenges.

Furthermore, the interactive and conversational nature of ChatGPT allows students to engage with the content in ways that align with their individual learning preferences and cognitive abilities (Sohail et al., 2023). ChatGPT is highly adaptable and responsive, providing real time support for students facing challenges like learning disabilities or ADHD. AI tools, such as ChatGPT, play a role in reshaping autonomy for students with disabilities by eliminating obstacles to the flow of information in a manner that mimics human interaction (Tajik & Tajik, 2023).

ChatGPT as a Paradigm Shift

ChatGPT represents a paradigm shift in assistive technology by distinguishing itself from existing tools offering a centralized, interactive, and adaptive platform for support. ChatGPT's underlying technology, based on advanced natural language processing, enables it to understand and respond to queries with human-like nuance. This means it can provide more personalized and context-aware assistance than many tools that are limited to predefined responses or specific functions (Roussey, 2023). For example, while a standard text-to-speech program can read text aloud, ChatGPT can rephrase complex text into simpler language or explain concepts in multiple ways, catering to individual comprehension levels.

ChatGPT is versatile and can consolidate functions that would typically require multiple specialized tools—such as dictation, reading assistance, language translation, and research aid—into a single interface. This integration reduces the cognitive load and technical barriers for students with disabilities who might otherwise have to navigate multiple programs and devices. Additionally, ChatGPT is adaptive and learns from interactions, which means it can continuously improve its support based on the user's unique needs and preferences. Unlike static tools, ChatGPT can evolve and provide students with long-term, tailored support that grows in effectiveness (Frackiewicz, 2023). Also, ChatGPT's capacity to engage in dialogue offers students the opportunity to clarify their understanding in real-time, providing a personal tutor available at any moment. This immediacy and interactivity facilitate a more engaging and effective learning process, especially for students who might require more time or different approaches to learning (Eid, 2023).

Lastly, ChatGPT can bridge gaps in existing support systems. It can guide students through administrative processes, help navigate campus resources, and even offer mental health support by providing coping strategies or directing students to appropriate services. This comprehensive support network, available 24/7, ensures that students with disabilities have equitable access to educational opportunities and resources. ChatGPT is a game changer because it brings an unprecedented level of personalized, adaptable, and comprehensive support to students with disabilities, all within a single, user-friendly platform (Roussey, 2023).

ChatGPT As Assistive Technology within the UDL Framework

ChatGPT has emerged as a technology within the framework of universal design for learning due to its versatile language processing capabilities. Being an intelligence driven language model, ChatGPT aligns well with the principles of UDL by providing multiple means of representation, action and engagement (Anderson, 2022). ChatGPT can act as a dynamic learning companion, offering personalized and interactive experiences that cater to individual learning styles and abilities. It has the ability to adapt its responses and support to meet the needs of students with disabilities ensuring they have access to course materials. Moreover, it provides ways for students to interact with the system whether through typing or using voice commands (Vasinda & Pilgrim, 2023). As a result of these capabilities campuses may need to reassess their approach towards accessibility.

ChatGPT has the capability to comprehend and respond to questions addressing each learner's inquiries and requirements. By offering guidance, resources and feedback, ChatGPT assists students in navigating challenges more effectively. Furthermore, it includes a range of accessibility features and accommodations such as themes for improved contrast visibility, adjustable font sizes and options for keyboard navigation to cater specifically to users with impairments or unique visual preferences (Cho et al., 2022). Additionally, ChatGPT is designed to be compatible with screen readers that assist students who rely on technology for accessing content (Rao et al., 2021). ChatGPT's adaptability allows it to provide alternative explanations, step-by-step instructions, and a customizable pace of communication, accommodating learner variability and cognitive abilities (Crompton & Burke, 2023). By incorporating these accessibility features ChatGPT ensures that students with disabilities can effectively engage with the system promoting inclusivity and accessibility in the learning experience.

Accessibility pertains to the intentional design and adaptation of technologies, in this case ChatGPT, to meet the diverse needs of all college students, including those with disabilities. It supports the principle that technology should not merely be usable, but should be inclusive and facilitate equitable learning opportunities (Kumar &Wideman, 2014). By leveraging ChatGPT as a universal design tool, there is an opportunity to bridge gaps in communication, comprehension, and collaboration, ensuring that students with disabilities can actively participate in and benefit from the academic experience. This approach moves beyond mere compliance to embrace a broader vision of an inclusive and beneficial education. Additionally, there are opportunities to support students who are linguistically diverse and also managing diverse learning abilities (Doran, 2015).

ChatGPT in Supporting College Students with Disabilities

ChatGPT offers several key benefits in supporting college students with disabilities. First, its ability to provide tailored assistance caters to individual needs, allowing students with diverse abilities to access highly relevant information and resources (Cho et al., 2022). Second, ChatGPT simplifies language and breaks down concepts into more manageable pieces of information. Students can ask ChatGPT to explain something to them at a lower reading level and ChatGPT will respond accordingly. It can organize ideas and even create quiz questions to enhance comprehension of material (Gilmore et al., 2017). Third, its interactive nature encourages engagement and motivation among students fostering a positive learning experience (Datchuk et al., 2015).

ChatGPT offers emotional support by being non-judgmental and empathetic towards students facing challenges. When a student shares their thoughts and emotions with ChatGPT they will receive responses that incorporate insights from therapists, educators and support systems. These inputs aim to make students feel heard and understood. Additionally, ChatGPT can suggest technologies and resources tailored to specific disabilities. This assists students in accessing accommodations and support required for their college education. All the adaptive and inclusive features of ChatGPT make significant contributions supporting students with disabilities on their academic journey.

As students develop independent learning skills, they also gain self- advocacy skills. ChatGPT empowers students to explore topics on their own and seek support as needed. It offers guidance on communicating needs to professors, seeking appropriate accommodations, and accessing support services on campus. Being able to advocate for oneself can contribute to building self-efficacy and self-confidence (Balasubramanian, 2023).

ChatGPT has shown significant potential in enhancing comprehension and understanding of content for college students with disabilities. It allows students to ask questions and seek clarification fostering a deeper understanding of content. It provides a rubric, an outline, a summary, a study guide, and various types of practice assessments. It explains a concept in multiple ways and provide examples. It can do this in multiple languages and with supports built in place. In this way, students with disabili-

ties have better opportunities for greater understanding, and an inclusive learning experience (Espulgas, 2023). For students who have difficulties with speech and language, ChatGPT is a tool for practicing communication skills. It offers a safe environment to develop and refine conversational abilities (Esplugas, 2023). This interactive tool encourages students to participate in discussions, hold conversations, ask questions and receive feedback. Students can also clarify doubts, seek assistance, and engage in dialogue at their own pace. This promotes a more accessible learning environment regardless of communication abilities. ChatGPT facilitates active involvement by offering features that encourage students to interact with course content. Students can ask multiple layers of questions and receive immediate responses or feedback for each one, which can motivate them to be more involved in their learning process. The feedback is personalized and the resources are tailored to individual interests and learning styles. With its user-friendly interface, ChatGPT empowers students to be more participatory in working towards achieving their goals (desJardins, 2014).

ChatGPT in Action: A Narrative Example

Over the summer we had the opportunity to work with a college student with identified disabilities, who shared their thoughts with us after using ChatGPT to research a paper. They said:

> I really appreciated how it could read documents out loud for me. It felt like having a conversation whenever I asked questions and received responses. I liked it so much that I ended up asking a lot of questions and had to keep track of my thoughts. When I started feeling overwhelmed by the abundance of information, I decided to ask ChatGPT to help organize our conversation. It did! It also explained concepts in more simple terms when I needed understanding. It also provided feedback on my writing by suggesting improvements or pointing out mistakes. And, it assisted me in researching a topic and creating an outline for my draft. Using ChatGPT was genuinely helpful. Made the whole process fun and interesting.

This student was working on a paper to explain how a student with autism could be successful at college. They wrote down all of the topics they wanted covered from selecting a dorm, dining hall plans, class schedules, study hours, events and activities, disability support services and many more nuanced topics. The writing was fast and furious and there were pages of content in no particular order. At one point there were 75 pages of text and a story being told in a very random fashion. We explained how ChatGPT could support this work. We began crafting prompts that would assist with this project. These are some of the prompts:

> ChatGPT, you are helping a college student write a paper about how a college student with autism can be successful on a college campus. I am going to give my list of topics and would like for you to put them in an order that tells the most cohesive story. (ChatGPT reordered the topics). Are there any topics that seem missing to make the story flow the best it can? (ChatGPT suggested two topics that would transition paragraphs in a better flow).

The student began cutting and pasting the draft into the different topic areas where they seemed to belong.

> I am going to copy some text to you and would like to know if I put it in the correct place or if it belongs under a different heading in this paper. Here is the first section: The student submits sections of the paper to ChatGPT and continues receiving feedback throughout the process for all sections.

The student had a number of phrases and catch lines they liked to use but were not really the best use of words for writing this paper. So, the student asked ChatGPT:

> Please check for awkward phrases or statements that do not make sense or are repeated.
> ChatGPT began to identify a number of different catch phrases and line that could be removed for better writing. The student went to work learning what those were and removing them. In

> the process we talked about why and I experienced my student learning about writing from ChatGPT.

At one point, the student realized they wanted to make a list of ideas for social activities on a college campus that would benefit a student with autism. The student asked ChatGPT:

> Can you please make some suggestions of activities on a college campus that would be good for students with autism and tell me why? The student began to choose a few items from the list and add them to the paper. They continued with writing about these selections and why they personally thought they were good choices.

The student still needed a summary because they weren't sure how they wanted to end the paper.

> ChatGPT, can you give me some ideas about how I could summarize this paper? ChatGPT begins to suggest a few ideas for a closing statement. Something catches my student's attention and the student begins drafting the summary. ChatGPT, I am going to copy a paper to you and ask you to review it for spelling and grammar. ChatGPT does a beautiful review of the paper. The student spends time making corrections.

We observed that this assignment was more engaging for this student compared to previous work tasks. Currently we are committed to observations around at least one university campus that is using ChatGPT. The art department is exploring how ChatGPT can replicate or explain art. The music faculty is investigating how original music can be composed. The Information Technology department is looking into the privacy and security issues related to ChatGPT on campus. Most of all, the faculty technology support center is looking into misuse of this tool by students as well as the current tools in development that will attempt to identify plagiarism. There is also a Faculty Learning Community that is exploring AI tools and how they lend themselves to pedagogy. It's too early to understand the total impact of ChatGPT on the college campus but we can certainly focus on how this tool will assist students with disabilities.

Discussion

This paper has explored the transformative potential of ChatGPT as an assistive tool for college students with disabilities, situating it within the Universal Design for Learning (UDL) framework. ChatGPT's ability to provide customized interactions aligns with the UDL's emphasis on offering multiple means of engagement, representation, and expression. This resonates with existing literature that underscores the need for educational environments to accommodate diverse learning styles and abilities (Smith et al., 2019).

The integration of ChatGPT into educational settings reflects a broader shift towards embracing assistive technologies that are flexible, responsive, and personalized. Unlike traditional assistive tools, which are often static and limited in scope, ChatGPT offers dynamic support that adapts to the evolving needs of students. This is a significant advancement over the accommodations detailed by Weiss et al. (2016), which, while essential, do not provide the same level of interactivity and adaptability. ChatGPT can mitigate some of the limitations of current assistive technologies. For example, while screen readers and text-to-speech software facilitate access to written content, they do not offer the nuanced comprehension support that ChatGPT does, such as simplifying complex texts or providing explanations in multiple forms. In this way, ChatGPT's capabilities go beyond mere accessibility, promoting deeper understanding and engagement with academic materials, a key component of UDL (Rose & Meyer, 2002). The AI's non-judgmental and responsive communication style provides emotional support and fosters a sense of agency among students, which is crucial for their academic and personal growth. This finding echoes the benefits of assistive technologies discussed by Mazzotti et al. (2023), emphasizing the importance of student-centered educational practices.

The narrative example presented in Section 5 illustrates ChatGPT's impact on a student with autism, showcasing the AI's capacity to assist with research, organization of ideas, and writing processes. This practical example aligns with the theoretical advantages of AI in education posited by Anderson (2022) and demonstrates how ChatGPT can serve as an effective complement to human support systems. However, the integration of AI-driven tools in education also raises other considerations, such as the potential for over-reliance and the need to maintain academic integrity. The challenge lies in balancing the use of ChatGPT as a supportive tool while ensuring it enhances, rather than replaces, traditional learning and teaching methods. In light of the narrative and evidence presented, the implications of ChatGPT's role in education are profound. It offers a new dimension of support for students with disabilities, one that is in harmony with the goals of UDL and existing accommodations. As universities continue to navigate the evolving landscape of assistive technology, it will be critical to monitor the long-term effects of AI tools like ChatGPT on student learning outcomes and independence.

Ethical Considerations in the Use of AI Technologies in Education

Ethical considerations and limitations come into play as AI technologies like ChatGPT become more integrated in settings. Addressing ethical concerns involves dealing with issues such as data collection and storage, particularly regarding students with disabilities and their interactions with ChatGPT. It's important to ensure that AI tools like ChatGPT don't replace human interactions and support but rather enhance existing services (OpenAI, 2021). ChatGPT does have its limitations which includes fully understanding gender, cultural and disability biases. The training data used for generating responses may not always be of great quality or quantity leaving the possibility that the responses may be biased or have limited perspective. ChatGPT4 strives to reduce these biases by being larger in scope and scale and taking user feedback into consideration. In specialized subjects there is also a chance of producing misleading information. While ChatGPT strives to hold human conversations to the best of its ability it may still have limitations in intelligence when providing empathetic support. It's crucial to recognize and acknowledge these limitations (Fuchs, 2023).

Responsible Use

To ensure proper use and provide support for users incorporating ChatGPT as an assistive technology tool requires certain measures. Universities should offer training and guidance to both students and educators on how to effectively use ChatGPT to enhance the learning experience (Tajik & Tajik, 2023). This training should cover discussions about ChatGPTs capabilities, limitations and ethical considerations. Training should also include the pedagogical approach to using ChatGPT within the UDL framework in addition to the technical aspects of using the tool. Additionally, establishing guidelines for usage of ChatGPT within educational settings can help ensure that students view it as a supplementary tool rather than a replacement for human assistance (OpenAI, 2021). Creating an accessible environment is crucial in maximizing the benefits of using ChatGPT as a UDL tool. Input from students about their needs and experiences using ChatGPT within the UDL framework should also be an important part of the training experience (Rao et al., 2021).

Future Directions and Conclusion

Future research should focus on the longitudinal impact of ChatGPT on students with disabilities, investigating how its use affects their academic success, self-efficacy, and transition into the workforce. Studies should consider the perspectives of faculty and disability service providers to understand how ChatGPT can be integrated into holistic support strategies that align with the overarching goals of UDL.

ChatGPT holds significant promise as a valuable UDL tool for college students with disabilities.

Its ability to enhance understanding of academic content, facilitate effective communication and interaction, promote engagement in learning, and support independent learning and self-advocacy skills makes it an incredibly powerful and adaptable resource (Vasinda & Pilgrim, 2023). The convergence of UDL and ChatGPT makes for an important learning experience for students with disabilities, addressing the diverse needs of all students, while ensuring inclusivity and accessibility (Rao et al., 2021). Further research should delve into areas of improving natural language understanding, enhancing personalized support, and developing AI-driven interventions tailored to specific disabilities. Additionally, studies on the impact of ChatGPT on learning outcomes and student engagement can provide valuable insights into its effectiveness as an assistive technology tool (Zhang & Walcott, 2016).

Presently, ChatGPT can transform the way information is conveyed because it has the capability to convert text-based content into spoken words using text-to-speech technology, benefiting students with diverse learning abilities. Additionally, ChatGPT can simplify complex concepts, which can aid students in understanding intricate subject matter. By providing tailored explanations and breaking down ideas into more understandable terms, ChatGPT aligns with UDL principles to ensure information is accessible to all. For those who struggle with traditional writing or speech, ChatGPT can be used as an alternative means of communication through text-based interactions or voice commands. This supports the UDL concept of offering multiple avenues for students to express their understanding and engage with the learning process (Frackiewicz, 2023). ChatGPT provides an online and customizable platform, which can mitigate noise and lighting issues that arise and act as distractors in some typical college learning environments. Timing and scheduling are also important considerations especially for those students who may need additional time or other flexibility. ChatGPT can cater to individual schedules and even provide clarity of assignments during preferred working and studying time.

ChatGPT's ability to accommodate various modes of information presentation, response methods, and environmental settings aligns seamlessly with the principles of UDL. By leveraging ChatGPT, colleges and universities can better establish inclusive and equitable learning environments for students with disabilities. As this technology continues to evolve, we may experience a complete paradigm shift in how students with disabilities access and receive higher education. The ultimate aim for all students with disabilities is to achieve academic success and to lead successful, productive, fulfilling, autonomous lives (Fuchs, 2023).

Supplement: Provide Support to College Students with Disabilities

ChatGPT's brings transformation to the learning experience of students with disabilities in ways that are fundamentally distinct from the experience of students without disabilities. The key lies in customization and the level of interactive support that can be constantly tailored to the unique challenges faced by students with disabilities (Smith et al., 2019).

For students with disabilities, accessibility and accommodation are not mere conveniences; they are essential for leveling the educational playing field (Weiss et al., 2016). ChatGPT can provide real-time, adaptive assistance that aligns precisely with the varied and specific needs of these students. For example, when a student with a visual impairment requests text-to-speech support, ChatGPT's response is not just a robotic reading of the text but an intelligent auditory delivery that can emphasize, rephrase, or explain as needed (Beckman et al., 2018).

Furthermore, the nuanced understanding and response generation capabilities of ChatGPT make it possible to handle complex queries related to accommodations and modifications, such as breaking down assignments into manageable steps or providing alternative explanations. Modifications and adaptations can be crucial for students with cognitive disabilities, who may require multiple forms of representation to understand the same concept (Rose & Meyer, 2002).

For students with autism, the ability to simulate social interactions in a controlled and patient manner allows them to practice and develop social skills without the pressure of real-time human judgment (Tajik & Tajik, 2023). This aspect of ChatGPT is differentiated from the support that might be used by students without disabilities, who may not require the same level of repetitive practice or step-by-step breakdown of social cues.

The capacity of ChatGPT to assist with time management and organization can be a game changer for students with attention-related disabilities or executive functioning challenges (Balfe & Trepagnier, 2019). While non-disabled students may find generic organizational tools sufficient, those with disabilities can benefit from the personalized scheduling and reminder systems that ChatGPT can provide, which take into account their particular pace of work and processing.

The provision of emotional support by ChatGPT can also be particularly beneficial for students with disabilities who may feel isolated due to their challenges. While non-disabled students may use ChatGPT for quick informational queries, students with disabilities can engage with it for longer, more meaningful conversations to receive encouragement and strategies for managing stress and anxiety (Nieminen & Pesonen, 2022).

In essence, while ChatGPT serves as a multifunctional tool for all students, it functions as a lifeline for students with disabilities, offering them a degree of independence and self-determination in their educational journey that they might not otherwise have (Mazzotti et al., 2023). Its ability to offer support that is both comprehensive and deeply personalized makes it a game changer in the landscape of assistive technologies (Roussey, 2023).

The following is a sample resource of how ChatGPT can be used to support college students with disabilities including a suggested prompt list. The support topics were selected by doing a thorough review of categories typically supported in a disability services office on a college campus (Deckoff-Jone & Duell, 2018). The rationale for each topic was established by actually using ChatGPT to address each of the categories and seeing how it could provide support. The prompts were developed by reading through many resources on how to best prompt ChatGPT and determining at least one clear directive as a suggestion for the reader to get started (Vasinda & Pilgrim, 2023).

Support Topic	Rationale	Student Sample Prompt
Academic Advising	ChatGPT can provide academic advising by offering guidance on course selection, degree requirements, and career pathways, considering individual needs and accommodations. It can also provide information on support services available on specific campuses.	"Hey ChatGPT, I'm a student in need of some academic advising guidance. Can you help me understand course selection, degree requirements, and any general support services that universities typically offer?"
Accessibility Features	ChatGPT can be designed with accessibility features such as high contrast themes, adjustable font sizes, keyboard navigation options, and compatibility with screen readers. These features can enhance usability for interacting with ChatGPT more effectively.	"Hey ChatGPT, does your platform offer accessibility features? I'm looking for things like high contrast themes, adjustable font sizes, keyboard navigation, and compatibility with screen readers. Can you help with this?"
Accessibility	ChatGPT can recommend and provide information on accessibility resources available on a campus or online. This can include accessible and assistive technologies, specialized software, support systems, or disability services.	"Hey ChatGPT, I'm trying to find accessibility resources available on my campus and online. Can you recommend any assistive technologies, specialized software, or support systems? Also, do you have information about disability services?"
Accomodations and Modifications	ChatGPT can adapt its responses to individual needs, such as providing alternative explanations, offering step-by-step instructions, or adjusting the pace of communication to cater to different learning styles. Providing multiple means of representation and alternative explanations can enhance comprehension for students with diverse learning needs such as attention-related disabilities, allowing students to better engage and process information.	"Hey ChatGPT, I'm struggling with understanding this. Can you give me an alternative explanation or step-by-step instructions? Can you explain this to me in a few different ways?"
Career and Transition Planning	ChatGPT can assist with career exploration and transition planning. It can provide information about different careers, educational pathways, vocational training, and available resources for decision making for the future.	"Hey ChatGPT, I'm currently exploring potential career paths. Can you help me understand different careers, educational pathways, vocational training options, and any resources that might guide my decisions?"

Clarifying Instructions	Students with certain disabilities, such as attention deficit hyperactivity disorder (ADHD) or autism spectrum disorder (ASD), may require additional clarification or repetition of instructions. ChatGPT can provide clear and concise instructions, repeat information when necessary and answer questions related to assignments or tasks.	"Hey ChatGPT, I'm a bit confused about my assignment. Can you give me clear and concise instructions, and if I still don't understand something, can you repeat or clarify it for me?"
Collaboration and Communication	ChatGPT can facilitate collaboration and communication among students, including those with disabilities, by providing a platform for discussion, brainstorming, or sharing ideas. It can act as a virtual intermediary to enhance interactions and promote inclusivity. By using ChatGPT as a communication tool, students can engage in group discussions, seek peer feedback, and collaborate on projects, creating a sense of community and collective learning.	"Hey ChatGPT, I'm looking to collaborate with my study group, which includes some peers with disabilities. Can you help facilitate our discussions, brainstorming sessions, or idea sharing?"
Exam Preparation and Study Assistance	ChatGPT can assist in preparing for exams or studying by providing relevant information, reviewing concepts, offering practice questions, and providing feedback on answers. This can help students reinforce their understanding of particular subject matter and potentially improve their performance.	"Hey ChatGPT, I have an upcoming exam and could use some help. Can you provide information on the topic, review key concepts with me, and maybe offer some practice questions? I'd also appreciate feedback on my answers to make sure I'm on the right track."
Language and Communication Skills	For students with speech and language disabilities, ChatGPT can act as a tool for practicing communication skills. It can engage in conversations, provide language models, and offer feedback on pronunciation, vocabulary, or grammar.	"Hey ChatGPT, I'm looking to practice my communication skills. Can you have a conversation with me and provide guidance on my pronunciation, vocabulary, and grammar?"
Personalized Assistance	ChatGPT can understand unique needs and challenges and offer tailored advice, guidance, and support to empower students to overcome barriers, make progress, and achieve academic goals.	"Hey ChatGPT, I need some advice on how to reach my academic goals? If I tell you about my struggles, can you help me figure out how to make progress?

Research Support	ChatGPT can aid in conducting research for assignments, projects, or papers. It can provide guidance on research methodologies, suggest relevant sources, help refine research questions, and offer assistance in organizing and structuring research materials. It can discuss topics and sort through articles; even help with annotation and summaries.	"Hey ChatGPT, I'm working on a research project for one of my classes. Can you help me with research methodologies, and maybe recommend some sources, and assist me in refining my research questions? I also need help with organizing my work, annotations and summaries of articles."
Resource Recommendations	ChatGPT can suggest appropriate resources, tools, or technologies such as specialized software, assistive devices, or online platforms designed for specific needs.	"Hey ChatGPT, I'm looking for resources and tools tailored to some specific needs I have. Can you recommend any specialized software, assistive devices, or online platforms that might be helpful for me?"
Simplified Language	A user can ask ChatGPT to use simpler language or break down complex concepts into more understandable terms. This can benefit students with learning difficulties, dyslexia or language processing disorders who may struggle with complex language or concepts.	"Hey ChatGPT, san you use simpler language or break this down for me to make it more understandable?" Can you try again and break it down even more?"
Social Skills Development	For students with certain disabilities, such as autism spectrum disorder or social communication challenges, ChatGPT can simulate social interactions, provide guidance on social cues, and offer opportunities for practicing social scenarios in a safe and non-judgmental environment.	"Hey ChatGPT, I have some challenges related to autism and social communication. Can you help me practice social interactions and social cues? Can we try a few social scenarios?"
Subject-Specific Support	ChatGPT can offer subject-specific support across various disciplines. It can provide explanations, examples, and resources tailored to specific subjects, helping students grasp and apply concepts more effectively.	"Hey ChatGPT, I'm having a bit of trouble with my "chemistry" class. Can you provide some explanations, examples, and resources related to "this specific" topic? Can you suggest how I can try to apply this concept?"
Text-to-Speech (TTS) Support	ChatGPT can convert its responses into spoken words using text-to-speech technology (TTS). This feature can help students with visual impairments or reading difficulties have auditory access to responses instead of relying on visual access. TTS enables students to access information and engage in conversations more effectively.	"Hey ChatGPT, I am visually impaired. Can you use text-to-speech technology to convert your responses into spoken words for me? It would be much easier for me to access information and converse with you that way."

Time Management and Organization	Students with disabilities, such as attention-related disorders or executive functioning difficulties, may struggle with time management and organization. ChatGPT can provide reminders, tips, and strategies for managing time effectively, setting goals, staying organized, scheduling tasks, prioritizing assignments, managing deadlines, and creating study plans.	"Hey ChatGPT, can you give me tips on organizing my work assignments? Can you help create a manageable schedule? I need help prioritizing my assignments and deadlines. I might need a study plan. Can you help?"
Writing Assistance	ChatGPT can act as a writing assistant. It can provide grammar and spelling suggestions, help with sentence structure, offer ideas for essay topics, and provide feedback on writing samples, supporting students in improving their writing skills.	"Hey ChatGPT, I'm working on a writing assignment. Can you suggest some essay topics? When I have a draft, can you help edit for grammar and spelling and give feedback on my paper?
Academic Support	ChatGPT can provide academic assistance tailored to the needs of students with autism by offering explanations, clarifying instructions, and providing additional examples or visual aids to enhance understanding. It can also help with organizing assignments, breaking down complex tasks, and developing effective study strategies.	"Hey ChatGPT, I have an assignment on "topic." Can you clarify the assignment for me and provide some visual aids for me to understand it better. And can you break the assignment down into manageable steps for me with a timeline?"
Autism	Some individuals with autism thrive on routines and schedules. ChatGPT can assist college students in creating and managing their routines and schedules by providing reminders, time management strategies, and organizational tips to help students structure their day and manage their academic and personal tasks effectively.	"Hey ChatGPT, can you help me create and manage my college routine? I'd appreciate strategies for managing my time, and any practical organizational to help me juggle both my academic and personal tasks. I'll give you my current schedule of classes and activities."
Emotional Support	College life can be emotionally challenging for students, including those with autism. ChatGPT can offer emotional support by providing a safe and non-judgmental caring experience. It can listen to students' concerns, offer encouragement, and provide strategies for managing stress, anxiety, or social difficulties.	"Hey ChatGPT, I'm feeling really stressed and anxious here at school. I don't have any real friends yet and I am overwhelmed by my dorm and all the noise. Can you talk to me?"

Self-Advocacy Skills	ChatGPT can assist college students with autism in developing self-advocacy skills by providing guidance on how to communicate their needs to professors, seek appropriate accommodations, and access support services on campus.	"Hey ChatGPT, I'm a college student with autism, and I'm trying to get better at advocating for myself. Can you explain how to ask my professors for accommodations, and how to find and access the support services available on "this" campus?"
Sensory Support	Sensory sensitivities are common among individuals with autism. ChatGPT can provide advice and strategies to manage sensory overload on campus. It can suggest coping mechanisms, such as finding quiet spaces, using noise-cancelling headphones, or developing sensory toolkits to help students regulate their sensory experiences.	"Hey ChatGPT, I have autism. Do you have any advice or strategies to help me manage sensory overload? I need coping mechanisms like finding quiet places and regulating my sensory experiences?"
Transition Support	Transitioning to college life can be challenging for students, including individuals with autism. ChatGPT can offer guidance and support during this transition period. It can provide information on campus resources, assist in understanding college expectations and norms, and help students navigate the social and academic aspects of college life.	"Hey ChatGPT, I'm just starting college and I have autism. The transition is a little challenging. Can you help me find campus resources here at "this college" and tell me what is expected academically and socially?"
Accommodations and Accessibility	ChatGPT can provide options for simplified language, visual aids, or alternative formats to enhance comprehension and accessibility. Additionally, it can provide text-to-speech functionality for students with learning disabilities who may benefit from auditory reinforcement.	"Hey ChatGPT, I have a learning disability. Can you explain this "idea" in an easier way, perhaps with visual aids or in a different format? Also, do you have a text-to-speech feature I can use?"
Assistive Technology Recommendations	ChatGPT can recommend and provide information on assistive technologies or software that can benefit students with learning disabilities. It can suggest tools for speech-to-text, text-to-speech, mind mapping, or organizational purposes, helping students access resources that can support their specific learning needs.	"Hey ChatGPT, I have a learning disability and I'm looking for assistive technologies or software that might help me. Can you recommend any good tools like speech-to-text, text-to-speech, or mind mapping?

Clarifying Concepts and Instructions	Students with learning disabilities may struggle with understanding complex concepts or instructions. ChatGPT can provide simplified explanations, offer examples, or provide visual representations to enhance understanding. It can break down information into smaller, more digestible parts to support comprehension.	"ChatGPT, can you break down this information for me in an easier way? Can you show me some graphics and give me specific steps to follow for the assignment?
Individualized Learning Plans	ChatGPT can assist in developing individualized learning plans for college students with learning disabilities. It can work with students to identify their specific needs, set goals, and create strategies to address challenges. It can also provide ongoing support and monitoring to help students stay on track with their personalized learning plans.	"ChatGPT, I'm a college student with a learning disability and I need help creating an individualized learning plan. Can you assist me in setting up goals and steps, and creating a check-in system to make sure I'm staying on track?"
Reinforcement and Practice	ChatGPT can offer practice questions, quizzes, and interactive activities to reinforce learning and provide opportunities for students to apply their knowledge.	"ChatGPT, I have a learning disability and need some additional practice for studying. Can you create practice questions, quizzes, or interactive activities related to my topic so I can study better?"
Study Strategies and Techniques	ChatGPT can assist college students with learning disabilities in developing effective study strategies such as note-taking methods, memory aids, organization techniques, and time management skills. It can also offer suggestions for breaking down complex tasks into manageable steps.	"ChatGPT, can you help me with study strategies like note-taking, remembering things, and organizing techniques? I'd also like to learn about breaking down complex tasks into smaller steps."
Visual Aids	ChatGPT can incorporate visual aids, such as images, diagrams, or charts, to enhance understanding. Visual representations can help students with learning disabilities grasp concepts more effectively to reinforce learning.	"ChatGPT, can you use visual aids like images, diagrams, or charts to help me understand this concept better? Maybe even it bring it down two grade levels until I understand."

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