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Universal Design Online and Students on the Autism Spectrum: Is It a Match?

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Abstract: Online education provides a way for young adults to attend postsecondary courses when they might not otherwise have those opportunities due to location, timing, or other circumstances. For individuals on the autism spectrum, or those with autism spectrum disorder (ASD), the online environment in general allows for unique opportunities for engagement while removing some of the distractions associated with face-to-face interactions. However, little has been done to explore the online learning environment, in particular, as it pertains to college students with ASD. Additionally, while online coursework moves to incorporate principles of inclusivity for students with disabilities using Universal Design frameworks, little has been done to see how or if these adjustments apply in particular to college students with ASD. This study seeks to explore these issues through a qualitative research synthesis, analyzing themes from strategically selected descriptive studies deductively by UDL principle. Conclusions are drawn based on what is currently known about online learning for college students with ASD, and how, or if, principles of UDL are currently being incorporated to facilitate their educational experiences.
Keywords: UDL,Universal Design, autism, college student

Introduction

Online education provides a way for young adults to attend postsecondary courses when they might not otherwise have those opportunities due to location, timing, or other circumstances. For individuals on the autism spectrum, or those with autism spectrum disorder (ASD), the online environment in general allows for unique opportunities for engagement while removing some of the distractions associated with face-to-face interactions. However, little has been done to explore the online learning environment, in particular, as it pertains to college students with ASD. Additionally, while online coursework moves to incorporate principles of inclusivity for students with disabilities using Universal Design frameworks, little has been done to see how or if these adjustments apply in particular to college students with ASD. This study seeks to explore these issues, using the following research question:

1. How does the literature about young adults with autism in the online learning environment compare to the three principles of Universal Design for Learning (UDL)?

To address this question, this study conducts a qualitative research synthesis, analyzing themes from strategically selected descriptive studies deductively by UDL principle. Conclusions are drawn based on what is currently known about online learning for college students with ASD, and how, or if, principles of UDL are currently being incorporated to facilitate their educational experiences.

Background

Research on the online experiences of young adults with autism, college students with autism in the classroom, and the principles of Universal Design for Learning are all useful in framing this study. These three main areas provide important context for this study when combined.

Young Adults with Autism Online

Though features of autism manifest differently in every person, some diagnostic characteristics include deficits in social communication and social interaction, along with sensitivities toward sensory aspects of the physical environment (American Psychiatric Association, 2013). It is perhaps no surprise then that young adults with ASD might find comfort in the online environment, where communication can occur without some of the additional stimuli. Individuals with ASD use the internet to connect and interact, and online forums have even been shown to provide members of this population with a strong sense of community (Anderson, 2016; Davidson, 2008;

Giles, 2014). Far from avoiding opportunities for communication, young adults with ASD often crave interaction. The internet, as an alternate or supplement to face-to-face communication, has provided these young adults with a potentially more conducive source for interaction with their peers.

Though little work has been done to investigate the online learning environment for young adults and college students on the autism spectrum, some blog posts and popular articles exist to support this idea as well (Rich, 2018). Online coursework has been suggested as a viable alternative to the traditional face-to-face classroom for children on the autism spectrum, with suggested benefits including an "escape" from sensory distractions as students can log in from in a controlled home environment (Southall, 2013).

College Students with Autism

Though exact numbers are unknown, it is possible that up to 1.9 percent of college students enrolled in the U.S. are on the autism spectrum (White, Ollendick, & Bray, 2011). While there are some targeted programs at individual colleges and universities, students with ASD largely enroll in inclusive classes just like their neurotypical, or those who do not have ASD, peers. Within the classroom, the burden is on the student to enroll in disability supports and inform their instructors at the start of each semester about their need for accommodations. What's more, students with ASD might not be registered for services through their disability support offices for multiple reasons. First, not all individuals who are on the spectrum receive a diagnosis, though displaying common traits. Additionally, some who do have an official diagnosis might simply not register for accommodations due to perceived barriers, not wanting to disclose, or a decision to not self-identify (Hart, Grigal, & Weir, 2010). And finally, characteristics of ASD are often vastly different than those exhibited by other students in need of support – that is, students with ASD might excel academically but require more guidance navigating social situations, for example – such that the traditional services provided by a campus' disability center might not even be applicable (Fleischer, 2012; Gelbar, Smith, & Reichow, 2014; Gobbo & Shmulsky, 2012; Hart et al., 2010). There is a clear need for inclusive support for non-diagnosed, or non-registered, students with ASD on college campuses (Hart et al., 2010; Jobe & White, 2007).

Universal Design for Learning

As many students with ASD are not registered for individual support services, it is even more important that educational opportunities are designed to be as universally accessible as possible, thus eliminating some, if perhaps not all, barriers to access. One approach that has been adopted for broad accessibility in education is Universal Design for Learning (UDL). This concept grew from the broader framework of Universal Design, which developed to create products and environments "to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (NCSU, 1997, n.p.). UDL maintains that course designers should address the "why," "how," and "what" of learning by providing multiple means and options within the following three broad themes: engagement; representation; and action and expression (CAST, 2018).

Applying Universal Design principles to learning or instruction does not, despite the name, mean that every student's needs are addressed "universally." Some students will still require more specific accommodations, with one example given that even with UD principles in action, a student who is deaf would still need a sign language interpreter (Burgstahler, 2015). However, "applying universal design concepts in course planning ensures full access to the content for most students and minimizes the need for special accommodations" (Burgstahler, 2015, para. 11)

Principles of Universal Design may be used in online education to focus on providing equal access to course content and materials (cite). In this framework, instead of relying in totality on a disability services office to provide specialized, individual accommodations, course materials and content are built to benefit learners "of all learning modalities without adaptation or retrofitting" (Dell, Dell, & Blackwell, 2015, p. 172). Students in the United States are required to take much of the initiative to receive targeted services through their campus disability offices; incorporating the principles of UDL into courses, both face-to-face and online, helps to relieve some of that burden by making courses more universally accessible.

Methods

This study builds upon on what is known about the population of young adults with autism, including their engagement online as well as the use of, or potential for, UDL in online college courses. To address and answer this study's research question, a systematic literature review was undertaken. First, a database search was conducted to collect all available empirical evidence, within a defined range, about how three major themes interact: online education, college students with autism, and UDL.

Within the ERIC database from the researcher's online university library, a search was done to capture literature related to online education for individuals with autism. Inclusion criteria is as follows.

Regarding online education, the researcher sought to include all literature about e-learning and online education for members of this population, as current examples are so few. As such, there was no differentiation between asynchronous or synchronous content delivery. Similarly, all e-learning environments were included, whether hybrid courses with some online elements incorporated into traditional classrooms, or those that were exclusively online. If more work had been done in this area, there would be the potential to further narrow down the selection criteria, but this was not possible given the current body of literature.

Regarding the population studied, the research sought to include just studies about teenagers, young adults, and adults with autism as they engaged in the online learning environment. Many studies focus on children with ASD; a smaller, but growing number exist that explore the lived experiences of young adults and adults on the autism spectrum. This study only sought to analyze literature about those who have already been successful in secondary education and are either prepared for, or experiencing, postsecondary opportunities.

To account for these parameters, the search terms used were: online learning OR online education OR elearning OR e learning OR elearn OR e learn AND autism. Results were limited to those which were full text, peer reviewed, and published within the last 10 years of 2008 – December, 2018 (the time of data collection) to ensure more current practices were being captured. Sixteen articles were returned. After careful review, articles were removed which despite a search term match, were determined to be irrelevant to this study as they did not discuss any intersection of the themes of college students with ASD and online education. Due to the overall lack of narrow information in the area, the researcher left for inclusion articles which discussed teenagers with ASD without intellectual impairment, and non-degree seeking college students with ASD. The articles remaining, and included for analysis, were the following qualitative studies:

- Meyers, C. A., & Bagnall, R. G. (2015). A Case Study of an Adult Learner with ASD and ADHD in an Undergraduate Online Learning Environment. Australasian Journal of Educational Technology, 31(2), 208–219.

- Ohrstrom, P. (2011). Helping Autism-Diagnosed Teenagers Navigate and Develop Socially Using E-Learning Based on Mobile Persuasion. International Review of Research in Open and Distance Learning, 12(4), 54–71.

- Politis, Y., Olivia, L., Olivia, T., & Sung, C. (2017). Involving People with Autism in Development of Virtual World for Provision of Skills Training. International Journal of E-Learning & Distance Education, 32(2).

To answer the research question, these results of the search were analyzed to better understand what the literature says about online education for college students with ASD and how the principles of UDL are either explicitly or implicitly described within this context, if described at all. Results were coded deductively based on principles of UDL, as follows:

1.   Multiple means of representation, to provide options for perception; language and symbols, and comprehension.
2.   Multiple means of action and expression, to provide options for physical action; expression and communication, and executive functions.
3.   Multiple means of engagement, to provide options for recruiting interest; sustaining effort and persistence, and self regulation (CAST, 2018)

Finally, only the papers' original material was coded, so literature reviews, abstracts, and other background information were not included for analysis.

Findings

Though none of the papers explicitly address them, themes from all three of the broad UDL principles could be mapped onto the content from these papers. This section details the findings collectively drawn from the papers analyzed, organized by UDL principle. Some themes from the papers fit within multiple UDL principles, as are noted.

Multiple Means of Representation

Across the papers, the most common UDL theme that could be mapped was "multiple means of representation," which is broken down by providing options for perception, language and symbols, and comprehension. The major findings in this theme include the idea of needing context to enable comprehension as well as individualization in design elements.

One learner with autism described challenges with comprehension due to lack of context or direction provided by an instructor. Other issues with context were described as such: "Contextual disorientation takes the form of being at a loss in determining value or validity. It arose from difficulty in placing hypermedia-based resources in context: of facing multiple opportunities in attributing value, relevance, or validity to these resources" (Meyers & Bagnall, 2015, p. 212). This user found himself struggling when not allowed to see the bigger picture of the content or lesson, so he created his own systems to place the information in context. Options existed for that strategy, but it was one that he had to create and implement due to need, when it could and should have been scaffolded for him by a knowledgeable instructor or course designer.

Data coded for individualization in design elements ranged from simply not finding the color scheme appealing to being overwhelmed by the organization of links and content on a page. For example, based on their findings, one researcher concluded that: "It is generally believed that the HANDS software will only be accepted by the teenager with autism if it has been individually designed and personalized" (Ohrstron, 2011, p. 62). Similarly, researchers noted the benefit to using multiple formats to represent content in the same lesson: "The three formats represent to users teaching, showing and practicing, respectively, and thus they can all contribute to the learning process in different ways" (Politis et al., 2017, p. 9).

Multiple means of Action and Expression

In the area of action and expression, multiple themes emerged. Regarding physical action, participants in the online environment described challenges with navigating space and moving around as an avatar. In describing their own action in initiating communication or expressing themselves, participants appreciated having the opportunity to reach out and communicate with a "chatbot," which also allowed for practicing social skills (Politis et al., 2017); students also requested additional opportunities to contact "knowledgeable" people such as instructors (Meyers & Bagmall, 2015).

Notably, and going against the general assumption of UDL for providing multiple options, this analysis found that executive functioning suffered when participants were provided with many options: "weak central coherence and impaired executive function have been associated with deficits in the ability to respond to multiple opportunities in the learning environment" (Meyers & Bagnall, 2015, p. 216). Concentration, a facet of executive functioning, also suffered in the virtual environment according to this same participant and this person attributed this to lack of opportunity to talk with an actual person (Meyers & Bagnall, 2015).

Multiple Means of Engagement

Other instances within the papers could be mapped onto the third and final broad UDL theme of "multiple means of engagement." Related within this principle, participants with ASD described more of a need than a currently occurring situation. That is, they described having lack of direction from an instructor, and a need for more scaffolding of material to spark their interest and foster opportunities for engagement. Of particular interest was one student with ASD who described the need for more engagement from an instructor to help "mitigate both contextual and procedural disorientation" (Meyers and Bagnall, 2015, p. 217). Additionally, too many options was listed as one reason why a student actually chose not to persist, and instead needed to receive technical assistance in navigating a course enrollment system.

Individualizing services fell under this theme, with researchers suggesting students retain interest and persist when tech tools were customized to their specifications. Though this was only hinted and not directly stated by the students themselves, this idea drove the participatory nature of two of the studies, and one notes: "It is imperative, when designing a virtual environment, that we get the users' views on how they want the VW to look, feel and work, because the strongest motivating factor for them is an enhanced, more enjoyable experience" (Politis et al., 2017, p. 9). Virtual reality as a whole was described as being particularly suited to drawing engagement, as "it can be delivered remotely from anywhere and the user can undertake the training at their own pace" (Politis et al.2017, p. 13).

Discussion

Perhaps the most striking finding from this study was the lack of research done in this area as a whole. When so few results were returned via the strategic keyword search, multiple other searches took place across other databases specifically focused on autism research to understand if something was simply being missed. Unfortunately, it was not. There is always the possibility more literature does exist about this topic, but is potentially not indexed or made easily accessible to interested researchers and practitioners.

Despite the lack of literature for study, some themes within the principles of UDL still emerged across papers. In particular, the concept of communication, in various forms and for various purposes, was a recurring theme that could be codified across UDL principles throughout.

Communication

Differences in social communication styles are a common characteristic that manifests in individuals with ASD; communication face-to-face leads to issues with difficulties in making eye contact, and understanding or interpreting body language and social cues among other differences (Muller, Schuler, & Yates, 2008) One might assume that online education could provide an escape from communication stressors for these students. Indeed, one of the most prominent subthemes to emerge, which could be coded at multiple UDL principles, was in regard to communication. But, far from wanting to avoid communication by retreating to an online environment, autistic individuals sought it out for guidance during their processes. Learners wanted options for communication themselves, which aligns with the UDL principle for "Multiple Means of Action and Expression;" this was particularly clear with those who appreciated interaction with the "chatbot" (Politis et al., 2017). Learners also wanted guidance and communication from instructors and tech support. This idea aligns with multiple UDL subthemes, though perhaps most clearly aligns with providing scaffolding and guiding information processing, as through "Multiple Means of Representation."

It is not fair to say that individuals with ASD do not want to communicate; instead, their communication styles might differ from what a neurotypical person might expect or demonstrate him or herself. It seems that online education could provide an alternate setting for communication, recognizing that avoidance of it in entirety is not what members of this population value. These findings demonstrate that they perhaps value the opportunity for options in communication, both for expressing themselves and in receiving guidance, scaffolding, and feedback, most of all.

Structured Versus Unstructured Options

One of the key tenets of Universal Design is in providing options for use and access. Each of the three themes is set up in the format "multiple means of… to provide options for…" (CAST, 2018, n.p.). This framework is important to ensure that all learners have the ability to experience their educational experience in the way that most aptly fits their needs. However, for a student with autism, more options could prove to be overwhelming. Planning, organizing, and determining what is important are cognitive processes which can be described as executive functioning; in adults with ASD, with or without an intellectual disability, executive functioning has been found to be an area of deficit (Wallace, Kenworth, Pugliese, Popal, White, & Martin, 2016).

When options were provided in the papers examined for this study, learners did not always respond positively. Too many options, without good scaffolding and guidance provided by course designers or instructors, seems to lead to confusion. For one learner, too many options while navigating course links led to a circular pattern, with no clear direction or sense of the path he needed to take to accomplish course goals. An instructor cannot simply provide all options and expect a learner to choose the best approach. Instead, there needs to be clear direction about how to choose, and what might make one option a better fit than another.

Options and opportunities are necessary, but it is the role of the instructor, professor, or course designers to facilitate the decision-making process. Again, this connects back to the idea of communication, in this case as initiated by the course leader.

Individualized Approaches

Notable, even in what should be inclusive spaces, learners with ASD still often preferred an individualized approach. This does not necessarily go against the broad themes of UDL per se, but instead leads to the suggestion that, again, options be provided within structure and with the opportunity for communication and support. Incorporating the principles of UDL will make online classes more inclusive and accessible in the general sense, but it is important to also provide opportunities for individualized supports as needed, wanted, or simply preferred. A personalized approach in the higher education environment has previously been advocated for by members of this population (Van Hees, Moyson, & Roeyers, 2014), and would likely be appreciated online as well.

Implications for Practice

Though consistently and strategically providing multiple options is a theme across UDL principles, this study found that doing so can also lead to decreased ability for executive functioning. This is not to suggest that removing options is the correct approach; instead, clearly describing options and reasons for utilizing each might give learners with ASD the structure they need to successfully navigate these online learning environments. Options without context or structure are overwhelming for any learner, and would be in particular for those on the autism spectrum. In considering the communication needs and the findings from this analysis, online course designers would do well to build in structured opportunities for communication, in multiple formats, between student and instructor or course support.

Implications for Research

Perhaps the most important finding in this study is just how little empirical data there is that focuses on online education and college students with autism. More work needs to be done to grow our collective knowledge about higher education online education practices and the students with autism who engage with e-learning. Given the prevalence of college students with ASD, and the ongoing movement toward providing coursework through the online environment, it is safe to assume that students with ASD are already in our online classrooms. These students might appreciate the experience, and might benefit from alternatives to the face-to-face classroom; however, at this point, there is no concrete evidence to support that online education as is currently being implemented is a conducive learning environment for them.

More work should also be done to explore the synergy between UDL along with targeted supports. If an online course is structured and facilitated using the principles of UDL, what opportunities are there to also provide individualized support when needed or even wanted? It is clear from this study that simply offering options is not enough to provide the highest level of support for college students with ASD. Future studies should examine the gaps there, and how scaffolding, communication, and opportunities for individualized services might interact within an online environment based in UDL.

Conclusions

Given the scarcity of research and collective knowledge in this area, no concrete conclusions can be drawn about the intersection of online education, UDL, and college students with autism. Multiple themes, as coded within the principles of UDL, do provide some clarity about how students with ASD experience online education, and how these processes could potentially be improved to create a more conducive learning environment.

Findings from this study suggest that opportunities for communication are valued, both as initiated by the learner and as provided by course instructors. Additionally, options, when provided without context or guidance, can create a more detrimental online learning environment for students with autism. Finally, even within an inclusive space, it is likely that learners on the autism spectrum will still appreciate and potentially thrive when provided with tailored, individualized services.

To effectively incorporate the Principles of UDL in serving students with autism, we must first better understand their experiences and then ensure options are being provided not just to have multiple options but in a strategic, scaffolded, manner. This study indicates that students with ASD might need more strategic systems in place in the online environment than UDL alone can provide. Further work needs to be done to understand just what measures might be put in place, in conjunction with the UDL Principles that do move us toward more universally accessible practices, to best support college students with autism in the online classroom.

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