Applying Universal Design to Address the Needs of Postsecondary Students on the Autism Spectrum

Sheryl Burgstahler
University of Washington

(Rose) Rosalie J. Russo-Gleicher
Borough of Manhattan Community College/City University of New York

Abstract

Legislation and contemporary social policies that favor inclusion and academic accommodations have contributed to a rise in the enrollment of students with disabilities, including students with autism spectrum disorder (ASD), on postsecondary campuses today. However, the literature is scarce about how instructors can routinely address the needs of students with ASD in their classes. There have been reports of how universal design (UD) strategies support the academic success of students who have various disabilities. By comparing instructional strategies that benefit students with ASD to UD strategies reported in the literature, the authors illustrate how a teaching method that benefits a student with a specific disability such as ASD can inspire the development of a UD strategy designed to benefit all students. Potential benefits of the UD approach for students with ASD are revealed and recommendations are made for future research as well as professional development and support for faculty that can be delivered and/or promoted by disability support personnel.

Keywords: Autism spectrum disorder, ASD, universal design

Legal mandates designed to ensure that individuals with disabilities can fully participate in society (ADA National Network, n.d.; Mackelprang & Salsgiver, 2009; U.S. Department of Education, 2011) have played a role in growing numbers of people with disabilities enrolling at institutions of higher education, now estimated to be 11% of all undergraduates (Myers & Laux, 2010). Students with disabilities need to register with the disability services office at the college to request accommodations (Martin, 2012), but often they do not do so due to lack awareness about support services offered, concerns about stigma associated with disclosing a disability, and/ or poor self-advocacy skills (Barber, 2012; Getzel & Thoma, 2008; Grasgreen, 2014; Pope, 2013). As a result, many postsecondary students with disabilities may not receive accommodations that they need because institutions do not know about their disabilities (Grasgreen, 2014). Moreover, although there are growing numbers of students with disabilities attending postsecondary institutions, college completion and graduation rates are lower for students with disabilities when compared to students without disabilities (Belch, 2004-2005; Myers & Laux, 2010).

Increased numbers of college students identified as having autism today (Carlotti, 2014; Lorenzetti, 2013; Pope, 2013) may partially be the result of Asperger's, a high functioning disorder on the autism spectrum, being added to the *Diagnostic and Statistical Manual of Mental Disorders (DSM) IV* in 1994. Many children who were diagnosed with Asperger's are now college age (Farrell, 2004; Goehner, 2011; Hare & Hicks, 2007). The Center for Disease Control reports the incidence of autism to be one in 68 children or approximately 1.3 million Americans under age 21, a significant rise from one in 150 children reported in 2002 (Diament, 2014).

Until 2013, the American Psychiatric Association (APA) classified disorders with similar deficits in social interaction, communication, and repetitive behaviors on the autism spectrum as a range of conditions occurring on a continuum from highest to lowest levels of functioning: Asperger's, pervasive developmental disorder, autism, childhood disintegrative

disorder, and Rett's disorder (APA, 2000; Kantrowitz & Scelfo, 2006). However, in 2013 the APA changed diagnostic criteria in order to improve accuracy of diagnosis and treatment for children with ASD (Diament, 2012a, 2012b; Friedman, 2014; Moran, 2013; Rukovets, 2012). The APA recategorized symptoms into a single diagnosis of ASD (Moran, 2013). Now, criteria used to diagnose ASD consists of three deficits in the area of social communication/social interaction (e.g., social-emotional reciprocity, nonverbal communication, and the ability to develop, maintain, or understand relationships) and at least two restricted/repetitive behaviors (e.g., repetitive movements or speech, insistence on sameness, inflexibility to routines or ritualized patterns of verbal or nonverbal behavior, highly restricted fixated interests of abnormal intensity or focus, and/or above or below typical reactions to sensory aspects of the environment). The APA (2013) also added a new category of Social Communication Disorder for those who have deficits in social communication and interaction without the restricted/repetitive behaviors associated with ASD. There has been public concern that, with the APA's new diagnostic criteria, fewer people might be diagnosed with ASD and thus not be eligible for special education services from schools, health services, and social services (Diament, 2012a, 2012b; Friedman, 2014; Kilgore, 2013; Moran, 2013; Rochman, 2012; Rukovets, 2012), but others report that the prevalence of ASD would only be changed slightly in that some children would receive the new diagnosis of social communication disorder (Autism-Speaks, 2014).

Challenges for Students with ASD in the College Classroom

The behaviors of some individuals with ASD can change the dynamics in a college classroom. Students with ASD may ask too many questions, monopolize class conversations, make comments that are not related to the topic of discussion, complain about fluorescent lights, and/or be easily distracted. Some students with ASD may need classroom activities to be predictable/routine; need to avoid crowds in public transportation, hallways, bathrooms, and lunch areas; have difficulty with time management; be unable to socialize; misunderstand particular forms of language (e.g., sarcasm, jokes, irony, metaphors, humor, abstract concepts); have poor concepts of time; have challenges working in groups and difficulty in or aversions to meeting classmates for projects outside of class; have difficulty selecting classmates with whom to work; and experience high levels of frustration during class activities (Barber, 2004; Belch, 2004-2005; Davis, 2011; Farrell, 2004; Gobbo & Shmulsky, 2012; Longtin, 2014; Minnesota State University, n.d.; Monroe Community College, n.d.; Moore; 2006; Organization for Autism Research [OAR], n.d.; Sorcinelli, 1994; VanBergeijk, Klin, & Volkmar, 2008; Wisconsin Technical College System [WTCS], 2009).

Students with ASD have unique personalities and learning styles and do not all display the same symptoms. Some individuals with ASD are very intelligent overall and/or have exceptional abilities in specific areas such as math, music, sports, singing, art, and memory (Farrell, 2004; Gobbo & Shmulsky, 2012; Van Pelt, 2008). With such variability within the group, one teaching approach is unlikely to be effective for every student with ASD. The Organization for Autism Research ([OAR]; 2006)) suggests that professors can support individual students with ASD by helping them choose the best place to sit in the classroom; having clear classroom rules included on the course syllabus; allowing lectures to be tape-recorded and note-takers to attend class; providing access to classroom notes in advance so students can read them before class and thereby better understand the material to be presented; offering extra time on essay tests; and/or facilitating peer study groups.

Some students with ASD benefit from taking online courses because interactions are easier for them online than in person and they benefit from the consistent format typically used in these classes, avoid social stigma, and can control the physical environment to minimize sensory overload (Davis, 2011, Reincke, 2013). Online classes often include a course guide with a detailed week-by-week agenda, readings (e.g., in textbook, articles, websites) and assignments (e.g., discussions, papers, exams) that facilitate effective time management. There are often grading rubrics for homework, discussions, and papers, so students can be fully aware of course expectations and to calculate their grades at any time. While taking these classes, students can listen to soothing music; complete coursework in any room of their home; sit on an exercise ball or sensory swing; be in the company of a favorite pet; take frequent breaks; and dim the lights. They can avoid crowded and noisy lunchrooms, subways, buses, and hallways and restrooms. It has been found that students with disabilities often perform better in online than in onsite courses (Stewart, Mallery, & Choy, 2010).

Students with ASD often need support in two areas typically unaddressed by accommodations on postsecondary campuses: "(1) the executive functions

of planning, organizing, and time management, and (2) the social-emotional/relationship realm" (Longtin, 2014, p. 88). Some colleges provide academic coaching, workshops for developing self-advocacy skills, and other services tailored to students with ASD (Ashkenazy & Latimer, n.d.; Pope, 2013, Virginia Commonwealth University, n.d.) and other skills that are key to college success (Barber, 2012; OAR, 2006) in addition to beneficial tutoring centers and other services that exist for all students (Longtin, 2014).

The authors use the remainder of this article to discuss how the application of universal design (UD) to instruction leads to inclusive teaching practices that benefit learners with diverse characteristics, include those with ASD, regardless of whether or not they have registered with the disability services office. Comparing UD instructional strategies reported in the literature with those reported as beneficial to students with ASD reveals (1) the potential benefits of UD strategies for students with ASD in the college classroom and (2) that UD strategies used with all students can be inspired by the educational needs of individuals with ASD. This analysis can be useful to instructors selecting teaching practices, trainers offering professional development to faculty, disability service providers engaging with faculty who are interested in proactively addressing the needs of students with disabilities, and to students enrolled in the courses impacted by these efforts.

Universal Design

Universal design "is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (North Carolina State University, 2011). The Principles of UD, developed by the Center for Universal Design ([CUD], 1997), encourage the development of products and environments that embody (1) equitable use, (2) flexibility in use, (3) simple and intuitive use, (4) perceptible information, (5) tolerance for error, (6) low physical effort, (7) size and space for approach and use. The UD conceptual framework reflects an understanding of disability as one of many forms of diversity, such as those defined by gender, race, age, and ethnicity (Burgstahler, 2012; Harrison, 2006). UD was first applied to the design of buildings and commercial products; later it was applied to the design of information technology; and, more recently, it has been applied to teaching and learning (Bowe, 2000; Burgstahler, 2012; Darby, n.d.). Instructors and support personnel who apply UD within educational settings anticipate the presence of students with diverse abilities and other characteristics and make design decisions that benefit all of these individuals, rather than simply focusing on the average or "typical" student (Bowe, 2000; Burgstahler, 2012). Thus, the application of UD to educational products and environments makes them welcoming and accessible to and usable by students with a broad range of characteristics, including disabilities. The best teachers have long employed flexible teaching strategies that reach a diverse student body (Gurin, Dey, Hurtado, & Gurin, 2002). In a study by Silver, Bourke, and Strehorn (1998), faculty reported that using flexible teaching strategies – including general cooperative and contextual learning, online instruction, provision of organizing tools for students, multimodal instruction, criterion-based learning, extended time for exams and assignments, and testing in the same manner as students were taught – benefit students with diverse characteristics.

Several approaches to applying UD in educational settings have emerged. For example, after a review of the literature on best practices in teaching at the postsecondary level, McGuire, Scott, and Shaw (2003) recommended the addition of two new principles to the original seven proposed by CUD. They concluded that adding principles that relate to a community of learners and instructional climate results in a more complete foundation for applying UD to postsecondary instruction through an approach identified as University Design for Instruction (Center on Postsecondary Education and Disability, n.d.).

The Center for Applied Special Technology ([CAST]; 2011) identified three characteristics of curriculum that reflect Universal Design for Learning (UDL): providing multiple means of representation, action and expression, and engagement. UDL practices are designed to benefit all students, including English language learners, students from different ethnic and cultural backgrounds, students with different levels of preparation for a course, and those with documented or undocumented disabilities. Many authors have shared examples of UDL in K-12 curriculum and instruction; some have articulated the relevance of UDL to the college environment. Examples of "multiple means of representation" include giving directions in multiple ways (e.g., on the whiteboard, on a printed handout, on a website, via oral instructions); providing outlines of class notes to help students understand key ideas (Stein, 2013); and relaying concepts through a mixture of mediums such as lectures, videos, and group discussions (Izzo, Murray, & Novak, 2008). Examples of "multiple means of engagement" include having

students repeat directions following teacher explanations, facilitating class discussions where students can add their thinking to the thinking of others, and providing opportunities for both cooperative learning with peers and working alone (Stein, 2013), as well as making learning motivating and relevant to all students (Izzo, Murray, & Novak, 2008). Examples of "multiple means of action and expression" are using dry erase boards for responses, having students discuss their thinking with peers before responding to the class, and using checklists/organizers to keep track of steps towards task completion (Stein, 2013); as well as using multiple types of assessments such as multimedia projects, written papers, portfolios, oral and group presentations, and multiple quizzes instead of one large exam (Izzo, Murray, & Novak, 2008). CAST's UDL guidelines promote the development of curriculum that includes options for (1) perception; (2) language, expressions, and symbolism; (3) comprehension; physical action; (5) expressive skills and fluency; (6) executive functions; (7) recruiting interest; (8) sustaining effort and persistence; and (9) self-regulation.

"Universal design of instruction" (UDI) as used by the Center on Universal Design in Education at the University of Washington embraces the established principles of both UD and UDL and applies them to a broad range of on-site and online instructional practices (Burgstahler, 2015). Its foundation is the general definition of UD established by the Center for Universal Design; the addition of "instructional" and replacement of "people" with "students" to the definition highlights its application to education. Thus, UDI "is the design of *instructional* products and environments to be usable by all *students*, to the greatest extent possible, without the need for adaptation or specialized design." Thus, UDI goes beyond an instructor's application of UDL to the creation and delivery of curriculum, to apply UD to other aspects of an instructional setting—such as the design of a course syllabus, classroom layout, or science lab—to ensure that all educational products and environments are welcoming and accessible to and usable by a great majority of students without the need for accommodations or other additional adaptations (Burgstahler, 2012; Harrison, 2006). Instructors who apply UDI strategies do not ignore the need for accommodations, but rather:

Plan for accommodations for students whose needs are not met by the instructional design. [They] know how to arrange for accommodations. [They] know campus protocols for getting materials in alternate formats, rescheduling class-

room locations, and arranging for other accommodations for students with disabilities. [They] make sure that assistive technology can be made available in a computer or science lab in a timely manner. [They] ensure the course experience is equivalent for students with accommodations. (Burgstahler, 2015, p. 5)

Examples of UDI practices were identified and applied by a team of disability professionals and faculty from more than twenty postsecondary institutions as part of a sequence of three projects funded by the U.S. Department of Education and facilitated by the Disabilities, Opportunities, Internetworking, and Technology (DO-IT) Center at the University of Washington in Seattle (Burgstahler, 2015). Project partners identified the process of applying UDI to include broadly defining the "universe" (potential students) for the instruction to include those with a broad range of disclosed and undisclosed disabilities and other characteristics. The leadership team also developed UDI examples that were often inspired by best practices for students with specific disabilities and generalized in such as way to benefit all students in a course.

These examples of UDI practices identified and tested by participants were eventually organized under eight aspects of instruction – class climate, interactions, physical environments, delivery methods, information resources and technology, feedback, assessment, and accommodations (Burgstahler, 2015) – to give faculty, disability service providers, and professional developers ideas for how to begin applying UD strategies for the benefit of all students, including those with disabilities. Suggestions include avoiding unnecessary jargon; identifying and explaining new concepts and vocabulary; placing key terminology on the front board or projected image at the start of the class; providing outlines, class notes, summaries, study guides, and other cognitive supports in both printed and text-based electronic formats; providing instructions both in printed form as well as orally; preparing a syllabus early to allow students the option of beginning to read the course materials before the first class; minimizing time constraints when possible; announcing assignments well in advance of due dates; allowing extended time on tests, unless speed is an essential outcome; providing sample test questions ahead of time to prepare students for your "style" of testing; assigning a class note taker, checking the notes, and sharing them with all students; and giving students a few questions at the beginning of class they should be able to answer by the end of the class.

To demonstrate how UDI examples apply the

principles of UD and UDL, each item on the list of UDI examples is also coded to specific UD principles and UDL guidelines to which the example is considered relevant (Burgstahler, 2015). An instructor needs to decide which UDI strategies will work in his/her class. Such UDI strategies are (1) proactive, (2) offered to all students in a class, and (3) designed to improve the opportunities for learning for all students. The evidence base is strong for some practices; for the others, the evidence base is primarily the previous experiences of a specific instructor.

UDI Strategies Inspired by the Needs of Students with ASD

Potential benefits of UDI strategies for college students who have ASD have been specifically mentioned in the literature (e.g., Gobbo & Shmulsky, 2012; Myers & Laux, 2010). In the following paragraphs, the authors reveal how a suggestion given to faculty for addressing the needs of a student with ASD can benefit other students as well when offered as a UDI strategy for the entire class. Meeting the needs of a student with ASD in this way avoids stigmatizing that student, minimizes the need for accommodations, and creates a more welcoming and inclusive environment for everyone. This is consistent with an approach used by Souma and Casey (2008) to argue that UDI practices can benefit students with psychiatric impairments as well as by DO-IT's UDI leadership team as they created a list of UDI examples. In the following paragraphs, the authors identify issues reported in the literature regarding students who have ASD and share examples of practices that could be offered as UDI strategies to potentially benefit all students in the class. For each issue presented, at least one UDI example that aligns with the suggestion is reported as well as a reference to literature recommending a similar practice for students with ASD.

Issue: Students experience difficulty in initiating a conversation with an instructor regarding their disabilities and knowing where to turn for help. One UDI strategy to "address individual needs in an inclusive manner" to promote a positive "Class Climate" (Burgstahler, 2015, p. 2) that might help a student initiate a conversation with an instructor regarding his/her disability, disclosed or undisclosed, is to include a statement in the syllabus that *invites* students to meet with the instructor to discuss disability-related and other learning concerns. For example, such a statement may say, "If you wish to discuss academic accommodations or other learning needs, please contact me after class or via email at [email address] to set up an appointment with me or visit me during office hours [state them], in room [office number]." Many students, including those with ASD, may also benefit when instructors provide contact information for the office that arranges accommodations for students with disabilities, counseling and advising centers, writing centers, tutoring centers, libraries, and other campus support services that may benefit them (Monroe Community College, n.d.; Sorcinelli, 1994).

Issue: The behavior of the students is disruptive in the classroom and/or students are teased by other students. UDI strategies that can proactively address potential behavioral issues include setting clear expectations, encouraging regular and effective communication with students, facilitating engagement in cooperative learning assignments in the category of "Interaction," and providing regular feedback and corrective opportunities in the category of "Assessment." Applying the UDI approach, faculty could institute rules and apply in-class strategies that address these issues without drawing undue attention to specific students. The instructor could articulate basic behavioral expectations in the syllabus and reinforce these expectations in interactions with the entire class. A civility statement in the syllabus could share how students must respect diverse perspectives and communications styles and be tolerant of different ways of communicating and learning. An example follows.

> The classroom is a special environment in which students and faculty come together to promote learning and growth. It is essential to this learning environment that respect for the rights of others seeking to learn, respect for the professionalism of the instructor, and the general goals of academic freedom are maintained. Differences of viewpoint or concerns should be expressed in terms that are supportive of the learning process, creating an environment in which students and faculty may learn to reason with clarity and compassion, to share of themselves without losing their identities, and to develop an understanding of the community in which they live. Student conduct that disrupts the learning process shall not be tolerated and may lead to disciplinary action and/or removal from the class.

Gobbo and Shmulsky (2012, p. 42) suggest that faculty relate the message to students that "We're all going through the same course, but we'll all do it differently." Teaching strategies that support the suc-

cess of students with ASD with social relationships (Longtin, 2014) can thus be used as UDI strategies to benefit all students. Such an approach benefits those who need instruction on appropriate behavior and those who are aware of appropriate behaviors themselves and appreciate it when instructors insist that others behave appropriately as well. However, if UDI strategies are employed, but a student's unacceptable behavior continues, the faculty member should meet with the student to privately reiterate behavioral expectations and give him/her specific opportunities to correct the behavior (Gobbo & Shumulsky, 2012; Sorcinelli, 1994). Clear written and spoken behavioral expectations and timely follow-up with an individual student can minimize the need to engage the campus office charged with addressing the inappropriate behavior of students.

Issue: Students ask too many questions, monopolize class conversations, and/or ask questions that move away from the topic being discussed. A UDI approach in the "Interaction" category regarding effective communication is for the instructor to present classroom rules on the syllabus and orally at the first class session that set discussion expectations. Examples include the expectation that all students engage, that individual students ask or answer a total of no more than a specific number of questions per class period, and/or that once a student contributes to a discussion he/she must wait for a specific number of responses from other students before speaking again (WTCS, 2009). A way to reduce monopolization of discussions in a specific class session is for the instructor to announce that questions must be answered by someone who has not yet contributed to the discussion.

If a student asks questions or makes comments that move away from the topic being discussed, an instructor can re-direct him/her to bring the conversation closer to the topic by politely saying something like, "You make a good point, but it is beyond the scope of today's topic, [name the topic]. To discuss your question further, please send me an email message or make an appointment to meet with me in my office" (Monroe Community College, n.d.; Moore, 2006). All of these suggestions benefit the class as a whole by increasing the participation of all students in discussions and minimizing dominance from a few while supporting students with ASD and helping them develop skills in the area of social relationships (Longtin, 2014).

Issue: Students do not engage in class discussions and other activities. UDI strategies in the category of "Interaction" include giving all students specific instructions, verbally and in print, regarding expectations for participation in discussions, presentations, and small groups and to offer a variety of ways to communicate. They should offer multiple options such as online discussion boards, in-class discussions, small groups engagement, since individuals may be more comfortable participating in some formats more than others (Gobbo & Shmulsky, 2012). Such alternatives are an application of the UDL principle of providing multiple ways for students to engage. As an example of how an instructor can ensure that all students contribute to a full-class discussion in some way, students could be told to pick up at the beginning of class a 3-by-5 inch notecard. On one side of the card they could be asked to write their names and at least one question, then write one remaining question they have on the other side of the card, and turn them in at the end of the class session. Besides promoting engagement of students with ASD (Longtin, 2014), English-language learners, and students who are shy, this approach can help guide the instructor in future classes and be used as a record of attendance and engagement.

To encourage the engagement of students with ASD in small group activities, it has been suggested that an instructor require small groups to work together during class (Gobbo & Shmulsky, 2012; WTCS, 2009); assign, or ask the students to assign, very specific roles for each student, such as recorder and speaker (Gobbo & Shmulsky, 2012); and otherwise facilitate group interactions (OAR, 2006). It is also recommended that for some assignments instructors allow students to work independently (WTCS, 2009). For student presentations, the instructor could allow students to choose to make their presentations to the entire class, to a small group, to the professor during office hours, or in a video (Gobbo & Shmulsky, 2012). Offering multiple means for engagement, a key principle of UDL, benefits the individual who is reluctant to participate as well as others who benefit from his/her perspectives and expertise. Related UDI examples include encouraging different ways for students to interact, facilitating participation in cooperative learning activities in the category of "Interaction," and providing multiple ways to gain knowledge and providing cognitive supports in the category of "Delivery Methods."

Issue: Students are sensitive to fluorescent lights, are easily distracted, or are negatively impacted by other environmental issues. The instructor is encouraged to pay particular attention to the physical space in examples under the UDI category of "Physical Environments and Products." All students benefit when the room is arranged so that everyone has a clear view of activities in the class. He/she could make written and verbal suggestions to all students regarding issues that may be particularly helpful to students with ASD. Examples include encouraging students who consider themselves to be easily distracted to sit in the front of the room and away from windows or doors (Gobbo & Shmulsky, 2012); who need frequent breaks to sit near an aisle and a door (Gobbo & Shmulsky, 2012); who are negatively affected by fluorescent lights or other environmental issues to choose a best place that minimizes their impact or wear sunglasses (WTCS, 2009). Instructors could also film and make available online or allow students to tape record their lectures for reference at a later time (OAR, 2006). For factors to consider in requesting the assignment of future classrooms, faculty could ask the classroom coordinator to locate available classrooms with a minimum of distractions as well as fluorescent-free lighting. More long-term, they could encourage administrators to apply UDI strategies as they design and renovate instructional facilities.

Recognizing that some students, with our without disabilities, have difficulty sitting for long periods of time, a faculty member could take a UDI approach by providing students with regular breaks during class (Moore, 2006), encouraging students who need additional breaks to sit in the aisle and near a door to avoid disruption of the class or stand unobtrusively in the back of the classroom. Students with and without ASD who have difficulty sitting for long periods of time should be encouraged to consider taking some classes online.

Issue: Students need predictability and routine. An example for addressing this issue, in the "Delivery Methods" category of UDI, is to provide consistent practices and cognitive supports. The instructor could allow students to sit in the same place each class (Monroe Community College, n.d.; WTCS, 2009) and share a class routine in spoken and written form (Gobbo & Shmulsky, 2012; Monroe Community College, n.d.). For example, an instructor could review prior class topics and provide time for questions and answers at the beginning of each class and then summarize content and give assignment reminders at the end of the class session. An instructor should clearly point out changes in dates of exams or assignments as early as possible (Gobbo & Shmulsky, 2012; Minnesota State University, n.d.; Monroe Community College, n.d.).

Issue: Students are easily confused about assignments and timelines. The UDI category of "Information Resources and Technology" encourages an instructor to be detailed and clear about assignments and timelines in the syllabus. Following is an example, adapted from Lerner (2012), that illustrates what can happen when faculty are vague about expectations.

A professor told the class to "submit an assignment before 4:30 p.m. on Tuesday." However, a student with ASD stood outside the professor's door, waiting for the professor to arrive at 4:30 p.m. to give the instructor the assignment. When the professor did not arrive by 5:00 p.m., the student went home, with the paper. The student did not understand the professor's instructions and did not ask for clearer instructions. In addition, the student was not a good self-advocate, or he/she could have reached out and asked the department secretary for clarification before leaving the college. The professor meant to have students put the assignment in his/her mailbox before 4:30 p.m., but the student did not figure that out. The professor received the paper the following week during class time and marked it late. However, the student finally told the disability coordinator at the school about what happened. Ultimately the situation was resolved by the disability coordinator at the college after talking to the professor, and the paper was not marked late.

The question is, how can we better explain what we want to all students, including those with ASD, to understand and do? The answer to this question is to *be clear and specific* when giving instructions, deadlines, and procedures because it benefits everyone. In the situation described above, the professor should have been specific about the place to submit the paper, such as to put it inside the professor's department mailbox, email it, put it under the professor's office door, and/or give it to the department secretary. For example, "We will have a test on Friday, April 5" is a better instruction than, "We will have a test after Spring break." Similarly, "Bring a copy of your midterm paper to class on Monday, March 18" is clearer than saying, "Be sure to give me enough time to read a draft of your midterm essay before it is due." As with other UDI strategies, making expectations clear and specific is a best practice for all students, not only those with ASD.

Issue: Students have difficulty managing their work, especially organizing the completion of parts of large assignments and completing essay exams. Examples for addressing this issue can be found under the UDI "Delivery Methods" and "Assessment" categories. To benefit students with and without ASD, an instructor can include in a detailed course syllabus clear expectations and deadlines, assessment methods, and a course calendar. The instructor should remind the class of upcoming deadlines, exams, and readings. All students can also be encouraged to consider using personal digital assistants, calendars, and/or alarms to remind them when to study for a test, when to complete readings and assignments, and when to conduct research for a paper (VanBergeijk et al., 2008).

Many students, including those with ASD, can benefit from a UDI strategy of breaking large assignments down into smaller, more manageable parts with multiple due dates (Monroe Community College, n.d.; VanBergeijk et al., 2008). Table 1 presents an example of how the assignment, "By May 20 submit a ten-page research paper on a topic related to this course (30 points)," could be re-designed by asking students to submit specific products.

Supporting students' ability to plan, organize, and manage time benefits students with ASD (Longtin, 2006) but likely others in class as well. For an essay exam, giving students guidance on organizing essays, examples for practice, and extra time to complete the exam (OAR, 2006) may benefit many students.

Issue: Students do not understand some forms of language, such as sarcasm, jokes, irony, metaphors, humor, and abstract concepts. Examples to address this issue are included in the UDI categories of "Delivery Methods" and "Information Resources and Technology." The instructor should deliver content in multiple ways, orally and in writing, accommodating a variety of reading levels and language skills. He/she should present content in a logical, straightforward manner and avoid unnecessary jargon and complexity; define new terms when presented; and restate a point in multiple ways, including in concrete, straightforward terms. Instructing in this manner benefits students with ASD but also English language learners, very old or very young students, and students with a variety of cultural backgrounds.

Issue: Students experience high levels of overall anxiety and frustration. Taking actions to create a comfortable course climate for everyone is an important proactive step for reducing the anxiety of many students. For example, UDI strategies under "Class Climate" included being approachable and available, welcoming questions and alternative points of view, and responding patiently. An "Interaction" UDI approach that may reduce anxiety is to use online, asynchronous communication because it allows for each student to take as much time as they need to type a comment. As a "Delivery Method" providing a videotape of lectures online or letting students video- or audio-record the class (VanBergeijk et al., 2008) and providing lecture notes in advance to minimize the need to take notes (Texas A & M University, n.d.; VanBergeijk et al., 2008) may reduce stress and increase access. Allowing students to demonstrate learning through multiple assessments (e.g., using multimedia, delivering presentations), instead of in one way, is a UDI "Assessment" strategy that may reduce the anxiety of students (Izzo, Murray, & Novak, 2008). A "Class Climate" UDI approach is for faculty to invite all students who are frustrated or anxious to meet with him/her to discuss how they can reduce these negative emotions (Gobbo & Shmulsky, 2012; Monroe Community College, n.d.). Providing course materials well in advance so that students can prepare ahead of time may also reduce anxiety (OAR, 2006). Students who experience high levels of anxiety should be encouraged to consider taking some courses that are offered in a self-paced online format (Gobbo & Shmulsky, 2012; Stewart et al., 2010).

Recommendations

The authors recommend that college faculty employ UDI strategies in their courses to address the learning needs of a diverse student population that includes students with ASD (both those who do and do not self-identify). Considering issues for students with ASD as instructors carefully select textbooks and other curriculum; design their course policies, presentation, and interaction methods; course assignments; and the organization of content, support materials, and assessment methods can support learning for all students. Promoting an inclusive physical environment and course climate will also make a more pleasant learning environment for everyone.

When an instructor identifies learning strategies or specific accommodations beneficial to students with various types of disabilities, he/she should consider if such strategies may benefit other students and, if so, consider implementing these practices for all students. An example of this UDI approach is inspired by the need for captioning on videos as an accommodation for students who are deaf. However, if an instructor uses videos with closed captions, other students will benefit as well. English-language

Table 1

Example of Assignment Broken Down into Parts

Due Date	Assignment (point value)
Monday, February 4	A description of your topic in 3–5 sentences (2 points)
Monday, February 25	A list of three sources that you have located (2 points)
Monday, March 11	A summary of the main points of the paper (2 points)
Monday, March 18	A list of another three sources (2 points)
Monday, April 8	A summary of the main points of these articles (2 points)
Monday, April 22	An outline of your paper (2 points)
Monday, May 6	A draft of your paper (3 points)
Monday, May 20	Your final paper (15 points)

learners and students with some types of learning disabilities benefit from seeing the written word as well as hearing it aurally. Students who want to review a specific section of a video can use online tools to search the captions to locate the specific content. Individuals watching a video in a noisy (e.g., in an airport) or noiseless (e.g., while children/spouses are sleeping) environment can benefit from captions as well. All students can benefit from seeing the spelling of technical terms and other words they are unfamiliar with as they watch a video.

Clearly, more research needs to be done to further identify the obstacles and solutions to successful college course completion for students with disabilities and how UD (including specific UDI and UDL strategies) principles can play a role in their success. Moreover, offering professional development to faculty who are experts in their professional disciplines but not necessarily knowledgeable about how to effectively use a broad range of teaching strategies may be beneficial to instructors and, ultimately, to their students. This recommendation is consistent with Myers and Laux (2010), who expressed the need for continued professional development to promote awareness and practice of UD and encourage faculty to go beyond legal compliance with the Americans with Disabilities Act. Personnel in disability support services and in teaching and learning centers can play important roles in developing and delivering such professional development. They can emphasize the differences between and importance of two distinct practices: being proactive (e.g., applying UDI) in addressing the needs of students with a broad range of

characteristics and being reactive in addressing the additional needs of students who require disability-related accommodations. Faculty members should also learn how UDI practices can reduce the need for accommodations for some students because access supports are built into the course in a manner that benefits a wide range of learners.

Conclusion

The authors share statistics regarding the growing numbers of students with ASD attending postsecondary institutions and the characteristics and academic needs of this population. They make a case for applying the UDI approach to address the needs of college students with ASD while also benefiting other students. The authors note how academic strategies particularly beneficial to students with ASD can inspire instructors to consider implementing teaching techniques that benefit all students. Such practices have the potential to increase the overall success of college and university students and ultimately benefit academic and career fields with the talents and perspectives of individuals with a diverse set of characteristics and backgrounds. It is expected that this analysis can be beneficial to instructors selecting teaching practices, trainers offering professional development to faculty, and disability service providers engaging with faculty who are interested in addressing the needs of students with diagnosed or undiagnosed ASD and, ultimately, to students enrolled in the courses impacted by these efforts.

Resources

Organizations that provide support and/or resources that can benefit people with ASD in college and advocates include those listed in Table 2.

Organizations that provide support and/or resources for faculty regarding UD applications in educational settings include those listed in Table 3.

Table 2

Organizations that Provide ASD Information for College Students

Organization/Resource Name	Website Address
Achieving in Higher Education with Autism/ Developmental Disabilities (AHEADD)	www.aheadd.org/
Asperger's Association of New England	www.aane.org/
Autism Higher Education Foundation	http://www.autismhighereducationfoundation.org/
Autism Society	www.autism-society.org/
Autistic Self-Advocacy Network (ASAN)	autisticadvocacy.org/
College Autism Spectrum	www.collegeautismspectrum.com
College Internship Program	*www.cipworldwide.org/*
College Living Experience	*experiencecle.com/*
Community College Consortium	*www.cccaid.org/*
Daniel Jordan Fiddle Foundation	*www.djfiddlefoundation.org/*
DO-IT Center	www.washington.edu/doit/
Global and Regional Asperger Syndrome Project (GRASP)	*grasp.org/*
Organization for Autism Research (OAR)	www.researchautism.org/
US College Autism Project (USCAP)	www.usautism.org/uscap/index.htm

Table 3

Organizations that Provide Information on UD Applications in Education

Organization/Resource Name	Website Address
The Center for Applied Special Technology (CAST)	cast.org/
The Center for Universal Design (CUD)	www.ncsu.edu/ncsu/design/cud/
The Center for Universal Design in Education (CUDE)	www.uw.edu/doit/CUDE
FacultyWare	www.facultyware.uconn.edu/home.cfm
Universal Course Design Website	www.eeonline.org/

References

ADA National Network. (n.d.). *What are a public or private college-university's responsibilities to students with disabilities?* Ithaca, NY. Retrieved from http://adata.org/faq/what-are-public-or-private-college-universitys-responsibilities-students-disabilities

American Psychiatric Association. (2013). *Desk reference to the diagnostic criteria from DSM-5.* Arlington, VA: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders, Fourth edition, Text revision.* Washington, DC: Author.

Ashkenazy, E., & Latimer, M. (Eds.). (n.d.). *Navigating college: A handbook on self advocacy written for autistic students from autistic adults.* Washington, DC: The Autistic Self Advocacy Network/The National Autism Resource and Information Center.

Autism-Speaks. (2014, Jan. 27th). *DSM-5 & Autism: Autism-Speaks study clarifies impact of new criteria.* Retrieved from http://www.autismspeaks.org/science/science-news/dsm-5-autism-autism-speaks-study-clarifies-impact-new-criteria

Barber, P. (2012, Sept). College students with disabilities: What factors influence successful degree completion? A case study. *Disability and work: Research report.* New Jersey: John J. Heldrich Center for Workforce Development at Rutger's University, and the Kessler Foundation. http://www.heldrich.rutgers.edu/sites/default/files/products/uploads/College_Students_Disabilities_Report.pdf

Belch, H. (2004-2005). Retention and students with disabilities. *Journal of College Student Retention: Research, Theory, and Practice, 6*(1) 3–22.

Bowe, F. G. (2000). *Universal design in education: Teaching nontraditional students. An approach to ensure that educational programs serve all students.* Westport, CT: Bergin and Garvey.

Burgstahler, S. (2015). *Equal access: Universal design of instruction. A checklist for inclusive teaching.* Seattle: DO-IT, University of Washington. Retrieved from http://www.washington.edu/doit/Brochures/Academics/equal_access_udi.html

Burgstahler, S. (2012). *Universal design in postsecondary education: Process, principles and applications.* Seattle: DO-IT, University of Washington. Retrieved August 1, 2014 from: http://www.washington.edu/doit/Brochures/Academics/ud_post.html

Carlotti, P. (2014, July 31st). Education Blog: More colleges expanding programs for students on autism spectrum. *Forbes.* Retrieved from: http://www.forbes.com/sites/paigecarlotti/2014/07/31/more-colleges-expanding-programs-for-students-on-autism-spectrum/

Center for Applied Special Technology. (2011). *UDL guidelines-Version 2.* Wakefield, MA: Author. Retrieved from http://www.udlcenter.org/aboutudl/udlguidelines

Center on Postsecondary Education and Disability, n.d.) *FacultyWare.* Storrs, CT: University of Connecticut. Retrieved from http://www.facultyware.uconn.edu.

Center for Universal Design. (1997, April 1st). *Universal design principles.* North Carolina State University. Retrieved from: http://www.ncsu.edu/ncsu/design/cud/about_ud/udprinciplestext.htm

Center for Disease Control and Prevention. (n.d.). *Data and statistics, autism spectrum disorders.* Retrieved from http://www.cdc.gov/ncbddd/autism/data.html

Darby, A. (n.d.). *Understanding universal design in the classroom.* Washington, DC: National Education Association (NEA). Retrieved from http://www.nea.org/home/34693.htm

Davis, M. (2011). Virtual education targets rise of autism. *Education Week, 31*(1), 5–8, 9,10. Retrieved from http://www.edweek.org/ew/articles/2011/08/24/01edtech-autism.h31.html

Diament, M. (2012a, Jan. 20th.). Report: New autism definition could end 'epidemic.' [online only] *Disability Scoop.* Retrieved from http://www.disabilityscoop.com/2012/01/20/report-new-autism-definition/14818/

Diament, M. (2012b, Dec. 3rd). Psychiatrists approve new DSM, Asperger's dropped. [online only] *Disability Scoop.* Retrieved from http://www.disabilityscoop.com/2012/12/03/psychiatrists-approve-dsm/16878/

Diament, M. (2014, March 27th). Autism rates spike again, CDC says. [online only]. *Disability Scoop.* Retrieved from http://www.disabilityscoop.com/2014/03/27/autism-rates-cdc-says/19237/

Farrell, E. (2004). Asperger's confounds colleges. The Chronicle of Higher Education, 51(7), A35–36. Retrieved from http://chronicle.com/article/Aspergers-Confounds-Colleges/25314/

Friedman, L. (2014, Jan, 23rd). Autism rates are about to drop. *Business Insider*. Retrieved from http://www.businessinsider.com/fewer-autism-diagnoses-with-dsm-5-criteria-2014-1

Getzel, L., & Thoma, C. (2008). Experiences of college students with disabilities and the importance of self-determination in higher education settings. *Career Development for Exceptional Individuals, 31*(2), 77–84.

Gobbo, K., & Shmulsky, S. (2012). Classroom needs of community college students with Asperger's Disorder and Autism Spectrum Disorders. *Community College Journal of Research and Practice, 36*, 40–46.

Goehner, A. (2011, April 13th). A generation of autism, coming of age. *New York Times*. Retrieved from http://www.nytimes.com/ref/health/healthguide/esn-autism-reporters.html

Grasgreen, A. (2014, April 2nd). Students with disabilities frustrated with ignorance and lack of services. *Inside Higher Education*. Retrieved from https://www.insidehighered.com/news/2014/04/02/students-disabilities-frustrated-ignorance-and-lack-services

Gurin, P., Dey, E. L., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72*(3), 330–366.

Hare, C., & Hicks, M. (2007, Fall). Asperger U! Tips for Aspie success in college. *AANE Journal, 1,* 12–13. Retrieved August 1, 2014 from http://www.aane.org/asperger_resources/articles/college/asperger_u_tips.html

Harrison, E. (2006). Working with faculty toward universally designed instruction: The process of dynamic course design. *Journal of Postsecondary Education and Disability, 19*(2), 152–162.

Izzo, M., Murray, A., & Novak, J. (2008). The faculty perspective on universal design for learning. *Journal of Postsecondary Education and Disability, 21*(2), 60–72. Retrieved from http://eric.ed.gov/?id=EJ822094

Kantrowitz, B., & Schelfo, J. (2006, Nov. 27th). Growing up with autism: What happens when they grow up. *Newsweek*, 47–54.

Lerner, M. (2012, April 8th). Society slowly learns to deal with autism. *Star Tribune*. Retrieved from http://www.startribune.com/lifestyle/health/146612015.html

Longtin, S. E. (2014). Using the college infrastructure to support students on the autism spectrum. *Journal of Postsecondary Education and Disability, 27*(1), 86–99.

Lorenzetti, J. (2013, Aug.). Helping students with ASD transition to college. *Recruitment & Retention in Higher Education, 4–5.*

Mackelprang R., & Salsgiver, R. (2009). *Disability: A diversity model approach in human service practice.* (2nd ed.). Chicago, IL: Lyceum Books.

Martin, R. (2012, Oct. 30th). ABC's of accommodations. *The New York Times*. Retrieved from, http://www.nytimes.com/2012/11/04/education/edlife/guide-to-accommodations-for-college-students-with-disabilities.html

McGuire, J. M., Scott, S. S., & Shaw, S. F. (2003). Universal design for instruction: The paradigm, its principles, and products for enhancing instructional access. *Journal of Postsecondary Education and Disability, 17*(1), 11–21.

Minnesota State University. (n.d.) *Asperger's syndrome: A guide for working with students with Asperger's syndrome.* Mankato, MN: Minnesota State University. Retrieved from http://www.mnsu.edu/access/faculty/students/asperger.html

Monroe Community College. (n.d.). *Helping students with autism succeed at Monroe Community College.* Retrieved from http://www.monroeccc.edu/lal/disability_services.htm

Moore, A. (2006, Nov 5th). Students on the spectrum: Navigating college is tricky with autistic traits. *New York Times, Education Life*, 28–32.

Moran, M. (2013). DSM-5 provides new take on neurodevelopmental disorders. *American Psychiatric Association (APA) Psychiatric News, 48*(2), 6–23. Retrieved from http://psychnews.psychiatryonline.org/newsarticle.aspx?articleid=1558424

Myers, K., & Laux, S. (2010, Feb.). Paving the way. *Business Officer*, 19–24. Washington, DC: National Association of College and University Business Officers.

North Carolina State University. (n.d.). T*he principles of universal design*. Raleigh, NC: Center for Universal Design, North Carolina State University. Retrieved from, http://www.ncsu.edu/ncsu/design/cud/about_ud/udprinciples.htm

Organization for Autism Research. (2006). *Life journey through autism: A guide for transition to adulthood.* Arlington, VA: Author. Retrieved from http://www.researchautism.org/resources/reading/index.asp

Organization for Autism Research. (n.d.). *Understanding Asperger Syndrome: A professor's guide. Organization for Autism Research (OAR).* [video]. Retrieved from, http://www.researchautism.org/resources/AspergerDVDSeries.asp

Pope, J. (2013, Sept. 16th). More college options for kids with disabilities. *Associated Press*. Retrieved from: http://bigstory.ap.org/article/new-college-options-students-disabilities

Reinecke, D. (2013, Jan 24th). How technology can improve post-secondary outcomes for students with autism. *Edutopia Blog*. Retrieved from: http://www.edutopia.org/post-secondary-outcomes-students-with-autism-dana-reinecke

Rochman, B. (2012, Feb. 6th). The end of an epidemic? Why a proposed new definition of autism has parents and advocates worried. *Time, 16.*

Rukovets, O. (2012, June/July). Are the proposed criteria for diagnosing autism spectrum disorders too restrictive? *Neurology Now: The Waiting Room, 8* (3), 13–14.

Silver, P., Bourke, A., & Strehorn, K. C. (1998). Universal instructional design in higher education: An approach for inclusion. *Equity & Excellence in Education, 31*(2), 47–51.

Sorcinelli, M. (1994). Dealing with troublesome behaviors in the classroom. In K. Prichard & R. Sawyer (Eds.). *Handbook of college teaching: Theory and applications* (pp. 365–373). Westport, CT: Greenwood Press. Retrieved from http://www.scf.edu/content/PDF/Library/DealingTroublesomeBehaviors.pdf

Souma, A., & Casey, D. (2008). The benefits of universal design for students with psychiatric disabilities. In S. Burgstahler & R. Cory (Eds.). *Universal design in higher education: From principles to practice* (pp. 97–104). Cambridge, MA: Harvard Education Press.

Stein, E. (2013, May 14th). *Chisel a teaching masterpiece: A MiddleWeb blog*. Retrieved from http://www.middleweb.com/7574/chisel-a-teaching-masterpiece/

Stewart, J., Mallery, C., & Choi, J. (2010). A multilevel analysis of distance learning achievement: Are college students with disabilities making the grade? *Journal of Rehabilitation, 76* (2), 27¬–39.

Texas A & M University. (n.d.). *Faculty guide: Teaching and interacting with students with disabilities*. Retrieved from http://disability.tamu.edu/facultyguide/teaching

U.S. Department of Education (USDOE). (2011, Sept.). *Students with disabilities preparing for postsecondary education: Know your rights and responsibilities*. U.S. Dept. of Education, Office of Civil Rights. Washington, DC. Retrieved from http://www2.ed.gov/about/offices/list/ocr/transition.html

VanBergeijk, E., Klin, A., & Volkmar, F. (2008). Supporting more able students on the autism spectrum: College and beyond. *Journal of Autism and Developmental Disorders, 38*, 1359–1370.

Van Pelt, J. (2008, Sept.-Oct.). Autism into adulthood: Making the transition. *Social Work Today, 8*(5), 12–17. Retrieved from: http://www.socialworktoday.com/archive/090208p12.shtml

Virginia Commonwealth University. (n.d.). *Going to College: A resource for teens with disabilities*. Richmond, VA: Author. Retrieved from http://www.going-to-college.org/

Wisconsin Technical College System (WTCS). (2009). *Autism spectrum disorders (ASD): Guide for Wisconsin technical college system staff*. Madison, WI: Author. Retrieved from http://www.witc.edu/stusvcscontent/docs/accommodations/AutismSpectrumDisordersGuide.pdf

About the Authors

Dr. (Rose) Rosalie J. Russo-Gleicher received her M.S.W., Master of Social Work, from the Wurzweiler School of Social Work of Yeshiva University, and D.S.W., Doctor of Social Welfare, from the CUNY Graduate Center and Hunter College School of Social Work. Her experience includes working as counselor for the state rehabilitation agency with adults who have physical and/or mental disabilities, and as a social worker with adults who have developmental disabilities at a day treatment and sheltered workshop program. Her research interests include college student retention, online student retention, peer mentoring, and peer tutoring. She is a disabilities consultant, advocate, and career counselor, and uses a strengths approach in her work. She is currently an Adjunct Associate Professor of Human Services at the Borough of Manhattan Community College, of the City University of New York, where she teaches counseling skills and introduction to disabilities. She can be reached by email: rgleicher@bmcc.cuny.edu or rosedsw@aol.com

Sheryl Burgstahler received her B.A. degree in mathematics and Ph.D. from the University of Washington (UW). Her experience includes working as a postsecondary professor, director of Accessible Technology Services, and a speaker and writer in the area of universal design. She is currently an adjunct professor in the Department of Education at UW. Her research interests include transition to college and careers for students with disabilities and the application of universal design to technology, physical spaces, student services, and instruction. She can be reached by email at: sherylb@uw.edu