

Online Pedagogy: Designing Writing Courses
for Students with Autism Spectrum Disorders

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF MINNESOTA
BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

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May 2010

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Acknowledgements

The guidance of Professors Laura J. Gurak and Lee-Ann Kastman Breuch shaped this research project and made its completion possible. As is often the case, alterations were required before obtaining Institutional Review Board approval. The suggestions I received were essential to completing the IRB process successfully.

The Academic Autistic Spectrum Partnership In Research and Education (AASPIRE), housed within Oregon Health and Science University, was instrumental in locating study participants. I also appreciate the input of the Autistic Self-Advocacy Network (ASAN) as I prepared research questions and a final survey.

Lisa King, a disabilities services expert at St. Catherine University in St. Paul, Minnesota, offered insights from the perspective of university service providers. Her familiarity with legal and regulatory requirements was invaluable.

I would like to thank Prof. Earl McDowell and Shaun Williams-Wyche for their suggestions on data collection and statistical analysis.

Most of all, my wife Susan has made it possible for me to complete this dream.

Dedication

This dissertation is dedicated to my parents, my wife, and the teachers who knew I could do the work. I would need several pages to list the names of the people who made this possible.

In addition to my family, I do want to dedicate this project to the inspirational support I received from Patricia Jones Whyte, Acting Director of the University of Minnesota Office for Diversity in Graduate Education. The university is a much better place because of her efforts, even though the obstacles to diversity and tolerance within such an institution are many.

Abstract

As more universities offer academic composition and technical writing courses via virtual classrooms, our institutions are also being asked to accommodate an increasingly diverse student population. The success of disability accommodations in elementary and secondary schools is expanding the number of students with special needs academically qualified for postsecondary admissions. Among these students are individuals with autism spectrum disorders—a population with unique gifts and needs. This project sought to determine how writing courses in virtual spaces might be improved for university students with ASDs.

The original research propositions included the possibility that Web-based course management software could be optimized by examining virtual spaces favored by individuals with ASDs. Ninety-eight Web sites were analyzed and 48 adults with clinical diagnoses of autism disorders were surveyed. The results directly challenged the research propositions and require a rethinking of the delivery of online course content.

Overwhelmingly, the communities analyzed and the individuals surveyed point to a need to deliver course content via e-mail, Really Simple Syndication (RSS), and other purely textual methods. Every online community studied relays content to members via both e-mail and RSS feeds, allowing participation without accessing a Web-based interface. Seventy-five percent of the individuals surveyed indicated Web sites present challenges that cannot be addressed via traditional accessibility practices.

The data suggest online courses should offer e-mail and RSS interactions, as an option to the Web-based interfaces of most courseware platforms. While instructors of academic composition and technical writing courses might be tempted to recreate the traditional classroom in virtual simulations, this approach not only hinders participation by students with autism disorders, but also might exclude them from courses that form an important foundation for university success.

Additionally, gender differences were found within the survey population, relating specifically to writing and communication practices. This study concludes with a recommendation for studies exploring these differences and any implications they might have for writing instruction, especially within virtual classroom settings.

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CHAPTER 1: INTRODUCTION

Background

In 2008, Minnesota governor Tim Pawlenty asked all state colleges and universities to offer a quarter of their courses via the Internet by 2015 (Ross, 2009). Among the courses to migrate to online settings via this mandate are writing courses, including first-year composition and technical writing courses. Online writing instruction is increasingly common, for a variety of economic and social reasons (Anson, 2003; Callister & Burbules, 2000; Fredericksen & Shea, 2000; Maeroff, 2003). Though the move to online courses is driven by other factors, one of the perceived benefits is greater access for students with disabilities.

“We offer a lot of on-line classes,” the entry for a San Francisco college states, “especially suited for someone on the autism spectrum” (Perner, 2003). David Moore and his colleagues have chronicled various studies meant to illustrate how computers and virtual learning environments might assist students with autism spectrum disorders, but these projects have proved inconclusive (Moore, Cheng, McGrath, & Powell, 2005). The logical question is if the courses themselves are uniquely suited for students with autism or if merely existing in a virtual classroom is assumed to be the accommodation. Also, it reflects a significant shift in perceptions of autism that a college or university would actively recruit from a population previously considered ill-suited to the college experience (Bundy, 2004; Erb, 2008; Passantino 2007; Prince-Hughes, 2003).

Public awareness of autism spectrum disorders seems to have increased dramatically over the last two decades, reflected in both mass media coverage and books published for general audiences (Grinker, 2007). Evidence indicates ASDs affect

a significant population, including individuals capable of success within university settings. Epidemiological studies in the United States and United Kingdom have detected incidence rates of autism ranging from 1 in 250 (Robledo and Ham-Kucharski, 2005) to as high as 1 in 91 (MSNBC.com/AP, 2009). A 2007 survey of 80 universities found an average of 10 students with autism per campus (Erb, 2008).

Diagnosing high-functioning individuals with autism and related disorders has only been accepted within mental health since the early 1990s (Attwood, 2007; Grinker, 2007; Yapko, 2003). We now recognize that university students with ASDs are, if not common, demonstrably not rare. While some individuals with ASDs have completed undergraduate and graduate degrees, it is likely that such successes represent exceptional situations (Bundy, 2004; Erb, 2008; Palmer, 2006; Wiley, 1999). If universities are using online courses to attract students with autism, we should identify best design practices for these virtual classrooms.

... on the very high end, there must have been kids who could conceivably pass for normal or previously had diagnoses such as ADHD, Borderline Personality Disorder, or a learning disability. A decade ago, some of the very high functioning kids now called autistic would have been called weird or unusual. (Grinker, 2007, p. 167)

As an individual diagnosed with high-functioning autism (HFA), one of many diagnoses collectively known as autism spectrum disorders (ASDs), I found that my experiences as a student and instructor led me to question the claims advanced by online education advocates. I found online settings can be more frustrating than traditional

classrooms, spaces that I have learned to navigate based on the memorization of social cues and classroom norms.

The difficulties I had with hybrid and online courses led me to wonder if I was unique or if other students diagnosed with ASDs found virtual classrooms more frustrating than physical classroom spaces. This personal experience is a direct challenge to what had become an accepted assumption according to Lars Perner (2003): online courses must be better for these students. A review of autism scholarship will demonstrate technology is often viewed favorably, and sometimes uncritically, by those seeking to aid students with autism (Attwood, 1998; Harpur, Lawlor, & Fitzgerald, 2004). Historically, any educational assumptions at the university level affect not only current students and faculty, but they tend to affect how our public elementary and secondary schools prepare students (Murphy, 2001). If we assume online is better, educators and administrators at all levels might potentially embrace the same notion and everything it embodies.

What does it mean to embrace online education as the ideal for students with ASDs? More importantly, can we challenge those assumptions not by resisting online education but by identifying and addressing any deficiencies originating in our assumptions? Research to improve writing courses conducted in virtual classrooms begins with the possibility of improvement, the potential for change.

This project focuses on academic composition, professional writing, and technical writing courses because these are both common requirements for undergraduate degrees and because these are the most likely writing courses to be taken by students with autism spectrum disorders. Because this project assumes university

writing courses offered online will continue to increase in popularity, this project considers only the design of such virtual classrooms. Where it appears traditional classrooms have been beneficial for some students with ASDs, the consideration will be how to adapt the positive classroom elements to the online setting. The impetus for this project is not a desire to challenge the increase in writing courses offered online by universities, but rather a desire to improve those spaces to be the most effective virtual classrooms possible for students with autism—or any similar special needs.

Assumptions about Individuals with Autism

Many of the traits associated with autism seemingly make online courses, especially in topics such as university writing, an ideal alternative to the traditional classroom for these students. Such traits include stereotypical movements, a lack of eye contact, and even sudden outbursts (Attwood, 2007; Baron-Cohen, 1993; Baron-Cohen et al., 2000; Frith, 2001; Grinker, 2007; Shore 2003). Online, the physical manifestations of autism are not apparent to peers or instructors, possibly offering a level of safety to these students. Physical expressions of ASD symptoms might also be less disruptive to an online writing course than in a traditional writing classroom.

Actively encouraging students with any special needs to enroll in online analogs to courses available in traditional classroom settings risks sending a message to those students that they are not welcome in the physical classroom spaces. The argument that it is “for your own benefit” is one administrators and professors have employed to convince me that online courses might be an ideal accommodation for my needs, paralleling the view of some researchers that autistic students might thrive in online

settings (Moore et al., 2005). We should determine if other individuals perceive such arguments as exclusionary, not inclusionary. Universities could be conveying an attitude in direct opposition to their intended goals.

If students with ASDs are being encouraged to consider online courses in a way their peers are not, this implies assumptions about the needs of these students. It might also reflect prejudicial stereotypes about the affect of these students within a traditional classroom. This project challenges several assumptions about students with autism as it considers their online experiences. Importantly, this project includes statements by individuals with ASDs, letting them express their needs and desires instead of relying on the theories of various experts.

It is often assumed, incorrectly, that individuals with autism do not express rhetorical agency; the early research of Leo Kanner (1943) and Hans Asperger (1944) established this assumption, which was embedded deeper in public perception by Bruno Bettelheim's 1967 work *The Empty Fortress: Infantile Autism and the Birth of the Self*. Current research into self-perception has continued this theory that intentional rhetorical agency is lacking in autism. A 2008 study at Baylor College of Medicine emphasized a "poor recognition of self" among high-functioning individuals with autism (ScienceDaily, 2008).

I theorize that autism is associated too broadly with isolation and a lack social and self-awareness, a point made by other individuals diagnosed with ASDs (J. Cohen, 2005; Nazeer, 2006; Shore, 2003). The students with autism who qualify for admissions into our colleges and universities might struggle with social norms or have some social impairments, but ethnographic research and memoirs indicate these individuals do want

to participate in the university setting intellectually and socially (Harpur et al., 2004; Palmer, 2006; Passantino, 2007; Prince-Hughes, 2002; Prince-Hughes, 2003; Shore, 2003; Wiley, 1999; Wolf, Brown, & Bork, 2009).

Assumptions about Writing Courses Online

As a review of existing scholarship demonstrates, universities, instructors, and students make a number of assumptions regarding online courses in general and about academic composition and technical writing courses in particular. Briefly considering some of these assumptions illustrates the need to examine how students with ASDs might be affected by erroneous beliefs about online writing courses. Some of the issues affect all students, but the symptoms associated with ASDs might magnify problems within the virtual writing classroom.

Administrators might assume that online courses are more cost effective than traditional spaces, even at the expense of usability considerations.

[T]he locus of concern focuses on necessary infrastructure, appropriate software and emerging technologies, and cost considerations, neglecting the difficulties students may encounter.... (Rubens & Southard, 2005, p. 193).

Regardless of the accuracy of this belief, administrators under increasing pressure to reduce costs are likely to seek the migration of more courses to online settings (Maeroff, 2003). This affects all students, but it also means that those students who might benefit from traditional classroom settings will have fewer options. For students with special needs, including those with ASDs, this shift demands that universities ensure the best possible online course designs are implemented.

Early in the evolution of networked writing classrooms and virtual writing classrooms, instructors assumed technology would radically democratize the classroom (Monroe, 2004; C. Selfe, 1999). Theorists optimistically hoped that technology could mask visible and audible differences, especially those associated with socioeconomic conditions, race, gender, and physical disabilities. For those with some physical disabilities, technology has made the task of writing less challenging, reducing a barrier to participation. However, researchers have discovered that differences do persist in the online writing classroom (Monroe, 2004). To think that the characteristics of autism might be masked by technology might be equally erroneous.

Students might assume an online class is more convenient and “easier” than writing courses offered in traditional settings (Eaton, 2005; Maeroff, 2003; Rubens & Southard, 2005). For students with ASDs, there might be assumptions that the online space is more comfortable because face-to-face interactions are minimized. Online courses allow a student to work from a familiar location, which might also appeal to students with ASDs. On the other hand, students with autism might have developed mechanisms for navigating the traditional classroom that do not apply to online settings.

Online courses require a high level of self-motivation and organizational skills, especially writing courses (Eaton, 2005; Maeroff, 2003). Writing scholars remind us that the flexibility of online environments “can backfire if students are irresponsible” (Breuch, 2005, p.146). Because some individuals with ASDs are extremely organized and like rigid schedules, it seems possible that an online course caters to their personalities. Unfortunately, little research exists on autism and online education

(Moore et al., 2005). Individuals, especially young university students, might overestimate their organizational skills, however, leading to problems.

Statement of Problem

The title of this project, “Online Pedagogy: Designing Writing Courses for Students with Autism Spectrum Disorders,” should not be assumed to suggest there is a single design for writing courses that will accommodate all students with autism spectrum disorders and meet the needs of every writing pedagogy. Though the goal of this project is to suggest design choices for online academic composition and technical writing courses that seek to accommodate students with ASDs, pragmatism requires that this goal be clarified and placed within a specific context.

Only academic composition and technical writing are considered within this research project. Many universities require that undergraduate students complete an academic composition course early in their academic careers. The University of Minnesota also requires additional writing intensive courses before degree completion. Many students meet this requirement with a professional or technical writing course. My goal is to develop recommendations for accommodating students with ASDs without altering the nature or goals of the university academic writing curriculum. Supporting an effective pedagogy within university writing courses is the primary concern of this research project. Specifically, this project does privilege the pedagogical biases of the researcher. If we need to radically alter writing pedagogies to accommodate any student population, including those students with ASDs, we should question the validity of the pedagogy. If we believe that writing classes, from first-year

composition to technical writing, engender inclusiveness and democratization within the university setting, then any pedagogy that resists including students with special needs is inherently flawed.

The percentage of post-secondary students with disabilities has risen dramatically within the last decade, now accounting for approximately 11 percent of enrollment (GAO, 2009). Some states have experienced dramatic increases in the need for disability services.

From 1999 to 2007, California public post-secondary schools reported an almost 20 percent increase in the number of undergraduate students with disabilities, and New York schools reported about a 40 percent increase in the number of undergraduate and graduate students with disabilities. (GAO, 2009. P. 8)

Accommodating students with special needs entails more than their presence at the start of a semester. The research goal is to encourage the retention and success of students with autism enrolled in our writing courses. Realistically, it is impossible to eliminate all factors affecting student retention and success, especially within a vulnerable community. This research can, however, aim to improve writing course completion rates and outcomes.

Academic composition and professional writing instruction at the university level are both considered successful if students develop a number of skills, including critical thinking and collaborative abilities (Bruffee, 2003; Conrad & Donaldson, 2004; Garrison & Vaughan, 2008). This is not a claim that collaboration is the primary skill, but rather that is a skill we privilege in many university writing courses.

From both theoretical and empirical perspectives, there is little question as to the necessity and effectiveness of interaction and collaboration to achieve deep and meaningful learning outcomes.... (Garrison & Vaughan, 2008, p. 31)

As composition scholar Kenneth Bruffee (2003) writes:

Collaborative learning provides a social context in which students can experience and practice the kinds of conversation valued by college teachers. (p. 422)

This project uses surveys, interviews, and writings of individuals with autism to determine how online spaces can best facilitate the skills, including collaboration and peer review, some writing scholars consider essential to academic writing. It is possible that some virtual classrooms already feature design choices that foster these skills for all students, including those with ASDs. These features need to be identified so they can be adopted by other writing instructors.

As a university writing instructor who has used Blackboard, Incorporated, course management systems (CMS) at three institutions, I have a personal interest in how such virtual classroom platforms can be customized by writing instructors to accommodate students with autism. Blackboard CMS platforms are installed at 60 percent of institutions with online courses (Kowitt, 2009). If a course management system lacks the flexibility that might be required to accommodate some students adequately within writing courses, we should identify specific features or abilities that are missing. We should also challenge any features that, while meant to improve student experiences, present challenges for students with special needs.

With only vague federal and state laws and regulations as guidance, we should turn to those who can evaluate our designs from the most informed perspective: individuals with disabilities, including ASDs. This research project emphasizes the stated and observed online community preferences of individuals with ASDs because these are true experts in accommodating autism.

While autism awareness has steadily increased since the early 1990s, colleges and universities have been rapidly adopting online technologies that supplement traditional instruction or replace the traditional classroom with an online experience. Autistic students are entering universities at the precise moment more online interactions are required for academic success. It is apparent that the current environment demands a better understanding of how students with ASDs experience online courses.

Definitions

As scholars in rhetoric and composition, we recognize that definitions are problematic in general. A general audience might view technical, scientific, and medical definitions as being more stable than other terms, but our scholarship challenges this assumption. The problem is that this view is demonstrably incomplete. Basic terms in the sciences change slowly, due in part to the conservative nature of science (Gross, 2006). Even erroneous information is slow to change.

For this research project it is important to define the technical, mental health, and legal terminologies used, especially when the words and phrases might have multiple or evolving meanings. Pedagogical concepts are explored within the review of

existing scholarship, where some issues of shared definition and understanding are addressed.

We tend to think, incorrectly, of most words as stable and reflecting precise objects or actions. Words that do have “conventionally accepted definitions” are called “mundane” and we tend to treat mundane words as having undisputed meanings (Schiappa, 2003, p. 33). However, even most philosophical realists accept that meanings can and do shift, sometimes suddenly but usually over time (Harris, 2004; Nagel, 1986). It is also the case that some words hold their general meanings better than others. Where we tend to see conflicts over definitions is on the edges of meaning. Specifically, we struggle most when a definition is based on criteria that are themselves subject to debate.

Because technical, health, and legal terms are subject to lively debates, the use of terms within this project is as consistent as possible based on the definitions given in this chapter. This is not to deny other definitions or understandings, but to establish internal consistency. “Autism” is a disputed term both within the mental health professions and within our laws. Such definitions require making choices about meaning based on circumstances (Perelman & Olbrechts-Tyteca, 1969). How health professionals define autism does not necessarily align with legal uses of the same word (Schiappa, 2003).

We cannot ignore the assumptions instructors and institutions might have regarding the word “autism” and students diagnosed with autism spectrum disorders. When joined together to form the virtual communities we find in online courses, students with ASDs and their educators confront new realities. A discussion of how

educators have reacted to university students with autism appears later in this project. The definitions of autism, both the clinical and general use of the term, do affect instructors and other students.

Technology Terms

Though underlying technology is usually of secondary concern to university writing instructors, we consider digital literacy important to the future of our students. Our technical knowledge and vocabularies are expanding thanks to the adoption of virtual classroom spaces for writing courses. For this project it is necessary to ensure a consistent technological lexicon is used; these are terms that have become or will be common when discussing virtual classrooms. Only terms appearing within the Web site analysis or the survey data are defined in this chapter. This is not an in-depth survey of technologies available to instructors of courses in online spaces. Some technologies university writing courses might use are not addressed in this research project.

When discussing design as it relates to virtual classroom spaces, this project is referring to the technological features of the space as well as the traditional visual design choices. An effort is made here to define current terms relating to online education, many of which describe both the technologies used and their visual elements. Examples include phrases such as course management system (CMS) and virtual learning environment (VLE). These are both sets of technologies and graphically represented, artificial spaces.

Course Management System

With the rise of Wikimedia, Drupal, and similar content management systems, some commercial firms and educational institutions have adopted the same acronym, CMS, for any course management system. An alternative name, learning content management system, LCMS, is also appearing online and in print (Kowitt, 2009; Maeroff, 2003; Moore, McGrath, & Thrope, 2000; Moore et al., 2005). These are not the same as a learning management system (LMS), which is, as the name implies, administrative in nature and not content-based (Seale, 2006). These are hybrid systems that help coordinate both course content and administrative management.

Within this project, CMS refers to any course management system, including those that are general-purpose content management systems, such as Drupal, used for course delivery. The term “courseware” is not used, since it seems to be used to describe specialized software for the development of stand-alone training applications. This project is not concerned with individualized courses or classes delivered to individual students. Only classes and Web sites that resemble gatherings, communities, and virtual classrooms are being considered for this research.

The dominant CMS provider to post-secondary institutions is Blackboard, Incorporated (Kowitt, 2009). Blackboard has acquired six commercial competitors, combining features from the various CMS vendors into a single platform. According to a Fortune/CNN report, Blackboard has 60 percent of the CMS market. Moodle, an open source project, is the second-most popular CMS platform, representing 10 percent of post-secondary CMS installations (Kowitt, 2009). Blackboard has been compared to Microsoft because just as Microsoft has a monopoly within business computing,

Blackboard's CMS platform might become a de facto monopoly within the education market.

CMS systems can include computer-aided learning (CAL) modules, which are self-directed. CAL applications are often used for such things as test preparation and have been called "studyware" by some experts (Maeroff, 2003). CAL is usually individualized instruction, meaning students work individually, at their own pace, mastering materials.

Recently we have seen the rise of virtual learning environment (VLE) applications (Seale, 2006). A VLE uses either visual renderings or abstract text to create virtual classrooms. VLEs attempt to simulate the traditional classroom online (Moore et al., 2005). This can result in shifting the problems of a traditional classroom directly to the online setting, instead of embracing new potentials that exist online (Hawisher & Selfe, 1991; Maeroff, 2003). In part, because our disciplines are unsure of the potential for all-online courses, approximately 80 percent of courses using the Blackboard CMS continue to meet at least part-time in traditional classrooms (Maeroff, 2003).

Graphic Design

When beginning any discussion of the colors, fonts, artwork, and layout of a Web site or individual Web page, the phrase "graphic design" will be used for clarity. This choice reflects the use of "graphic design" in World Wide Web Consortium (W3C) documents; in many ways this is a vestige, like the use of "page" for Web content that is seldom equal to a single printed page. Generally, if an element can be printed or captured as a still image, it will be considered within the context of graphic design. Most CMSs allow significant control over graphic design choices, though not every

institution enables such control at the course-level for writing instructors. Many institutions have graphic design guidelines, often based on official color schemes and approved artwork.

Features, Services, and Applets

When Tim O'Reilly and others within technology media began using the term "Web 2.0" the intent was to highlight the interactive nature of Internet spaces, especially Web sites that allowed visitors to add or alter content (O'Reilly, 2007). Virtual classrooms dedicated to writing ideally embrace as much "Web 2.0" technology as possible, with an emphasis on collaboration and feedback. It is easy for our desire for interactivity to outpace technology, but current CMS platforms are transforming university writing courses.

The term "design" has evolved among Web technologists to include software choices. Such technological design choices are reflected by the features of the online classroom. Some common features determined by technology include:

- Internal e-mail, allowing for private exchanges within the learning system.
- Threaded discussion forums, which organize asynchronous messages in an outline format.
- Interactive, text-based "chat" sessions.
- Virtual whiteboards, which allow "live" demonstrations.
- Online word processing and editing tools.

This project considers which technological features are presented to students to be a design choice. The choice to adopt a particular technology can affect students with

special needs more dramatically than other students. Obviously, silent videos would be perceived as unfair to students with limited vision. But the limitations of students with autism can be less obvious; accommodation strategies require a special understanding of the nature of autism and co-morbid conditions.

A Web site can be a complicated assemblage of software and hardware “services,” and some, none, or all services might be “hosted” on a single computer. Generally, the end-user does not need to know or care how services are implemented. However, writing instructors do need to know which services are supported by the CMS platforms available within their institutions.

Some systems support “client-side” applications known as “applets.” The term applet was once limited to small programs developed using the Java programming language, but current usage refers to any embedded application required to interact with a Web site (O’Reilly, 2007).

Ideally, a CMS would support all possible interactive technologies either via prepackaged modules or via customization by third parties. This would allow writing instructors to select those features they consider essential to their personal instructional techniques. Reality is more complex, though the Web-based virtual classes of today include technologies barely imagined only a few short years ago.

Many of the technology choices made at academic institutions are outside the control of writing instructors. We can and should do our best to have our concerns considered, but there must be someone capable of translating our desires into the technical specifications familiar to programmers and systems administrators.

Additional Terms Used

Because this research project explores the design of virtual classroom spaces, the discussion requires technical terminology. The terms used come from the computer industry, user communities, popular media, and academic scholarship.

Several forms of text-based communication are common on computer networks. In addition to the ubiquitous e-mail, asynchronous text-based exchanges include newsgroups, forums, and listservs. Newsgroups, the most famous of which might be the USENET, reside on centralized servers. To read newsgroups, the user must use “newsreader” software that connects to the server. By comparison, a listserv, is a mailing list service that “pushes” messages to members. A push service means that content is sent to the members, requiring no action on the part of the members.

The benefit of a newsgroup service is that there is no need to join the service or share any information with the server. When the user wants to read the messages, he or she uses a newsreader to retrieve a specific number of recent messages. The benefit of a listserv is that messages are received automatically, via whatever e-mail software a user prefers. The requirement to join a list can help “moderate” the exchanges between members, plus members violating rules can be removed. Newsgroups are difficult to moderate, by comparison.

Forums are messages hosted and stored on a server. Forums generally require membership and they require the user visit the Web site hosting the messages to participate. Messages are stored on the server, not the user’s local computer, which means an active network connection is required to participate. Most CMS platforms use the forum model to restrict who can read messages and participate in discussions.

Synchronous exchanges are those that take place in “real time” between two or more individuals. Examples of synchronous exchanges include chat, instant messaging, video conferencing, and shared whiteboards. These systems require special software.

The most complex synchronous exchanges occur in chat rooms and virtual environments. Chat rooms may be text-based, graphical, or a mixed-format of text and graphics. The Internet Relay Chat (IRC) system is one of the best known text-based chat systems. Members can enter and exit virtual rooms or channels. Many of these are moderated, allowing system operators (SysOps) to remove unruly participants.

Second Life might be the best-known graphical virtual environment. Second Life is known as a virtual world, in which users navigate a three-dimensional map using graphical characters called “avatars.” An avatar may resemble the Second Life user or it may be created to resemble any imaginable creature. Users can even choose to be anthropomorphic objects, such as a talking book. There is no limit to what an avatar can be, though Second Life limits the size of characters.

The term “avatar” is sometimes applied to a simple icon chosen within any online system to represent the user’s identity. Avatars might be representative of the user, but it is also common to use a “bumper sticker” as an avatar to personalize messages.

The VLE concept within CMS platforms is a specialized use for synchronous virtual environments. In fact, some VLE modules make use of Second Life and its avatar technology. Linden Research, Inc. markets Second Life to companies, organizations, and educational institutions as a low-cost and easy-to-use VLE.

Outside text-based chat and email, avatars have supplanted “emoticons.” An emoticon uses standard text characters to represent emotions or concepts. The “smiley” created by a colon and parenthesis might be the most famous emoticon. Modern software tends to convert the typed symbols into a graphic of a smiling face. Many chat applications include several dozen small graphical emoticons that can be inserted into messages. These elements of synchronous interactions were discussed by survey respondents, which is why the terms have been clarified beforehand.

Defining Autism Spectrum Disorders

Autism is, in the purest sense of the phrase, a socially constructed neurological condition. Unlike cancer, we cannot observe the damage done to the human body at the cellular level. Unlike influenza, we cannot detect the virus or responding antibodies. Finally, unlike some mental health conditions, science has yet to find genetic or neurological markers for the conditions grouped together as “autism spectrum disorders.”

For now, and maybe for some years to come, autism is defined by different groups according to different criteria. Because this project attempts to determine design criteria for accommodating students with ASDS within writing courses conducted in virtual classrooms, the symptoms of autism disorders are more important than the diagnostic label.

The Special Problem of Mental Health Terms

The two leading diagnostic guides for autism are the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*, published in print and electronically by the

American Psychiatric Association (APA), and the *International Statistical Classification of Diseases and Related Health Problems (ICD)* of the World Health Organization (WHO). The primary difference is that the ICD offers more categories under the umbrella of autism.

The current edition, the DSM IV-TR, the bible of mental health, logs in at 943 pages and weighs nearly 4 pound. It lists 297 distinct disorders... and guides most of the psychiatric research and training in the world today. (Grinker, 2007, p. 111)

Any health care issues are likely to be debated among researchers, clinicians, politicians, and, most importantly, patients. Edward Schiappa (2003) reminds us that debates involving scientific terms are political no matter who is involved in the discussion. Schiappa suggests scientists should not be assumed to be free from biases.

Definitions proffered by scientists may serve different interests than those put forth by non-scientists, but they serve interests nonetheless. Typically, “scientific” interests can be described as those “internal” to the language community to which a scientist belongs. ... there is no reason to treat a “scientific” point of view as any more “real” or “correct” than the non-scientific definition. (Schiappa, 2003, p. 72)

Schiappa is correct; even the scientists and experts specializing in autism and education cannot agree on a single definition of what constitutes autism. More importantly, even a “medical” definition does not address the situation of a university

having to decide what to consider a disability. The pragmatic nature of diagnosis is impossible to ignore.

Anyone who tells you that psychiatric diagnosis is a strictly scientific exercise is fooling you. In making a diagnosis, doctors consider the educational options, the treatments, the economics, even the sensitivities of the parents, who may prefer or dislike certain diagnoses. (Grinker, 2007, p. 135)

According to psychiatrist and professor Thomas Szasz (2003), the problem with mental health definitions is that some groups have an interest in altering the common usage of the very foundational terms used: “mental health,” “disease,” and “disorder.” Because autism and related developmental disorders have sometimes been referred to as mental health diseases, it is worthwhile to consider the more traditional position of Szasz, since it challenges any effort to create a pragmatic definition of autism.

Unless we agree on the root meaning of the term “disease,” we cannot know what counts as a literal disease and what counts as a metaphorical disease, that is, not a true disease. ... If we fail to settle the argument about what should count as a disease, or settle it on the basis of capricious, politically grounded criteria, we incapacitate ourselves from thinking clearly about should count as health care or treatment, who should pay for it, and many other health policy issues we now argue about. (Szasz, 2003, p. xxxii)

One of the challenges for universities is that autism and other mental health disorders are categorized and described by symptoms, not underlying causes, which have yet to be identified. Scientists understand that autism is a “phenomenological

diagnosis” (Schreibman, 2005, p. 52) while students, parents, and educators may not comprehend or even care about scientific precision.

Scientific concepts are defined by scientists and then used, or not used, by people as they deem fit. ... Authority over the scientific definition of disease must not be confused with power over controlling medical interventions available to people or with authority to judge the ethics of medical research, prevention, or treatment. In a free society, people have a right to think anything they want, including believing they have a disease even when they don't. (Szasz, 2003, p. 24)

Autism Defined

What most mental health professionals consider mild autism today was first described in an academic paper in 1926 by Russian neurologist Ewa Ssucharewa in 1926 (Attwood, 2007). The first in-depth clinical case studies to use the specific term “autism” were published by Leo Kanner (1943). Kanner published case studies of eleven children with what he named “infantile autism.” Kanner’s patients had average or above average intelligence, but had difficulty engaging the social world. The patients labeled autistic by Kanner met specific criteria, while the existence of other mental health conditions explicitly precluded the label. According to Grinker (2007) Kanner saw himself in these children. The children preferred order and isolation. They were sensitive to particular noises and other sensations. And like Kanner, all were concrete thinkers. As a result, Kanner’s criteria for autism created a narrow definition, meant to apply to a select group of individuals.

The definition of autism as a distinct condition first appeared in the *DSM-III* in 1980. Kanner's basic criteria remained in place, though mental retardation no longer precluded a diagnosis of autism. Mental retardation is now associated with nearly half of autism cases (Grinker, 2007; Yapko, 2003). Those individuals with average or above average intelligence are now more likely to be labeled as having Asperger's syndrome.

A contemporary of Kanner, Hans Asperger, also studied individuals with social and language impairments (Asperger, 1944). While Kanner published in English, Asperger's work remained in German until 1991 when translated by Uta Frith. Though Lorna Wing had written about Asperger's studies ten years earlier (Wing, 1981), these papers were not widely circulated, so mental health professionals in the United States were largely unaware of these case studies. Asperger's patients were less impaired than Kanner's, but they were also similar enough that today clinicians consider "Kanner's Classic Autism" and "Asperger's" two extremes of the same diagnosis. Unlike Kanner, Asperger did not establish criteria for the disorder he observed. The criteria used for Asperger's syndrome are still evolving. In the United States, diagnostic guides use Asperger's syndrome, often with syndrome capitalized. It should also be noted that internationally, Asperger syndrome or Asperger disorder is used, without the possessive. The syndrome entered clinical language in 1988.

Although the original descriptions of Asperger were extremely detailed, he did not provide clear diagnostic criteria. In London, in 1988, a small international conference was held on Asperger's syndrome, with speakers who had begun exploring this newly discovered area of the autism spectrum. One of the results of the discussions and papers was the publication of the first diagnostic criteria

in 1989, revised in 1991 (Gillberg, 1991; Gillberg and Gillberg, 1989). (qtd in Attwood, 2007, p. 36)

Even this short historical background reveals the problem facing universities: autism, a condition recognized as a federal disability, is a condition without a stable definition. This instability existed before what might be one of the strangest stories of a definitional shift occurred. We would like to imagine that a book of definitions used by a group of health professionals to categorize individuals would be an example of near-perfect editing. As readers, we probably anticipate minor errors, but certainly we do not anticipate such an error changing a definition so greatly that potentially thousands of lives are affected. And yet, that is precisely what happened due to a minor error in the 1994 edition of the DSM (Grinker, 2007). A single word changed, “and” became “or” in a checklist, and the definition of autism was altered and expanded in ways likely unimaginable to Kanner or Asperger.

The publication of the *DSM-IV-TR* corrected this error and autism was restored to the intended, narrower definition the editors of the *DSM* had adopted in 1993 and had expected to see in print in 1994. For at least six years, and probably longer, clinicians used the “wrong” definition of autism. A definition with a single error in typesetting affected more than research data — this definition affected the lives of individuals. With the “explosion” of people categorized as autistic between 1992 and 2000, closely paralleling the period during which the broader definition of autism was in print, it is reasonable to infer a causal relationship between the definition and the “epidemic” of autism.

Those individuals with average or above average intelligence, but exhibiting traits associated with autism, are likely to be labeled as having Asperger's syndrome or high-functioning autism (Attwood, 2007). Autistic individuals participating in online education courses are likely to be those diagnosed with high-functioning autism (HFA) or Asperger's syndrome (AS). The literature on HFA/AS individuals indicates a high rate of above average to genius level capacities (Attwood, 2007; Bowler, 2007; Shore, 2003; Tammet, 2007; Yapko, 2003). So, while rare, these individuals might have unique capabilities that should be embraced and nurtured by universities.

Because autism is mentioned specifically in various disabilities-related laws and regulations, university departments responsible for disabled student services are expected to not only know what autism is, but to make accommodations available accordingly. The benefit of moving towards pragmatic definitions of what constitutes autism disabilities at the university level is that most schools are primarily concerned with educating students, not adherence to strict mental health definitions. A pragmatic approach is likely to be supported by parents and students, as well. Psychologist Alexander Durig (1996) observes that parents and clinicians working with students diagnosed as autistic are less concerned with the causes of autism than they are with the best treatments.

Parents and experts are not as interested in a theoretical claim to what Autism really is, as much as they are interested in the development of treatments, therapies, and curricula that will streamline the social experience of people with Autism. But the development of such therapeutic treatments may be mired

currently in controversy precisely because no one can agree on what Autistic perception in is the first place. (Durig, 1996, p. 11)

Current definitions of autism have shifted from the DSM-IV-TR to more service-oriented definitions; clinicians apply the term autism to a broader set of students to obtain various social, educational, and treatment services for those students. Mental health professionals in the United States have moved beyond the criteria of the DSM-IV to use “Autistic Spectrum Disorders” to describe a range of symptomologies. The use of Autism Spectrum appears to have originated at the London conference of 1988. It could be said that the editors of the DSM, though selected by other APA members for their specialized knowledge, have “lost control” of the word autism and its meaning.

More than 100 books have been published on Asperger’s syndrome since 1988, most of these for parents of K-12 students (Attwood, 2007). Between 2005 and 2006, nearly 300 general audience titles on autism were published (Grinker, 2007). These books do not adhere to the DSM-IV-TR, but instead used a variety of terms and descriptions to define autism. Bogdashina (2006) suggests the characterizations found in these books of autism as a spectrum moves beyond clinical definitions.

As autism is a spectrum disorder and its manifestation varies from individual to individual, it is no wonder, therefore, that many ‘non-official’ but widely accepted descriptions have emerged: high-functioning autism (HFA), low-functioning autism (LFA), ‘mild autism,’ ‘moderate autism,’ ‘severe autism,’ ‘autistic traits,’ ‘autistic tendencies.’ It is necessary to note that these terms are subjective. There are no clinical definitions of words such as ‘high-functioning autism,’ ‘low-functioning autism,’ ‘mild’ or ‘severe’ autism. However, because

autism is so wide ranging, professionals may use terms like these to describe where on a continuum they believe an individual's abilities may lie.

(Bogdashina, 2006, p. 27)

As some clinicians and advocates push for the broadest definitions of autism, the public might begin to question the seriousness of the diagnosis. Gifted autistic individuals perceived as successful academically, such as Temple Grandin and Stephen Shore, complicate public perceptions of autism. This has been called the "conundrum of being both gifted and disabled" (Solomon, 2008). Universities will have to deal with these perceptions when deciding which autistic students qualify for accommodations.

The students with autism that universities will be asked to accommodate are likely to have been diagnosed as having high-functioning autism (HFA), Asperger's syndrome (AS), or pervasive developmental disorders (PDD). Individuals with diagnoses of AS or PDD are characterized by only minimal symptomologies. The criteria used for Asperger's syndrome are still evolving.

There is a cultural bias against labeling students as autistic (Grinker, 2007). As a result, some clinicians will use only the Asperger's syndrome or PDD-NOS diagnoses, recognizing that these will still be considered under the heading of autism by most institutions.

It is important to acknowledge that the PDD-NOS diagnostic classification is sometimes employed when a diagnostician is simply reluctant to use the Autistic Disorder label. In fact, in one study 176 children with Autistic Disorder were judged to not be significantly different from 18 children with PDD-NOS on any

neuropsychological or behavioural measure (when nonverbal IQ was controlled; Rapin et al., 1996; cited in Filipek et al., 1999). (Brock, 2006, p. 6)

Diagnostic terminology will undergo a major revision in 2012, with the publication of the fifth edition of the *DSM* (Wallis, 2009). The APA is considering the elimination of both Asperger's syndrome (AS) and pervasive developmental disorder, not otherwise specified (PDD-NOS) from the diagnostic matrix, replacing current delineations between autism disorders with a single category of autism spectrum disorder (ASD). The goal is to reduce confusion and implement a single standard diagnosis for autism (Wallis, 2009).

This official terminology shift will occur over time, as clinicians and researchers adopt the ASD standard. Already, use of the term "spectrum" appears to be widespread in books and articles, so the official change might be following popular usage (Wallis, 2009). Because the *DSM* is used as a reference in laws and regulations, the ASD designation will be legally important to educational institutions.

Legal Terms and Mandates

According the U.S. Government Accountability Office report "Higher Education and Disability," as of 2008 approximately 11 percent of post-secondary students had a legally recognized disability (GAO-10-33, 2009). Autism spectrum disorders are considered a mental health disability within U.S. laws and regulations (Palmer, 2006; Wolf, Brown, Bork, Volkmar, & Klin, 2009). Legal definitions are not necessarily consistent with definitions used by mental health professionals. This project requires a minimal review of the legal terms and mandates associated with ASDs and education to

explain requirements that apply to higher education and any online courses offered.

Admittedly, this is an abridged discussion of terminology limited to matters affecting writing instructors conducting university courses in virtual classrooms.

Autism as a Legally Recognized Disability

Diagnostic tools such as the DSM and ICD are clinical, philosophical, legal, and political. Courts throughout the world use the guidelines in these manuals to determine mental fitness, for example. The Americans with Disabilities Act (ADA) and the Individuals with Disabilities Education Act (IDEA) use editions of the DSM to define various disabilities, including autism.

The vague language of the ADA describes a disability as “a physical or mental impairment which substantially limits one or more of such person’s major life activities” (Americans with Disabilities Amendments Act of 2008). Universities must comply with the ADA by providing reasonable accommodations for both employees and students with disabilities (Wolf et al., 2009). Courts have rules that autism and comorbid conditions can “substantially limit” an individual (Sherman, 2007). But, this must be determined on an individual basis, complicated by the concept that there is a range of severity within the autism spectrum.

The Children’s Health Act of 2000 created the Studies to Advance Autism Research and Treatment (STAART). The eight primary research centers are located at leading universities. This act is but one of several examples indicating congressional intent to classify autism as a disability (Combating Autism Act of 2005). In 2004, the 108th Congress reauthorized the Individuals with Disabilities Education Act (IDEA), extending and expanding the Education for All Handicapped Children Act of 1975.

Several interceding legislative mandates were incorporated into the revised IDEA legislation. IDEA 2004 specifically mentions autism spectrum disorders and mandates the training of educators to recognize and serve HFA/AS students.

With autism established as a legally recognized disability, educators must address the specific needs of students with ASDs. Unfortunately, as with the legal definition of disability, there are few legally prescribed accommodations for students with ASDs.

Mandates and University Writing Courses

University writing instructors, especially those of us teaching courses in virtual classrooms, must recognize that our courses are subject to federal regulations and mandates. What makes writing courses and our disciplines unique is that we deal with areas specifically addressed in federal legislation and regulations, in particular the right of students with disabilities to engage in “includes learning, reading, concentrating, and thinking” (GAO, 2009). The legal mandates discussed in this section apply to all university courses, including online courses, though many issues remain unresolved by existing court precedents.

Many faculty are aware of the Americans with Disabilities Act (ADA), which requires federally funded institutions provide accommodations, and thus equal access, for students with disabilities. These requirements apply to both public and private institutions. Since the passage of the ADA in 1990, additional legislation has emerged with respect to accommodating students with disabilities. [...] In an instructional setting an “accessible Web site” is designed

to accommodate a wider set of ways students can access a Web site's content.

Many Web sites are designed with visual aesthetics, rather than equal access, as the goal.

... One technological domain in which faculty members may be behind the curve is in designing accessible Web sites. Section 508 could be interpreted as applying to individual faculty members who are an integral part of such universities. Thus, individual faculty members could be held liable (or responsible) for complying with the legal mandates of Web accessibility for the individual Web sites they create and use for instructional purposes. (Bradbard & Peters 2010, p. 2-3)

Our pedagogies reflect a dedication to equality, participation, and civic engagement. Legal mandates elevate these beyond pedagogy, raising equality in our classrooms to a legal obligation. Of specific concern to instructors designing online writing courses should be the Higher Education Opportunity Act (HEOA, Pub. L. No. 110-315, August 14, 2008), which added new provisions to the Higher Education Act of 1965 (HEA) to support post-secondary students with disabilities (GAO 2009). The Americans with Disabilities Amendments Act of 2008 (ADA Amendments Act, Pub. L. No. 110-325, September 25, 2008) also affects our courses because it amended the Americans with Disabilities Act of 1990 (ADA) to provide broader coverage for post-secondary students.

Title II (Section 202) of the ADA requires universities make their facilities, programs, services, and activities accessible to the disabled. The ADA interprets

information technology and related communication as part of the aids and services that must be reasonably accommodated for the needs of disabled students. (Bradbard & Peters 2010, p. 12)

Our course designs are subject to state and federal requirements to provide accommodation for students (and faculty) with special needs. As the previous section of this chapter demonstrates, autism and ASDs are considered disabilities. Writing courses offered online, like all other courses at a public university, are covered by sections of the ADA; Sections 504 and 508 of the Rehabilitation Act of 1973; and the Family Educational Rights and Privacy Act (FERPA). The inclusion of online technologies was established by two cases filed in 2005: the Association for Disabled Americans, Inc. v. Florida International University (405 F.3d 954 U.S. Eleventh Circuit) and La Marca v. Capella University (U.S. Ninth Circuit, dismissed).

Unfortunately, as stressed throughout this chapter, laws and even legal decisions are often vague and even contradictory. However, the U.S. District Court opinion in Association for Disabled Americans, Inc. v. Florida International University including a finding that ADA was passed as a “clear and comprehensive national mandate for the elimination of discrimination against individuals with disabilities,” citing a previous decision by the Supreme Court, Tennessee v. Lane (541 U.S. 509, 124 S.Ct. 1978, 2004). Specifically with respect to Title II, public entities are prohibited from discriminating against “qualified” persons with disabilities in the provision of a public service, program, or activity. Title II would apply, according the District Court, to a public university in terms of its educational programs that are available to students. Persons with disabilities were describes as “qualified.”

The case involved a claim that Florida International University failed to provide adequate auxiliary aids and services, such as adaptive technology, equivalent online access to course materials, effective note takers, qualified sign language interpreters, etc., to disabled students. Based on this case, an institution's vulnerability to suit under the ADA by disabled students could be substantial. Any institutions receiving public funds, including most private institutions, fall under Title II of the ADA, according to part of this ruling.

Until researching disability laws applicable to university courses, I must admit that I was unaware that our designs of online writing courses were potential liabilities. As a graduate student I had taken excellent courses in traditional and digital pedagogies, but there had been no discussion of legal mandates. We should work within writing disciplines to expand awareness of these requirements, including the vague nature of laws, regulations, and court cases as explained in the remainder of this section.

We specialize in guiding students toward effective communication. According to the 2009 GAO report,

The ADA Amendments Act rejected several Supreme Court decisions which had narrowed the definition of an individual with disabilities. In addition, the ADA Amendments Act set out guidelines for determining who qualifies as an individual with disabilities and provided a non-exhaustive list of "major life activities," which includes learning, reading, concentrating, and thinking. (3-4)

Reading and writing are considered major life activities according to Congressional hearings and findings (GAO, 2009). In fact, the GAO pointed to the need to write and communicate to be a successful college or university student. The

university writing course is, therefore, dedicated to something our society has determined is a core life skill for modern life: human communication. The ADA mentions “effective communication” explicitly. The official ADA Web site (<http://www.ada.gov>, 2009) emphasizes the following statutory language:

III-4.3200 Effective communication. In order to provide equal access, a public accommodation is required to make available appropriate auxiliary aids and services where necessary to ensure effective communication. The type of auxiliary aid or service necessary to ensure effective communication will vary in accordance with the length and complexity of the communication involved.

The ADA applies to any “public accommodation,” a legal phrase that means any space where the public can enter and engage, ranging from government offices to private businesses that are open to the general public. Universities are considered public accommodations and must comply with all sections of the ADA. This use of “accommodation” to mean a gathering place, real or virtual, can be confused with the adaptations made to the design of a space. Online course have been ruled “public” spaces, though access is restricted to “qualified” individuals, a term directly from the Amended ADA.

Though *La Marca v. Capella University* was dismissed, the court hearing the case did find that an all-online, private university such as Capella is under Title II of the ADA and must comply with all Section 504 and 508 guidelines. However, the court found that the university had demonstrated a “reasonable effort to comply” based on the learning disability of the student involved (Carnevale, 2007). This case established that a reasonable effort to comply is a legal defense, but that still means online courses,

including our online courses in writing disciplines, must reflect such an effort. Again, what is “reasonable” has long posed problems for courts deciding ADA cases, as noted by Schiappa (2003), a situation unlikely to improve in the short term.

It is suggested that those designing spaces in which communication is a primary task consult with disability and technology experts. Communication is definitely primary to the writing classroom. However, the ADA is typically vague in what measures we must take to make our writing classrooms accessible in compliance with ADA mandates.

While consultation is strongly encouraged, the ultimate decision as to what measures to take to ensure effective communication rests in the hands of the public accommodation, provided that the method chosen results in effective communication. (ADA Title III-4.3200)

We are compelled, by law, to ensure that nothing in our virtual classrooms impede the ability of students to engage in “effective communication” with either the instructor or other students. While true of all online courses, this seems particularly relevant within writing courses. To limit the ability of a student with autism, or any special needs, to participate in a meaningful way is a violation of the ADA. As writing scholars, we recognize that the legal terminology relies on adjectives and adverbs, modifiers without specific meanings. We are compelled to do our best when designing courses for access and participation, without knowing if regulators and courts will judge those efforts as sufficient within the law.

While the ADA provides little guidance for writing instructors, the Sections 504 and 508 of the Rehabilitation Act of 1973, revised in 1990, do attempt to define

accommodations in clear language and with specific examples (Seale, 2006). Section 508 includes a discussion of computer access and design considerations mandated by federal usability regulation (§1194.22). The Web Accessibility Initiative (WAI) is a sub-committee of the World Wide Web Consortium. The WAI has adopted international guidelines similar to Section 508 (McFarland, 2004; Seale, 2006). These guidelines are extensive and beyond the scope of this review of scholarship. However, they are available online at the WebAIM site (<http://webaim.org/>).

Adam A. Milani (1996) analyzed ADA decisions relating specifically to higher education. Referencing *Alexander v. Choate* (1985), in which the Court decided Section 504 of the Rehabilitation Act of 1973 requires a balance between “the need to give effect to the statutory objectives and the desire to keep section 504 within manageable bounds,” Milani suggests colleges have a great deal of flexibility in setting requirements. The fundamental nature of a university education is not the same as a high school education: students can be excluded from particular fields of study, for example. In 1979, the Court recognized in *Southeastern Community College v. Davis* (U.S.C. § 12182(b)(2)(A)(ii); 34 C.F.R. § 104.44(a); 442 U.S. 397, 1979) that a deaf student was not entitled to special modification in a nursing program (GAO 2009, p. 4). Universities are required to remove unreasonable barriers that unfairly discriminate against students: an autistic student is expected to attend the same classes, complete the same work, and demonstrate the same skills as his or her peers within a university degree program. As the GAO observed,

While schools are required to provide reasonable accommodations to qualified students and bear the costs, schools are not required to provide accommodations

that would fundamentally alter the nature of a program, lower or waive essential academic requirements, or result in undue financial or administrative burdens.

(Milani, 1996, p. 4)

For this research project, the usability standard of Section 508 are used to analyze Web site accessibility. However, a writing course complying with the language of Section 508 might still be in violation of the ADA, which is left to courts to interpret on a case-by-case basis.

Student Expectations: Shaped by K-12 Mandates

University writing instructors must always deal with the challenges experienced by students shifting from secondary to post-secondary settings. For students with special needs, the transition is complicated by a reduction in legal and institutional supports at the university when compared to the high school experience (Bundy 2004; Erb 2008). The more we know about the secondary classroom, the greater our ability to help writing students with special needs make the transition successfully.

The majority of students with ASDs entering colleges and universities will have attended public high schools, and an increasing number of public schools are specialized to serve students with autism or similar disorders (Walsh, 2007). Many current secondary students with ASDs have received accommodations throughout their elementary and secondary education experiences. The GAO determined that increased numbers of students with disabilities enrolling at post-secondary institutions

may result from the increased proportion of elementary and secondary students who have received special education services over the past 30 years. (GAO, 2009, p. 8)

Legal mandates placed on K-12 schools require that public schools provide a specific, formal educational plan for any student with special needs. These plans are known as Individualized Education Plans (IEPs). The Code of Federal Regulations (34 CFR §§300.320-300.328) requires an IEP for any disabled K-12 student. An IEP is prepared by a teacher, often with the assistance of school district special education experts, and then refined during a meeting with parents or guardians of the disabled student.

In the K-12 setting, a request to meet with the student and his or her guardians usually includes a disclosure of both any disabilities and the symptoms that might affect learning or the classroom environment. This is not the case at the university level. Our writing classrooms, like all university courses, are regulated by the Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99). Under most interpretations of FERPA, the disability services of a university discloses only ideal accommodations and those symptoms likely to affect others in a physical classroom setting.

FERPA, which applies to all schools that receive any funds under an applicable program of the U.S. Department of Education, is meant to protect students' privacy and to prevent discrimination. However, it could be argued that university writing instructors would benefit from disclosure of specific conditions instead of symptoms. As demonstrated with definitions of autism, symptoms are the definition. Because

success in university writing courses, especially those courses hosted in virtual classrooms, could be affected by learning disabilities associated with reading, writing, and cognitive delay, writing instructors might be tempted to assume a condition based on the disclosure of symptoms.

Student or guardian disclosure is not legally sufficient, under FERPA, ADA, or 504/508 regulations, to qualify for accommodations. If the virtual writing classroom is suggested or promoted as an accommodation for students self-identifying as disabled, we should understand how the student or guardian determined the existence of a disability.

The Department of Education provides model forms and information on the requirements for IEPs. The terms used on many of these forms, however, are undefined either on the model forms or within federal statutes. When a school determines a student meets the criteria for services, this is reported to the U.S. Department of Education. There is no mandate for a clinical evaluation to determine if a student has autism or any autism spectrum disorder (Grinker, 2007; Wolf et al., 2009). Legally, schools determine “autism” and “disability” without federal guidance, though we know autism is a protected disability.

Federal regulations have been influenced by advocacy groups (Grinker, 2007; Sherman, 2007), leading to aid in public schools for autistic children that is not available to all groups with mental health issues. The Office of Special Education Programs (OSEP) of the Department of Education oversees the reporting of special education statistics from both public and private K-12 schools. The OSEP’s October 2006 report on IDEA data collection explains just some of the complications resulting

from the way Congress dictates, however vaguely, definitions. Extremely similar terms had different definitional criteria. Researchers are warned by the OSEP to consider how definitions and reporting rules shift over time “before analyzing and reporting on these data” (2006). No currently counted disability category aligns with a category reported before 1991.

In 1990, the *Education of the Handicapped Act (EHA)* was reauthorized by Congress. In the reauthorization, the name of the law was changed to the *Individuals with Disabilities Education Act (IDEA)*, and the names of all disabilities were also changed. (OSEP, 2006, p. 1)

Before 1991, OSEP forms did not include autism, traumatic brain injury, or developmental delay (Grinker, 2007). Autism certainly existed, but it was not reported to the Department of Education as a condition requiring classroom accommodations. Grinker suggests students were categorized as “mentally retarded” or with other conditions before OSEP forms were updated for the 1991–92 academic year. Department of Education model forms were further revised in 1997 (Grinker, 2007).

Though the OSEP collects data from the states, territories, and other U.S.-affiliated schools, it does not determine how states themselves collect data from schools. This leaves states to establish standardized definitions for conditions such as autism or, as is more often the case, states leave it to school districts to establish definitions for OSEP reporting. In this way, the definition of autism begins to include a spectrum of individuals when statistics are reported.

Variation in services is not unusual because public school districts must decide how to comply with state and federal mandates while at the same time struggling with

shifting clinical and legal definitions of autism disorders. How each school defines autism determines which services a student might receive (Exkorn, 2005; Palmer, 2006; Wolf et al., 2009). Regardless, the K-12 student is used to receiving special assistance without engaging in self-advocacy.

Student Responsibility

While a post-secondary institution is legally obligated to serve students with ASDs, a university can only be expected to arrange the required accommodations if the student discloses his or her disability and any comorbid conditions. The ADA includes reference to legal protections for obvious physical disabilities regardless of non-disclosure by the individual. However, developmental and mental health disabilities are not obvious and under current U.S. laws and regulations

it is the responsibility of post-secondary students to identify themselves as having a disability, provide documentation of their disability, and request accommodations and services. (GAO, 2009, p. 5)

States and individual institutions have had to develop their own definitions and criteria to determine when a condition is eligible for additional educational supports and any physical accommodations (Harpur, Lawlor, & Fitzgerald, 2004; Palmer, 2006; Pollak, 2009; Wolf et al., 2009). Depending on state laws, which attempt to define autism in the absence of a clear federal definition, a university writing instructor might be forced to adopt a definition of autism that embraces a particular view of the disorder.

Starting in 2009, the Department of Education intends to track students registered for disability services at U.S. colleges and universities (GAO, 2009). We will

have students both clinically diagnosed and legally labeled “autistic” in our university writing courses. A legal designation is not a mental health diagnosis, but it might result in the same mandates for accommodation within a university writing course.

Limitations

Because autism has been a clinical diagnosis for high-functioning individuals only since the mid-1990s (DSM-III, revised in DSM-IV), there is a small population of university students and former university students officially diagnosed with autism spectrum disorders. Over time, it is reasonable to assume the number of individuals diagnosed with ASDs who attend a post-secondary institution will increase. Future studies should have a larger, more representative sample available for survey and interview methodologies.

Even with a relatively small sample population of 48 individuals, statistically significant data were collected and analyzed for this research project. Because the percentage of adults diagnosed with ASDs is under one percent (Attwood, 2007), a small sample can be representative of the larger subject population (Neuman, 2007). Based on statistical modeling, the ideal sample size would be 50 cases per one percent of the general population; this sample might be representative of the community they represent (Neuman, 2007). This potential for validity is explored further within the method discussion of Chapter 3.

Observed behaviors and preferences might be more reliable than self-reported preferences collected via survey methods, but such a study would necessarily last several years, following the academic experiences of students diagnosed with ASDs.

The institutional review board (IRB) determined that students with autism, regardless of age, are a vulnerable population. This meant that observations of standard educational practices, which are exempt in usual circumstances from IRB review and formal consent procedures, were not approved for this specific project. It was suggested that an observational study could be developed and approved, but only with a significant time investment. Unfortunately, the limited pool of subjects might affect the viability of an observational study, even without time constraints.

Pedagogical Constraints

This project considers online academic composition and technical writing courses, specifically university-level academic writing courses. There are dominant writing pedagogies that have evolved within both composition and technical writing programs with some consistent components. Most college writing instructors have experience with writing workshops. This does not refer to a physical writing lab, though many universities do offer dedicated places for students seeking writing assistance. Instead, this is a reference to a pedagogical approach that privileges peer interactions throughout the writing process. In particular, revising and editing are conducted within small peer groups of student writers.

What this project seeks to discover is not for an ideal design that accommodates students with autism regardless of the writing pedagogy, but the best design for an online course that embraces the author's personal pedagogical approach to academic writing instruction. The online writing classroom must therefore facilitate or even

encourage collaborative writing and peer review practices. This project does not attempt to address other writing disciplines, such as creative writing.

Our online courses in academic composition and technical writing often seek to recreate the participatory, collaborative environments of traditional classrooms. Unfortunately, we are often constrained by course management software (CMS), also known as learning management software (LMS). Despite any obstacles posed by hardware or software, writing instructors do attempt to recreate and enhance collaboration in our online courses. Because CMS platforms vary, this project cannot determine the best practices for specific CMS platforms; only general suggestions can be offered based on the data analyzed.

Significance

This research project intends to offer suggestions that improve the design of university writing courses conducted in virtual classrooms so the courses might better accommodate students with autism spectrum disorders. As stated earlier, the goal is to improve course designs while embracing an underlying writing pedagogy of inclusion, democratization, and engagement. I believe that writing courses are special within the university and we, as writing instructors, have an obligation to serve all university students equally.

According to the U.S. Government Accountability Office, disability service personnel admit “they lack experience in supporting the needs of students with autism” (GAO, 2009, p. 22). Universities are struggling to develop appropriate accommodations in part because autism specialists are still rare within campus disability service offices.

The GAO report notes that a handful of institutions are developing autism-specific training and support for faculty and staff (GAO, 2009, p. 22).

Autism researchers specializing in education have suggested there is “evidence that computer-aided learning is well accepted by students with autism” (Moore et al., 2000, p. 218), yet the lack of specific research is a recurring theme in the literature (Moore et al., 2000; Moore et al., 2005). The use of computer technology was “relatively unexplored” at the turn of the century (Moore et al., 2000, p. 218). Five years later little research still existed, but computers were increasingly used in the classroom.

[There is] an increase in research and development work involving CBL [computer based learning] for users with autism (see Moore, 2005, for an overview of recent work in the field). Despite this, however, the field remains largely unexplored (Beardon, Parsons, & Neale, 2001; Hardy et al., 2002). In particular, one promising approach to CBL, which has thus far seen very little research as an educational tool for people with autism, is the use of “virtual environments.” (Moore et al., 2005, p. 231)

The value of academic education within the autism community is emphasized by advocates and researchers (J. Cohen, 2005; Palmer, 2006; Prince-Hughes, 2002; Sanders, 2004; Shore, 2003; Shore, 2004; Wolf et al., 2009). Our writing classrooms can help students develop academic, workplace, and interpersonal skills. The writing disciplines have a history of scholarship dedicated to civic awareness and constructive social change (Berlin, 2003; Corbett, Myers, & Tate, 2000; Dubinsky, 2004; Selfe, 1999; Tate, Rupiper, & Schick, 2001). This project extends the ideals of previous

writing scholars by recognizing a set of potential students who will challenge some of our preconceptions, not only about students but about what it means to engage in rhetorical analysis and critical thinking. Individuals with ASDs do experience and evaluate social interactions, including reading and writing, in ways some writing instructors might not initially appreciate.

While this research project only deals with the design of virtual classroom spaces, I hope that the readers and future writing scholars come to recognize that some basic assumptions in academic writing pedagogy can devalue the autistic experience. As only one example, to “think like someone else” is not an autistic trait, yet it is something many of us ask of academic composition and technical writing students within the process of audience analysis as will be explored briefly in the review of writing instruction scholarship in the next chapter (for historical perspective see Blakeslee, 2004; Connors, 2004; Corbett, Myers, & Tate, 2000; Dubinsky, 2004; Murphy, 2001).

Furthermore, not only is thinking like an idea audience member difficult for some with autism, but also considering the needs and intentions of class peers can be a challenge. In autism, what Simon Baron-Cohen refers to as “theory of mind” is lacking, resulting in “mindblindness” (Schreibman, 2005, p. 114). This makes negotiating social situations difficult, yet every writing class is a social situation. Even our virtual classrooms are richly collaborative spaces.

If the findings of this project help writing instructors design virtual classrooms in which students learn more about each other, the value goes far beyond helping autistic students understand their classmates. Many students, not only those with ASDs,

resist collaboration and peer review. By researching ways to work with a population particularly resistant to collaboration and social interaction, writing scholars might be able to smooth the transition to collaborative writing practices for all students. If we can create welcoming, comfortable, and supporting virtual classrooms for writing students with autism disorders, we will be simultaneously improving these spaces, and writing instruction, for all university students.

In addition to the potential to refine our pedagogies, our writing spaces do need to comply with state and federal mandates for accessibility and usability. It is not sufficient for a technology to be accessible if that access still results in asymmetrical learning experiences. Federal law emphasizes “effective communication” (ADA Amendments Act of 2008), which means the communication experience should be meaningful and productive. For example, offering students an alternative to a live chat session or video feed is asymmetrical: the accommodation presumes a “separate but equal” experience that no writing instructor should endorse.

As Cook and Grant-Davie (2005) acknowledge, “accessibility remains a surprisingly under-researched area of online education” within the writing disciplines (p. 7). Because writing classes are often a shared experience for students regardless of their major fields of study, our classes should be inclusive not only of the ideas and philosophies found throughout the university but we must also strive to include students regardless of any special needs.

Designing online writing classes that comply with ADA and Rehabilitation Act mandates should actually support our pedagogies as university writing instructors. Inclusive designs inherently reflect the dominant pedagogies in our disciplines.

Scholarship dedicated to improving virtual classroom spaces will necessarily be ongoing, and the writing disciplines are likely to continue their leadership within this body of research.

Considering Professors with Autism

Though this project aims to improve the experiences of university students with ASDs who enroll in our writing courses, ideally this project raises awareness of faculty members at universities who are also diagnosed with autism spectrum disorders. The Chronicle of Higher Education addressed this population in a 2005 article, “A Secret Syndrome: Professors with a mild form of autism must decide whether to reveal their diagnosis.” If professors feel they must hide ASDs from other faculty members and students, maybe projects such as this will help overcome some of the stigma and prejudice associated with autism.

After twenty-five interviews, and twenty-five rejections, Professor Lars Perner decided to disclose his ASD with a personal note accompanying each job application (Diament, 2005). Writing a personal narrative and the rhetorical skill of anticipating the needs of his audience were key to Perner obtaining an assistant professorship. However, Perner is an exception, as

many other professors who have autism choose not to tell their colleagues. They say that too few people, even among faculty members, understand the diagnosis and that if they reveal it they will be pitied or perceived as less capable.

(Diament, 2005)

We like to think of colleges and universities as uniquely tolerant and inclusive settings. However, they do reflect society as a whole and can be slow to change their own cultures as institutions. Writing courses, including those hosted in virtual classrooms, are spaces in which differences are negotiated and explored. As future generations come to appreciate that “autism” is not debilitating, merely a form of difference, hopefully faculty members can serve as role models for students with ASDs.

CHAPTER 2: REVIEW OF EXISTING LITERATURE

Introduction

Since university writing courses seem to be offered in virtual classrooms in greater number each year, it is important that we continue to research online writing spaces to improve the experiences of all students. This project examines how we might adjust writing course designs to better accommodate students with autism spectrum disorders. The foundational literature is, therefore, existing scholarship in the disciplines most closely associated with academic writing. Because there are rich literatures within composition studies and technical communication related to online writing instruction, research from writing scholars in these fields inform the research for this project.

The review of existing scholarship begins with what is known about the affects of autism among those with ASDs who are likely to pursue post-secondary education. References to writing pedagogies are made within the review of autism research, and then expanded upon later in a specific review of writing instruction scholarship.

While appreciating the nature of autism is essential to this project, autism itself is not and should not be the focal point. The students and their eventual success in online courses, including writing courses, are my primary concern. Students with ASDs do have special needs; once identified we must make a reasonable effort to accommodate those students in our writing classrooms. The essences of dominant writing pedagogies tend to emphasize skills paramount to success in post-secondary settings. If we sacrifice pedagogies that develop skills essential to future success, we are shortchanging students under the guise of accommodating their disabilities.

As an individual with physical and neurological limits, I know that not everyone can do every task. In fact, that is why teaching collaborative skills and social learning is an important task of the university writing course. By learning how to work with others, to accept people based on their talents, we learn to work on teams towards shared needs and desires.

To develop writing courses that accommodate students with ASDs, it is necessary to draw upon the clinical research related to autism and the memoirs of individuals with autism who have experiences in higher education. There is an expanding literature exploring how individuals with autism navigate higher education. By bridging the literature on autism and higher education to scholarship in writing pedagogy, I hope to demonstrate that we can develop writing courses with virtual classrooms that accommodate and support students with ASDs.

Knowing the theoretical bases for academic composition and technical writing pedagogies, especially theories and research addressing university writing courses in virtual classrooms, we can look to how accommodations for other special needs were, or were not, successfully provided. Though composition and technical writing are distinct, the disciplines do share a common scholarship and the dominant pedagogies are informed by many of the same researchers and theorists.

The writing disciplines include extensive literature on integrating courses with diverse socioeconomic populations provides insights because individuals with ASDs have described themselves as “strangers” among a “neurotypical” majority (Passantino, 2007; Prince-Hughes, 2003; Solomon, 2008). There are potential physical, linguistic,

and even cultural barriers to integrating students with ASDs into the university writing classroom. These are certainly not unfamiliar issues within the writing disciplines.

After reviewing the literature, I offer a rationale for the design of this research project. That rationale, that we can extend our past accommodation strategies in ways that are effective for students with ASDs, is then expanded into hypothetical set of design principles that are tested within the framework of the presented research data.

Literature on Students with Autism

University writing instructors who encounter students with autism spectrum disorders are most likely to encounter individuals with high-functioning autism (HFA), Asperger's syndrome (AS), or a pervasive developmental disorder (PDD). These are sometimes referred to as "mild" autistic disorders, especially when compared to Kanner's syndrome (also called "classic autism") or severe degenerative disorders, such as Rett syndrome, also known as Rett's disorder (Exkorn, 2005; Grinker, 2007; Schreibman, 2005). Sadly, severe autism is associated with diminished mental capacity, even in the rare cases of autistic savants (Exkorn, 2005). Because only one percent of the general population possesses savant skills, but ten percent of individuals with ASDs are savants, a myth has developed that high-functioning autistic individuals are necessarily gifted in some way (Exkorn, 2005).

The nature of universities includes admissions processes limiting student populations to those with academic, social, and other valued skills. "Holistic" admissions are still potentially exclusionary for students with ASDs and other disorders that are accompanied by social impairments (Wolf et al., 2009). It is likely that writing

instructors at colleges and universities, based on the preceding factors, will need to develop accommodations for a subset of the population with autism.

Autism research ranges from neurological studies to examinations of behavioral therapies. Autism is viewed as a disability to treat, with existing research making limited gestures towards accommodation (Diament, 2005; Harpur et al., 2004; Moore et al. 2000; Moore et al., 2005; Wolf et al., 2009). There does appear to be a division between those seeking cure/treatment-centered research and advocates concerned with integration and social advocacy (Solomon, 2008; Wallis, 2009). University writing instructors, many of whom view their classrooms as places for inclusionary practices, are ideally situated to conduct theoretical and practical research to integrate students with special needs, including autism.

The review of research on students with autism that follows is narrowly focused on the characteristics of autism commonly found among those with mild symptoms. Because ASDs are complex, a review of scholarship on autism must explain how symptoms of autism and commonly comorbid conditions affect individuals capable of university-level academic tasks. The review will focus on how autism affects social skills, which are important in any classroom environment, and language cognition, which is of interest to writing instructors. Writing instructors generally focus on issues of social engagement, as demonstrated by our embrace of “rhetoric” within the field, and language skills, represented by “composition” scholarship. Autism disorders and other disabilities require that we also consider physical and emotional obstacles faced by some students.

Colleges and universities generally require evidence of a medical or mental health condition before offering special accommodations to an individual (GAO, 2009; Wolf et al., 2009). However, universities vary in the type of documentation required before disabled student services will work to provide accommodations to the student. The requirements can range from a public school diagnosis updated during high school to a new neuropsychiatric examination. An analysis of university requirements reveals that some universities accept a physician's diagnosis, as well (GAO, 2009). There is no clear national legal requirement covering the qualifications of a health professional providing the diagnosis of "autistic" on behalf of a university student.

Unfortunately, it is not possible to write of "autism" as a single condition or set of symptoms. The unknown etiologies, uneven expression of symptoms, and a general lack of precise understanding complicate the efforts of educators to accommodate students diagnosed with autism. The complicated nature of autism necessitates an exploration of why universities will struggle to accommodate students diagnosed with ASDs.

University Students Diagnosed with Autism Spectrum Disorders

With an increased awareness of autism spectrum disorders, our ability to accurately diagnose ASDs has improved dramatically since 1994 (Grinker, 2007; Yapko, 2003). Only two decades ago the diagnosis of autism was rare, with the United States Centers for Disease Control reporting 15,580 diagnoses among school-aged children in 1992. Whether we are improving diagnostic criteria or actual instances of autism are increasing, official diagnosis is more common today. The Individuals with

Disabilities Education Act requires that reports of student disabilities be gathered by the Office of Special Education Programs (OSEP), an office within the Department of Education's Office of Special Education and Rehabilitative Services (OSERS). By 2003, in the United States 141,022 students had an official diagnosis of autism; reported cases of autism were increasing at a 20 percent annual rate (Grinker, 2007; OSEP, 2008). Many of these students, having received individualized instruction, will be qualified academically for post-secondary education.

Books meant to help students with ASDs and their families prepare for the post-secondary experience are now widely available. Titles include *Realizing the College Dream with Autism or Asperger Syndrome: A Parent's Guide to Student Success* (Palmer, 2006); *Succeeding in College with Asperger Syndrome: A Student Guide* (Harpur et al., 2004) and the collected memoirs in *Aquamarine Blue 5: Personal Stories of College Students with Autism* (Prince-Hughes, 2002). Also available are books for faculty and staff, such as *Students with Asperger Syndrome: A Guide for College Personnel* (Wolf et al., 2009) and *Neurodiversity in Higher Education: Positive Responses to Specific Learning Differences* (Pollak, 2009).

Students with ASDs who are likely to gain admission to colleges and universities are generally categorized as high-functioning autistic (HFA) individuals. But HFA is not a DSM-IV-TR sanctioned diagnosis. Clinicians assign this label to individuals who demonstrate autistic traits at an early age but possess a Full Scale IQ above 70 (Attwood, 2007; Bogdashina, 2006; Yapko, 2003). For university writing instructors attempting to accommodate students with autism, Bogdashina (2006) and Wing (1996) complicate matters by adding subgroups with names that might be

misconstrued. These two clinicians subdivide autistics as “aloof,” “passive,” “active,” and “stilted.” These terms are not clinical, though. Wing’s definitions stress the “inappropriate” behaviors of autistic individuals, again without defining what constitutes inappropriate.

The literature on university students with ASDs is limited, but expanding (Erb, 2008). Personal memoirs (Grinker, 2007; Sellin, 1995; Shore, 2003; Tammet, 2007; Williams, 1992) include numerous stories of alienation and academic failures. The traits characteristic of autism appear to create a barrier between these students, their peers, and their instructors. The traits of autism are an important consideration for researchers in the writing disciplines because the nature of autistic personalities challenges assumptions about communication and identity. Also, individuals with autism embody some of the characteristics that have been previously studied within computer-mediated communication (CMC) research.

The nature of ASD dictates that only a portion of ASD individuals are likely to succeed academically. However, the students with ASDs most likely to be admitted into post-secondary institutions will exhibit some common behavioral traits. These students, according to researchers (Attwood, 2007; Exkorn, 2005; Harpur et al., 2004), are likely to exhibit a unique mix of traits.

Intellectually:

- Above average to extremely high intelligence
- Literal, concrete understanding of language
- “Black and white” ethics and beliefs
- Honest (tactless)

- Logical
- Detail oriented

Socially:

- Avoids eye contact and touch
- Independent
- Isolated
- Fails to “read” social cues
- Difficulty compromising routine
- Forgetful about or inattentive to hygiene
- Socially naive, especially women with ASDs

Physically:

- Aversion to light (photophobia)
- Synesthesia (senses “cross” neurologically)
- Aural sensitivity
- Acute sense of smell (hyperosmia)
- Clumsy, uncoordinated

Emotionally:

- Seems “sad”
- Prone to anxiety and depression

While there might be some social difficulties or physical awkwardness, the average to above average intelligence of these individuals allows them to function in classrooms and society (Harpur et al., 2004; Palmer, 2006; Pollak, 2009; Wolf et al.,

2009). There are those who suggest “geeks,” those obsessed with particularly demanding academic subjects, are likely to exhibit “autistic” traits. Durig suggests most people have autistic traits.

[W]e might consider the notion that there is not actually such a thing as Autism as much as there is a phenomenon of Autistic perception that is experienced in varying gradations. In current terminology, a person with Autism is actually a person with very strong Autistic perception. (Durig, 1996, p. 98)

The “autistic perception” described by Durig includes traits and manners of considering the world that we, as writing instructors, claim to value. We teach our students that logical, quantitative analysis is important when presenting an argument in the form of academic writing, a tradition dating back to at least the nineteenth century in English studies (Ferreira-Buckley & Horner, 2001). This logical approach was further cemented in our writing classrooms during the Cold War (Hobbs & Berlin, 2001). Perceiving the world in detail, with heightened cultural and emotional sensitivity, is also something we claim to value as writing instructors (Corbett, Myers, & Tate, 2000; Tate, Rupiper, & Schick, 2001). This might not translate into an appreciation for the rigid logic and heightened perceptions of autistic individuals, despite any implications in the texts we use and classroom lectures we deliver in the writing disciplines. As the survey data and comments presented later suggest, the obsession with details and precision associated with autism can be a hindrance to effective communication, at least from the perspective of participants in this project.

Researchers have suggested that gifted students with autism are easily noticed as being different, though teachers might not consider them disabled (Grandin, 2001). One

challenge for writing instructors and other students in a traditional writing classroom is that

unlike a disability that confines an employee to a wheelchair or the language barrier that a foreigner faces, autism is something others can't see or easily understand. (Mayor, 2008)

Autism can range from an "intellectual advantage" to a severe impairment, and there is an implication "that genius in any field is an abnormality" (Grandin, 2001).

Challenges for Students with Autism

Before discussing challenges for students with autism that unquestionably relate to writing pedagogies, a brief discussion of traits that affect the general academic performances of these students is in order. There are strategies we can use within the writing classroom, especially in virtual spaces, to help not only students with ASDs but all students dealing with some of the adjustments university success requires.

Lars Perner, a professor with Asperger's syndrome, explains that students with ASDs are likely to struggle with higher education. He also stresses that specific challenges are not unique to students with ASDs, but are more pronounced and can exacerbate autistic traits. Perner told the Associated Press:

Autistic students often drop out or do not attempt college because they have difficulty with bureaucracy, time management, and taking notes, tests and required classes not in their area of expertise.... (Bundy, 2004)

Potential ways to address these problems are discussed in detail as part of the research analysis appearing in Chapter 6. From providing online calendars to adjusting

writing assignments to allow students to address their personal interests, there are ways to guide students towards good academic habits and reduce their stress.

Autism and Social Connections

Somewhat paradoxically, while we often discuss individuality and self-awareness in writing courses, individuals with autism can seem self-centered and isolated. Because individuals with ASDs struggle with concepts of empathy, audience, and “the other” according to both research and personal memoirs, the challenges these students face are in direct conflict with what we privilege in many university writing courses. Many individuals with ASDs have few social connections. Some, including Temple Grandin, express a lack of interest in emotionally based human social contact (2006). Nazeer (2006) has also documented this tendency to limit social interaction to contacts necessitated by work or personal interests. Individuals with autism base their relationships on shared interests and common goals.

Grandin (2006), Nazeer (2006), Shore (2004), and other individuals diagnosed with autism have written about their struggles with audience analysis and demands to think like other people (Shore, 2003). Yet, our writing courses often concentrate on these difficult concepts—with expectations that students with ASDs cannot meet without additional assistance. Audience and community are further complicated within writing courses conducted online.

College writing instruction often is based on notions of community and shared interests. However, these communities tend to be artificial, with the slight common connection being students are enrolled in the same composition or technical writing

course. Issues of community and writing pedagogy will be detailed in following sections. Without adaptation, community and socially based pedagogies might not serve students with ASDs. However, it is also true that these students will need to function within a social society.

Some autistic people are shattered by their social deficits, while others are largely uninterested in friendship. Those who are told throughout their lives that they are bizarre and aberrant are less likely to feel good about who they are than those who receive supportive messages. It is not possible to separate the person and the autism.... (Solomon, 2008)

How students with ASDs deal with social challenges varies, as it does for all students. What we can do is aspire to design writing courses that do not exacerbate the isolation many of the students' experience.

Autism and Interpersonal Communication

Social and language skill deficiencies are indicative components of an autism diagnosis. Yet, our writing classrooms, traditional and virtual, assume certain social and linguistic competencies. The difficulties with language might be less disruptive to writing instruction than the social deficiencies associated with ASDs. Traditional pedagogical practices, such as peer editing and workshops, are likely to be difficult for students with ASDs. The designs of online writing courses might influence the ability of students with ASDs to interact with their peers. Designing collaborative communities is essential.

Uta Frith's neurological research has found that individuals with ASDs have a demonstrable "inability to attribute mental states, such as desires and beliefs, to self and others (mentalizing)" (2001). This inability proves an obstacle to the pedagogical traditions that have evolved in the writing disciplines, as mentioned previously when exploring audience analysis. This challenge is also explored in the data analysis of this project, since study participants commented upon not understanding the motivations or intentions of others. An inability to imagine the thoughts of others limits both social interactions and the ability to anticipate the needs and interests of an intended audience.

Abnormalities of the cerebellum and the limbic system may cause... abnormal emotional responses. Margaret Bauman and her colleagues at Massachusetts General Hospital autopsied the brains of people with autism and found that both the cerebellum and the limbic system had immature neuron development. Eric Courchesne also found abnormalities in the cerebellum on MRI brain scans. (Grandin, 2006, p. 87)

According to Grandin (2006), many individuals with autism she has interviewed have a limited range of emotions and therefore "complex emotional relationships are beyond... comprehension" (p. 91) In extreme cases Grandin has found individuals with ASDs who experience only calm, fear, sadness, and anger. There is no "joy" or extreme "happiness" (p. 93). Research has found people with Asperger's syndrome have less brain activation than other people when viewing scenes of a character being injured or harmed (Frith, 2001; Grandin, 2006).

The social connections of the writing classroom are similar to those of a workplace. A description of a computer expert with Asperger's syndrome highlights the

difficulties faced by students with ASDs in the workplace. These traits are also likely to exist among university students with ASDs.

What Jeremy is not good at is suffering fools in the workplace or dealing with the endless bureaucracy of the modern corporation. If someone is wrong — if their idea just plain won't work — he says so, simply states the fact. That frankness causes all manner of upset in the office, he's discovered. (Mayor, 2008)

It is not uncommon for individuals with ASDs to prefer working alone (Bundy, 2004). This might be because they are not interested in friendship (Solomon, 2008), or it might be that they simply prefer to focus on things instead of social interactions (Attwood, 2007; Bundy, 2004; Moore et al., 2000). While writing instructors are aware that group work and collaborative projects are resisted by many students (Blakeslee, 2004; D. Selfe, "Collaborating," 2004), the avoidance of group interactions associated with autism is likely neurological, not social, in origin (Frith, 2001) and therefore more challenging to address, even with computer technology (Moore et al., 2005).

Researchers have found conflicts are common in student groups in which a member has an ASD (Harpur et al., 2004; Wolf et al., 2009). The required social interactions result in increased stress, which in turn leads to more expression of the symptoms associated with ASDs. Another potential problem is that most students with ASDs have highly specialized interests and will expect near-perfection from other students when collaborating on a project in that field. There is some concern that professors lack the training to understand the group dynamic or to help mediate the conflicts that arise (Wolf et al., 2009).

Mathematical savant Daniel Tammet was socially isolated as a student because “other children didn’t know what to make of him” and his interests in numbers and things (Johnson, 2005). He preferred to think about mathematical and linguistic patterns during his free time, instead of talking to other students. It is not that he dislikes people; Tammet simply finds that “numbers are my friends” (Johnson, 2005).

Autism and Language Cognition

University students with ASDs are often described as using precise, formal language. As young children, it is common for students with ASDs to be described as precocious or even as “little professors” (Attwood, 2007; Schreibman, 2005; Yapko, 2003). It is common for ASD students to demonstrate unusual perseverance, even obsession, with topics of interest to them. As a result, ASD students learn the related jargon of their area of interest with a scientific precision. This language ability does not translate into the ability to consider abstractions. One study of students with Asperger’s syndrome found that 67 percent had difficulty with what is called “pragmatic competence” in language. Even with high verbal abilities, the language handicap was significant in routine conversations (Tantam, 1991).

Exploring the challenges of assessing neurodiverse populations, including students with autism, Heather Symonds (2009) concludes that these students with language cognition differences

are still required to be assessed directly within the field of their disability by being asked to *write* about their knowledge, interpretation of the subject and understanding. In order to write at the level expected, they often have to read

inaccessible texts. Creative artists, for instance, are asked to read semiotics and comprehend the *jouissance* of the text, presented with polysyllabic and unfamiliar word, which stretch the memory and auditory processing facilities. (p. 244)

Kamran Nazeer (2006) and Daniel Tammet (2007) both describe the challenges they experienced learning idioms, metaphors, and other elements of language. Nazeer found that visual and vocal cues had to be memorized, while Tammet continues to struggle with abstraction. Yet, these men are both known for their intellectual abilities: Nazeer as a philosopher and legal scholar, and Tammet as a mathematician and computer programmer. Universities should prize such individuals as students. Considering such individuals, this project does explore the possibility that online writing instruction is a barrier, a virtual gatekeeper limiting academic success.

Writing classrooms, real or virtual, can frustrate ASD students. Frith (2001) notes of individuals with autism that “even those who become verbally fluent still have problems in comprehension” (p. 969). Because ASD individuals tend to be concrete thinkers, with literal modes of operation and understanding, many of the typical university assignments can be problematic (Bogdashina, 2006; Bowler, 2007; Frith, 2001; Shore, 2003). While ASD does not preclude creativity, the creativity tends to be based on forms of realism, with accuracy prized by the ASD student.

Metaphors, idioms, and other figurative language are confusing for the ASD student (Baron-Cohen, 1995; Bogdashina, 2006; Frith, 2001; Rogers & Williams, 2006). Many of these students memorize phrases and sayings, using forced recall to interact with peers. New or unexpected language results in confusion or even alienation.

The literature does not explore how these language patterns affect ASD students in textual online environments.

Tammet speaks French, German, Spanish, Lithuanian, Icelandic, Esperanto, and has developed his own language based on rigid rules and patterns (Johnson, 2005). Researcher Simon Baron-Cohen, director of the Autism Research Centre at Cambridge University, has found that such language skills are common among high-functioning and savant individuals with ASDs (Johnson, 2005). Baron-Cohen emphasizes that the language exhibited by these individuals is pattern-based, often spoken in a sing-song, rhythmic manner that reflects the modular, definitional approach to communication employed by people with autism.

Researchers have suggested that language is acquired in social settings, with Frith providing a review of the supporting literature (2001). Children learn mental state verbs (want, know, think) before they understand color names, according to observational studies. However, individuals with ASDs learn concrete words and are much slower to develop mental state awareness (Baron-Cohen et al., 1996; Frith, 2001). The early words of students with ASDs are things, often without any descriptive modifiers. For example, Autistic savant Stephen Wiltshire's first word was paper, relating to his desire to draw (Wiltshire, 2009).

One of the more fascinating aspects of language and autism is that extreme word "maturity" is found among those able to process complex social intentions (Frith, 2001, p. 972). In fact, young children with autism had to exceed the linguistic abilities of their peers by four or more years to demonstrate equal social intention skills. In other words, though the student with ASDs might possess impressive language skills, the emotional

maturity and linguistic maturity are unaligned. Manipulating language with precise skills does not necessary reflect any other form of social cognition.

Frith (2001) theorizes that language for the individual with ASDs is set of patterns to be learned and employed, much as the same individuals are attracted to mathematics. It is not “associations between behavior and outcomes” (p. 973) that shapes language in students with ASDs, but how well they process patterns such as linguistic roots, grammar systems, and other discernible artifacts of communication. Though a simplification, it might help writing teachers to think of students with ASDs as memorizing words and language, which means lessons that reveal patterns in writing might be useful.

Autism and Tech

Much of the early literature on computer mediated communication (CMC), especially within composition studies, suggested that technology could be a democratizing factor within university writing courses, in particular by removing barriers to discussion participation within networked environments (Hawisher & Selfe, 1991). Online, the theory held, students would be more likely to participate equally, with the dynamics of the traditional classroom disrupted. The supposed absence of verbal and visual social indicators of ethnic, gender, and socioeconomic status was expected to allow writing students to focus on shared knowledge creation (Taylor, 1997; Monroe, 2004). However, scholars within the writing disciplines now challenge some of the assumptions about virtual spaces (Hawisher & Self, 1991; Moran, 2001; Oppenheimer, 2003; Spears & Lea, 1992).

Though there are limits to virtual classrooms, network technologies might benefit students with autism spectrum disorders. Mental health experts and autism researchers have found that many individuals with ASDs find technology comfortable, even inviting (Anthes, 1997; Attwood, 2007; Grandin, 2001; Mayor, 2008; Moore et al., 2000). If university students with ASDs also demonstrate an affinity for technology, then offering writing courses online are a valid and important potential accommodation to meet the special needs of this student population.

As early as 1997, Silicon Valley publication *ComputerWorld* was reporting on autistic computer programmers and technologists. The article “My Code Just Flies” featured interviews with autistic individuals who related better to computers than people. Ami Klin, assistant professor of child psychology at the Yale Child Development Center at Yale University Medical School explained that computer are “very autism-friendly” (Anthes, 1997).

“Computers are very rigid, and so are the people we work with.... One of my clients once had a very nice insight,” Klin adds. “He described himself as a computer simulation of a human being. He tried to decode the social world in a way that a computer would try to make sense of it.” (Anthes, 1997)

According to autism experts, careers in technology and engineering are common among individuals with ASDs (Attwood, 1998; Harpur et al., 2004). Despite this emphasis on science and technology, Attwood (1998) cautions that we “must not assume that the only career options involve science, engineering, and computers” (p. 180). It has become something of a truism that “the computer technology industry has a number of successful people with Asperger traits” (Harpur et al., 2004, p. 52).

ComputerWorld returned to the topic of autism in high-tech in 2008, with “Asperger’s and IT: Dark Secret or Open Secret?” Temple Grandin told the magazine there was definitely a link between autism disorders and the computer industry.

“Is there a connection between Asperger’s and IT? We wouldn’t even have any computers if we didn’t have Asperger’s,” she declares. “All these labels — ‘geek’ and ‘nerd’ and ‘mild Asperger’s’ — are all getting at the same thing. ... The Asperger’s brain is interested in things rather than people, and people who are interested in things have given us the computer you’re working on right now.” (Mayor, 2008)

While the technically skilled students with ASDs often bring unusual, even spectacular computer skills to composition classes, they often prefer technology to interactions with other students. The *ComputerWorld* series was one of many such profiles of programmers with autism. Experts refer to Asperger’s syndrome as “Silicone Valley Disorder.” While a stereotype, Tammet (2007) believes there is truth to the claim autistic individuals might prefer computers. Tammet himself develops CAL software for language and math education (Johnson, 2005; Tammet, 2007). Grandin (2001) asserts

It is essential that talented children labeled either high functioning autism or Asperger’s be trained in fields such as computer programming, where they can do intellectually satisfying work. (p. 1)

The family histories of individuals with autism have revealed 2.5 times the number of engineers in previous generations when compared to other families. There

are also more students with autism diagnosed in areas of high-tech industries and research (Grandin, 2001). The correlation between specific skills in families and autism might explain why students with autism seem to relate well to technology. As noted in the introduction, I expected that comfort with technology and online spaces might make writing courses online more effective experiences when compared to traditional classroom spaces for students with ASDs. However, the findings demonstrate a more complex situation; online is different, but not necessarily better simply because a student enjoys exploring technology. Writing courses are, even when online, about the skills and experiences gained writing regardless of the technological tools used during instruction or composition.

While Dickie Selfe (“Collaborating with Students,” 2004) cautions that it is easy to overestimate the technical skills of this generation, the truth is that most of the students have naturalized technology in their lives. Many of the students with ASDs I have interviewed consider online spaces a refuge, a place to avoid complicated interactions and confusing social cues. Kelli Cargile Cook (2005) suggests that such naturalization leads students, and writing instructors, to accept writing technologies uncritically, “not as experiences tied to theory or a practice open to inquiry” (p. 57). Cook emphasizes the importance of pedagogy and writing instruction, which includes asking students to be aware of their tools and environments.

The concerns expressed by writing scholars are explored further within my review of literature in the writing disciplines. Because that is more likely to be familiar to readers than issues of autism, I will touch upon autism and writing in general before a richer exploration of academic composition and technical writing scholarship.

Computer-Aided Learning and Autism

There is some hope that collaborative virtual environments (CVEs) can help students with ASDs succeed not only academically, but socially. It has been suggested that CVEs exist “as an assistive technology, as an educational technology, and as a means of helping address any theory-of-mind (ToM) impairment” (Moore et. Al, 2005, p. 232). The lack of specific research, however, complicates any assumption that CVEs will assist students with ASDs as they attempt to master both the academic and social aspects of our writing courses. The literature seems to encourage individuals with ASDs who might want to avoid social situations, yet the virtual classroom is certainly a social space.

Thus, CVE technology can potentially help people with autism who cannot or do not wish to come together physically, but who wish to discuss common interests. The technology may therefore provide a means by which people with autism can communicate with others, and thus circumvent, at least in part, their social and communication impairment and sense of isolation. (Moore et al., 2005, p. 233)

The qualifiers “potentially” and “may” are difficult to ignore and reflect most of the current scholarship on autism and technology as an accommodation. Some autism researchers are optimistic that an interest in technology could lead to social interactions with other students. Despite the lack of supporting research, one of the leading Asperger’s and autism scholars suggests,

an interest in computers should be encouraged, not simply as potential means of employment but to encourage self-confidence and social contact. The child can be become a personal tutor to children in their class. In turn, these children may then help the [autistic] child in other situations in gratitude for their guidance in computers... (Attwood, 1998, p. 98)

Though educational scholars theorize that students with ASDs, especially Asperger's syndrome, might benefit from online settings (Maeroff, 2003), there is little evidence that supports this assumption. Anecdotal evidence is insufficient grounds for redesigning our virtual classrooms. Also, any changes to designs of writing spaces might not improve the interactions between students with ASDs and their peers. John Elder Robison (2007) says that though he "studied computer programs that engage in conversation" to improve his interactions with people, he doubts he is "much better than the machines" (p. 189).

Autistic savant Daniel Tammet has founded a courseware company specializing in math and language instruction. According to Johnson, Tammet claims courseware has "the fringe benefit of keeping human interaction to a minimum" (2005). This reflects Tammet's preference for solitude.

According to Judy Singer, an autism activist with an ASD, the Internet is "a prosthetic device for people who can't socialize without it" (Solomon, 2008). However, Singer emphasizes that an individual must want to communicate for accommodations to matter. Temple Grandin states that "you can't degeekify the geeks" (Solomon, 2008). The student with an ASD who is obsessed with technology, not people, might not gain social skills regardless of the designs of our online classrooms.

Technology as a Barrier to Skills

The possibility that technology could be a barrier to social and communications development for students with ASDs enrolled in online writing courses should concern the writing disciplines. Many of us embracing activist pedagogies want students to develop not only their writing skills, but a sense of engagement and social responsibility (Berlin, 2003; Corbett et al., 2000; Dubinsky, *Teaching Technical Communication*, 2004; Freire, 1998; Grabill, 2004; Murphy, 2001; Tate et al., 2001). According to some autism experts, technology can become the focus of an individual with an ASD, allowing the person to feel safe and avoid social interactions, actually working against social engagement (Attwood, 2007; Grandin, 2006). Technology, unlike people, allows the individual with autism a sense of control and order.

“Adults with Asperger’s have a social naiveté that prevents them from understanding how people relate. What draws them in is not parties and social interaction, but work that allows them to feel safe, to feel in control,” explains Steve Becker, a developmental disabilities therapist. (Mayor, 2008)

One of the questions asked as part of this research project is how often students with ASDs interacted with other students in online settings. If the technology enables avoiding social interactions that would be difficult to avoid in the traditional writing classroom, we should be concerned. Unfortunately, as the findings suggest, avoidance is precisely why some with ASDs preferred online settings. Writing classrooms are about people, about our communications within specific contexts. When virtual classrooms reduce our role to teaching genres, mechanics, and grammar, then we are no longer teaching university writing courses with pedagogies reflecting social engagement.

Indeed, it might be argued that use of the computer for education may exacerbate any social difficulty of users with autism, causing them to rely on, and perhaps become obsessed with, the computer, and thus engage in less “real” social interaction (cf. Parsons & Mitchell, 2002; Parsons et al., 2000). (Moore et al., 2005, p. 233)

Parents of students with ASDs are concerned that technology, especially obsessions with computer programming or similar skills, exacerbates the lack of social development in their children (Grandin, 2001). Catering to student preferences for things instead of people might be problematic, though Attwood (1998) suggests computers and technology are ideal tools for individuals with ASDs. This project considers online social interactions because it does seem, at least anecdotally, easy for students with ASDs to withdraw from engagement with others. These students might consider virtual classrooms safe, and even prefer them to traditional writing classrooms, but what is safe might not be better educationally for the students. That an online setting is convenient or less challenging emotionally is not a pedagogical justification for teaching writing courses in virtual spaces and, as will be demonstrated in the review of writing scholarship, runs counter to prevailing pedagogical trends in the writing disciplines. I believe writing instructors, including me, want to challenge our students to be engaged and socially active.

Autism and Self-Advocacy

Many scholars within the writing disciplines embrace advocacy pedagogies, notably Paulo Freire (1998) and James Berlin (2003). In fact, one might assume activist

pedagogies have been dominant since the late 1960s (Dubinsky, *Teaching Technical Communication*, 2004; Jarratt, 1991; Murphy, 2001; Villanueva, 2003). Because the autism self-advocacy movement was founded by college students (Solomon, 2008), writing classrooms can point to this movement as an example of student engagement. This movement resembles other civil rights movements, as it seeks social change instead of changing the traits of individuals with ASDs.

Autism advocates are an entirely new category: The whole idea didn't really exist five years ago. Moreover, rather than advocating for a cure, or seeking research into the cause of the much-publicized "autism epidemic," these activists argued that society needed to change, not autistic people. (Solomon, 2008)

Ari Ne'eman describes himself as "the only kid in third grade who brought the newspaper to school in the morning" (Solomon, 2008). This reflects the language precociousness detected by autism researchers (Frith, 2001). Language is an essential tool for self-advocates. Online spaces might privilege language skills over social skills, as scholars in writing disciplines once hoped (Anson, 2003; Licklider, 1968; Monroe, 2004; Moran, 2001; Walther, 1992).

Temple Grandin, a professor of animal behavior who happens to be an individual with autism, argues that ASDs might be an evolutionary advantage. Grandin claims the asocial tendencies associated with autism and accompanying desire to focus on things and patterns, leads to discoveries and innovation. According to this theory, having some individuals free from distractions benefits the community. Grandin believes,

“If you got rid of all the autism genetics, you’d get rid of scientists, musicians, mathematicians. Some guy with high-functioning Asperger’s developed the first stone spear; it wasn’t developed by the social ones yakking around the campfire.” (Solomon, 2008)

The preceding quote reflects the blunt, direct nature of an individual with an ASD. Though she is a university professor, Grandin can seem dismissive of “the social ones” who are called “neurotypicals” by the autism self-advocacy movement (Solomon, 2008). It is my personal belief and commitment that university writing instructors, especially within academic composition, can help individuals develop more effective methods for discussing difference that does not seem condescending or insulting to the majority. Students with ASDs need to be persuasive self-advocates, especially within academic institutions.

College students must become their own advocates, a change that can take them and their families by surprise, said Donna Martinez, executive director of George Washington University’s Health Resource Center.... (CNN.com/AP, 2008)

Writing instructors are in a unique position to support self-advocacy, one some pedagogies specifically embrace, such as examples within feminist pedagogies and pedagogies concerned with marginalized students. There is a rich scholarship on personal advocacy in writing, including works by figures such as Paulo Freire (1998) and Susan Jarratt (2001). The view that autistics are “better” is explored within the findings of this study; such statements might be a reaction to marginalization.

If our virtual writing courses can help students with ASDs learn to negotiate a heterogeneous community, then their overall ability to navigate the institution of the university should also evolve. We do not seek to discourage the pride of individuals with ASDs, but we wish to help them communicate it more clearly and effectively. It might be that virtual classes help reduce tensions while these students develop advocacy skills.

Autism and Writing

The Writing Process

Students with ASDs are likely to struggle with the writing process as taught in university writing courses. Lad Tobin's "Process Pedagogy" (2001) offers an excellent overview of the rise of process-based pedagogies, observing "our nearly evangelical zeal exaggerated the contributions of Murraray, Elbow, Macrorie, and Graves" (p. 7) during the 1970s and early 1980s. Process scholars value a discussion among student writers and models such as conferencing or workshops. Lee-Ann Kastman Breuch (2003) also offers an overview of process scholars and finds that there is no single process, but rather a divergent view of what constitutes "technique that could be mastered" in writing instruction (p. 107). With these caveats in place, I do believe many of us teach writing as a series of steps, which I associate with Donald Murray's landmark essay, "Teach Writing as a Process, Not Product" (1972, 2003).

The writing process itself can be divided into three stages: prewriting, writing, and rewriting. The amount of time a writer spends in each stage depends on his personality, his work habits, his maturity as a craftsman, and the challenge of

what he is trying to say. It is not a rigid lock-step process, but most writers most of the time pass through these three stages. (p. 4)

Murray's claim that 85 percent of time is spent in prewriting is of particular interest (1972, 2003). If we can use technology to help students during the prewriting process, technology might have pedagogical benefits for students with ASDs. Because a common trait among students with ASDs is poor time management and planning skills, also known as executive functions (Attwood, 2007; Harpur et al., 2004; Wolf et al., 2009), writing instructors in both traditional and online settings may want to emphasize calendars and schedules. Planning strategies might help all students, so addressing the needs of students with ASDs has wider benefits to members of the writing classroom. The writing process can become tedious, and even emotionally traumatic for the student with an ASD.

Writing, a recognized challenge for any types of specific learning difference, requires students to overcome mental blocks based on past academic pressure, while struggling to organize thoughts and words, hoping that in proof-reading, one error is not corrected at the expense of another being made. (Symonds, 2009, p. 244-5)

Potentially more challenging for students with ASDs are issues of analysis that require considering the author's perspective or the potential perspectives of other audience members (Happé, 1991; Wolf et al., 2009). Checklists and detailed rubrics might assist the student, but research has found the Theory of Mind skills required for

such analyses cannot be taught (Baron-Cohen, 2000; Frith, 2001; Happé, 1991; Wolf et al., 2009).

On a minor note of concern, researchers have found that most students with ASDs have difficulty with the fine motor control required for handwriting (Attwood, 1998). The student can become so frustrated with the mechanics of writing that the process suffers. In such instances, computers are an ideal accommodation and virtual writing classrooms potentially more inviting because all work is typed, recorded, or digitally produced in some manner.

Identifying clear steps in the writing process seems potentially helpful for students with ASDs; at the same time, the dialogical basis of many process theories requires social interactions that are challenging for students with autism. Workshop writing models might not translate well in online or traditional settings for students with ASDs, a concern I hope comments and survey responses within this research project address. A full review of process theories is beyond the scope of this research project, but I do believe we will need to consider the affect of these theories on students with developmental social deficits that resist discussion-based, workshop models of instruction. Again, this project explores the writing experiences of individuals with autism; knowing these experiences will enable further studies of specific writing pedagogies.

How Autism Affects the Writing Act

For writing instructors, a central question should be how autism affects the communications skills of capable postsecondary students with autism spectrum disorders, many of whom have extremely high Iqs and language pattern skills. As this

project illustrates, even intellectually able students with ASDs have communications anomalies that result in social and intellectual isolation (Attwood, 2007; Harpur et al., 2004; Wolf et al., 2009). How these deficiencies manifest themselves in a writing class should be clarified.

Francesca G. E. Happé (1991) has asked, “What can we point to in their writings that deserves the label ‘autistic’?” (p. 207). Analyzing published works is challenging, since the process involves extensive collaboration and most authors, with or without disabilities, receive assistance (Happé, 1991). However, there are sections of published works and various personal writings that have been analyzed by autism and writing scholars to discern patterns that might reveal what constitutes “autistic” self-expression (Happé, 1991; Roth, 2007).

Because students with ASDs treat language as one might approach computer programming, the result is correct language use that still fails within the writing classroom. Happé (1991) notes, “There is less wrong with autistic language than with its usage” (p. 229). The formally correct but “odd” use of language by students with ASDs, a language reliant more on precise nouns and verbs, might seem cold or even disconnected from readers.

Happé finds that Temple Grandin often assumes reader knowledge and fails to connect passages effectively.

Although surprisingly well written, Temple’s unghosted work is hard to follow in places, in ways that are perhaps significant.... (Happé, 1991, p. 209)

Within Grandin’s works, Happé (1991) notes evidence that for Grandin to understand an experience, the author has to engage in the same experience. The writing

thereby gives evidence that Grandin cannot imagine what others feel during an experience, so she must recreate the experience. The lack of associative empathy is a diagnostic criteria for ASDs.

This lack of interest in the affective and emotional significance of events is perhaps most striking where [Grandin] talks about her view of the fundamental deficits in autism. She seems throughout to disregard the fact that most people would feel the social handicap to be the most striking aspect of autism. Instead she is more interested in the autistic person's differences in cognitive style, perceptual experiences and underlying nervous system. (Happé, 1991, p. 211)

There is significant scholarship in the writing disciplines and within cultural studies on the rhetorics of disability. However, collections such as *Embodied Rhetorics: Disability in Language and Culture* (Wilson & Lewiecki-Wilson, 2001) feature disabled individuals employing empathy, metaphor, and other rich language skills to connect with their audiences. If there is a “rhetoric of autism” it is more likely driven by factual arguments and appeals to reason. Hans Asperger noted that adults with seemingly normal vocabularies, but with autistic traits, spoke properly but without regard to audience.

However many possibilities there are, they all have one thing in common: the language feel unnatural, often like a caricature, which provokes ridicule in the naive listener. One other thing: autistic language is not directed to the addressee but is often spoken as if into empty space. (Asperger, 1944, p. 70)

Asperger noted that rigid adherence to grammars and large vocabularies do not sound natural to most people. In fact, such rigidity and adherence to patterns can be off-putting. However, because they are intelligent and often recognize their failures in communication, many gifted individuals with ASDs attempt to mimic the language patterns they hear and read. The results are seldom ideal and can lead to further problems. Analyzing the writings of a young man in his twenties, Happé notes a number of revealing features

including his idiosyncratic use of language, his flitting between topics, his perseveration, parroting and social naivety about other minds. (1991, p. 214)

Ilona Roth (2007) found that even the poetry of individuals with autism was different than that of other authors. Studying poetry samples from both students and adults with ASDs, Roth found fewer creative metaphors.

The most strikingly distinctive feature of the autistic poets' work was their pronounced focus on the self ... whereas the non-autistic poets also wrote frequently about philosophic, political, or fantastical topics, as well as favoring poems about nature, places, or events. The autistic poets also mostly wrote in their own voice ... whereas the non-autistic poets also used other voices, to the perspective of others, or talked about others from a neutral stance. (p. 155)

The substantial number of "idiosyncratic" metaphors identified by Roth are likely not actually metaphors, but what are categorized as "transfers" in psychology. Leo Kanner (1946) recognized that autistics would attach, or "transfer," meanings to certain things or events. These transfers resemble metaphors, but they are not

conventional metaphors as studied within the writing disciplines and certainly not aligned with the uses of metaphor we attempt to teach in our writing classrooms. For example, if an autistic individual associates young women with nurses, then saying another student is “like a nurse” might only describe the age of the person, not any characteristics associated with medicine such as compassion or dedication to service (Happé, 1991).

The important point is, perhaps, that even an autistic writer who is trying to communicate will use such private ‘transfers’ without explanation. Thus it seems that the [autistic individual] does not recognize what knowledge is shared and what is personal. (Happé, 1991, p. 214)

In the writings of individuals with autism, “metaphors are conspicuous by their absence” (Happé, 1991, p. 238). When a metaphor is employed, it is the result of “parroting” observed patterns, never original invention. That is why transfers might confound writing instructors who are accustomed to metaphors within student writings. Classical rhetorician Kristina Chew, who has an autistic son, notes that the inability to process and create metaphors is a disadvantage in modern society. Chew (2007), citing scholars George Lakoff and Mark Turner, finds the lack of metaphors more than a simple quirk of autism.

But metaphors are intricately infused in our understanding: they are not “just words” but directly influence and create our thinking processes and understanding of the world. (p. 139)

Chew theorizes that the lack of metaphor further separates the individual with an ASD from society.

Autistic language is a fractioned idiom, its vocabulary created from contextual and seemingly arbitrary associations of word and thing, and peculiar to its sole speaker alone.... (p. 142)

Irony is even more problematic within the writings of individuals with autism. Actually, it is more accurate to say the absence of something is again more revealing. Happé (1991) notes, “There is not, to my knowledge, a single example of irony in any of the writings by our autistic authors” (p. 238). Instead, the writings focus on facts and events, even when irony might be an effective literary device.

One of the conflicts between the nature of autism and the underlying philosophies of most writing instructors is the approach to truth or logic for the individual with an ASD. In their writings, this is reflected in strict binaries, such as “right and wrong” or “true and false” that the writing disciplines have come to resist (Miller, 1979). Happé (1991) finds that the writings of individuals with ASDs offer some insights into why this conflict arises.

This sort of crime and punishment moral reasoning may be a feature of mental age, but it also shows a lack of insight into others’ feelings and one’s own duties and responsibilities. Without a full and rich knowledge of how others feel in different situations, we would have little more than a fear of retribution to guide our actions. (p. 216)

Literature on Writing Pedagogy

College and university writing courses are a uniquely shared experience at many institutions. The modern university writing requirement has been traced to the nineteenth century at Harvard (Hobbs & Berlin, 2001). Whether virtual or traditional, “first-year composition” (FYC) courses are often part of the required general education requirements, though select students have avoided this requirement through testing or other placement processes. In effect, the writing course is a gateway. To help contextualize the importance of writing courses, statistics will be presented on the writing course requirements at universities. With institutions implementing mandatory writing courses, these courses must serve the broadest of university populations: every student.

Administratively, universities might situate the writing classroom within composition and rhetoric; writing studies; academic and professional writing; or an English department. While differences could be highlighted, the general terms “writing” and “composition” are used within this project. Some universities require additional writing-intensive courses beyond a first-year composition course, while many do not. The varied nature of university philosophies, goals, and the resulting course requirements are beyond the scope of this research project. For the purposes of this project, what is important to recognize is that writing courses are, if not universal, certainly among the most commonly shared experiences of university students. For students with autism spectrum disorders, the gate-keeping role may or may not be exacerbated by situating writing courses in virtual classroom spaces.

Writing courses are therefore not only a shared university experience, but they also might help students with autism develop communications skills with practical social implications. Those of us in composition, rhetoric, and related fields have long argued that our disciplines help foster democratic participation and responsible citizenship (historical overviews include Connors, 2004; Cook, 2005; Jarratt, 1991; Murphy, 2001). Writers with autism, especially those addressing issues in education, demonstrate that our ideals can be put into practice.

One of the key consequences of the removal of barriers to inclusive and equitable education is that e-learning can also promote freedom, independence and individualized learning. (Seale, 2006, p. 22)

Complications

The characteristics associated with autism present challenges to many of the pedagogical theories and practices associated with university writing instruction. Writing courses, from first-year composition to advanced technical writing courses, might deal with issues of persona, audience, and rhetorical devices that might be difficult, or even impossible, to clarify for individuals with ASDs. We cannot, and must not, ignore concepts that have demonstrable value, but we also need to consider ways to help students with unique cognitive needs appreciate these concepts. For example, autism research has demonstrated we might not be able to train students to mimic empathy, but maybe we can provide logical devices approximating the concepts covered in writing instruction.

Some online courses, including writing course, could complicate these problems for students with ASDs further. Courses that are less reliant on social interactions or subjective reflection might do well online for these students, while writing courses might be more challenging online. The survey and comments obtained during this research project do point towards different experiences for students with ASDs dependent on the academic discipline of the course, which is explored within the data analysis. In the next section of this chapter, a discussion of online pedagogies finds current pedagogical trends in online writing instruction emphasize virtual personas, electronic collaboration, and online audience. How we accommodate students with ASDs and other special cognitive needs should be considered when we design and adjust any writing courses.

Students in higher education are not normally considered to be affected by a ‘digital divide’ (Selwyn 2003; Selwyn and Gorard 2003) because they usually have high access to computers and the Internet (Steyaert 2005). However, for students with disabilities, even if they do have access to computer and the Internet, they may not necessarily have access to accessible e-learning opportunities. These students therefore are still ‘have-nots’ and may experience what Burgstahler (2002a) describes as the ‘second digital divide.’ (Seale, 2006, p. 26)

A Natural Philosophical Conflict

One of the questions I had developed from personal experience is if the way individuals with autism spectrum disorders interpret the world around us and

understand information might be inherently at odds with statements and theories of writing scholars I admired. The survey and comments collected for this research project do pose the question: is it possible that the nature of autism results in a philosophical conflict with dominant theories of knowledge embraced by some within the writing disciplines?

James Berlin's essay "Rhetoric and Ideology in the Writing Class" (1988, 2003) immediately came to mind when I pondered autism as having an inherent philosophy of knowledge that might conflict with some writing instruction. I admit to being personally torn between embracing a purely cognitive rhetoric, in Berlin's terms, and a desire to seek social change he links to social-epistemic rhetoric. The challenge for someone with a neurological condition is that the role of the brain in knowledge interpretation and understanding becomes undeniable, as both survey and memoir data explored in this research project demonstrate. While I do not believe that Berlin suggests a pure binary, his view of knowledge is one that poses a problem for me and other autistic individuals. I must quote at length to introduce the problem adequately.

Knowledge, after all, is an historically bound social fabrication rather than an eternal and invariable phenomenon located in some uncomplicated repository—in the material object or in the subject or in the social realm.

[...] Psychological-epistemic rhetoric grants that rhetoric arrives at knowledge, but this meaning-generating activity is always located in a transcendent self, a subject who directs the discovery and arrives through it finally only at a better understanding of the self and its operation—this self comprehension being the end of all knowledge. For social-epistemic rhetoric,

the subject is itself a social construct that emerges through linguistically circumscribed interaction of the individual, the community, and the material world. There is no universal, eternal, and authentic self... (Berlin, 1988, 2003, p. 731)

While Berlin is discussing self-knowledge and human situations, there is a larger implication that truth, including scientific facts, are relative. For an autistic individual, as will be demonstrated in the analysis of comments by those with ASDs, this is a difficult or even impossible concept to process. This is important because addressing the resulting disparate views of knowledge and “truth” might be more difficult in online settings than in traditional classrooms. More essentially, it brings into question a basic assumption embraced by writing pedagogies.

Patrick McDonagh (2007) makes the connections between ASDs and philosophical modernism explicit in *Autism and Modernism: A Genealogical Exploration*. McDonagh turns to Hans Asperger’s descriptions of autism to explain why the individual with autism might be described as the embodiment of modernism. Asperger observed

The autist is only himself (cf. the Greek word *autos*) and is not an active member of a greater organism which he is influenced by and which he influences constantly. (Asperger, 1944, p. 38)

Modernism, according to McDonagh (2007), embraces science, technology, and craft, employing these even to analyze the individual. Because “science and technology are central to modernity” (p. 108), and the autistic mind seems to desire scientific order

and processes, it seems reasonable to McDonagh that individuals with ASDs would be attracted to modernism, positivism, and similar schools of philosophy.

Discussion of this philosophical divide precedes a review of other writing pedagogy issues because it reflects a central belief within our disciplines. Carolyn R. Miller's "A Humanistic Rationale for Technical Writing" (1979) is indicative of the philosophical position on knowledge and "truth" held within the writing disciplines over the last thirty years. Miller, though studying technical writing, appears to express the social-epistemic view of Berlin. This seminal essay begins with a critique of the positivist position within writing programs and how the sciences were represented in higher education.

Such a view of science presupposes a mechanistic and materialistic reality. The goal of human knowledge is direct apprehension of that reality. Facts are self-evident entities existing out there in the real world — we have only to learn how to see them accurately or derive them logically. (Miller, p. 612)

The complication is that such a conception of knowledge, the one critiqued in our field as flawed, is precisely how neurologists, psychologists, and other autism researchers now theorize the "autistic brain" processes information and reaches conclusions (Attwood, 2007; Durig 1996; Exkorn, 2005; Tantam, 1991; Wolf et al., 2009). According to a study by the Wellcome Trust Centre for Neuroimaging at University College London, individuals with ASDs not only make decisions more "logically" than others, but different portions of the brain are involved (Wellcome Trust, 2008). A marked decrease in activity within the amygdala allows individuals with ASDs to avoid the emotional "framing effect" found in most human decision making.

According to Dr. Benedetto De Martino, individuals with ASDs “avoid potentially irrelevant emotional information and make more consistent choices” (Wellcome Trust, 2008).

That consistency found among individuals with ASDs runs counter to the theories of knowledge and learning many fields, including the writing disciplines, assume to be, paradoxically, a given truth. Scholars in our fields tend to view knowledge as a relative, rhetorical construction within social communities, even in the sciences.

... a new epistemology, based on modern developments in cultural anthropology, cognitive psychology, and sociology, has challenged the positivist conception of knowledge. This new epistemology makes human knowledge thoroughly relative and science fundamentally rhetorical. (Miller, p. 615)

How the writing disciplines approach concepts of truth and knowledge is important because we often evaluate students on “critical thinking,” which, in our fields, implies a social constructionist or social-epistemic paradigm (Hobbs & Berlin, 2001). Students not reflecting our views of knowledge might be unfairly penalized (Mutnick, 2001). The concept that knowledge is socially constructed is embedded within the history of writing instruction, both academic composition and technical writing (Murphy, 2001). Similar theories of knowledge can be found in linguistics (Ong, 2002) and educational psychology (Piaget & Inhelder, 1969), though Berlin describes distinctions between cognitive rhetoric and social-epistemic theories. Philosophers Richard Rorty and Thomas Kuhn have been cited within our field as evidence that knowledge is constructed by communities (Covino, 2001; Howard, 2001).

According to Berlin (*Rhetorics and Poetics*, 2003), composition and rhetoric scholars recognize that

Language is... a pluralistic and complex system of signification that constructs realities rather than simply presenting or reflecting them. Our conceptions of material and social phenomena, then, are fabrications of signification, the products of culturally coded signs. (p. 61)

The history of postmodernism in our field (Berlin, 2003) reveals how central social construction is to our beliefs and theories on what constitutes critical thinking skills among our students. Ironically, the view that knowledge is constructed is adhered to rigidly by many in our fields. This is not a claim that there is no debate about knowledge construction or truth, but even these debates tend to focus on how knowledge is created or manufactured instead of how facts might be discovered. Any theory that facts and truth are unstable undoubtedly leads to conflicts with individuals like Temple Grandin, Daniel Tammet, Stephen Shore, and other gifted autistic individuals (Wolf et al., 2009). Again, the data collected for this project also reflects a real conflict for students with ASDs, described within the findings.

According to Temple Grandin (2001, 2006) and other autism experts, the reason individuals with ASDs are attracted to sciences and technology is because these fields are precise and logical (Anthes, 1997; Attwood, 2007; Mayor, 2008; Prince-Hughes, 2003). The “black and white” thought process associated with ASDs results in a view that basic knowledge is discovered and refined, while technology is the creative application of knowledge.

Some autism experts even suggest students with ASDs enroll in writing courses and other requirements in the humanities with “pass/fail” grading options (Willey, 1999). Liane Holliday Willey, an autistic individual with a doctorate in education, strongly advises students with ASDs to avoid classes such as philosophy. She even admits to wishing she had dropped such courses immediately instead of trying to comprehend the materials. Concern that students with ASDs and their “literal thinking interferes” with their ability to decode core assumptions of humanities courses (Willey, 1999, p. 134) results in some experts suggesting that students request alternative “fact-based” courses in the humanities to meet general education requirements (Attwood, 2007; Grant, 2009; Wolf et al., 2009).

It seems that courses in the writing disciplines are perceived to be obstacles and even points of conflict for the students with ASDs admitted into colleges and universities. The message sent to these students is that writing courses do not value the “autistic” thinking (Durig, 1996) that some writing scholars perceive as outdated and philosophically discredited.

The insistence that facts exist and are to be discovered through observations and measurements is a common trait among those with ASDs most likely to qualify for post-secondary institutions (Grandin, 2001; Grandin, 2006; Harpur et al., 2004; Palmer, 2006; Pollak, 2009; Shore, 2003; Shore, 2004; Willey, 1999; Wolf et al., 2009).

Researchers have found that autistic savants are comforted by solving puzzles and math equations. Daniel Tammet becomes physically uncomfortable when asked to ponder the possibility of an equation without a solution (Johnson, 2005). For Tammet, Grandin, Robison, Shore, and others with autism, all decisions should be based on logic

(Grandin, 2006; Robison, 2007; Sanders, 2004; Shore, 2003). Our writing classrooms are likely to pose a difficulty for these students. In my experiences, classes questioning the nature of “truth” and “facts” are not only confounding, but lead to extreme stress and agitation. Other individuals with ASDs seem to have similar responses (Grandin, 2006; Prince-Hughes, 2002; Shore, 2003; Willey, 1999).

A student with an ASD might take an academic or technical writing course expecting prescribed forms and clear ethical standards. Scholars have pointed to the fact professional writers adhere to legal and professional ethics, which are rigid, while writing scholars tend to pursue philosophical questions in terms of “obligations and rights” (Clark, 1994, p. 191). The student with an ASD is more likely to resemble the professional writer, who understands that “moral decisions in organizations where technical communicators work are resolved by management” (Clark, 1994, p. 191).

Writing pedagogies that challenge students to evaluate and explain moral and ethical values are unprepared for students who prefer to follow, strictly, the rules imposed on them externally. Many writing instructors encountering such a student might conclude that the student with an ASD is not as emotionally developed or mature as other post-secondary students. An emphasis on the social construction of knowledge and suggestions of relative truth could devalue the neurological nature of individuals with autism spectrum disorders.

Grandin (2001) states that she has “no vague, abstract, language-based concepts in my head, only specific pictures.” She considers her approach to reasoning “programmed” and admits she does not understand the possible benefits of emotional

reasoning. Writing disciplines often focus on emotional and social aspects of knowledge that individuals like Grandin might never grasp, despite their best efforts to do so.

Grandin (2006) finds, “Some scientists are strictly analytical thinkers” (p. 210). Her research has found that gifted students are “motivated by the search for intellectual truth” and share her desire for “measurable results more than emotion” (p. 212). She theorizes that there are roadblocks for these students such as language courses, and even our emphasis on various examinations, such as the Graduate Record Exam, that emphasize writing samples evaluated according to our pedagogical biases.

It has been argued that computer-aided learning and virtual classrooms might help students with ASDs adapt. Some experts have referred to the rigidity of thought and systematic ethics as an “autistic... impairment” that theoretically might be ameliorated with the flexibility required to function in a virtual setting (Moore et al., 2000, p. 222). However, this possibility is also considered unlikely by many researchers, as we learn more about the neurological influence on thought and logic (Moore et al., 2000).

If individuals with ASDs cannot, by neurological design, adjust to the expectations of the university writing course, with its emphasis on critical thinking and theory, it is unclear what that means for our pedagogies. It is also unclear what the implications are for instructors with ASDs, since we are asked to teach unfamiliar and even “unnatural” ways of thinking from our perspectives. If online classes do help bridge this chasm, that would be an important insight.

Rhetorical Analysis in Writing

Writing courses ask students to engage in various tasks we consider analytical, though they are necessarily subjective. The analysis of an intended audience, for example, is not a scientific process but rather an attempt to emotionally relate to an idealized audience. We generalize, because we must to structure academically persuasive compositions (Perelman & Olbrechts-Tyteca, 1969).

What happens when we ask a student with an autism spectrum disorder to analyze the beliefs or desires of other individuals? As previously discussed

Individuals with autistic disorder have occasionally commented on what they perceive as an unfathomable yet ubiquitous ability of other people to “mind read” during ordinary social interactions. Normal people indeed behave as if they have an implicit theory of mind, and this allows them to explain and predict others’ behavior in terms of their presumed thoughts and feelings. (Frith, 2001, p. 969)

This challenges a staple of the writing classroom: the writing instructor advising students to imagine what the audience thinks, feels, desires, et cetera. Temple Grandin has explained the impossibility of this task for herself (Grandin, 2006) and other individuals with ASDs also describe difficulty understanding what other people want or expect in communications (Nazeer, 2006; Robison, 2007).

As Robison correctly observes of “regular people,” when it comes to arguments and attempts at persuasion, “their responses often have nothing at all to do with logic” (p. 191). This is the same challenge reported by Temple Grandin (2006) and

Daniel Tammet (2007). Scholars within the writing disciplines base rhetorical analysis not only on logic and reason, but also on such concepts as reputation, cultural norms, and even emotion—analysis of the work, the author, and the audience is subjective. Histories of rhetoric as applied to composition offer valuable insights, including the collection of essays edited by James Murphy (2001), Susan Jarratt’s review of sophists and composition theory (1991). Numerous works more specific to rhetoric also explain the complexity of rhetorical analysis (influential examples include Berlin, 2003; Burke, 1969; Perelman, & Olbrechts-Tyteca, 1969). For the individual with an ASD, it might be possible to measure reputation in terms of demonstrated credentials, but emotional and cultural connections are difficult to comprehend and analyze.

Rhetorical analysis underlies much writing instruction at the university level (Berlin, 2003; Corbett, 1972; Covino, 2001; Murphy, 2001). If, as explained in previous sections of this project, writing courses are perceived as hostile to the thought processes of students with ASDs (Attwood, 2007; Durig 1996; Exkorn, 2005; Tantam, 1991; Wolf et al., 2009), we must embrace alternate approaches to rhetorical analysis that emphasize quantifiable information such as audience demographics that can be more readily appreciated with these students. Though Berlin (1988, 2003) critiques cognitive rhetorics, as previously noted, it seems cognitive-based approaches or expressivist pedagogies that emphasize the writer might benefit students with ASDs. Such questions are beyond the scope of this project; the question is posed here because the data and anecdotes explored in the findings and conclusions suggest we should find ways to match the learning style of students with ASDs to complementary theories of rhetorical analysis. My personal biases might, in fact, reflect my “autistic mind” when I turn to

scholars such as Elbow or Murray and the expressivist movement (Berlin 1988, 2003) to guide my own approach to writing instruction.

In a traditional classroom setting, presenting both traditional rhetorical theory and a more “concrete” method of analysis might prove problematic. Online settings might allow writing instructors more flexibility to cater to the learning styles and analytical processes of a varied student population that includes individuals with ASDs. Though specific strategies are beyond the scope of this current research project, which focuses on designing spaces, one benefit of online settings is that supplemental materials are easily offered online. Among additional materials could be guides to audience analysis.

Role Play

One of the strategies adopted by writing instructors in traditional and virtual classrooms to help students consider audience and rhetorical devices is role playing (Batorsky & Renick-Butera, 2004; Lunsford, 2003).

Role-playing exercises and persona paraphrases offer... effective means of helping students “de-center” and hence gain the distance necessary to effective analysis and synthesis. In fact, it is possible and, I would urge, highly profitable, to build an entire basic writing course on exercises like the ones described... (Lunsford, 2003, p. 310)

The problem with role play is that imaginative play is not only resisted by many individuals with ASDs, but can cause a sense of anxiety or panic (Attwood, 1998). Some researchers have found that children with Asperger’s syndrome have a marked

“difficulty distinguishing between reality and fiction... and can be quite frightened and unable to appreciate that ‘it’s only a story’” (Attwood, 1998, p. 124-5). Though sometimes called role playing, therapists do practice conversations with adolescents and teens to help students with ASDs memorize social routines (Harpur et al., 2004; Yapko, 2003).

That students with ASDs rehearse likely social situations to memorize social cues should not be confused with the improvisational role-playing exercises advocated by some writing scholars (Batorsky & Renick-Butera, 2004; Lunsford, 2003). Because students with ASDs are likely to react to feigned emotions as if they are genuine, being unable to recognize the difference between playacting and reality, this poses a potential risk to both the student with an ASD and other students in the classroom. This is an aspect of autism revealed in the personal statements of survey participants and one I personally experience: an inability to delineate some fictions from real situations.

In a traditional classroom, the teacher’s presence might reduce potential problems with role playing. It is also likely that a skilled teacher would discontinue an exercise that appeared to be potentially harmful. Online, without seeing how the student with an ASD is reacting, there are fewer protections for the emotional wellbeing of the student. While audience analysis can be aided via role playing for some students, it is likely inappropriate for students with ASDs.

Writing Class Communities

In my experiences, the dominant university writing instruction practices stress collaboration and the workshop model, indicating that instructors, including me, have

taken aspects from various scholars to develop personal pedagogies. The creation of an engaged yet polite and moderated discourse community with a unified sense of purpose is inherent within these pedagogies (Bruffee, 2003; Hobson, 2001; Howard, 2001; Trimbur, 2003). Communities are the foundation of the learning environments we seek to create and nurture, in both traditional and virtual settings.

Students are especially likely to be able to master that discourse collaboratively if their conversation is structured indirectly by the task or problems that a member of that new community (the teacher) has judiciously designed. ... Throughout this process the teacher has to try to help students negotiate the rocks and shoals of social relations that may interfere with their getting on with their work together. (Bruffee, 2003, p. 425)

Bruffee (2003) cites Richard Rorty's theory that knowledge begins with the social justification of belief, followed by testing and consensus. The notion of consensus in a democratic society helps explain why we want students to negotiate towards some shared understandings within the class community, even when there are temporary conflicts among students (Garrison & Vaughan, 2008).

Miller (1993) offers a detailed history of "community" within the writing disciplines. One of our assumptions is that an engaged community leads to civil engagement beyond the university writing classroom (Berlin, 2003; Freire, 1998; George, 2001; Murphy, 2001). "Tension is a natural and even necessary condition for critical discourse," Garrison and Vaughn (2008, p. 96) observe, yet these conditions can cause serious issues for students with ASDs, as previously discussed based on existing scholarship on autism. The question that must be asked for this project is if online

communities are better, worse, or the same as traditional classroom spaces when we, as teachers, attempt to facilitate engaged communities.

Researchers in composition and technical writing have found a correlation between perceived relationships and course satisfaction (Eaton, 2005). The more connected students consider themselves to each other and the instructor, the higher the reported satisfaction (Garrison & Vaughan, 2008). This means we need to pay particular attention to issues of persona, but this is complicated when dealing with autism disorders.

As discussed previously, there is extensive scholarship in the writing disciplines emphasizing community and social construction of knowledge (Berlin, 2003; Blyler and Thralls, 1993; Covino, 2001; Howard, 2001; Murphy 2001). Individuals with ASDs, however, tend to think knowledge is not created by the community (Grandin, 2006). Instead, students with ASDs might embrace the concept that while “truth” exists, it is distributed and shared among individuals with common interests and goals (Attwood, 2007; Wolf et al., 2009). The model of creating a “community of inquiry” within the writing classroom might better align our teaching strategies with the needs with students with ASDs.

A community of inquiry is a cohesive and interactive community of learners whose purpose is to critically analyze, construct, and confirm worthwhile knowledge. The three key elements for a viable community of inquiry are social presence, teaching presence, and cognitive presence. (Garrison & Vaughan, 2008, p. 9)

Because students with autism describe themselves as existing outside the university community, preferring to focus on their areas of interest, writing courses with thematic or cross-disciplinary content might create communities of inquiry that support these students. Online settings might offer ways to create smaller communities of writing students with similar interests from within larger writing courses. We can foster communities without relying on the hope students will form social and emotional connections by instead focusing our writing courses on shared intellectual interests.

Students with ASDs often have difficulty with courses and content outside their interests (Attwood, 1998; Grandin, 2006; Palmer, 2006; Wolf et al., 2009). This means we should develop writing courses with thematic content disclosed in course catalogs and online within course descriptions. Self-selection of students for particular writing courses could be the foundation for communities of inquiry.

Collaboration

Technical writing scholarship has dealt with collaboration, which is integral in workplace writing. Today's world is one of collaboration and constant engagement with various audiences. Myers (1986) traces the writing disciplines' emphasis on collaboration to Peter Elbow and Kenneth Bruffee. Outside the university, collaboration is not only common but it is the norm.

In business and industry, furthermore, and in professions such as medicine, law, engineering, and architecture – where to work is to learn or fail – collaboration is the norm. All that is new in collaborative learning, it seems, is the systematic

application of collaborative principles to that last bastion of hierarchy and individualism, the American college classroom. (Bruffee, 2003, p. 428)

Not only do collaborative assignments improve problem-solving skills but they encourage the development of social skills that those of us with an activist pedagogy embrace. Collaboration forces students to confront disagreements, cultural differences, and other aspects of social dynamics important in our society. Allowed to navigate these joint authorship projects with minimal teacher guidance, students become responsible for their own learning.

Collaborative assignments and team projects encourage students to take responsibility and design learning strategies. If expectations and guidelines are clear, team projects can offer opportunities to engage in relevant, realistic problem solving. (Garrison & Vaughan, 2008, p. 98)

Despite the benefits of collaboration and its status as a desired pedagogical component of writing courses, students with ASDs have a difficult time collaborating with others (Attwood, 2007; Bundy, 2004; Flora, 2006; Harpur et al., 2004; Johnson, 2005; Palmer, 2006; Prince-Hughes, 2002; Wolf et al., 2009). As a ComputerWorld series on autism from 1997 recognized, programmers with autism flourished when left alone, with clear directives, but did poorly when they attempted to collaborate. Though we value collaboration, it might be important to allow some students to work on independent writing projects.

The sometimes debilitating struggle to collaborate with others experienced by individuals with ASDs conflicts with the ideals of many instructors and theorists within

the writing discipline. This could lead writing instructors to penalize students who literally have a demonstrable inability to work well with others, depending on how instructors value participation and collaboration in their courses. Data collected for this project might reveal such biases in favor of social interactions, as discussed within the findings. We should ask if collaboration is a core requirement in writing courses that should not or cannot be waived, regardless of a student disability.

Temple Grandin (2006) and Robert Sanders (2004), both successful individuals with ASDs, believe it is important for students with autism to appreciate what Grandin calls the “ways of the world” (p. 116). Grandin recalls that growing up in a time before computers and cable television forced her to engage other children. Grandin writes that her “favorite childhood activities required participation with another child” (p. 117). She fears that too much “time on the computer... spent solo” is potentially detrimental to the development of skills required in the workplace.

One question posed by this research project is if the online setting might make collaboration easier for students with ASDs, a possibility explored in the review of online writing instruction scholarship. As Grandin and Sanders caution, there is a potential that the computer might enable students with ASDs to avoid learning skills they would need in a traditional classroom. Our writing classrooms, by requiring collaboration, prepare students for social interactions outside the university.

Technology and Writing

The writing disciplines have embraced broad definitions of text, composition, and writing (Bolter & Grusin, 1999; Kress, 2003; Wysocki et al., 2004). Writing is,

according to Ong (2002), “a technology, calling for the use of tools and other equipment: styli or brushes or pens, carefully prepared surfaces such as paper, animal skins, strips of wood, as well as inks or paints, and much more” (p. 80-81). Ong argues that all writing is a specialized form of technology, an application of knowledge that evolves as new innovations emerge. The writing disciplines have followed technology, from the days when books and paper were expensive rarities (Cook, 2005) to modern multimedia tools that allow students to be virtual publishers (Bolter & Grusin, 1999).

Our disciplines have embraced photography, illustration, information graphics, audio recordings, and now we are adapting to video and even computer animation (Bolter, 1991; Bolter & Grusin, 1999; Kress, 2003; Selfe, 1999; Wysocki et al., 2004). Digital composition methods are likely to become dominant media for expression in coming decades. For example, according to Jay Bolter (1991) computer programming is an act of writing.

For students with ASDs, alternative forms of composition might serve as accommodations within our writing courses, especially in virtual classrooms. Though the traditional writing classroom can include such alternative projects as oral histories, videos, or even animation, multimedia compositions are more readily shared in virtual spaces.

Writing Courses in Virtual Classrooms

Any writing pedagogy embracing online settings should avoid the historical errors documented by journalist Todd Oppenheimer in *The Flickering Mind* (2003). Educators, administrators, and political leaders have rushed to new technologies,

assuming new—and often expensive—hardware and software almost magically would produce better teaching and learning.

Accommodating ASD students within online writing courses requires awareness of the social, emotional risks to these students. Poorly designed virtual settings might increase the alienation of these students. Unfortunately, there is a lack of literature specific to autism and online spaces (Moore et al., 2005). Writing educators are left with courseware and online environments that might reinforce existing problems. Write Cynthia Selfe and Gail Hawisher:

Along with becoming acquainted with current composition theory, instructors, for example, must learn to recognize that the use of technology can exacerbate problems characteristic of American classrooms. It must continue to seek ways of using technology that equitably support all students in writing classes. All too frequently, however, writing instructors incorporate computers into their classes without the necessary scrutiny and careful planning that the use of any technology requires. (1991, p. 129)

Tech Savvy Students

When students, including those with ASDs, arrive in our writing courses, they arrive with a life-long familiarity with computers and technology. They live their lives in two worlds, the real and the virtual, with reputations and actions on MySpace or Facebook as important to their routines as anything they might do in the “real” world. Randy Garrison observes:

Much has been made of the changing attitudes and expectations of current higher education undergraduates. They are often referred to as the net generation (Net Geners). They do not make the same distinctions between the real and virtual world as did previous generations. (Garrison and Vaughan, p. 86)

If students can and do use complex, and powerful, systems such as Facebook and MySpace without manuals, online help, or formal training, then problems they encounter with online learning environments represent a design issue. As Dickie Selfe suggests, online course design should match student expectations, which are forever evolving (Selfe, “Collaborating with Students”). The technical knowledge of each entering university class will be different, and “changing technological literacies will or should change the courses we teach” (Selfe, “Collaborating with Students”, p. 201).

When Philip Rubens and Sherry Southard (2005) found students struggling with an online space, they rightly concluded that it was unlikely students were unfamiliar with Web navigation. Instead, the usability theories accepted by these instructors were challenged.

We believe our own expectations, as Web designers, needed to be re-examined, rather than the behaviors of our audience. (Rubens & Southard, 2005, p. 201)

Selfe and Hawisher found that by the 1990s, students knew as much or more about most computing technologies than did their writing instructors. Such tech savvy students are unlikely to struggle with Web basics. Students read the screen before them, looking for ways to interact with the Web space. What Rubens and Southard (2004)

learned was that the online writing course has to be designed with sufficient textual clues for usability.

Adoption of Online Writing Courses

As late as 1999, the National Center for Educational Statistics estimated that 54 percent of universities and colleges would offer online courses by 2000 (Cook, 2005). This estimate has proved to be startlingly inaccurate. As Garrison and Vaughan (2008) report, we are approaching near-universal adoption of online technologies in education, including hybrid models that meet both in traditional and online settings. This does not suggest some instructors and intuitions will not resist such trends, but the trends are evident.

A recent survey of e-learning activity at 274 colleges and universities in the United States found that 80 percent of undergraduate and graduate higher education institutions and 93 percent of doctoral institutions offer hybrid or blended learning courses (Atabasz & Baker, 2003). (Garrison & Vaughan, 2008, p. 49)

Unfortunately, the move to online education is often viewed as a response to financial constraints (Anson, 2003; Cook, 2005). As an example of this trend, the University of Phoenix had 49,000 online students in 2002. Ninety-five percent of the faculty were part-time (Wahlstrom & Clemens, 2005). Though beyond the scope of this research project, we should ask how much support legions of part-time faculty will receive from institutions, including adapting courses for students with special needs.

The University of Minnesota and Minnesota State Colleges and Universities have established a formal goal of migrating a quarter of course credits earned by students to online settings by 2015 (Ross, 2008). This mandate has focused on general education courses and those courses deemed most amenable to the online format. First-year writing courses and technical writing courses are among those being targeted for this migration.

We should ask if this migration to online setting will negatively affect some student populations, including those with disabilities, limited English proficiency, and those with learning styles not aligned with online course designs. Pedagogy should precede technology, but fiscal pressures are dictating the inverse approach. Now, technology is viewed as a cheaper way to teach writing, regardless of effectiveness.

The potential for online education to exacerbate existing problems is a concern voiced throughout educational scholarship (Cuban, 2001; Maeroff, 2003; Oppenheimer, 2003), especially in the writing disciplines (Hawisher & Selfe, 1991; Monroe, 2004; Trimbur, 2003). There is a general consensus that

Unfortunately, e-learning could turn out to be just one more manifestation of the digital divide. The technology and knowledge that one needs for comfort with online learning are not distributed evenly across the economic spectrum.

(Maeroff, 2004, p. 219)

We tend to conceptualize the “digital divide” as a socioeconomic matter, representing division of gender, ethnicity, class, and localized cultures (Gurak, 2001; Monroe, 2004). This overlooks other differences that affect online learning, including but not limited to issues of disability (Seale, 2006).

In a neurodiverse world, the way all learners can be supported by some of the very latest technologies can be both empowering and enabling. We must not allow the divisions between what is considered assistive and what may be fashionable to blur our vision as to how successful this application can be in supporting study strategies. (Draffan, 2009, p. 220)

Instead of representing an effort to embrace new and exciting possibilities for writing instruction, Kelli Cargile Cook (2005) suggests that pressure to move composition instruction to online spaces comes from institutional pressure, software developers, and the technology itself. To this list, we should add the demands of a changing student population, many of whom find online settings more convenient (Eaton, 2005). As technologies advance, there is also an increased need for technologically skilled employees.

Concurrently, the availability of technology to deliver courses online and the enthusiastic marketing of this technology have encouraged administrators to migrate university instruction to the Internet. Another compelling force behind this movement is the market for online education itself—a workforce whose educational needs continue to grow. (Cook, 2005, p. 50)

Admittedly, individuals with ASDs want to gain the skills necessary for self-sufficiency. Skills with vocational application are essential for all students, but because communication skills are particularly challenging for students with ASDs, writing classrooms hold special promise (Grandin, 2006). Unless we create online writing

courses with solid pedagogical foundations and inviting community-oriented designs, we risk failing these students.

Established Pedagogies and Online Writing

Originally, technology was expensive and time intensive, not a more affordable delivery method for writing instruction. During the 1980s, an increasing number of schools installed computers in some writing classrooms and opened computer labs for student use (Selfe & Hawisher, 2004). Because the early computer technologies were expensive, this raised questions about the “digital divide” between socioeconomic groups of students (Selfe & Hawisher, 2004). As more students gained access to computers, the editing and revising steps of the writing process could be emphasized more by writing instructors. Just as pen and paper allowed teachers to require drafts of works, computers encouraged a focus on the editing process (Cook, 2005).

Early computer use in the writing classroom was merely an extension of typing. It took time for specific pedagogies to evolve that recognized the teaching implications of word processing software. According to Cynthia Selfe (1999):

By 1996, it was difficult to find a college English studies program that did not use computers to teach a range of courses involving advanced literacy. (p. 84)

The adoption of computing technologies did not change underlying composition pedagogies, according to Selfe, because English teachers remained focused on the text instead of all the options presented by digital composition. Individual activists with autism have turned to alternative forms of composition, including podcasts, YouTube videos, and collaborative fiction to express their views. Some use adaptive

communication devices or software, which create compositions unlike traditional academic compositions. Yet, online writing courses remain purveyors of tradition and enculturation when we try to recreate the traditional space. There are challenges to this as new potentials for online spaces are envisioned (Bolter & Grusin, 1999; Wysocki, Johnson-Eilola, Selfe, & Sirc, 2004).

Writing scholars are adjusting pedagogies to the “text to come” in this age of digital technologies (Bernhardt, 1993). Texts are no longer static pages, but modular, hyperlinked, interactive experiences a reader can control and adjust (Bolter, 1991; Bolter, 1999; Kalmbach, 2004; Kress, 2003; Wysocki, Johnson-Eilola, Selfe, & Sirc, 2004). Our writing instruction has to change to address this new, modular form of communication that favors concise writing and captivating visuals (Bernhardt, 1993).

The Writing Space

If our technologies seem outdated or inconsistent with current software, students either struggle or assume have nothing to offer. Our online writing spaces should reflect the spaces where students are already creating digital compositions. There is little doubt that the design of a classroom space affects both the comfort of students and the pedagogical approach of the instructor (Bissell, 2004; McGregor, 2004; Weinstein, 1979).

A classroom with open space and tables encourages group work and facilitates teacher movement among the students. Such an arrangement privileges collaboration and constant interaction with the instructor. Classrooms with individual desks organized in parallel rows privilege individual work. While an instructor can move about such

rows, the lack of collaboration between students leads students to consider the instructor presence a form of monitoring, rather than a sign of support (Bissell, 2004). The instructor must, in effect, overcome the geography-implied pedagogy. The instructor can do this with positive feedback and a personal approach that signals support to the students.

University spaces do not always reflect the pedagogical assumptions of writing instruction. Many writing instructors embrace a workshop model of writing instruction (Myers, 1986). The workshop approach encourages peer feedback, reviewing, and editing. The workshop is also based on instructor empathy and encouragement. Writing instructors embracing this pedagogical trend seek classroom spaces that accommodate the workshop approach.

Unfortunately, instructors, including myself, can and do find themselves in lecture hall spaces that not only discourage group work, but inherently limit teacher mobility. With desks anchored to a sloping floor, often mere inches apart, it is difficult to ask students to work in small groups conducive to peer review tasks. These spaces can “trap” an instructor at the front of the lecture hall, or wandering up and down aisles between the fixed desks.

Trying to recreate the nature of traditional classroom is unlikely to benefit ASD students, or students from any marginalized group. Yet, the literature on CMC has a clear preference for recreating cues or creating new cues (Byron & Baldrige, 2007; Hawisher & Pemberton, 1997; Hawisher & Selfe, 1991; Kreijns et al., 2004; Lee, 2007; Mayer et al., 2003; Nicol, Minty, & Sinclair, 2003; Sia, Tan, & Wei, 2002; Swan, 2002; Tanis & Postmes, 2003; Tu, 2002; Walther, 2005). As the cited research demonstrates,

there is a tension between desires to create virtual worlds, complete with numerous symbols based on the physical, and desires to democratize classrooms. The tendency to recreate the face-to-face model for online space designs appears insufficiently critiqued as it applies to ASD students (Moore et al., 2005). Just as operating systems first tried to recreate the office desktop and familiar office tools via simulation, some instructors might attempt to recreate the physical classroom in virtual spaces.

Nicol et al. (2003), suggested “the social context of online learning is qualitatively different from face-to-face learning and that this has significant implications for online learning design” (p. 270). Admitting there is a difference between online and traditional classrooms, writing instructors require research addressing best practices for inclusion online; ideally a body of literature that does not rely on the historical face-to-face communications research. Writing disciplines are currently too reliant on the face-to-face model, applying it to an inappropriate medium.

Online spaces can either support instructors’ writing pedagogies, or the spaces can limit the ability of writing instructors to implement those classroom arrangements we consider essential to productive writing experiences. Online systems that make sharing documents difficult, for example, hinder the collaborative experience many of us value. As most of us know too well, computers do not always enhance or enable clear communication and sharing.

A major factor in determining satisfaction with online writing courses is the design of the space (Garrison & Vaughan, 2008). These factors are interdependent, as a space can foster community while a strong community can support students struggling to navigate the unfamiliar. Students with ASDs depend on structure, order, and

predictability for comfort. Writing classes can be structured, but interactions are still unpredictable.

Virtual Community

An online writing course is a special-purpose virtual community. It would be unusual for a college writing course not to include peer interactions as a core pedagogical feature. These interactions occur within virtual spaces that are described in physical terms. This metaphorical model of communication can be confusing for students with ASDs.

Existing literature on CMC and online education assume social cues are desirable (Preece, 2001). In general, this might be accurate, but social cue transmission and social orienting skills are adversely affected by autism. Though we know autistic students suffer social impairments, “very few experimental studies that have systematically examined social orienting impairments in autism” (Dawson, Toth, Abbott, Osterling, Munson, & Estes, 2004, p. 271).

Though some experts suggest ASD students can learn to recognize some social cues in face-to-face situations (Frith, 2001; Lovaas, 2002), none of the experts have explored this in relation to online settings. Frith describes the social impairments in autism as “devastating” (p. 969). We should ask if these impairments are as severe in online settings.

Frith (2001) has identified “compensatory learning” techniques employed by ASD individuals (p. 977). These individuals memorize cues, using cognitive skills to match perceptions to expected realities. Such methods can result in erroneous

interpretations of emotions and intentions, but these decrease with experience. There is also a correlation between the verbal intelligence of the ASD individual and the ability to decode social skills.

Using neurological tests such as magnetic resonance imaging (MRI), autism researchers have identified the cognitive functions used by HFA and AS individuals to decode social situations (Critchley, Daly, Bullmore, Williams, Van Amelsvoort, & Robertson, 2000; Oberman, Hubbard, McCleery, Altschuler, Ramachandran, & Pineda, 2005; Uddin, Iacoboni, Lange, & Keeman, 2007). The ability to memorize the meanings of facial expressions enables ASD individuals to interact with greater social success. The literature to date only examines this social cognitive ability as it relates to face-to-face encounters (Klin, 2000; Howlin et al., 1999). The literature does not address if the same social cognitive skills can be used by ASD students in online settings.

Early synchronous systems such as the Internet Relay Chat (IRC) adopted the familiar metaphors of physical gatherings. Despite their text-only nature, even the earliest chat systems featured groups, hosts, rooms, and even lobbies where users gathered virtually. Online communities were foreseen by Licklider and Taylor as early as 1968 (p. 37). When they discuss a “community of interest” the researchers use terms like “inside” for the virtual spaces.

The “chat” metaphor leads to studies influenced by communications, linguistics, and psychology, to name only a few fields. This might result in a research focus on the elements that resemble face-to-face encounters—and the elements of face-to-face interactions that are missing from digital communications. Such an approach risks

noticing only perceived “deficiencies” in chat environments instead of ways in which electronic chats might be more effective.

... several empirical studies report that CMC is less personal or socioemotional than is face-to-face (FTF) communication (Hiltz, Johnson, & Turoff, 1986; see Rice, 1984). (Walther, 1992, p. 51)

Walther revised his findings a decade later, recognizing that virtual communities were exhibiting social aspects. Working with Loh and Granka (2005), Walther has determined that social cues in computer-mediated spaces might differ from face-to-face interactions in their specifics, but that the general purposes and effects of these cues are similar. While the connections sometimes take longer to develop, emotional bonds do form among classmates in online settings. These relationships are important, influencing motivation and satisfaction (Garrison & Vaughan, 2008).

Original assumptions about virtual communities are therefore challenged by the existence of emotional content. Spaces that might have paralleled the personality characteristics of individuals with ASDs, and hence be more comfortable for them, turn out to be as potentially complicated and challenging for students with ASDs as any traditional classroom.

Academic writing instructors, in particular, need to convey a welcoming atmosphere online. This is because writing instructors are traditionally viewed in terms of “red pen” marks on student papers. We know it is important to reassure students that we are working with them towards better writing (Garrison & Vaughan, 2008; Conrad & Donaldson, 2004). Writing courses traditionally involve a great deal of feedback from instructors and peers.

The two least-liked features of the online classroom are the lack of face-to-face interaction with classmates (selected by 59% of respondents) and the lack of face-to-face interaction with professors (65%). (Eaton, 2005, p. 36)

Research has shown that the frequency and quality of input from an instructor in an online setting affect student perceptions and satisfaction (Eaton, 2005). E-mail, discussion forums, and online chats can nurture this desired connection with an instructor. But, what if students with ASDs do not appreciate or even desire constant interactions? In fact, many with autism find interactions stressful. Therefore, we face competing pressures to communicate with most students, while not driving students with ASDs from our online writing courses.

Writing, regardless of genre, is a personal act. By this, we mean that writing exposes the author's thoughts to an audience, along with his or her basic literacy skills. It is a vulnerable position that the writing student occupies. Successful teams, and therefore groups of online students, are motivated by social satisfaction (Robey, Khoo, & Powers, 2004). To encourage the sense of unity, Garrison and Vaughan recommend adopted a "Community of Inquiry" model for online writing courses. This pedagogy is based on a constructivist model, meaning the entire community creates meaning together.

A community of inquiry is a cohesive and interactive community of learners whose purpose is to critically analyze, construct, and confirm worthwhile knowledge. The three key elements for a viable community of inquiry are social presence, teaching presence, and cognitive presence. (Garrison & Vaughan, 2008, p. 9)

To establish a community of inquiry, Garrison and Vaughan believe face-to-face meetings are helpful. They theorize, based on communications research and scholarship within writing studies, that social presence is easier to develop in traditional, physical classroom spaces. However, it has been suggested that communities can form online, though it does require more time to establish the same level of connection present in traditional classes (Breuch “Enhancing Online Collaboration”, 2005).

Regardless of age, most writing students have not developed the social skills required to navigate the collaboration inherent in composition classrooms. Even without peer editing, writing classes involved the sharing of personal thoughts and opinions. Breuch suggests that students need guidelines for these interactions (Breuch “Enhancing Online Collaboration”, 2005). One has to wonder what will occur when students with autism, who might never develop interaction skills, are asked to critique the works of peers.

Writing instructors are responsible for designing spaces that result in a sense of community. Discussion forums, chat rooms, and other design features should invite participation while having a clearly defined purpose. Such clarity brings cohesion to the community of inquiry.

Teaching presence in terms of design and facilitation is necessary to ensure that communities come together in a productive manner. Communities of inquiry do not automatically or quickly move to integration and application phases of inquiry unless that is the objective and a teaching presence creates and maintains cohesion. ... Familiarity developed through sustained purposeful discourse

creates the cohesion necessary for participants to progress through the phases of inquiry. (Garrison & Vaughan, 2008, p. 44)

Designing for clarity of purpose and to create inviting spaces is challenging. For example, studies asking questions about usability often fail to consider emotional signs conveyed by online spaces. A teacher must experiment within the confines of whatever online spaces an institution provides. Designers know that colors, fonts, and graphics convey emotional messages, but educational institutions have not responded accordingly (Rubens & Southard, 2005).

Unfortunately, the ability of instructors to control the designs of online spaces varies widely by institution and even academic departments (Rubens & Southard, 2005). Whether a university adopts commercial or open source software solutions, online courses and online writing spaces are still constrained by software choices. We do not exercise complete control over the virtual spaces we inhabit—our communities are still not our own, even though they should be.

Virtual Persona

Student online personas are also essential to address, particularly in online settings. Some suggest “icebreaker” activities to establish personal connections among students (Conrad & Donaldson, 2004). In a traditional classroom setting, students talk before, after, and, we instructors admit, during class. These conversations serve important social purposes, helping students bond. In a writing classroom, these bonds contribute to the sense of “safety” during peer editing and peer feedback sessions (Garrison & Vaughan, 2008).

If social connections are important, how will other students—and the writing instructor—react to a student with no desire and possibly only minimal ability to establish personal connections? Since individuals with autism seem to lack awareness of both self and others (Frith, 2001), the concept of persona and intentionally controlling a persona would appear difficult to teach. This leads to questions of if we should require students to establish and nurture online personas in our online writing courses.

Much has been written about the construction of identity in virtual settings (Bolter, 1991; Bolter & Grusin, 1999; Kress, 2003; D. Selfe, 2004; Turkle, 1995). However, the concept of an “invented self” conflicts with autistic conceptions of self and identity (Baron-Cohen, 1995; Baron-Cohen, 1999; Baron-Cohen, 2000; Frith, 2001). As students with ASDs have difficulty with role-playing, an issue addressed earlier in this project, the notion of creating an alternate self is likely to be problematic as well. I have observed that the social naiveté of students with ASDs includes not understanding why people would exaggerate or omit information from online profiles. If anything, it is possible that students with ASDs are too open and honest (Hane, 2004; Wolf et al., 2009).

To fully address the value of online persona in pedagogy, it is essential to define what constitutes “persona” in composition. The persona of a writer is both the image the author intentionally attempts to create and what each reader infers. Though the author normally asserts control over his or her persona, the reality is that no two readers reach the same conclusions about an author. This can be considered a negotiated, social understanding of the persona (D. Selfe, “Collaborating with Students,” 2004).

Again, though, we find that individuals with ASDs are confused by notions of creating or negotiating an identity, a problem mentioned by most of the memoirs by individuals with autism. These individuals simply “are” themselves, unable to analyze with any ease how their actions create perceptions of identity. Without the ability to reference “self,” there is little ability to consider “the other” in a writing or speaking context (Attwood, 2007; Frith, 2001; Nazeer, 2006).

How to convey concern for other students and their needs in an online environment has received only limited research attention (Rubens & Southard, 2005). This lack of research is particularly acute when we consider online peer editing, where most research has focused on in-classroom workshops and not interactions between students online (Breuch “Enhancing Online Collaboration”, 2005).

When we think about traditional university composition programs, the personal narrative is a common assignment. Dickie Selfe is among the researchers suggesting literacy autobiographies, a form of personal narrative, could be adapted towards technological literacy. Autobiographical works inherently create a persona, as the author decides what he or she values, especially in a public forum.

It occurred to me that I should also be making a stronger effort to know these students and to construct learning experiences with them, not just for them. (D. Selfe “Collaborating with Students”, 2004, p.198)

Because individuals with ASDs are represented within the memoir genre, it is possible that these models could be used to explore personal narrative. Unfortunately, writing instructors would need to know if they have a student with an ASD enrolled in an online writing course. This presents a number of disclosure issues and complications,

both legal and ethical. Still, it is clear that individuals with ASDs can and do write personal narratives as a form of self-advocacy.

Other ways to overcome the lack of casual connections in online spaces include establishing an open forum discussion (Garrison & Vaughan, 2008), creating online profiles (D. Selfe, "Collaborating with Students," 2004), and using chat systems that support personal avatars (Garrison & Vaughan, 2008). How much students and instructors disclose online also contributes to persona. We should remember that even online some students will remain introverted. It is impossible to predict how someone will interact online versus in person, though there is some evidence that people outspoken in a traditional classroom are also outspoken online (Garrison & Vaughan, 2008).

Composition instructors can use online persona as an entry into several subjects. The author of a Web profile, online discussion posts, and chat messages constructs an online persona.

... a static learning-profile area that contains brief student-authored biographical information that is available for easy and ongoing reference would increase social presence. (Garrison & Vaughan, 2008, p. 89)

Students can also explore how readers each construct a distinct author, based on the composition encountered superimposed on the readers' cultures, biases, and other assumptions (Wysocki, 2004). Sometimes it is difficult to appreciate differences in a purely online course. As mentioned previously, Garrison and Vaughan (2008) suggest that meeting in person, often at the beginning of a course, can help students develop more realistic and broad understandings of online personas. The hybrid, or blended,

model in which students meet in physical and traditional spaces, also allows students the opportunity to reflect on differences between online personas and face-to-face encounters.

There are problems with online representations and the ability of individuals with ASDs to link these representations, or avatars, to emotional states (Frith, 2001). Watching animated shapes with emotional traits, individuals with autism had difficulty properly interpreting the implied motives and desires of the characters. More realistic, human-like characters can help, but it has been suggested that difficulties associating these with people persist (Moore et al., 2005).

It might help students with ASDs to see and meet other students, or it might cause other students to view their classmate with autism differently. It is a difficult question and one that is likely situational. Some individuals with Asperger's syndrome or similar diagnoses can and do perform reasonably well in social contexts. Those with diagnoses of high-functioning autism or verbal communication impairment might not be served well by meeting in person.

What we must avoid is any pressure on students to define themselves by disabilities or difficult circumstances they have experienced in life. The personal narrative as an introduction can seem like a request by the instructor to have students expose their "weaknesses" or "suffering" to their peers. Advocates for the disabled call this the "super cripp" persona, the idea of overcoming a disability via exceptional effort (Nazeer, 2006).

Peer Review and Editing

Important aspects of collaboration are peer editing and peer review. Peer review develops the ideas and rhetorical strategies of a composition, while editing focuses largely on the mechanics of writing (Ferreira-Buckley & Horner, 2001; Howard, 2001). In our courses, we hope to guide students towards the ability to review their peers, in contrast to making routine corrections to papers without regard for content. Breuch reminds us peer review is not new to writing pedagogy, but it is different in an online space than in a traditional classroom.

Despite the common pedagogical (and theoretical) bases that virtual peer review shares with traditional peer review, virtual peer review is fundamentally different in terms of practice. (Breuch “Enhancing Online Collaboration”, 2005, p. 144)

Building on the previous discussion of community, persona, and collaboration, it should be recognized that the writing disciplines have adopted instructional strategies and overall pedagogies that the writing process is an ongoing dialogue between authors and readers. It is a pedagogical assumption among most writing instructors that editing the work of others helps students discover potential weaknesses in their own compositions.

The teaching of writing, unlike some other disciplines, is founded on the assumption that students learn well by reading and writing with each other, responding to each other’s drafts, negotiating revisions, discussing ideas, sharing

perspectives, and finding some level of trust as collaborators in their mutual development. (Anson, 2003, p. 807)

Recall that students with ASDs approach language as a series of patterns to be mastered (Tantam, 1991). Students with ASDs view the language they read as detached from the emotions of the writer (Attwood, 1998; Happé, 1991). Individuals with ASDs who are interested in language are likely to be grammatical and style perfectionists, able to identify even the most obscure errors. They are also likely to be tediously slow readers, having to translate any colloquial language into concrete ideas (Attwood, 1998; Grandin, 2006; Harpur et al., 2004).

Because it takes time to truly read and respond to an author with any level of depth and care, asynchronous peer editing provides an ideal model to encourage students to take as much time as they might require, within reason, to respond to each other in an online writing course.

One of the beauties of virtual peer review is that there is a degree of technological flexibility in the exercise: it is driven by goals of the writer and reviewer rather than by any particular technology. (Breuch “Enhancing Online Collaboration”, 2005, p. 145)

As stated throughout this project, students with ASDs have difficulties with social interactions and collaboration. Peer editing is a collaborative process that requires empathy and the ability to appreciate the potential viewpoints of the student or colleague being edited. Students with ASDs treat tasks mechanically and programmatically (Attwood, 2007). They are unlikely to recognize the need for polite

suggestions or gentle persuasion. Instead, individuals with autism are likely to be accurate, but perceived as rude or uncaring peer editors.

Peer revision is likely to pose a unique problem for students with ASDs, something reflected later in the findings and analysis within this project. The resistance to peer work of any kind was pronounced within the data, as reflected in the corresponding chapters of this project. Without the ability to think like the author of an assignment, the student with ASD can only apply his or her interpretation of authorial intent (Happé, 1991; Harpur et al., 2004). If the student with an ASD is uninterested in a topic, theoretically one might expect minimal feedback provided to a peer (Attwood, 2007; Grandin, 2006; Wolf et al., 2009).

We should also consider how the students with ASDs might react to peer feedback and editing. Martin (2009) remind us that students with ASDs have likely received an overwhelming amount of negative feedback in the past, therefore our goal should be “to minimize barriers in order to foster success, so a long list of perceived failings and deviations from neurotypicality has no useful place” (156).

This research project might uncover the strategies successfully employed by students with ASDs who engage in collaborative writing and editing processes. If we can identify such strategies, we can adapt them to our writing pedagogies. The goal is to help students with ASDs participate in the peer editing and revision stages of writing as fully as possible.

Rationale: Accommodating Students with Autism

Some generalizations based on clinical and experimental reports on individuals with autism do suggest that online classroom environments should have a number of benefits for these students. The accommodations might be categorized as physical and emotional, though this terminology admittedly is not ideal. At least on the surface, the online setting seems an ideal space for some students with autism disorders.

Physical Accommodations

Most obvious physical expressions of autism might be the involuntary movements and utterances of some individuals with ASDs. Depending on the severity of symptoms and the nature of their expression, such movements and utterances can be disruptive within a traditional classroom environment. It should be stated that not every individual with an ASD experiences the same involuntary physical manifestation of the disorder. Therefore, university writing instructors and universities in general should be cautioned against assuming stereotypical manifestations of autism are always present in diagnosed individuals. But, the reality is also that a significant number of individuals with ASDs do experience repetitive movement and vocalizations. Because vocalizations can be particularly disruptive, these will be addressed first.

Autism can be co-morbid with vocalized conditions including echolalia, non-linguistic utterances, Tourette's syndrome, and other verbal anomalies (Attwood, 1998; Exkorn, 2005; Robledo & Ham-Kucharski, 2005; Yapko, 2003). Echoing is a need to repeat statements of other individuals or personal statements several times. Theories differ on why this occurs. Some individuals with ASDs suggest the repetition allows

them to analyze and decode statements. The repeating of statements heard, especially in conversations, forces other participants to slow down normal spoken interactions. Unfortunately, this is disruptive in a lecture setting or within small groups such as the writing workshops we favor as writing instructors.

Nonlinguistic utterances include random grunts, snorts, shouts, and even laughter. These utterances do not always reflect what might be considered an appropriate response in the context of a conversation or lecture. Certainly, laughter while reading another student's essay on a serious topic would be confusing within a writing workshop context. Other noises, while not necessarily confusing, can be disruptive in the traditional classroom environment. Tourette's syndrome stereotypically includes random utterances of profanity or interjections (Attwood, 1998; Yapko, 2003). Again, such vocalization is likely to disrupt a traditional classroom.

Any text-based online environment, the verbal symptoms of ASDs would be masked or hidden from other students in the writing class. This assumes that the course does not make use of features such as live audio chat, video chat, or other real-time interactions that might include the transmission of audio.

For students with motor control issues related to ASDs, it is possible that the repetitive movements associated with the disorder might distract or disrupt other students (Harpur et al., 2004; Wolf et al., 2009). As we have seen with students suffering various motor control impairments, our traditional classrooms can accommodate limited mobility.

In an online setting, limited motor control might impair the ability to interact in real time with other students or the writing instructor. Typing speed is affected by motor

control and coordination. As is also discussed throughout this project, decoding speed is also an issue. If a student is struggling to type quickly to respond to a live chat session, he or she might miss important information displayed during the session.

It seems likely that asynchronous interactions would provide the best accommodations for those students with motor control issues. Asynchronous discussion forums, e-mail, journals, blogs, and other text-based interactions intuitively seem ideally suited to those students with ASDs. Interviews and surveys might reveal issues that are not immediately apparent to writing instructors or the designers of online classrooms.

Some of the most confounding and disturbing actions by individuals with ASDs are described as self-injurious behavior (Exkorn, 2005; Harpur et al., 2004; Wolf et al., 2009). These actions range from repetitive slapping of hands against other body parts to very serious biting or scratching of the self. It is difficult to imagine but self-injurious behavior would not disrupt a classroom. The safety of the autistic student and other students must be considered. Corresponding literature indicates that these extreme examples of involuntary movement increase with stress.

Less obvious physical conditions associated with autism include seizure disorders, migraine headaches, tactile sensitivity, photophobia, synesthesia, aural sensitivity, and hyperosmia (Attwood, 1998; Exkorn, 2005; Grandin, 2006; Robledo & Ham-Kucharski, 2005; Schreibman, 2005; Wolf et al., 2009). These are physical conditions that are not outwardly obvious to instructors or other students, but they often limit the ability of students with ASDs to participate fully in courses. Classroom

settings are filled with stimuli that have the potential to cause discomfort, anxiety, or even unbearable physical pain for students with ASDs.

The traditional classroom space cannot be as tightly controlled as a student's computing environment. A student with extreme sensitivity to stimuli could react to scents such as perfumes or colognes; noises in adjoining classrooms or hallways; problems with lighting; high pitched tones from electronic devices; or any number of other stimuli beyond an instructor's control. By comparison, the same student could work from his or her residence and avoid problematic stimuli. Because sensitivity increases under stress, the writing classroom is already a difficult location for students with ASDs.

Assuming online writing courses are an appropriate accommodation for students with ASDs, this project explores how design factors can be considered to optimize the student experience. Questions asked in this project address the use of adaptive technologies and the physical requirements placed upon students in our online writing spaces. We often think of online settings as apart from the physical world, while in reality even a virtual writing classroom requires physical interactions to participate.

Behavioral Accommodations

It is assumed that an online course might offer the perfect setting for an individual with autism. If a writing student with an ASD experiences stress in an online setting, we assume that he or she will "take a break" from the classroom. In a traditional classroom, a student leaving the writing workshop or lecture might be disruptive, but

online we do not notice if a student takes a break from reading online content, watching a video, or participating in a discussion.

Autism literature indicates that some vocalizations and movements are used by individuals with ASDs to distract themselves from stressful situations. This response is known as self stimulation or “stimming” (Exkorn, 2005; Robledo & Ham-Kucharski, 2005; Wolf et al., 2009). Though usually not a conscious choice, the autistic individual attempts to reduce stress by repeating a motion or vocal pattern.

All classes at the university level can induce stress. The writing classroom, however, is a space in which we frequently encourage students to express their ideas, beliefs, experiences, and knowledge. University writing classes generally invite debate and discussion on a range of issues. These discussions can cause stress for any writing student. Though it is difficult for me as an individual diagnosed with high-functioning autism, I must admit that the writing classroom can induce stereotypical autistic behaviors.

Research indicates students with Asperger’s syndrome or PDD-NOS diagnoses have a tendency for violent and unpredictable “meltdowns” when under extreme stress (Attwood, 1998; Exkorn, 2005; Harpur et al., 2004, Wolf et al., 2009). Instructors cannot be expected to accept physically or emotionally threatening behaviors within the writing classroom, regardless of any underlying medical condition. However, it is unfortunately easy to confuse physical distress from stimuli with a reaction to other individuals in the classroom. An instructor should always ask a student who seems anxious or angry to explain the source of distress.

If a student has disclosed an ASD to the university disability services and the writing instructor, ideally the instructor will understand that the physical pain and discomfort of some situations is not likely to trigger a meltdown or angry outburst at other individuals. A student in physical distress is likely to experience anxiety or panic. The student should be allowed to either depart the class space or adjust the work area accordingly.

We do not want to convey the message that a student with an ASD is unwelcome in our writing classrooms. However, when a student Asperger's syndrome or PDD-NOS has a history of "meltdowns" and physical outbursts, the online writing space is both a safer and more inclusive writing classroom. Because students with ASDs might have special behavioral needs, this project includes questions about conflicts with other students and instructors in both traditional and online settings. If the online space provides the buffers of time and moderation, virtual writing classrooms might be improved for this student population.

Cognitive Accommodations

Researchers and clinicians have found that students with ASDs are also likely to be diagnosed with or have symptoms similar to various cognitive disorders. The most prominent of these are attention deficit disorder, sometimes with hyperactivity disorder (ADD/ADHD), and dyslexia or other text decoding disorders (Kennedy, 2002; Yapko, 2003). Though traditional diagnosis of autism excludes other disorders, clinicians increasingly recognize comorbidity in autism (Schreibman, 2005). In terms of

accommodations, some universities might require the clinical diagnosis of a learning disability in addition to an ASD (Grinker, 2007; Schreibman, 2005; Wolf et al., 2009).

A significant number of students with ASDs are also diagnosed as dyslexic. Studies suggest that “dyslexic students... comprise 30 to 40 percent of all students classified as disabled” in K-12 settings (Maeroff, 2003, p. 217) and approximately 10 percent of students receiving disability services in postsecondary settings (GAO, 2009). Online settings might be ideal for writing instruction in these cases because students can work at their own pace. Because dyslexia affects so many students, a number of research projects are underway to improve the accessibility of online courses for this population (Seale, 2006). In a traditional classroom, time constraints and the pace of discussions might be difficult for a dyslexic student, especially one with an ASD.

Because more cognitive disorders affect processing speed, it is likely that some students with ASDs will prefer asynchronous virtual writing spaces. The flexibility provided by online education especially in the area of writing, which is uniquely challenging for these students, might provide us with a way to embrace individuals who would normally seek alternative courses or waivers in place of the university writing course. Unfortunately, as a review of the literature demonstrates, too many disability specialists and autism experts believe our writing courses are unwelcome obstacles to academic success.

Research Questions

The problem examined by this project is how to accommodate students with autism spectrum disorders optimally within writing courses conducted in virtual

classroom settings. The assumption is that online course offerings will continue increasing within post-secondary institutions and that writing courses are among those most likely to be adapted to online technologies. Furthermore, this research project embraces the dominant trends in writing pedagogy, developed within the fields of composition and technical writing that favor collaborative learning and social epistemic values.

Though there are propositions underlying this research project, qualitative propositions are not the same as quantitative research hypotheses (MacNealy, 1999; Marshall & Rossman, 2006; Neuman, 2007). While data are obtained and analyzed using methods common to scientific quantitative research, instead of testing a null hypothesis the data actually lead to specific questions and theories that might not have been anticipated before data collection (Marshall & Rossman, 2006). According to Neuman (2007), the method resembles “grounded theory” in that this project attempts to develop a theory to explain why students with ASDs and their advocates report difficulties with online courses, including university writing courses.

Proposition: Individuals with ASDs Engage in Online Writing

Because there are many Web sites and blogs authored by individuals with ASDs, one can observe that individuals with ASDs engage in acts of digital composition and online writing. Consider WrongPlanet.net, a Web site operated by and for young adults with ASDs. As of November 2009 there were 30,741 registered members. There were 60,130 postings in the “Arts, Writing and Music” forum, with 1689 of the posts being original creative works. WrongPlanet is only one Web site community for individuals with ASDs.

While anyone can read works posted to WrongPlanet, only registered members may post works or comments to the forums. It is important to recognize that young adults with ASDs, many of whom are attending or will attend post-secondary institutions, do engage in writing and possess the basic digital literacy to operate in an online writing course.

Proposition: Individuals with ASDs Prefer Text-Based Settings

Because the existing scholarship indicates difficulty with abstraction, this project tests the proposition that individuals with ASDs will prefer text-based online learning environments. Though disciplines within writing studies no longer view “text” as exclusive to printed or displayed words, academic writing remains word-based instead of relying on visual or auditory expression. While we might make use of multimedia technologies, our courses are text-centric.

While CMS platforms support animated graphics, avatars, and virtual learning environments, these simulations might pose barriers to participation for students with ASDs. The hypothesis that students with ASDs will demonstrate a preference for text-based settings draws from limited research, admittedly (Moore et al., 2005). The proposition that text is preferred by students with autism disorders is, therefore, based on anecdotal evidence from memoirs and interviews of individuals with ASDs.

Proposition: Significant Numbers of Individuals with ASDs will Prefer Online Writing Courses

Because existing scholarship and anecdotal evidence indicate individuals with ASDs have difficulty interpreting social cues (Attwood, 2007; Cohen, 2005; Exkorn,

2005; Frith, 1991; Tantam, 1991; Wolf et al., 2009), the proposition that they will exhibit or express a preference for online writing instruction is hypothesized. Though other difficulties might be associated with writing courses in virtual spaces, the balance of potential benefits might favor these virtual settings.

Major Proposition: Writing Courses in Virtual Settings Can Be Optimized for Students with ASDs

The purpose of surveying individuals with ASDs and studying their online communities is to determine optimal design strategies for our online writing courses. The major proposition of this project is that we can, and must, optimize virtual classrooms for writing instruction. Writing pedagogy must be emphasized, so an ideal design supports and extends our pedagogies. The hypothesis that redesign is possible might seem obvious, but determining the design choices will be challenging.

Admittedly, personal experiences have raised questions about the designs of virtual classrooms, but I remain hopeful that these spaces can be adjusted to the needs of students with ASDs. Virtual spaces do have social cues, but with proper design and instructor moderation, writing instruction in these spaces might equal or surpass the effectiveness of traditional classrooms.

Challenges to the Research Question

The questions I set forth to answer were directly challenged by the data collected for this project. As the discussion and analysis in chapters 5 and 6 demonstrate, the potential for online writing instruction as an accommodation faces serious challenges. The data in this study lead me to question if students with ASDs

should be encouraged to take online courses in place of traditional classroom-based writing experiences. My hypotheses outlined in this section do not appear to be accurate reflections of the experiences individuals with ASDs have in online courses.

CHAPTER 3: PROCEDURES AND METHODOLOGIES

Introduction

This research project features three separate components, with the appropriate methodologies adopted for each based on the research questions pursued. The foundational research within this project seeks to establish the computing preferences and habits of individuals with autism spectrum disorders, especially as those individuals engage in online composition. The first two components of this project analyze the online composition practices of individuals with autism spectrum disorders, including their virtual space preferences. The last component is an examination of online course designs, comparing these designs to the preferences of individuals with ASDs.

The components of this project are:

- A statistical analysis of designs of existing online spaces and communities that target individuals with autism spectrum disorders;
- A survey to determine computing preferences and digital writing practices of individuals with autism disorders; and
- A reflective analysis of the designs of writing courses currently offered online at the University of Minnesota.

Based on the research conducted, design suggestions are offered for online writing courses following a review of findings. These design suggestions might better accommodate students with ASDs. Course designs were not tested as part of this project; such testing would require using a revised virtual classroom design for the

length of a college writing course that included a significant number of students with ASDs. Future studies should be conducted, following this research project.

In studies of virtual communities, it is common to use quantitative analysis to locate trends and then explore the possible explanations using qualitative analysis of interviews or open-ended questioning. Though I believe qualitative studies of virtual spaces frequented by individuals with ASDs would offer unique insights, this study had to be limited due to the vulnerable nature of the study population. As an alternative, we find that quantitative methods are common and form the basis for some of the current research on Internet communities (Byron & Baldrige, 2007; Kreijns et al., 2004; Sohn & Leckenby, 2007; Walther & Bunz 2005; Wright, 2005). A review of some current studies demonstrates the use of instruments, often from disciplines such as communications studies, which allow researchers to quantify interactions that are then analyzed using statistical analysis. However, those conducting studies of virtual communities recognize the need for qualitative evidence.

Combined with the quantitative analysis, qualitative investigation of the content communicated may produce richer knowledge of the process of interpersonal/group communication. (Sohn & Leckenby, 2007, p. 448)

There is some historical resistance to quantitative, or empirical, research in the writing disciplines, but as our disciplines increasingly overlap other fields we are finding ways to use empirical data to inform our qualitative research projects (MacNealy, 1999). Studies of Wikipedia, for example, use quantitative data to describe online activity, while supplementing the data with detailed interviews to explore the motivations that lead to increased participation online (Bryant, Forte & Bruckman,

2005). Writing is still the primary topic of the research, but quantitative data reveal the amounts written by subjects and over what periods of time writers are active. Such overlap within research methods is now perceived as an essential approach to studying online communities.

Drawing from MacNealy (1999), the data collected for this research project can be viewed as empirical measures that lead to a qualitative study of online experiences, which in turn lead to recommendations for the designs of online writing courses. Statistical analyses lead to questions, instead of testing traditional quantitative research hypotheses. In qualitative research, the goal is to understand and appreciate the experiences of a population, with theories and explanations arising during the research process (Marshall & Rossman, 2006).

In studying a social space, such as a virtual writing classroom, qualitative research attempts to explain why individuals interact in specific ways. In some cases, the researcher is a member of the studied population, though he or she might not be a part of the study sample. For this project, it is important to disclose that the researcher is a member of the considered population. As an individual with traits of high-functioning autism, my ability to relate to the interviewed volunteers offers a first-order interpretation of the data.

A researcher begins with a point of view of the people he or she is studying, and the researcher wants to grasp fully how they see the world, how they define situations, or what things mean to them. A *first-order interpretation* contains the inner motives, personal reasons, and point of view of the people who are being studied in the original context. (Neuman, 2007, p. 90)

Populations Involved

This research project explores the online preferences and experiences of individuals with autism spectrum disorders. Though there are individuals who self-identify as autistic and those classified as autistic for K-12 educational purposes, only individuals with official diagnoses of ASDs are included in this study. The decision to limit participation to those with clinical diagnoses ensures that conclusions can be generalized. The decision to narrowly construct a research project also aids future replication (Marshall & Rossman, 2006), though replication is complicated when dealing with online experiences. This might be one reason qualitative and participant research is emerging in Internet studies (Bryant et al., 2005).

Participants for this research project were asked to attest to an official diagnosis. Admittedly, any self-reported verification could be erroneous or false. No actual evidence of a diagnosis was requested, due to privacy concerns, but examples were offered to help volunteers self-screen for participation in this research project. Examples of verification included being registered with their institution's disability services as having an ASD condition or documentation of a diagnosis by a health professional.

Protections for Participants

The University of Minnesota Institutional Review Board (IRB) determined that individuals with autism constitute a vulnerable population (IRB 0705P09024, 2007; IRB 0909P72516, 2009). The IRB suggested changes to survey introductory statements and minor alterations to informed consent procedures. Because individuals with autism

might not realize they are eligible for university accommodations, access to these services was specifically added to informational screens and e-mails.

Current university students volunteering to participate in this research but not registered with their institutions' disability services were informed of the legal protections and services offered by disability services. While advising students of the role of disability services is inherently an act of advocacy, this is also to protect subjects and researchers. Because volunteers were not identified, it is impossible to determine if student subjects did seek registration and then re-enter the survey process. It is also possible that students with official diagnoses completed surveys without pursuing university accommodations or services.

Individuals diagnosed with an autism spectrum disorder have a right to confidentiality. There is the potential for discrimination when a disability is perceived or specifically disclosed. Researchers should first take precautions to ensure confidentiality, and then inform subjects of available legal protections and services.

To protect confidentiality, surveys were administered anonymously. Any longer responses and follow-up exchanges were randomly assigned an identifier for coding and analysis. Ideally, the data collected cannot be re-associated with any individual participant. Because the subject population of this research project is considered vulnerable, it was determined there should be no direct contact with project volunteers during the data collection cycles.

The nature of this study includes a minor risk to the participants due to the nature of autism. Any new situation can cause stress for an autistic individual, leading to an increased occurrence of symptoms. Every attempt was made to word questions in

a neutral, non-confrontational manner. The questions were tested during a pilot survey to help refine the wording and structure of the survey.

Data Collection and Analysis

All data were collected during 2009 to ensure that any findings would reflect the state of Web sites and underlying technologies as they exist at the time of this research project. By restricting the period of data collection, the understanding of autism is also limited to current diagnostic criteria and research findings. The adoption of a research window was possible because this research project did not include any observational or longitudinal data.

Web site design data and survey data were analyzed with the aid of Microsoft Excel, IBM SPSS Statistics Pack 15 and SAS JMP 8. The analyses were performed using an Apple MacBook Pro running OS X 10.6. All software and operating systems were updated to include any available patches.

Web Site Design Data

Web Site Design Elements

This research project began with an analysis of online spaces designed for individuals with autism spectrum disorders. Appreciating online spaces where individuals with ASDs engage in composition, in a variety of forms, might suggest how university writing programs can adopt the best design elements found in these spaces. If we can determine what autistic students consider an inviting, comfortable online experience, we can then later compare these desires to the rhetorical strategies of online courses.

During the preliminary research for this project, interviews with individuals with ASDs found that individuals with ASDs either leave or reduce participation in online settings because of overwhelming sensory stimuli, not because they wish to be isolated (UMN IRB 0705P09024, 2007). Visual design choices are potentially the easiest to address when we consider virtual classrooms. Technology exists to allow students the freedom to customize the online environment, which should alleviate some potential issues with which might be called “surface design” choices. Of greater concern to writing instructors should be the technical design elements of a space.

Even with customization, knowing that autism is sometimes accompanied by sensitivity to colors, sounds, and other stimuli (Attwood, 2007; J. Cohen, 2005; Exkorn, 2005; Frith, 1991; Schreibman, 2005), it is important to determine how existing online communities have adapted to other aspects of autism. Those of us responsible for teaching online courses can apply the best practices of public spaces to our virtual classrooms. We should not adopt such design elements without considering pedagogical implications. Our primary task is writing instruction; good virtual classroom design supports our instructional aims.

Web Sites Analyzed

There are numerous Web portals, mailing lists, communities, and blogs dedicated to individuals with autism, their families, and advocacy. Until data are collected on the various purposes, designs, features, and sponsors of these sites, it is difficult to generalize about the Internet and how individuals with ASDs use network technologies. It is likely that there are “clusters” and “rings” of Web sites and mailing

lists that share emphases, such as communities dedicated to issues of self-advocacy and communities dedicated to legislative and regulatory matters.

Early studies tend to treat “the network” as a single place, with a single set of writing norms. While video and audio were foreseen by the researchers, they seemed to envision a homogenous online space. Laura Gurak, in “Internet Studies in the Twenty-First Century” (2004), challenges researchers to move beyond this assumption of uniformity.

Probably one of the most fundamental shifts in Internet studies at the dawn of the twenty-first century came in a move away from trying to generalize about all online behavior to recognizing that, as the Internet became the domain of many, and as websites covered everything from the news to college courses to home recipes, it was not possible to say that online communication is *one thing* and one thing only. (Gurak, 2004, p. 28)

Gurak encourages those studying the Internet and digital communications to study specific situations.

Research about the Internet as a social, psychological, and linguistic communication site is most fruitful when it is based on the specific case at hand. (Gurak, 2004, p. 28)

This research project recognizes the wisdom of limited scope. Critiques of online communities are limited to specific design elements and how they accommodate, or create obstacles to, various composition processes. Information on the sponsorships

or views expressed within particular communities is ancillary to the aims of this research project.

Descriptive data were collected on a representative sample of online communities frequented by individuals with autism. Using Google as a primary search engine and the Autism Hub (<http://www.autism-hub.co.uk/>) as a central portal, 98 communities and blogs were identified for potential analysis. The choices were based on popularity; originally the top 100 sites based on Google analytics were chosen. Using Google, you can determine how many unique visitors have been to a Web address and how many online sites link to that address. The search syntax “link:URL” returns a count and list of other sites connected to the Uniform Resource Locator, better known as the Web address of a site. Unfortunately, two of the sites were “dead links,” meaning no site was found when either manually entering the Web address or attempting to connect from the Autism Hub. As a result, only the 98 most popular sites, based on Google statistics, were analyzed. It should be noted that several of 98 sites were dormant, meaning they were not updated within the last six months.

Because the goal was to analyze successful sites designed to include individuals with ASDS, it was determined only active sites would be further analyzed. It was arbitrarily determined that a site would be “active” if it featured new content within a two-week period. Therefore, all data were collected during a two-week period to ensure that changes in technology or other factors did not disrupt a comparative analysis of designs. Web sites were analyzed between 5 July and 18 July 2009. Statistical analysis was possible because design elements can be counted, measured, and in other ways quantified, locating some dominant trends in design.

Automated Data Collection

Web page properties were collected using the Firefox browser from the Mozilla Foundation (<http://www.mozilla.org/>) with the “Developer’s Tools” plug-in module installed. In a special developer’s mode, Firefox produces reports listing all HTML tags for a Web page and the attributes of these tags. The developer reports were imported into Microsoft Excel for verification and editing. A manual check of Web page HTML and CSS source code, available via the “View Source” option of Firefox, verified the integrity of the design report to correct or supplement the automated data collection.

Only the Mozilla Developer’s Tools and source code were used to analyze design elements of Web communities. The reality of technology today is that no two combinations of computer monitors, browsers, or operating systems displays a single Web page in the same manner.

Monitors in wide use includes cathode-ray tubes, light-emitting diodes (LEDs), and several less common display technologies. Even two monitors from the same vendor using the same technology will not display precisely the same colors (Krause, 2007). Remarkably, Apple and Microsoft operating systems make different assumptions about color calibration and rely on decidedly different theoretical color models, also known as color spaces (Nack, 2009).

Browsers such as Microsoft Internet Explorer, Apple Safari, and Mozilla Firefox differ in how they interpret HTML, CSS, and other Web technologies to display specific Web sites. Developers have long struggled to create Web sites that render properly on the various browsers in use (Andrew & Shafer, 2006; Krause, 2002; McFarland, 2004; Tollett, Williams, & Rohr, 2002). Even the size of primary text might

vary from one browser to another, despite the efforts of a designer to create a specific look.

For individuals with special needs, the browsers and operating systems differ in their abilities to support adaptive technologies, including basic keyboard-only navigation. While both Windows and OS X support alternative input technologies, Web sites do not always respond to these adaptive devices in predictable and intuitive manners (McFarland, 2004). As a user of voice-control software, I can attest that even within a single operating system platform, various Web browsers respond differently to the same commands.

Quite simply, it is impossible to rely on an individual tester to accurately report how any virtual space renders on a computer screen or how that same space is navigated. Only the analysis of underlying HTML and CSS code via automated tools produces consistent evaluations of virtual spaces. Even with automated tools, it is possible that errors in HTML or CSS syntax produces unexpected rendering of a Web community.

Usability and accessibility data were collected using the “WAVE Tool” plug-in with FireFox. This special tool was created by WebAIM, Web Accessibility in Mind, a non-profit organization within the Center for Persons with Disabilities, Utah State University (<http://webaim.org/about>). WAVE evaluates Web pages to determine if the pages are accessible to individuals with disabilities.

To test a Web site, the URL is entered into WAVE, which then “visits” the Web site using a series of automated scripts and applets. Using a database of Rehab Act Section 504/508 and ADA Title III compliance guidelines, WAVE simulates the online

needs of individuals with various disabilities. All potential usability compliance issues are reported and logged after WAVE analyzes a Web site. Automated testing ensures that all usability aspects are tested in a uniform manner across every analyzed site. An individual following the same evaluation criteria could accidentally miss some test procedures or mistakenly log a usability issue when none exists.

Theoretically, the data collected could be compared to design trends in future years. Using standardized reporting tools and a popular multi-platform Web browser should allow other researchers to compare any set of online communities to the set of communities for individuals with ASDs analyzed during this research project.

Analysis Procedure

Of the initial 98 online spaces identified, design data were collected from 82 blogs, one portal, and six communities. Sites were excluded from analysis if they could not be considered public spaces. A Web community was considered public if the space featured unrestricted access to all content. No non-public, password-protected, or “member’s only” content was included in the analysis to respect the nature of these communities. Data collection and study was similar to analyzing published texts or the designs of public spaces.

All raw data were first imported into Microsoft Excel and then verified by at least two individuals, including the primary researcher. Traditional data analysis required that some data be modified for analysis. For example, because SPSS and JMP require numeric data, variables that could be logged as “True/False” or “Yes/No” were converted to “1/0” as is standard practice. Measures that were quantifiable, such as the numbers of new posts to blogs, were unmodified. After the data were verified and

adjusted to match the requirements of statistical software, the datasets were imported into SPSS and JMP for analysis.

Survey of Individuals

Though some online preferences and habits might be discerned by analyzing Web communities targeting individuals with autism spectrum disorders, the best source for information is undoubtedly the individuals with ASDs. Unfortunately, as the literature on autism suggests, during a series of pilot interviews I determined that most potential volunteers with ASDs did not wish to be interviewed in person, via telephone, or even via synchronous online chat (UMN IRB 0705P09024). To obtain first-hand data from the primary subject population, it became obvious the best approach for this research project was a survey methodology. While survey methods are popular in Internet-related studies, they are not without complications.

Studies of digital communications frequently include survey data. There are several reasons for the popularity of survey methodologies, including perceived affordability, accessibility, and efficiency (Wright, 2005). The popularity of surveys has resulted in literature specifically addressing this research approach.

Studies of online populations have led to an increase in the use of online surveys, presenting scholars with new challenges in terms of applying traditional survey research methods to the study of online behavior and Internet use (Andres, Nonnecke, & Preece, 2003; Bachmann & Elfrink, 1996; Stanton, 1998; Witmer, Colman, & Katzman, 1999; Yun & Trumbo, 2000). (Wright, 2005, p.

1)

Unfortunately, some perceptions of survey methods are incorrect or, at best, incomplete. Though convenient for many studies, conducting a survey still requires a great deal of effort and care. One reason for this is the need for manual inspection of responses to screen for duplicate responses or other problems (Konstan, 2003).

... web-based survey research is still highly worthwhile, and can achieve high validity. The web does not provide a “cheap and easy“ research platform.... The substantial investment made in validity checks can increase confidence in the quality of data collected and therefore in the results of the research. (Konstan, 2003, p. 4)

Problems with validity are not unique to online surveys (Wright, 2005).

Unfortunately, it remains difficult to design online surveys that cannot be manipulated (Konstan, 2003). Because one of the key appeals of virtual spaces is anonymity, there is never a guarantee of truthful responses to questionnaires or surveys. That same anonymity can give people a sense of safety. As a result, groups that might not be popular might be more open to surveys and studies conducted online (Galegher, Sproull, and Kiesler, 1998).

One advantage of online survey research is that it takes advantage of the ability of the Internet to provide access to groups and individuals who would be difficult, if not impossible, to reach through other channels (Garton, Haythornthwaite, & Wellman, 1999; Wellman, 1997). In many cases, communities and groups exist only in cyberspace. (Wright, 2005, p. 2)

Survey Development

A pilot project was conducted during the summer of 2007 (UMN IRB 0705P09024). This project was used to refine survey questions and determine the feasibility of interviewing volunteers. The pilot project led to the decision to develop an anonymous survey with open-ended questions in place of any interviews. Research specialists suggest mixing open- and close-ended questions can improve survey reliability (MacNealy, 1999; Neuman, 2007). A disadvantage of open-ended questions is that they can reduce participation rates (MacNealy, 1999).

The pilot survey also revealed that participants required specific choices whenever possible, so the multiple choice format was developed for this research project. Based on survey research, options were limited to six or fewer and a “other” category was offered for most questions (Neuman, 2007). While it is impossible to imagine the answer to every question, leading to the inclusion of an “other” option for most questions, the choices provided were based on the pilot survey data to anticipate the needed response choices.

Once survey questions were developed on paper and compared to questions asked in previous surveys of individuals with ASDs (GAO, 2009; Tantam, 1991), the survey was submitted for IRB approval. Once approved, the survey was converted to electronic form for administration by SurveyMonkey.com, a commercial service. A paid account was used to obtain a number of essential options from SurveyMonkey. Those services include:

- Secure Socket Layer protection so volunteers would be using an encrypted and secured Web service for data entry;

- Internet Protocol (IP) address verification to prevent one person or a group of people from submitting responses from a single computer in short period of time;
- Cookie support for instances when IP verification might not be sufficient, such as on some wireless networks that renew IP addresses every few minutes;
- Guaranteed data destruction complying with Department of Defense standards for erasure; and
- Downloadable data for analysis on a secured system owned by the primary researcher.

Based on the existing literature on Web-based surveys, it was important to reduce the likelihood of duplicate data or intentional data manipulation by volunteers. There was also an ethical imperative to protect the confidentiality of volunteers during and after the survey process. Though a self-reported survey process cannot match the reliability of observational data, everything possible was done to limit data distortions.

The final survey features a cascading filter, meaning that fewer responses are expected for each consecutive section. For example, only those individuals indicating they are or have been postsecondary students were presented questions relating to higher education. Survey sections are titled:

- Demographic Data
- Technology Use
- Writing and Technology
- Postsecondary Students

- Online Course Design

Demographic data were collected to compare the volunteer sample to existing data on postsecondary students with disabilities (GAO, 2009). If the survey participants reflect general trends, there is a greater probability that any findings can be generalized (MacNealy, 1999; Neuman, 2007). Furthermore, demographic data in this research project should enable future research to establish longitudinal trends.

Some data could be extended beyond writing pedagogy, but the survey was designed with writing habits and educational experiences in mind. Technology use questions were meant to determine which technologies might be most comfortable and afford the greatest levels of accommodation for students with ASDs. No attempt was made to develop questions with broader generalizability.

This project is primarily concerned with writing pedagogy, but it does not stress any one genre. Participants were asked questions about writing, including academic, professional, and personal writing. It is important to determine if the students collaborate on writing projects, whether this collaboration occurs in the writing classroom or as part of a personal avocation. Also of interest to writing scholars is any peer review or editing in which these students might engage. If we determine collaborative practices that work outside the classroom, those can be useful in the improvement of online writing courses.

Qualitative Data

Despite the inherent challenges, it was essential to the success of this research project to obtain some in-depth qualitative data. However, since direct contact with research volunteers was restricted, open-ended questions were submitted to the IRB for

inclusion within the survey component. Every open-ended response was optional and response rates, which will be detailed during analysis, were insufficient to claim any generalizability. However, the responses did explain and give additional insights into the quantitative findings, supporting the correlations and trends detected within the data.

It should be noted that any qualitative data obtained via the open-ended prompts within the approved survey reflect a form of self-selection among the participants. In particular, only those individuals with ASDs who are comfortable with disclosure and self-reflection are likely to volunteer the additional information that was sought. For this reason, the responses appear as supporting evidence for any quantitative findings, but are not themselves presented as findings.

Anecdotes can persuasively support statistical findings, making it easier to argue that online writing courses need to accommodate students with ASDs. Also, the anecdotes add explanations and depth to the quantitative findings. Future studies can and should seek more qualitative data from students with ASDs and some recommendations follow the findings within this research project.

Recruitment Process

An IRB-approved recruitment letter was posted to several mailing lists, online forums, community blogs, and to my academic blog that focuses on issues of autism and education. Because this project was intended to improve online writing courses, the promotion of the survey via the Internet was not considered problematic. Also, the distribution channels are frequented by self-advocates with ASDs, who were likely to tell other individuals about this project.

Requesting volunteers by posting to various mailing lists and Web site forums might result in a disproportionate number of “self-advocates” within the sample. These individuals tend to be highly skilled with Web technologies and comfortable with online composition. They might not be reflective of general student populations, including students with ASDs. For this reason, requests for volunteers were posted to the LiveJournal and WrongPlanet communities, which are less focused on self-advocacy.

The recruitment of volunteers results in a purposeful sampling, also known as a purposive or judgmental sampling (MacNealy, 1999; Neuman, 2007). The individuals volunteering represent “cases that are especially informative” (Neuman, 2007, p. 143). Because they are individuals diagnosed with autism disorders, are using the Internet, and most have been or are university students, the sample population closely resembles the potential students for whom our online writing courses are designed.

Sample Size

According to Neuman (2007), for populations over 10 million, such as the population of the United States, sampling ratios of 0.025 percent can achieve statistical validity. Neuman suggests that for subgroups of the general public, 50 cases should be analyzed for each one percent the group represents within the greater populace. Though there is a great deal of controversy surrounding the diagnostic rate of autism (Grinker, 2007; Schreibman, 2005), for the purpose of sample determination, a rate of one percent will be assumed. According to experts, high-functioning, college-capable individuals with autism represent 40 percent of diagnoses (Attwood, 2007; Grinker, 2007). Using these assumptions, 20 sample cases might lend external validity to this project. A total of 48 cases were collected.

Memoirs and Published Interviews

The curriculum of academic composition courses and technical writing programs include genres that can empower students, including those with ASDs. The dozens of personal memoirs published by successful individuals with autism disorders illustrate the power of personal narratives—a common early assignment within writing programs. Many of the works by individuals with autism also include coping strategies and procedures, supported by lists and diagrams. There is no single form of writing best suited to self-advocacy and self-expression.

There is evidence that writing is becoming a primary form of communication for autism self-advocacy proponents. Non-verbal and limited-verbal individuals with autism are using writing to express their social and intellectual interests. Books such as *Aquamarine Blue 5: Personal Stories of College Students with Autism* (2002) and *Succeeding in College with Asperger Syndrome* (2004) demonstrate the role of texts in self-advocacy, especially within post-secondary education.

As Happé (1991) indicates, any study of memoirs is complicated by the role of coauthors, “ghostwriters,” editors, and the numerous other collaborators involved in the publication process. Analysis has revealed the influence these collaborators have on both form and structure within the memoirs. Neither the content nor the style can be accurately analyzed if the individual with autism is not the primary writer. Because ghostwriting is common, unfortunately, we are left to hope the memoirs are at least factually reliable thanks to editorial researchers.

[P]arrotting and the help of co-writers may lead us to believe the autistic writer is more socially adept than is actually the case. (Happé, 1991, p. 222)

It is impossible to know the extent to which any memoir is the work of either a credited or un-credited coauthor. Therefore, it is the circumstances of the subject's life that can be studied. Admittedly, this is not as informative as a textual analysis, but it is sufficiently revealing for the purposes of this research project.

CHAPTER 4: RESEARCH DATA

Introduction

To determine possible virtual writing classroom design choices that benefit individuals with autism spectrum disorders, this project includes an analysis of existing online spaces, a survey of individuals with ASDs, and supplemental materials in the form of participant comments. Additionally, comments from individuals with ASDs about technology and education have been collected from memoirs and interviews to determine if the comments of survey volunteers are representative of a larger community.

The data in the following sections are presented in as much detail as possible, while avoiding disclosure of identifying information or comments. Though confidentiality and anonymity were stressed in the approved IRB forms for recruitment, informed consent, and survey instructions, some participants did divulge potentially identifying information. Removal of such data, especially from open-ended questions, was attempted but may not be complete despite the efforts of the researcher.

Respondent answers to some open-ended questions follow the appropriate survey prompts. Because the answers explain or add additional insights to the statistical data, incorporating the answers in this manner seemed to provide the best possible context for readers and future research projects. Additional open-ended responses appear separately in this chapter. These responses seemed to offer additional insights, in general, but embedding all responses within the quantitative data hindered the presentation and interpretation of the survey.

Discussion and analysis of the data appear in following chapters of this project.

The complete data are presented here to enable other researchers an opportunity to explore potential questions not addressed by this research project.

Web Site Trends

Blog Data

Data were obtained for 82 blogs that are maintained by or intended for individuals with ASDs. The list of blogs was compiled by comparing a Google search on “autism blog” to the blog Really Simple Syndication (RSS) feeds aggregated by the Autism Hub (<http://www.autism-hub.co.uk/>). All data were collected during a two week period during July, 2009. As explained in the previous chapter on the research methods of this project, sites were selected based on Web traffic and popularity, using Google Analytics and reverse-link searches.

Table 1:
Blogs Written about, for, or by Autistics

Data Collected	Type of Author					Grand Total
	Academic	Autistic blogger	Autistic / Family	Family member	Pro	
Count of Type	2	42	1	35	2	82
Sum of Posts	1	95	59	75	4	234
Sum of Replies	0	387	490	482	1	1360
Sum of Photos	1	18	1	24	0	44
Sum of Videos	0	12	1	16	0	29

Of the blogs analyzed, 42 were written by individuals self-identified as having an ASD, 35 written by family, two professional service providers, two academics, and one blog was written for an organization by a pair of compensated authors. Because the sponsored blog had an anomalous amount of activity, both in terms of postings and replies, it was excluded from statistical analyses of correlations.

Activity

More than half of the blogs, 46, had been updated within the two week period chosen for analysis. There was no significant difference when comparing the idle blogs by individuals with ASDs to the overall idle mean (0.48:0.56). There was a difference between the idle blogs of individuals with ASDs compared to family member blogs (0.48:0.63). The family member blogs were significantly more likely to be active within the sample period.

The active bloggers with ASDs posted an average of 3.96 new entries during the two-week window, while the average family member posted 3.57 new entries. It appears that if a blogger is active, there is no significant correlation between those with ASDs and other autism-focused bloggers.

There is a potentially significant difference in the overall number of responses, but not the percentage of posts that attract responses. Only one ASD blog post did not receive a public response, and only one family member blog entry failed to generate a public response. What is interesting is that there were 16.83 responses per entry for bloggers with ASDs and 24.10 responses to family member blogs. This translates to 43 percent more responses for family member blogs.

Design Choices

The designs of blogs were determined by the hosting services, which appear to be predominantly Blogger and WordPress. No color combinations or font choice trends were evident since the blogs analyzed relied on templates provided by Google (Blogger) and WordPress. Since none of the blogs were customized, analysis of sites is unlikely to provide clues to any visual design preferences of individuals with ASDs.

The blogs of individuals with ASDs were less likely to include photos or videos than blogs of family members. Forty-three percent of the bloggers with ASDs included photos, while 67 percent of family members included photos. Only 29 percent of bloggers with ASDs embedded links to shared videos, while 46 percent of family member blogs included embedded video links. There was no significant correlation found between the inclusion of media and the number of blog entries or replies to entries.

Finally, every blog studied, without exception, provided an RSS feed. Every blog also supported “following” via a Web aggregator, meaning those interested could interact with the blog without visiting the site directly. It is possible to read and reply to blogs via aggregators. There are implications for course design that will be explored within the findings and conclusions of this research project.

Special Note

The researcher operates a blog on autism and education, which was excluded from the data collection. This did mean automatically collected data had to be manually extracted, but this seemed a reasonable decision to avoid having the design of this blog affect the data analysis in even a minor way.

Portal Design

One portal, WrongPlanet.net, was analyzed, but because the site requires membership to use many of the features only a basic analysis of the main site and its platform is possible. WrongPlanet, like the blogs analyzed, relies on existing software and is not customized in any significant manner. The site runs PHP-Nuke, an open

source portal application and uses basic themes included with the free edition of PHP-Nuke.

The chosen design uses black text on a light gray background. There are no embedded videos, but there are photos included with most front-page articles. For example, book reviews include images of book covers, which are linked to the Amazon.com bookstore. The forums and other parts of the portal require a free membership and are not considered public spaces. To join, you must indicate an ASD diagnosis, submitted via e-mail to a site moderator. As with the communities analyzed, confidentiality and a desire to protect the nature of the community might be concerns of the WrongPlanet virtual space.

An important feature is that members can choose to interact with WrongPlanet.net via RSS feeds and e-mail updates. As a result, it is possible that many members do not visit the Web community directly, but instead use software of their choice to read and write content that passes through the WrongPlanet.net server. In effect, the portal can act like an old-fashioned, 1970s technology “listserv” that does not require Web-based interactions once someone joins the community.

Special Note

Again, it should be disclosed that the researcher operates another autism-focused portal at the time of this research project. That portal, AutisticPlace.com, is not analyzed within this project, though the design may change based on the findings of this project. Including a portal that reflects my preferences would be inappropriate.

Communities

Six communities were analyzed, once again drawing attention to changes in technology that allow members to set their preferred screen colors, fonts, and even screen layouts. Also, all six communities supported either e-mail or RSS interactions, further enabling the reader to avoid any imposed design choices. There are default designs, however, and it remains likely many readers do visit these communities directly. Unfortunately, it is not possible to determine how many members visit the communities directly and how many, once members, interact indirectly.

It should be noted that the communities with the greatest number of unique monthly visitors are hosted by two Internet media companies: Yahoo and LiveJournal, a division of Russian media company SUP. Possible reasons for this dominance by two companies will be discussed within the analysis of designs. While part of the reason for dominance might be the longevity of these communities, there are also design similarities.

Yahoo Communities

Three Yahoo Group communities and three LiveJournal communities were explored. All three Yahoo Group sites required a free Yahoo membership and then used the display theme chosen by the member. The Yahoo Groups service allows members to post via a Web-based interface or to interact via e-mail. It is even possible to join a Yahoo Group via e-mail, again like a listserv mailing service. The communities selected were the oldest and most active autism-focused groups that could be located.

Table 2:
Yahoo Hosted Autism Communities

Group Name	No. of Members	No. of Posts in June 2009	Years Online
Autism-Aspergers	3173	107	9
AspergersSupport	2981	790	11
AutismList	863	70	11

As the data indicate, the top two communities are substantially larger and more active than the third most active. The first-two are general interest, while the AutismList appears to focus on therapies for children with autism, in particular facilitated communication (FC). It appears the current moderator of the list has a private therapy practice, which is promoted via the group Web page. The AutismList also makes the following unverifiable claim:

The AutismList is the first spin off of the St John's Autism List which in turn was the first major autism discussion group on the internet.

(<http://groups.yahoo.com/autismlist/>)

With a tenth of the activity, it is unclear if AutismList reflects the other two, more active online communities hosted on Yahoo Groups. However, because Yahoo Groups is primarily mailing lists with Web-based archives, any design differences are minor. Mailing lists are, by definition, controlled by the e-mail program chosen by each member of the community. Yahoo Groups allows any group to have the following Web-based features:

- Files
- Photos
- Links
- Database

- Calendar

It appears the Web-based features of the groups, in all three communities, are of minimal importance. There were two files in the AutismList area, but both of these were advertisements for a dietary supplement company. It is doubtful that these files were uploaded by an individual with an ASD to share with other members of the community. None of the communities were using the public calendar. Other features are limited to members and not available to the general public. This project cannot address, for ethical reasons, how or if those features are used. What can be stated is that e-mail is the primary form of community interaction.

Though Yahoo Groups supports a chat mode, the chat option was not enabled within any of the Yahoo-based communities. Because the moderator of any Yahoo Group can enable the real-time chat functionality, the lack of chat and instant messaging features can be considered a design choice.

LiveJournal Communities

The LiveJournal platform differs from Yahoo Groups because they have different heritages. While Yahoo Groups evolved directly from mailing lists, the LiveJournal system was a blogging system that evolved into a community platform with e-mail support. This is an important distinction because it means LiveJournal originally required Web interaction to create and respond to content. The LiveJournal system “feeds” community activity to members, allowing each member the opportunity to tailor his or her viewing experience.

E-mail posting and reading appear to be the preferred method of interaction for many users, but no statistics on interaction methods could be located. Three e-mails to

LiveJournal support asking when e-mail support was added went unanswered. I can report, as a user, that I have used e-mail interactions since joining an autism-focused community in 2007. Communities on LiveJournal are treated the same as individuals. As a result, a community is merely another “friend” a user connects with via the LiveJournal system. Communities can either automatically add friends or be moderated by some members with special privileges. The autism communities are all moderated, like the Yahoo Groups.

Web-based interactions with LiveJournal communities occur via an interface that each user can customize. Examples of this interface will be included with the design analysis. The communities do have unique Web pages, but LiveJournal does report that most users access communities via a feed system.

Customization & Friends Colors: You can customize the appearance of your Friends page in the same way that you can customize your journal page. This allows you to change things such as the overall layout of the page, its colors, and the number of entries that appear on it. Many friends page styles also use foreground and background colors for your Friends when displaying your Friends’ entries. (<http://www.livejournal.com/support>)

It is possible to customize LiveJournal using all HTML and CSS standards. A user can, and apparently some have, customized pages to the extent that interaction with the system becomes nearly impossible. There is no way to know how many users customize LiveJournal, but there are several online communities dedicated to developing custom “themes” for the Friends page.

Your journal or Friends page can display incorrectly when you or someone on your Friends list post an entry with incorrect HTML or with wide images or text. It can also happen with errors in your style customizations.

(<http://www.livejournal.com/support>)

LiveJournal does not include a report on monthly community activity. To count posts, membership would be required in the communities.

Table 3:
LiveJournal Hosted Autism Communities

Group Name	No. of Members	Years Online
asperger	1756	8
autism	1355	8
autism_spectrum	151	2

As with the Yahoo Groups, the two largest groups are significantly larger than the community ranked third in activity. Additional autism-focused communities are dramatically smaller still, often with fewer than ten members.

Survey Data

Fifty-one individuals volunteered for this project and 48 surveys were completed for cross-tabulation, the response rate was higher than previous studies of autism and online settings (Moore et al., 2005). As explained in the methods review, a sample of approximately 20 individuals might represent generalizability among students with ASDs. This estimate is based on statistical sampling models and theory (Neuman, 2007). The demographic information appears to parallel GAO reported data on university students with disabilities (GAO 2009).

Existing scholarship indicates that it is unusual to have samples of similar size when studying issues of autism and learning, indicating that the recruitment of participants and the study organization was effective. That the sample population closely matches the demographics of federally reported data indicates a potential for generalizability.

Due to the nature of the online survey system, SurveyMonkey, used for data collection within this project, volunteers could and did omit answers to some questions. Two surveys were considered incomplete and not analyzed. Thirty-six surveys included a response to every question, including those about higher education and writing experiences. Twelve surveys were complete, but the individuals were never enrolled in a postsecondary institution based on their responses. These 12 were included in data analysis when appropriate.

Demographics

The GAO report *Higher Education and Disability* (2009) compiled data from ten previous studies. Additionally, the GAO visited 14 campuses and conducted phone interviews with 11 campus disability offices, usually referred to as Disability Services. The data collected are part of the Department of Education's annual *National Postsecondary Student Aid Study* (NPSAS) and represent the self-reported demographics of all students completing financial aid forms for the 2009-2010 academic year.

The NPSAS data, being self-reported, might not be as reliable as K-12 data reported to the Department of Education, as many students might not disclose a

disability or might not consider themselves disabled as adults. It is not uncommon for the need for accommodations to decline over time, as that is one of the goals of providing supports during development.

The GAO/NPSAS data do indicate differences between the national profile of postsecondary students and the volunteers for this research project.

Table 4:
Higher Education Demographics of Students with Disabilities

	<i>Higher Education and Disability (GAO, 2009)</i>		<i>Current Project</i>	
	Percent Without Disabilities	Percent With Disabilities	Response Percent	Individuals with ASDs Surveyed and...
Women	57.1	57.7	54.2	Women
Men	42.9	42.3	35.4	Men
23 or Younger	61.5	54.9	26.0	24 or Younger
24 or Older	38.5	45.1	74.0	25 or Older
Delayed Enrollment	30.3	35.1	41.2	Delayed Enrollment

The sample population is similar to the national profile in terms of gender and delayed enrollment. Because this project included an optional “Other/Decline to State” gender category, it is possible that the gender balance is closer to the national data than apparent at first glance. Also, the slightly higher percentage of delayed enrollment and older population are possibly artifacts of limitations on this project, which had to exclude individuals younger than 18 years. Another possibility is that the recent nature of autism spectrum diagnoses is reflected in the age of participants, as demonstrated by data collected on age and gender.

Table 5:
Survey Participant Demographics

<i>Gender and Age (Percent of Group/Count)</i>					
Age	Male	Female	Other	Response Percent	Response Count
18 – 24	23.5 (4)	38.8 (8)	20 (1)	27.1	13
25 – 34	29.4 (5)	42.3 (11)	20 (1)	35.4	17
35 – 44	29.4 (5)	15.4 (4)	20 (1)	20.8	10
45 or older	17.6 (3)	11.5 (3)	40 (2)	16.7	8
Total	35.4 (17)	54.2 (26)	10.4 (5)	100.0	48

The distribution of male study participants featured minimal skew, which means a graph might resemble a traditional bell-curve distribution. However, the female participants skewed significantly younger and those selecting “other” as gender skewed older. It is unknown if this pattern reflects university populations, disabled university students, students with ASDs, or is unique to this sample.

Attwood (2007) and other researchers have suggested women are diagnosed with ASDs at a later age than men and receive fewer supports. Data collected for this project reflect the possibility of late diagnosis and decreased supports for women.

Table 6:
Ages of Participants at Time of Diagnoses

<i>Age of Official Diagnosis for High Functioning Autism, Asperger's syndrome, or PDD-NOS by Gender and Age (Percent of Group/Count)</i>					
Age	Male	Female	Other	Response Percent	Response Count
Before age 8	17.6 (3)	3.8 (1)	0.0 (0)	8.3	4
8 – 12	23.5 (4)	7.7 (2)	0.0 (0)	12.5	6
13 – 18	0.0 (0)	11.5 (3)	20.0 (1)	8.3	4
19 – 25	17.6 (3)	30.8 (8)	20.0 (1)	25.0	12
After age 25	41.2 (7)	38.5 (10)	60.0 (3)	41.7	20
Do not know/recall	0	7.7 (2)	0	4.2	2
Total	17	26	5		48

A greater percentage of the male study volunteers, 41.1 percent, were diagnosed before age 13 when compared to the female participants, with only 11.5 percent diagnosed before age 13. In fact, more than two-thirds of the women in this study, 69.3 percent were diagnosed after the age of 18, meaning they were less likely to receive

academic supports related to autism. Those within the other gender category were the most likely to have a late diagnosis, with 60.0 percent diagnosed after the age of 25.

Those with an official diagnosis of an autism spectrum disorder were overwhelmingly diagnosed by private-practice clinicians, with 79.6 percent of study volunteers relying on private psychologists or psychiatrists for an evaluation.

Table 7:
Source of Participant Autism Evaluations

Who Evaluated	Response Percent	Response Count
A private-practice psychologist / psychiatrist	79.6	39
A specialist employed by or contracted by a school system	14.3	7
Do not know / recall	6.1	3
Total		49

Participants may have received special academic accommodations during some of their education, and students with disabilities commonly receive accommodations for only a portion of the K–12 experience. As a result, numbers on the following response are indicative of receiving sporadic accommodations on an as-needed basis.

Table 8:
Participants Receiving Special Assistance or Accommodations

Assistance Provided	Response Percent	Response Count
Before grade 4 (“early elementary”)	29.4	10
4 through 6 (“upper elementary”)	26.5	9
7 or 8 (“middle school”)	23.5	8
9 through 12 (“high school”)	32.4	11
During college / university studies	38.2	13
Do not know / recall	35.3	12
No accommodations indicated	35.4	17

Note: The respondents were instructed to mark all options that applied.

Only three males (23.1 percent of male respondents) received accommodations during their postsecondary studies. By contrast, 40.0 percent of women and 75.0 percent of those selecting other for gender received accommodations during their postsecondary education. The reasons for this gender difference are beyond the scope of this project,

which focuses on design and accommodations within virtual writing classrooms, but clearly there is a need to explore gender differences among postsecondary students with autism. Early intervention and support is considered important within special needs education; clearly women are not receiving diagnoses or supports early in their educational experiences.

Technology Use

One of the primary purposes of the survey within this research project was to determine if and how autism and any co-morbid conditions might negatively affect the technology use of postsecondary students with ASDs. While 65.9 percent of those responding indicated no challenges using computers in general, responses did uncover difficulties using Web-based communities. Also, while this study was focused on the challenges faced by all university students with ASDs, some gender differences were apparent within the survey data. It is not known how or if those differences reflect larger trends within university populations or if these trends are unique to the ASD community. Certainly, gender does emerge from this project as a topic for further study, a recommendation explored at the conclusion of this project.

Table 9:
Autism-Related Challenges Using Computers

<i>Do you ever have challenges using a computer related to a medical condition, including any problems related to an autism spectrum disorder?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
<i>Yes</i>	<i>34.1</i>	<i>14</i>
<i>No</i>	<i>65.9</i>	<i>27</i>
<i>Total Responses</i>		<i>41</i>

One hundred percent of the men (13) responding to this question indicated no challenges using a computer. By comparison, 45.5 percent (12) of the women reported challenges using computers. Furthermore, 75.0 percent (3) of those selecting other for gender reported challenges using computers. The comments explaining difficulties were, therefore, only from the two gender groups indicating the existence of challenges with computing technologies related to medical conditions, including autism.

“Auditory processing” seems to be the source of frustration for several respondents. They write about this as it relates to online education, offering a design insight that is incorporated into the findings and conclusions of this project.

Due to my auditory-processing difficulties, I have problems watching and understanding streaming video or audio, similar to that which might be experienced by someone with hearing loss. Most spoken content is incomprehensible to me unless I can concentrate on it *completely*, to the exclusion of activities such as taking notes or following a video. Although many people who embed video in their blogs or websites take the time to offer a transcription, the proportion is still low enough that a lot of online content is inaccessible. I’m pursuing a master’s degree online right now, and most instructors put up course content in the form of a streaming video slideshow; I’m forced to either download the slides alone and read them, if the instructor thinks to offer that choice, or work from the course readings and hope I don’t miss any nuances.

Captioning content seems to be a reasonable accommodation and one mentioned by another survey participant.

I have a lot of difficulty with non-captioned audio/video. I have a lot of challenges related to visual processing as well, however I'm able to avoid most of these challenges with the accessibility options of most software (unlike A/V where if there are no captions, then, well, there are no captions).

Though women and other gendered volunteers reported more difficulties using computers, substantially fewer women reported major physical limitations.

Table 10:
Participants with Physical Limitations

<i>Do you have any major physical limitations?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	22.0	9
No	78.0	32
Total		41

Only 18.2 percent of the women surveyed indicated a physical limitation and none of the other gendered participants reported a physical limitation. However, the comments submitted with the answers to these questions indicate there are neurological challenges and sensory challenges. These might be physical in origin, but were not considered “physical” limits by the study participants. Sensory issues were emphasized repeatedly in comments.

I cannot use traditional CRT displays or be in rooms with traditional fluorescent lighting, as I can see the refresh rate (flicker) of the CRT, even at 80+Hz and can see fluorescent light fixtures flicker. Unsure if this is because of my vision, or my neurological interpretation of the image.

Seizures were a concern of several participants, as well as migraine headaches. Display technologies are improving, but not every user or university computer lab has the best display technologies for those with special needs.

I occasionally have seizure breakthroughs despite being on antiseizure [sic] medication due to my older monitor's strobing effect.

Wrote another participant:

Brightness of the screen—I need to have the brightness turned down. I have my own computer set to a dim default, but this is harder to adjust in school computer labs. Also—sometimes it takes me a while to process information (especially audio), but this isn't only specific to computer media.

Cathode-ray monitors, and many computer power-converters, emit a high-pitched tone. These sounds are problematic for some survey participants.

The high whine that some monitors produce gives me serious headaches; it's one of the categories of sound to which I am oversensitive due to my neurology.

The co-morbidity of seizure disorders and migraines has been discussed earlier in this project. The data in this survey indicate the co-morbidity of these conditions should be considered when university students with ASDs are asked to take courses online, in virtual settings. With more than a third of those surveyed, 36.6 percent, reporting discomfort or distress while using computers, we must consider when technology is an appropriate accommodation.

Table 11:
Respondents Experiencing Discomfort Using Computers

<i>Does using a computer ever cause you discomfort or stress?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	36.6	15
No	63.4	26
Total Responses		41

Gender differences persisted in questions relating to discomfort and stress during computer use. While 76.9 percent of males reported no discomfort or stress during computer use, 45.5 percent of women and 50 percent of the other gendered participants reported discomfort or stress during computer use.

Though it is unclear how wording affected questions, when asked specifically about autism and discomfort while using a computer, the percentage of respondents reporting challenges with the technology increased to 46.2 percent. This will be explored further within the findings of this project.

Table 12:
Discomfort Using Computers Related to Autism

<i>Do you experience any discomfort related to an autism spectrum disorder when using a computer?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	46.2	18
No	53.8	21
Total		39

Sensory sensitivity was cited by several respondents within their comments explaining how autism affects the computing experience.

Without accessibility [sic] options on the computer such as the ability to change font size, screen dimness, and the ability to turn off visual annoyances like smilies and animations, the computer can be uncomfortable to the point of unusable. I do make wide use of accessibility [sic] options in my software however to mitigate most of these items.

The result of sensory overload can be debilitating regression for some individuals with ASDs. One respondent explained this overload and the resulting heightened expression of autism.

‘Busy’ webpages, audio content, or animations, which require significant effort to process, cause stress if I need to process them to get information; if I work long enough with a poorly-designed site I develop headaches and start to lose verbal functioning.

Another participant added:

Sometimes I have problems with reading any text (including not being able to comprehend text at all), including text via computer, that happens only during overload/shutdown period.

There was a pronounced preference for computing interfaces with only text or text with icons. Only 12.2 percent of respondents preferred icons without text and only 4.9 percent expressed a preference for animated online environments.

Table 13:
Participant Computer Interface Preferences

<i>What type of computer environment interface do you prefer?</i>		
Interface	Response Percent	Response Count
Text-based interface	14.6	6
Static graphic or icon based	12.2	5
Animated environment	4.9	2
Text with Icons	56.1	23
Other	12.2	5
Total		41

For a population that has difficulty with overwhelming input, it is unsurprising to find they prefer textual interfaces. A respondent wrote:

I often find that the visual sensitivity can trigger feelings of overwhelm very easily. I also find that when presented with lots of text to read, or complicated GUI's or OS's that I tend to “shut down” and avoid those over-complicated

sites, or attempt to use them on a mobile screen or a netbook screen with a smaller interface.

The participants were also divided among those preferring keyboard-based interfaces and those who used a mouse for interface interactions. Of course, using a mouse in an era of graphical computing could reflect the most efficient form of controlling some computing environments.

Table 14:
Participant Preferences for Computer Input and Control

<i>What is your preferred method of interface control?</i>		
Controls	Response Percent	Response Count
Mouse	44.7	17
Keyboard	44.7	17
Trackball	7.9	3
Voice	0	0
Adaptive Device	2.6	1
Total Responses		38

Only one study volunteer indicated the use of an adaptive input device. Again, this reflects the previous data that the challenges experienced by this population are generally neurological and not related to other physical disabilities. Sensory challenges were more pronounced than other disabilities.

Because light sensitivity is often associated with ASDs, individuals were asked if they have specific text and background color preferences when working on a computer. While a clear majority have a color combination preference, it cannot be determined if these preferences relate to autism sensory sensitivity.

Table 15:
Participant Computing Color Preferences

<i>Do you have a preferred text and background color combination?</i>		
Yes or No	Response Percent	Response Count
Yes	65.8	25
No	34.2	13
Total Responses		38

The preferences indicated were not for specific colors, but rather for specific low-intensity combinations with reduced contrast. Adjectives such as “subdued,” “pale,” and “dull” recurred in the explanations offered. A typical response is:

Dull grayish-lavendar [sic] or dull grayish-blue background with lighter or darker gray text. I literally can not [sic] read high contrast or bright colors.

Though color preferences were not consistent, the desire to avoid bright, high-intensity colors was a constant.

I prefer that backgrounds on web pages/word processors not be a super glaring white (or any other glaring color). Again, this isn’t so bad if I can control the monitor’s brightness settings.

Colors listed as problematic by the individuals surveyed included red, anything “neon,” and pure white. Knowing which colors to avoid is at least as important for instructors and universities designing virtual classrooms as knowing which colors might be optimal.

I am hypersensitive for bright colors/lights, whould [sic] prefer to avoid it as possible.

Knowing that some virtual communities use media such as video or sound, it was important to determine if design choices caused stress for individuals with ASDs.

Though sensitivity was common across genders and ages, it was more pronounced among women and other gendered participants than among the men within the sample population.

Table 16:
Participants Reporting Stress Caused by Interface Design Choices

<i>Are there any screen (design) elements such as graphics or colors that cause stress?</i>		
Yes or No	Response Percent	Response Count
Yes	75.0	30
No	25.0	10
Total Responses		40

A significant percentage of men, 61.5 percent, indicated design elements caused stress. This problem was more pronounced among women with 81.8 percent reporting design-related stress and 100 percent of those selecting other as gender. This is an interesting correlation and one that would require a larger sample to verify.

The design choice cited by the most participants as causing difficulties was the inclusion of animation. One respondent even wrote, “Animations are evil.” An analysis of the written responses, which offered insights beyond the survey data, illustrates how problematic animations are for individuals with ASDs.

Table 17:
Specific Design Elements Causing Stress

<i>Specific Design Elements Causing Stress</i>		
	Response Percent	Response Count
Animation	60.0	18
Bright or high-contrast colors	63.3	19
Sound	13.3	4
Total Respondents		30

Note: The respondents were instructed to mark all options that applied.

Individuals with ASDs sometimes describe severe, even debilitating over-awareness of their environment, a need to consider any and all sensory input. One of the respondents to this survey wrote:

Animations take a lot of mental effort to process and also take significant mental effort to ‘tune out’ if they aren’t page content. Moving navigation links—the kind designed to stay visible as you scroll down a long page—tend to jump around as I scroll, making it difficult to focus on the text. Graphical backgrounds, even if they’re used as ‘borders’ and don’t show behind page text, also make it difficult to concentrate on page content.

Because animations and other media can cause emotional and physical discomfort for individuals with ASDs, it is unsurprising that several mentioned a desire to control if and how media were presented online.

Blinking or animated elements are distracting and cause me stress, especially if there is no way for me to make them stop.

Another respondent mentioned that this desire for control is not limited to video, but includes audio that “play without my explicit permission/control.”

Online Communities

Only one respondent indicated no affiliation with an online community. As indicated by their popularity in the following table, it is clear that Yahoo Groups and LiveJournal are dominate platforms for online communities frequented by individuals with ASDs participating in this research project. This supports the decision to evaluate Yahoo Groups and LiveJournal communities dedicated to autism issues.

Table 18:
Participant Membership in Online Communities

<i>Do you belong or have you belonged to any of the following?</i>		
Answer Options	Response Percent	Response Count
FaceBook	74.4	29
LinkedIn	17.9	7
MySpace	25.6	10
Yahoo Groups	64.1	25
Twitter	53.8	21
LiveJournal	76.9	30
Other	35.9	14
Total Respondents		39

Note: The respondents were instructed to mark all options that applied.

Women in the sample population are significantly more likely to be involved in online communities in general, and most were involved in multiple communities. LiveJournal participation was 95.2 percent among the women surveyed. Yahoo Group participation was 66.7 percent among women. By comparison, only 41.7 percent of men were active in LiveJournal communities. LinkedIn, a professional networking site, is used by 28.6 percent of the women surveyed but only 8.3 percent of the men. Surprisingly, 42.9 percent of the women have belonged or do belong to MySpace compared to 8.3 percent of the men. None of those indicating other as gender have belonged or do belong to LinkedIn or MySpace, but 75 percent of this group is active in LiveJournal communities.

Table 19:
Participant Membership in Autism-Focused Online Communities

<i>Do you belong to any online communities dedicated to members with autism?</i>		
Yes or No	Response Percent	Response Count
Yes	87.5	35
No	12.5	5
Total Responses		40

Communities dedicated to autism are more popular among women and the other gendered participants than among men in this survey. All of the other gendered survey participants and 90.5 percent of the women are active in online communities for

individuals with ASDs. Again, because this study was primarily seeking to discover the preferences of individuals with ASDs, the gender differences were not anticipated and no data were collected to explore these differences. It is hoped that a researcher will explore these differences to determine if there are differences unique to individuals with ASDs or if the gender differences reflect greater social trends. One of the female participants wrote:

I'm a part of many online communities that are geared toward individuals on the spectrum. This has provided me with a sense of community and friendship that I haven't experienced offline.

Another respondent wrote that online support groups were important social connections.

I find that an online support group for autism spectrum disorders has a larger, more active community, and a more diversified one than any in-person one that I could attend. While it doesn't replace real in person face-time, it is indispensable for support group needs. I would not be able to find another community like this outside of online interaction.

Survey participants overwhelmingly preferred asynchronous online interactions, including discussion board, e-mail lists, and group blogs. The 80.5 percent indicating a preference for discussion boards was surprising, but it should be pointed out that many of the discussion boards and group blogs use e-mail notification and forwarding, allow interactions with a Web site to occur without actually accessing the site via a browser.

Table 20:
Participant Preference for Asynchronous or Synchronous Interactions

<i>Do you have a preference for asynchronous or synchronous interactions?</i>		
Interaction Type	Response Percent	Response Count
E-Mail Lists	73.2	30
Group Blogs	63.4	26
Discussion Boards	80.5	33
Real-Time Chat	19.5	8
Instant Messaging	39.0	16
Video Conferencing	4.9	2
Voice Chat	7.3	3
Other	17.1	7
Total Responses		41

Note: The respondents were instructed to mark all options that applied.

Men participating in this survey expressed a much more pronounced preference for e-mail lists, with 84.6 percent of men preferring correspondence as a form of communication. By comparison, 68.2 percent of women indicated a preference for e-mail communications. Discussion boards were the favored form of communication overall, due to a consistent high ranking across the genders and ages. The time-delay and separation of asynchronous interactions was seen as a positive by study participants. Many appreciated the time to consider written responses, while interactive chats were challenging.

Interactive communication presents a... problem due to my requirement for a more protracted processing time. If multiple concepts are presented, I become confused as to their order.

The language processing impairments associated with autism affected a number of the study participants. As a result, these individuals avoid real-time communications online since the impairment can lead to frustration and increased expression of autistic traits.

I generally shy away from IM/real-time online communication. I'm not quick enough. And I find that I absolutely cannot multitask when I use IM. I have to

sit and stare at the IM window and cannot do or think about anything else, and it's such a drain on my time and energy.

Another respondent explained:

Among these, I much prefer structured, well-organized things like message boards to messy email lists where messages arrive in no particular, sortable order.

Avatars and even “emoticons” can be problematic for individuals with autism (Frith 2001). The social cues represented by symbolic and graphical images do not seem helpful based on past studies; participants in this research project also had little patience for graphical images within virtual environments. Significantly, 61.5 percent of respondents reported that graphical elements made a space more challenging.

Table 21:
Participants Affected by Visual Elements in Online Communities

<i>Do animations, graphics, and other visual elements affect your ability to use an online community?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	61.5	24
No	38.5	15
Total Responses		39

Again, this might explain the appeal of text-based, user-customizable communities hosted by Yahoo Groups and LiveJournal. Consider the comments of study participants, especially as these again express the problem of stimulation and trying to focus on content within a complex setting.

I have to hide animated graphics or leave the page. They're impossible to tune out and I can't comprehend whatever else is on the page.

Trying to interpret visual cues becomes an all-consuming task for many of the study volunteers. As a result, these individuals become overwhelmed and decide it is best to leave the community.

If such things exist and I can't disable them I probably will not be a part of the community.

Clearly this should be considered when designing online writing courses. As the findings and conclusions will discuss, many online courses are embracing more, not less, use of avatars and animations within virtual classrooms. The study volunteers expressed the likely result.

If there is an overabundance of visual elements, it can cause the community to become distracting, potentially to the point of non-communication.

Twenty-three survey volunteers commented at length on the question of graphics within communities. None of those who commented wanted graphics and many indicated that simulations caused headaches, nausea, or even seizures. A virtual classroom that tries to recreate the physical classroom is not an accommodation, according to study participants.

Visual elements such as animations and graphics are distracting, plus they overstimulate [sic] me and make me feel a sense of motion sickness.

Seven of the written comments mentioned headaches associated with animations in virtual communities.

A central question, especially for instructors, is if a virtual space contributes to or reduces potential conflicts among residents. Most of the study respondents did not

attribute any conflicts to moderation or design, with 51.2 percent reporting no misunderstanding attributed to either of these factors.

Table 22:
Participants Reporting Online Misunderstandings

<i>Have you experienced any misunderstandings online that you might attribute to the design or moderation of the community?</i>		
Type of Misunderstanding	Response Percent	Response Count
No misunderstandings	51.2	21
Yes, caused by design issues.	17.1	7
Yes, caused by poor moderation.	48.8	20
Total Respondents		41

Note: The respondents were instructed to mark all options that applied.

Those who did encounter misunderstandings online overwhelmingly blamed poor moderation, with 48.8 percent citing this as a cause for misunderstandings. Skillful moderation is important in both real and virtual settings. Some participants do associate online spaces with conflict.

[I] had a lot of trouble in online community setting, people can be very cruel, and social misunderstandings escalate a lot more quickly than in face to face interactions.

To further clarify whether or not survey participants had experienced any challenges with online technologies and virtual communities, questions were asked specifically about autism and online interactions. It is possible that the questions were interpreted as “if and how” ASDs affect the online experience. Asked if they had positive experiences relating to their ASDs, 67.5 percent of participants indicated the online experience was in some way positively related to autism.

Table 23:
Participants Attributing Positive Online Experiences to Autism

<i>Were there positive online experiences you attribute to your autism spectrum disorder?</i>		
Yes or No	Response Percent	Response Count
Yes	67.5	27
No	32.5	13
Total Respondents		40

As one study participant explained, in the online communities favored by individuals with ASDs, “It is a text based world.” In these communities, language is generally concrete and focused. Volunteers indicated a preference for this distraction-free virtual setting. Another participant wrote:

Online discussions in general are a positive experience for me, because they are easier to process due to being visual rather than verbal, in general they focus on the issue at hand with much less emotional subtext than in-person discussions...

As mentioned in the review of existing scholarship, the lack of social cues in some online settings was considered potentially liberating for some populations. Several study participants did comment on the lack of social cues does make online settings more inviting for some individuals with ASDs.

It’s nice to be able to see what I wrote and what they wrote without having the invisible channels (body language, tone, etc) interfering.

This freedom to participate was explained in detail by another study volunteer.

As long as I can set the UI up to accommodate my needs, I consider networked computing to be the single most critical piece of assistive technology I have ever used. Most of my disabilities become irrelevant and my deep abilities can really shine through.

The preceding response is a reminder that the interface is important, but if properly designed a virtual setting can be liberating for individuals with ASDs or other special needs. Online, some individuals explained they were able to connect with others in ways not easily accomplished in person. As one study volunteer wrote, “I’ve been able to find far more people who share my odd, ‘geeky’ interests online.” University courses are likely to include a number of students with specialized interests. For many individuals with ASDs, the topics seem more important than the social interactions of a classroom.

In many online venues it is acceptable to address specific points directly without the necessity for social chitchat or reading nonverbal emotional cues. Also, online it is often possible to take more time and edit a comment or response so that it exactly expresses one’s thoughts (although few people avail themselves of that opportunity).

Several respondents indicated that online spaces are ideal for learning about subjects and people, though comments did emphasize content over socialization. Social connections are, as explored earlier, key to many writing pedagogies. Wrote one respondent:

Online experiences have allowed me to grow in ways I never thought possible or even even thought of in the first place. Online communications are the natural way for me to learn, express myself, interact with others, especially others on the spectrum.

There were slightly more negative experiences than positive. One respondent wrote, “There’s nothing positive I’d attribute to my autism online.” The 70.0 percent of study participants indicating negative online experiences they attributed to autism illustrate how difficult it is to balance the positive and negative aspects of online communities. While the genders were equally likely to indicate positive connections between autism and online technology, there were significant gender trends among those with negative experiences associated with their ASDs.

Table 24:
Participants Attributing Negative Online Experiences to Autism

<i>Where there negative online experiences you attribute to your autism spectrum disorder?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	70.0	28
No	30.0	12
Total Respondents		40

All participants selecting other as their gender indicated negative experiences online that they attribute to their autism spectrum disorders. By comparison, 61.5 percent of men attributed a negative online experience to their ASD. Women surveyed fell almost mid-way between the other two gender groups, with 76.2 percent of women attributing negative experiences to their ASDs. Three participants even mentioned death threats received in online communities. Such threats are likely to decrease online participation.

One study participant explained that online communities, in some ways, make all members similar to individuals with ASDs.

I find that many people don’t realize that online methods of communication are essentially autistic in nature; such hard to understand things as tone of voice, emotion, and body language are stripped away in the transmission. Whatever

emotions you feel reading e-mail are a mirror of your current emotional state, not the intended communication.

Wrote another participant:

I sometimes misinterpret language/cues/in-between-the-lines stuff—in email, discussion boards, blog comments, etc. being very literal, I have misinterpreted what someone was saying. I don't really know that it's attributable to autism, but it could be.

The inability to interpret social cues and language in online settings was mentioned specifically by seven respondents, and implied by 22. These issues would need to be addressed in a writing course, especially a course in a virtual classroom.

Sometimes its difficult to maintain discussion, because of ASD issues, like difficult to concentrate, and it can lead to misunderstandings and accusations, if people expect immediate answer [sic] from you.

Participants recognized that they have missed “subtle clues from others” during online interactions. None offered suggestions on how these missed clues and the resulting misunderstandings might be addressed through either moderation or improved online community designs.

I attribute negative experiences everywhere to my personality, and having autism affects my personality

Finally, because games are among the most common simulations online and these are often considered virtual communities, it seemed reasonable to ask about online

gaming. Because autism experts have suggested difficulties with role-play and imagination among with ASDs (Frith, 2001), survey volunteers were asked if they participate in online gaming.

Table 25:
Participants and Online Games

<i>Do you play online, interactive games (multiplayer)?</i>		
Yes or No	Response Percent	Response Count
Yes	14.6	6
No	85.4	35
Total Respondents		41

Women were the primary online game players in this survey, with 18.2 percent of women surveyed indicating they play online games. Only one male respondent indicated participation in online gaming. The sole male respondent who plays games wrote, “I usually play solo and don’t talk to the other players.” Simply because a game or environment allows interactions among virtual residents, not all participants will engage in interactions. One of the female volunteers wrote

I play games to be entertained without having to involve other people. I don’t understand why one would want to do something like play an RPG with a bunch of other people, let alone strangers.

The lack of interest in social gaming is probably indicative of a broader disinterest in purely social interactions.

Writing

There have been limited studies of the creative writing, including memoirs and poetry, by individuals with ASDs (Happé, 1991; Roth, 2007). Because the goal of this research project the optimization of university composition and technical writing

courses conducted online for students with autism, knowing the writing experiences and preferences of individuals with ASDs is essential. The survey conducted included questions on writing and writing technologies.

The survey found that a significant percentage of the sample population members had or currently do use computers to write. While most surveyed, 72.5 percent, have used computers for blogging, technology has been used for academic writing by 70.0 percent of respondents. The next most popular forms of writing completed with the aid of technology are creative writing, 65.0 percent, and business writing, with 52.5 percent of study volunteers composing business documents via computer applications.

Table 26:
Participants and Writing with Computers

<i>Do you use a computer to write any of the following?</i>		
Writing Genres	Response Percent	Response Count
Academic Papers (Term Papers, etc.)	70.0	28
Poetry	35.0	14
Creative Writing	65.0	26
Fan Fiction	27.5	11
Blogging	72.5	29
Personal Journal (not Blog)	47.5	19
Business Documents	52.5	21
Non-Fiction	45.0	18
Other	20.0	8
Total Respondents		40

Note: The respondents were instructed to mark all options that applied.

The survey data indicate that, at least among the sample population, writing is an important form of communication for high-functioning adults with ASDs. For university writing instructors, such data indicate the value of our disciplines. Happé (1991) and Roth (2007) have found that the writing of individuals with autism often features mechanical perfection, but stilted or awkward attempts at figurative language.

Attwood has compared the language of individuals with ASDs to computer programming. This theoretical association was specifically made by one of the survey respondents.

I also think that part of ASD involves having an eye for detail—and this aspect has served me well as a writer, reader, and designer of texts, online and off. I am very good with code and arrangement.

Writing as “code” mirrors the conceptualizing of programming as writing view of Bolter (1991). Following the rules of language is, as Roth (2007) found, not the same as communicating clearly and effectively when engaging in creative self-expression. One of the reasons “fan fiction” was included within the survey responses is an assumption the form would be popular because the characters and situations are predefined, and many of the fan fiction communities insist on complete adherence to established canons. In other words, this is creative writing within rigid rules and contexts.

To determine the primary word processing software used by the sample population, participants were asked to indicate which software they preferred. While the majority, 74.2 percent, did use Word for document creation, a substantial number indicated a preference for other applications. There was overlap in the responses, and some wrote they compose in a separate application and use Word for the final formatting of documents. Microsoft Word, and other Microsoft Office applications, do feature a great many menu options and toolbar icons.

Table 27:
Word Processing Software Preferences of Participants

<i>Which software do you prefer to use?</i>		
Software	Response Percent	Response Count
Microsoft Word	74.2	23
OpenOffice	35.5	11
Apple Pages	0.0	0
WordPerfect	3.2	1
Other	53.8	17
Total Respondents		31

Note: The respondents were instructed to mark all options that applied.

Six of the respondents indicating “other” as their choice of word processing software noted a preference for “NotePad” or a similar plain-text editor. Simplified applications allow writers to focus on content. It is doubtful that such preferences are unique to individuals with ASDs. Instead, the data indicate familiarity with the writing tools common within university and business settings.

Programs like Word are too graphic-intensive. I hate having to constantly guess at what an icon means, or where they’ve hidden a function each time they completely redesign the menus.

A substantial percentage of survey participants, 41.0 percent, use the dedicated “reviewing” tools within their writing software of choice. A small group, 7.7 percent, preferred to edit printed documents. It is unknown how these data compare to other word processor users. Some writing courses use the reviewing tools within applications, but it is also unknown how many require this of university students.

Table 28:
Participant Use of Editing and Reviewing Software Features

<i>If you edit/revise on computer, do you use the "reviewing" tools of the software?</i>		
Editing Tools	Response Percent	Response Count
Do not edit on computer	7.7	3
Yes	41.0	16
No	51.3	20
Total Responses		39

In addition to determining if the individuals in this study do edit their documents, and if any use the reviewing tools, it was important to determine if the study volunteers have a second individual review documents. Only 32.4 percent of survey respondents indicated they have a second person review documents. It is not known if the low percentage seeking review differs from the public in general or students in particular.

Table 29:
Participants Seeking Peer Review

<i>Does someone review your papers and/or writing for you?</i>		
Yes or No	Response Percent	Response Count
Yes	32.4	12
No	67.6	25
Total Responses		37

There were no significant differences by age or gender. Two-thirds or slightly more of every group did not have someone else review documents.

Excluding computers from the question of writing, the percentage of respondents engaging in creative writing increased from 65.0 percent to 77.5 percent. By asking about any writing with or without technological assistance, it was learned that the individuals with ASDs in this study engage in creative writing at a higher rate than anticipated.

Table 30:
Participants Engaged in Creative Writing

<i>Do you do any creative writing on your own time?</i>		
Yes or No	Response Percent	Response Count
Yes	77.5	31
No	22.5	9
Total Responses		40

Men surveyed were more likely to engage in creative writing, with 92.3 percent of male respondents indicating they write creatively outside of school. By comparison, 71.4 percent of women engage in creative writing outside of school. All the men and 84.2 percent of women surveyed indicated they engage in some form of writing outside work and academic settings. These forms included note taking, journals, and personal letters.

With the sharing of writings a key component of most writing courses, survey volunteers were asked if they share any of their creative works with others. A substantial percentage, 76.3 percent of respondents, indicated they do share the creative writing they compose outside of school or work.

Table 31:
Participants Sharing Their Creative Writing

<i>Do you ever share this writing, online or in print?</i>		
Answer Options	Response Percent	Response Count
I do not write on my own time	10.5	4
Yes I share	76.3	29
No I do not share	13.2	5
Total Responses		38

Though most questions included room for open-ended responses, none of the survey participants explained what or how they share. This would have been valuable information to obtain and might be explicitly asked in any future research. It is interesting that individuals we might assume are not interested in sharing and discussing writing report that they do engage in these activities.

One form of collaborative, non-fiction writing that was considered within this research project was Wikipedia. Since the literature suggests an interest in academic topics is common among individuals with ASDs, it seemed likely that some might be compelled to create, update, or edit an online encyclopedia. In fact, 35.0 percent of survey respondents reported contributing to Wikipedia or a similar online project.

Table 32:
Participants Contributing to Wikipedia and Online Collaborative Projects

<i>Have you ever contributed to an online Wikipedia or other collaborative project?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	35.0	14
No	65.0	26
Total Responses		40

While 47.6 percent of the women surveyed indicated participation in Wikipedia or collaborative online writing projects, only 15.4 percent of male respondents indicated similar activities. This lack of interest in collaboration, even in academic writing, appeared in later survey questions about classroom interactions and discussions. There was a significant gender difference. Data on gaming also reflected the same gender trend, with women more likely than men to interact within a community.

Editing Wikipedia is apparently different than contributing. In fact, the gender difference does not exist: close to half of all three gender categories edited an existing online work. A slight majority of study participants, 52.5 percent, reported editing a work such as Wikipedia.

Table 33:
Participants Editing Wikipedia or Other Online Collaborative Works

<i>Have you ever edited or revised an existing online work, such as Wikipedia?</i>		
Yes or No	Response Percent	Response Count
Yes	52.5	21
No	47.5	19
Total Responses		40

Since peer editing and reviewing are common within university writing courses, this willingness to edit the works of others might be a positive sign. Granted, existing literature suggests that editing by individuals with ASDs might lack the social graces and norms expected within a writing course, so an instructor would have to be a skilled moderator during the editing process.

Blogs and Social Media

The writing section of the survey for this project concluded with an exploration of blogs and social media sites. By definition, these Web technologies are meant to be shared, social sites for self-expression and discussion. An impressive 85.0 percent of the survey respondents indicated they had or do maintain a blog.

Table 34:
Participants with Blogs

<i>Do you now or have you ever maintained a blog?</i>		
Yes or No	Response Percent	Response Count
Yes	85.0	34
No	15.0	6
Total Responses		40

Though there was an open-ended prompt to further explain the blog topic or other aspects of blogging, only one of the participants added such information. That individual indicated the blog discussed autism-related news. The popularity of blogging certainly presents an opening for some interesting writing course assignments, as will be discussed in the conclusions of this research project.

Sharing media appeared to be evenly divided among survey participants, with exactly 50.0 percent sharing media via a site such as Flickr for photographs or YouTube for videos. However, further analysis again revealed gender differences.

Table 35:
Participants and Media Sharing Web Sites

<i>Have you ever posted to a media-sharing site, such as YouTube or Flickr?</i>		
Yes or No	Response Percent	Response Count
Yes	50	20
No	50	20
Total Responses		40

Women surveyed were substantially more likely to share photos and videos than men. Of those responding, 66.7 percent of women shared photos or videos online. Only 30.8 percent of men shared photos or videos online. Fourteen of the respondents explicitly indicated in open-ended comments that others have commented on their media posts within the online sharing site.

Survey participants were eager to indicate viewers had commented on blog posts or shared media, and many included such comments within their survey responses. The survey asked if participants responded to any comments made by Web site visitors. Indeed, 76.3 percent of those responding indicated they interacted with blog readers and shared media commentators.

Table 36:
Participants Responding to Online Comments

<i>If you have maintained a blog or shared media online, have you responded to comments from others?</i>		
Yes or No	Response Percent	Response Count
Yes	76.3	29
No	23.7	9
Total Responses		38

Among those who did respond to visitors, there was no pronounced gender difference. However, it should be remembered that most of the individuals with ASDs

who were sharing blogs and media were female. The men who did share online were as likely as the women to interact with others, but substantially fewer men shared via a public blog or media site.

The comments made about sharing are interesting and reflect awareness that interaction is part of the reason for blogs and media sites on the Web. As a participant noted, “Dialog is the essence of blog comments.” For others, interactions online were easier than face-to-face exchanges, again contributing to a sense of liberation. Online spaces allow the survey participants to locate individuals with shared interest. One wrote, “I like to socialize based off common interests, not close real world proximities.” Interactions online were even enjoyable, according to some volunteers.

I enjoy the interaction with others. I find it difficult to interact in real-time or real-life, but via the computer, I feel normal.

Another respondent approached interactions as a way to encourage more Web visitors who would view her photographs.

I believe it stimulates both traffic and thought when I interact with those who comment on my blog.

An aspiring writer observed that comments to a blog where short stories were posted help the author learn more about writing as a craft. This is precisely the type of interactions we might expect in a writing course, especially in a virtual classroom.

I like to thank readers who take the time to comment on my stories. I’ve also gotten in fascinating discussions about story structure, characterization,

extrapolations into the secondary world of a story, and so forth, with my readers; it's the most rewarding part of posting online for me.

The possibility that online interactions might help social skills (Moore et al., 2005) was supported anecdotally by one study participant. This individual reported that social difficulties associated with autism were improving thanks to online interactions with others.

I think that writing on a blog and Facebook has helped my social skills, actually. I've been able to see how normal people communicate in short, pithy phrases. Reading their interactions without having to respond has helped me to interact better in real-life with ordinary people. I still monologue sometimes and go on at length too much when it's "my turn" to hold the floor, but still, I'm a lot better and a lot less awkward and mute than I used to be.

The possibility that virtual classrooms can help students with ASDs gain social skills is further addressed in the conclusions of this research project. While one anecdote is insufficient for findings, it can suggest an area for future exploration. However, at least one member of the study population found that interactions were still difficult.

I very rarely respond to comments because it takes me too long. I **want** to respond, but I spend so much time thinking about the comment and an appropriate response that weeks sometimes go by... and then I generally just forget about responding. I'm trying to work on this.

The fact that the respondent is hopeful that the ability to respond can be mastered over time indicates there is some hope that online spaces will allow this person to slowly nurture social interactions.

Postsecondary Education

The online survey system, SurveyMonkey, employs “cascading filters” so volunteers were asked only questions that applied to their particular experiences. After asking about writing experiences, participants were asked if they have attended a postsecondary institution. As a result of filtering, the number of responses to further questions declined. Of the original 48 respondents, 36 indicated they have been enrolled in a postsecondary educational program or institution. However, four additional participants had taken courses while not working towards a degree. Some education-related questions were answered by as many as 40 participants, while other questions were completed by as few as 24 individuals.

Table 37:
Participants with College and University Attendance

<i>Are you now or have you ever been a postsecondary (college or university) student? (Percent and count data)</i>					
<i>Yes or No</i>	<i>Male</i>	<i>Female</i>	<i>Other</i>	<i>Response Percent</i>	<i>Response Count</i>
<i>Yes</i>	92.3% (12)	100.0% (21)	75.0% (3)	94.0%	36
<i>No</i>	7.7% (1)	0.0 (0)	25.0% (1)	5.3%	2
<i>Total Responses</i>					38

Though more males are affected by autism disorders overall than females, data collected for this study indicate more women with less debilitating ASDs might be entering colleges and universities. This could be a reflection of the most severe cases of autism affecting a proportionally higher percentage of men, or it could be a reflection of broader social trends with more women attending postsecondary institutions. Despite

later diagnoses and fewer educational supports as children, the women in this study included the only doctorate and slight majority of participants with master's degrees. It is unknown why there was no correlation between receiving supports at the secondary level and university attendance, but that might be an issue for further exploration.

Table 38:
Participants and Highest Degrees Earned

<i>What is your current standing at the university or highest degree obtained?</i>		
<i>Educational Standing</i>	<i>Response Percent</i>	<i>Response Count</i>
Freshman	3.3	1
Sophomore	6.7	2
Junior	6.7	2
Senior	13.3	4
Bachelor's Degree	33.0	10
Master's Degree	33.0	10
Doctorate	3.3	1
Other		9
Total Respondents		39

Four individuals indicated an associate's degree, which was not a category included, but should be in future studies. Some of those with vocational or associate's degrees selected "other" for educational standing.

Of those indicating when they attended a college, university, or vocational program, over half of those with postsecondary experiences, 54.3 percent, attended an educational institution within the current decade. However, the previous three decades were also represented within the survey respondent subset with postsecondary course experiences. Six participants had attended postsecondary institutions during the 1970s, five during the 1980s, and five during the 1990s.

Table 39:
First Year of College or University Attendance

<i>When did you first attend university of college?</i>		
	Response Percent	Response Count
1970s	17.1	6
1980s	14.3	5
1990s	14.3	5
2000s	54.3	19
Total Respondents		35

The student demographic data collected by the *National Postsecondary Student Aid Survey* includes information on delayed enrollments (GAO, 2009). The participants in this research project were slightly less likely than their peers to have attended a degree-granting institution directly after high school. This difference (6.1 percent) might reflect the unique challenges of individuals with ASDs. The 17.6 percent who attended a two-year college was is also important to consider.

Table 40:
Participant Paths to Postsecondary Education

<i>Did you enroll directly in your degree-granting institution or did you attend another institution first?</i>		
University Enrollment Path	Response Percent	Response Count
Directly enrolled from high school	58.8	20
Enrolled after some time (year or more) out of school	8.8	3
Attended a community / junior college	17.6	6
Attended another college or university and transferred	14.7	5
Other		6
Total Responses		40

The path to and through degree-completion can be complex for students with special needs. Several participants commented on this challenge. One student enrolled in a special program that “was designed to help people who hadn’t got the grades to immediately transfer,” a common problem for those with special needs.

Quit HS sophomore year, had to wait to get GED, once got GED, enrolled in Community College [sic], then transferred to state University [sic], where I got my degrees.

Another participant wrote that she attended two universities, each for three years, took a “personal trauma break,” completed a course at a third institution and then remained out of school for nine years. Finally, she attended a community college for a vocational program. Though most of the survey participants followed a more traditional path, there are clearly significant obstacles for some students with ASDs.

Special Needs Accommodations

The participants in this study overwhelmingly did not inform the disability services offices at their universities of any special needs for accommodations. More than two-thirds, 67.9 percent, did not officially inform their postsecondary institution that they were disabled students. Without such notification, universities are only mandated to provide accommodations if there is an “obvious” physical disability that is readily apparent others without formal notification. Autism disorders are, unlike many physical disabilities, not obvious to the casual observer.

Table 41:
When Participants Informed Institutions of Autism Diagnoses

<i>When was the university informed of your ASD status?</i>		
	Response Percent	Response Count
Before my first day of classes	21.4	6
During my first semester enrolled	7.1	2
During my first academic year at the university	0.0	0
After my first academic year on campus	3.6	1
I did not notify the university officially	67.9	19
Other		12
Total Responses		40

Only 21.4 percent of the respondents to this survey section indicated they informed their university of a disability before starting classes. In the future, this lack of official notification should be examined. One potential explanation is that individuals with high-functioning ASDs are not always diagnosed as children. Nine individuals, 22.5 percent of those responding, indicated they were diagnosed with an autism spectrum disorder after graduating from a college or university. As one respondent wrote, “I didn’t know about it myself, at the time.”

The delay of diagnosis is a serious issue within the autism self-advocacy community. Formal evaluations are expensive and time-consuming, usually requiring three days of testing and evaluation by a specialist. Universities might have far more students with ASDs than current statistics indicate if the data for this research project are indicative of the experiences of other high-functioning individuals with autism disorders. Also, there is a hesitancy to disclose, with ASDs still perceived by some of the affected individuals as stigmatized conditions.

I refuse to acknowledge this issue in public and do not want a label. And I’ve suffered socially, personally and professionally for it, too, believe me.

One participant had notified disability services as an undergraduate, but decided against disclosure as a graduate student.

I did as an undergraduate, but have refrained from this at the graduate school level.

We should explore why some who disclose later decide against such notification. Though federal guidelines in the United States require formal notification

of disability services for complete legal protections, many students with ASDs indicated they informed instructors directly of their special needs. This is probably acceptable in many instances, though this study did inform participants that they are entitled to services and supports if they officially report their status to a central office of disability services.

I notified specific professors when I felt it was necessary, but since I was only in the process of obtaining an official diagnosis at the time, it did not do me much good in most cases.

There are definite advantages to disclosure. Unfortunately, 53.1 percent of survey participants received no supports while enrolled as postsecondary students. Again, many did not have an official diagnosis, but even those who did have diagnoses rarely sought assistance.

Table 42:
Accommodations Received by Participants

<i>What services and/or accommodations do you receive at the university?</i>		
	Response Percent	Response Count
None requested or used	53.1	17
Informative letters or meetings with instructors	25.0	8
Training sessions on skills such as time management and organization	3.1	1
An ASD support group or student organization	9.4	3
In-class accommodations (use of a computer, recording device, or note taker)	25.0	8
Additional time on tests or assignments	34.4	11
Interpretation / explanation of assignments and guidelines	12.5	4
Other		8
Total Respondents		32

Note: The respondents were instructed to mark all options that applied.

The most common accommodation was extra time on tests or assignments, with 34.4 percent of the study participants receiving additional time to complete tasks. With

technology increasingly common, and required for any online course in academic composition or technical writing, the “accommodation” of laptop computers seems somewhat assumed. The 25 percent of respondents using technology in the classroom as an accommodation might not need to request special permission to use technology in the future.

It was interesting to discover that 9.4 percent of question respondents participated in ASD support groups. All respondents active in support groups notified their institutions and instructors of their ASD diagnoses. Overall, more than half of those responding, 51.5 percent, indicated they informed instructors of an ASD diagnosis. All but two of those disclosing also met privately with an instructor to discuss the special needs related to autism.

Table 43:
Participant Disclosures of Disability to Instructors

<i>Have you disclosed your autism/ASD to any instructors?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	51.5	17
No	48.5	16
<i>Total Responses</i>		33
<i>Have you met individually with any instructors, regarding your needs?</i>		
<i>Yes or No</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	48.4	15
No	51.6	16
<i>Total Responses</i>		31
<i>Do you believe instructors appreciate your needs, as they relate to an ASD?</i>		
<i>Answer Options</i>	<i>Response Percent</i>	<i>Response Count</i>
Yes	57.1	16
No	42.9	12
<i>Total Responses</i>		28

Disclosure seems to occur organically within university writing courses. Four survey participants mentioned disclosing an ASD diagnosis within a personal narrative or memoir writing assignment. Writing instructors should consider how such

disclosures are handled, since individuals with ASDs do not always consider or appreciate how their peers might interpret the disclosure.

- I usually only disclose this information if it's directly related to a project I've been given. For instance: "Write about a difficulty you had growing up."
- Discussed it in some essays in my memoir and in Project Seminar
- In my personal essay class, it found its way into an essay.
- In addition to discussing it in some of my writing classes (I tend towards essays and creative nonfiction in my work), I do disclose when I feel disclosure would clear up any misunderstandings with my professor.

Some participants in this project disclosed after they experienced difficulties interacting with professors or peers. In these cases, the disclosure was offered to explain academic and social challenges.

I rarely disclosed during undergrad. [...] I only disclosed to one professor in my MA program and have disclosed to almost all of my profs in my PhD program. I got sick of communication mishaps, and I was very afraid of teaching and networking at conferences and felt that my advisor/mentors should know of my [diagnosis].

Another respondent wrote:

It usually came up when a professor decided there was a gap between what he or she perceived as my ability level and how well I was actually doing in a course.

Most often this was a result of something like a class being heavily group-oriented.

Two respondents who indicated their fields of study were within the sciences indicated they perceived no benefit to disclosing their diagnoses. One wrote:

I have not had any problems so far that required me to tell my instructors. I'm a Biochemistry major with a 4.0; I'd rather my instructors define my [sic] by my successes, not my limitations.

Whether or not an ASD contributes to any misunderstanding is not always easy to determine. As a result, some students experiencing misunderstandings might still avoid disclosure. One study participant's response reflected this.

My Asperger's did not link to any difficulties relating to the instructors, so it was not necessary in my mind to disclose the information.

A major concern is whether or not university instructors are perceived by students with ASDs as appreciating their special needs. The data from the survey for this project indicate the mixed experiences of students with ASDs.

Most teachers were very understanding because I could prove I understood and could process the material.

Unfortunately, there were negative experiences. Sadly, problems seemed to be accepted with a certain resignation. Too often accommodations were offered with "minimal complaint," as if any complaint from a faculty member about disability services was tolerable. One respondent wrote that professors occasionally "think its an excuse" for

poor academic performance. Another participant wrote that the language processing challenges of ASDs were not appreciated.

Instructors in general don't seem ready to accommodate [sic] anyone for whom verbal instruction is problematic. While going for my bachelor's, I eventually stopped attending lectures altogether, because they never helped me to learn. Few instructors bothered with course content outside lectures, except the textbook and Powerpoint [sic] lecture slides, which rarely include all the information covered in class.

Observed another participant:

They act friendly and accept it, but I think this is more out of politeness than anything. The reality is that they don't want to deal with the extra burden and going out of their way to help someone. This is especially true a larger institutions.

Wrote another:

I think there was a lack of understanding of how much this [autism] actually impacts the way I see the world.

The paradox of being both gifted and disabled was also mentioned in the open-ended responses to this part of the survey.

I have had a few professors who have criticized my manner of speaking (I'm very quiet and am sometimes behind topic). I've also had a prof [sic] tell me that I can't be disabled because I'm smart.

Though the following is a lengthy response to this section of the survey, it expresses many of the experiences related by other survey respondents. The sense that university instructors do not appreciate the nature of autism is conveyed by what this individual wrote about instructor acceptance and understanding. Original formatting has been retained to reflect the passion of the author.

Absolutely not. Most don't know much of **anything** about ASDs, or have wildly erroneous ideas, or have no concept that it's a spectrum and so immediately dismiss that I may have any needs simply because I can talk. Most that I have encountered don't understand or care that the way they choose to structure a class can make it difficult or *impossible* for me to concentrate on the material, when I am forced to expend all my energy dealing with **unnecessary group situations** instead. In a class that focuses on conflict resolution or public speaking or something, this construction may be relevant to the topic, but I have encountered it in many classes where it is not. In my experience, this is the area in which professors are most inflexible.

The response indicates that the survey volunteer understands that some courses might require group work. However, the difficulty of group work is difficult to overstate for students with ASDs, as was explained in the review of existing scholarship. Social situations can result in sensory overload, language processing confusion, and social misunderstandings.

When disclosure was prompted by course circumstances, it was most often the class environment that prompted the disclosure. A significant number of survey

participants, 22.7 percent, indicated course environments prompted the disclosure of an ASD diagnosis.

Table 44:
Reasons for Disclosure of Disability to Instructors

<i>If you disclosed, was the disclosure prompted by any difficulties with the course material or the course environment?</i>		
Reason for Disclosure	Response Percent	Response Count
Did not disclose	63.6	14
Difficulties with Materials	13.6	3
Difficulties with Course Environment	22.7	5
Other	7.0	7
Total Responses		29

Peers and Disclosure

University courses, and writing courses in particular, require peer interactions. As explained in the review of current scholarship, many academic composition and technical writing pedagogies stress collaboration and peer revision. A supportive class community is important to the success of these pedagogies.

Table 45:
Participants and Disclosure of Disability to Peers

<i>Have you disclosed your autism/ASD to other students?</i>		
Yes or No	Response Percent	Response Count
Yes	50.0	16
No	50.0	16
Total Responses		32
<i>Do you believe students have been supportive of your needs?</i>		
Yes or No	Response Percent	Response Count
Yes	58.3	14
No	41.7	10
Total Responses		24

The question of peer support was one of only two higher education survey prompts with a pronounced gender difference in responses. Women surveyed were three times more likely to consider their peers supportive. While 76.9 percent of women and all those self-described as “other” considered peers supportive of their special needs,

only 25% of men responding to the question describe their peers in a similarly favorable manner.

I prefer not to discuss it at all, for fear of prejudicial [sic] reactions. I've seen enough people dismiss Asperger's as 'an excuse to be a jerk' or 'the latest trendy disease' that I'd rather be taken as a jerk on my own merits, so to speak.

Again, disclosure did not always achieve the intended results. Another participant related that disclosure "backfired" with peers.

Have mostly avoided it, but I have disclosed where I felt it necessary. When I disclosed to disrespectful roommates, it made things worse.

University Courses, Including Writing Classes

One of the motivations for this research project was the near-ubiquity of composition and technical writing courses within college university degree requirements. As a general education requirement, writing classes are a shared experience for many university students. The data collected for this project indicate that 77.1 percent of survey volunteers did take a writing course while enrolled as a postsecondary student. The data support the assumption that our writing courses are uniquely situated within the university experience. This means developing accommodations for students with ASDs is not only a legal, but also an ethical duty.

Table 46:
Participants and Writing Course Enrollment

<i>Have you taken a college or university writing course?</i>		
	Response Percent	Response Count
Yes	77.1	27
No	22.9	8
Total Responses		35

Eight of the respondents recalled taking a course specifically named “composition” and four respondents recalled a course title including “technical writing.” Others referred to “grammar” courses or “editing” courses, but did not mention specific course titles. Courses mentioned were often similar to “Freshman Composition I and II” listed by one participant. Another student explained,

I majored in Technical Communications (it was Technical Writing and Editing when I started and was also an English major that got switched to a science major by the time I graduated).

Three participants mentioned withdrawing from writing courses; two of the three indicated issues with the instructor. One respondent indicated an interest in writing until being “discouraged” by a university writing instructor. Writing courses do need to be supportive, academically and emotionally.

The number of online courses is likely to increase, but the sample population for this research project has limited experience within writing courses conducted in virtual classrooms. Only 17.1 percent of those responding enrolled in a writing course that was at least partially online.

Table 47:
Writing Courses with Online Content

<i>Was any of your writing course's content online?</i>		
	Response Percent	Response Count
Yes	17.1	6
No	62.9	22
Did not take a writing course	20.0	7
Total Responses		35

Survey participants were also asked about taking any university courses with any content delivered online. An overwhelming majority, 75.8 percent, had enrolled in a

course with supplemental materials provided online. Also, 44.1 percent had enrolled in a course conducted entirely online. Only 23.5 percent of respondents had enrolled in a course with some traditional meetings and some content delivered online, often referred to as “hybrid” courses.

Table 48:
Participants and University Courses Online

<i>General University Courses</i>		
	Response Percent	Response Count
Have you ever taken an all-online course?		
Yes	44.1	15
No	55.9	19
Have you taken a hybrid course?		
Yes	23.5	8
No	76.5	26
Have you taken a course that used online resources to supplement traditional classroom sessions?		
Yes	75.8	25
No	24.2	8

The percentage of participants who had enrolled in courses with some materials delivered online indicates there is a shift towards providing supplemental information via Web spaces. This might also be a precursor to the migration of courses online, either as hybrid or completely virtual courses.

The dominance of Blackboard, which now owns WebCT/WebVista after the merger of three course management vendors, was also demonstrated within the survey data. Asked if any course used a CMS platform, 55.6 of respondents indicated at least one course used Blackboard and 19.4 percent had a course use WebCT/WebVista.

Table 49:
Online Course/Learning Management Systems

<i>Did any course use the following course management systems (CMS)?</i>		
<i>CMS</i>	<i>Response Percent</i>	<i>Response Count</i>
No online course content	25.0	9
Blackboard	55.6	20
Angel	11.1	4
WebCT / WebVista	19.4	7
Sakai	2.8	1
Moodle	2.8	1
Other	36.1	13

Note: The respondents were instructed to mark all options that applied.

It was unknown if online courses would have a higher attrition rate among students with ASDs than traditional courses. To determine if students with ASDs have a high attrition rate from either traditional or online courses, survey participants were asked if they had withdrawn from any courses and if so to explain the circumstances. Overall, 71.4 percent of respondents had withdrawn from a university course.

Table 50:
Participants and Course Withdrawals

<i>Have you ever withdrawn from or received an incomplete in any course?</i>		
	<i>Response Percent</i>	<i>Response Count</i>
Yes	71.4	25
No	28.6	10
Total Responses		35

Some of the students indicated they stopped going to courses but did not formally withdraw. It is unknown how common this problem is, but students with ASDs might not formally withdraw when frustrated by a course or its content. Only three individuals indicated the course they withdrew from was an online or hybrid course.

I've only withdrawn from one class, and that was a class that was entirely online. The format was confusing, the assignments were unclear, and the deadlines weren't specific. I missed an assignment because I didn't know it existed and decided to withdraw from the course.

Online Course Experiences

When asked if they might have a preference for online, hybrid, or traditional courses, there was no statistically significant preference between completely online courses and those with materials available online, based on the size of the sample population. The completely online courses were preferred by 29.0 percent of respondents, while 22.6 percent preferred traditional classroom-based courses with materials available online. Those with a preference for online supplemental materials did not want online course discussions or other forms of peer interaction.

Table 51:
Course Settings and Participant Preferences

<i>Which of the following is your preference?</i>		
	Response Percent	Response Count
An all-online course	29.0	9
A class that is primarily online, but with some classroom meetings	12.9	4
A classroom course with materials online and some online participation	16.1	5
A classroom course with materials posted online, but no online participation	22.6	7
A traditional, classroom-based course	19.4	6
Total Responses		31

Only 12.9 percent of respondents indicated a preference for hybrid courses. Five respondents, 16.1 percent, indicated a traditional course, supplemented with online discussions among peers. By comparison, 19.4 percent preferred a traditional classroom experience. When supplemental material is available, the form should be carefully considered, reflecting the survey data indicating sensory overload was common among participants.

The more online content is in the form of streaming video or audio without transcription, the more cut-off I am from discussions. The growth of broadband has made such content far more common.

One respondent indicated a preference for traditional classroom spaces because the experiences in those settings had helped develop social skills required beyond the university.

I believe that physically being around neurotypicals forced me to learn new communication styles. It was difficult and I have no friends from my uni years, but all the same, it was part of my long, arduous learning curve.

Survey participants with online course experiences were asked to consider the virtual setting to the traditional classroom setting. Only two individuals, 10.0 percent of those with online course experiences, considered the online experience more effective than the traditional classroom.

Online-only courses are forced to go asynchronous; class discussions are always text-based, some instructors even post text-based readings instead of lectures. I am expected to show 'class participation' via discussion board postings instead of verbally in person, and can participate on my own time and from a comfortable, familiar environment, which helps me to be coherent.

Wrote the other individual favoring online settings:

I was able to take in information when my brain was working well, set my own pace and hours. I was able to actively participate in class discussions which I

can't do in real-time classroom settings. I was able to take in information visually (I have major problems with auditory processing, so traditional lectures are problematic for me). I did not experience anxiety due to potentially missing something that was said. As a side note, my all-online courses did not have an audio/video component which would have been problematic for me.

One of those considering online more effective also considered the instructor more responsive. However, instructor responsiveness did not correlate with online satisfaction in a statistically significant way due to the small number ranking online courses as more effective.

Table 52:
Evaluations of Online Course Effectiveness

	Response Percent	Response Count
Effectiveness of online course(s)		
More effective than traditional instruction	10.0	2
As effective as traditional instruction	50.0	10
Less effective than traditional instruction	40.0	8
Responsiveness of instructor		
More responsive than in a traditional course	10.0	2
As responsive as in a traditional course	52.6	10
Less responsive than in a traditional course	36.8	7

The data indicate that online settings are an alternative to traditional courses, rather than a more effective accommodation for students with ASDs. Exactly half, 50.0 percent of respondents, considered online courses as effective as traditional instruction. Also, 52.6 percent considered university instructors of online courses as responsive as instructors of classroom-based courses.

However, the 40.0 percent rating online education as less effective cannot be ignored. There were also a significant number of respondents, 36.8 percent, who

considered instructors of online university courses less responsive than instructors conducting classes in physical classrooms.

I had no way of asking the instructor questions after the meeting was done.

Well, she asked if there were any more questions, but what if I thought of one after we all hung up? I didn't have her e-mail address. I only had my supervisor's, and my supervisor didn't give me very constructive answers. Also, there are exceptions to every rule in the instructions you are given, so it would have been nice to have a followup [sic] or an ongoing educational period for the software (like you usually get in college) instead of a one-shot course.

A study participant apparently familiar with teaching and online courses wrote a detailed response to the survey questions about course preferences and instructor interactions. The response highlights issues with online course design.

Really out-dated pedagogical approaches, first of all. Lots of talk in professional discussions about "andragogical" approaches to online teaching and "learning modalities," then courses are traditional, old-fashioned "read this and take a test" or "read this and write a paper." Why does anyone bother studying how to implement online education when it's all done the same boring way, over and over, because taking a class by yourself in your living room is totally different from being engaged in material by a walking, talking professor who leads the class actively for an hour or three at a time.

The response continued:

Online instructors have no interest in the committee-designed classes, duck out of responsibility for problems with design (as they well should) and are “grading machines.” Not instructors, not even teachers, and certainly not “professors.” They record marks in online gradebooks—that’s it. I hate online education because there’s no chance to get acclimatized to a professional environment, and Aspies and high-functioning autistics desperately need to see how people behave and speak. In online classes, any professional acclimatizing aspect is gone. Students are robbed of the chance to be around professional, accomplished people to learn how they talk and think, plus students are lied to and told that this “piece of paper” is just as good as or better than one from a real university. Come on. It’s a ghost of an education, but for a lot of people, it’s all they’ve got or all they can access. Online degrees should not be worth as much as on-ground degrees; in fact, online programs will always be looked at as second-tier, I believe, by established brick-and-mortar institutions, which will privilege degrees earned from programs with deeply specialized, state-of-the-art classes designed by professors who are at the forefront of research and expertise in their fields—not from standardized, really badly designed, boring classes implemented by a bunch of 20-some-year-old instructional design geeks who’ve never stood in front of a classroom.

Finally, the survey for this research project explored how online courses affect the interactions between students with ASDs and their peers. The data revealed that, at least among the sample population, online courses allow students with autism disorders to avoid interactions with other individuals in a course. In fact, 42.1 percent of the

participants with online course experiences indicated they never interacted directly with other students in the online courses. Many of those asked to post to online discussion forums posted as required, but did not respond to the ideas of other students.

Table 53:
Participants and Interactions in Online Courses

	Response Percent	Response Count
Student interactions online		
Frequency		
At least once a week	36.8	7
Less than once a week	21.1	4
Never directly interacted	42.1	8
Interactions with students online		
Difficulty Level		
Easier than in a traditional classroom	36.8	7
The same difficulty as in a traditional classroom	10.5	2
More difficult than in a traditional classroom	10.5	2
I did not interact with other students	42.1	8
Type of student interaction		
Type		
E-Mail	33.3	5
Discussion Forums	80.0	12
Live "Chat" Online	6.7	1
Equally Split	0.0	0

All the men surveyed indicated they "never directly interacted" with other students in online courses. By comparison, 41.7 percent of women and 66.7 percent of other gendered enrolled in online classes interacted with classmates at least once a week. One male participant expressed complete disdain for communicating in real-time with colleagues in the university setting.

Really, really dislike real-time chats and IMs with university-affiliated people, especially other students.

Another male participant wrote:

Lots of online students have deeply inferior communication skills. It's hard to deal with them because everything's in writing, but that's fine by me because I really don't care to interact with them.

Finally, a volunteer expressed her desire to avoid real-time interactions with other students in online courses:

I hate hate hate hate hate real-time interactions in educational environments. It's awful to be required to interact in real-time.

Additional Comments

The survey concluded with an open-ended prompt for any additional comments regarding online education. The first of these was a reiteration of the distaste many had for group work and real-time communication online. Though the writer states this is not autism-related, the review of existing scholarship does indicate groups are challenging for many with ASDs.

Absolutely no real-time interactions and absolutely no group work. That's not related to autism, that's related to how badly many people perform. I don't want my grade involved with them AT ALL.

Three participants offered that motivation online was a problem. The topic had to be of special interest or these individuals had difficulty remaining engaged in online courses.

I found it harder to engage emotionally with a course online, if I did not have to do something then I wouldn't do it. I do believe that it is related to autism that I react this way.

Wrote another participant:

I would be very very choosy about what course I took online. It would have to be very specific to something I needed for me to stay engaged in such a format.

The need for physical, tactile exercises was important to one of the survey respondents. This individual indicated that reading content online was insufficient for the retention of material.

I consider myself a knowledge sponge, but my brain is very selective about what it will absorb (without tactile aids such as writing or doing) and what it will not. This is not intentional on my part; it's just the way my brain works, no matter what anyone thinks.

Finally, one of those mentioning online courses and motivation concluded that after trying a course, this individual was “[l]ess interested in online, but the way of the world is going that way increasingly. Sucks.”

CHAPTER 5: DISCUSSION AND ANALYSIS

Introduction

This project aimed to determine if university writing courses could be optimized to better accommodate students with autism spectrum disorders. Because academic composition and technical writing courses are often part of the general education requirements for undergraduate degree programs, it is essential that these writing classes attempt to address the needs of all qualified university students. After analyzing online spaces and virtual communities serving individuals with ASDs some questions about the appropriateness of Web-centric course designs have arisen. These concerns were further amplified by survey results and the accompanying comments of individuals diagnosed with ASDs.

The original research propositions introduced at the start of this project were:

- Individuals with ASDs engage in online writing;
- Individuals with ASDs prefer text-based settings;
- Significant numbers of individuals with ASDs will prefer online writing courses; and
- Writing courses in virtual environments can be optimized for students with ASDs.

The data collected indicate the first two propositions accurately reflect the sample population surveyed during this research project. However, the second two propositions are more difficult to either embrace or reject based on the analysis of Web sites and the survey data collected. Based on the opinions expressed by the sample population, courses might be altered to accommodate students with ASDs, but those

alterations might result in something not accurately referred to as a “virtual learning environment” (Moore et al., 2005).

Many of the findings from this project, and the pedagogical theories advanced, can be generalized to university composition and technical writing courses conducted online. The issues highlighted by individuals with autism apply to other marginalized segments of our university student population, and often to all students. Dominant writing pedagogies call on us to avoid physical discomfort, reduce the potential for confusion, and moderate any conflicts. The nature of writing, an act of self-expression, inherently leads to some confusion and conflict; it is the responsibility of writing instructors to demonstrate and encourage civil discourse on complex matters.

Reducing physical discomfort is important to those students, and instructors, with special needs. When a classroom, either physical or virtual, must be manipulated for a single or small group of students, other members of the classroom community notice. The best design is accessible to as many students as possible without modification. Online spaces have the technological advantage of being customizable by each member of the community. Unfortunately, not every online course management system allows sufficient customization for students with special needs. Expanding customization features would benefit not only those students and instructors with unique requirements, but would grant all students a sense of ownership of the classroom.

Findings

This research project points to the importance of allowing students enrolled in courses that use various technologies the freedom to customize not only an online virtual setting, but even whether or not they use that setting to participate in the course. Every online writing space analyzed, every popular virtual community for individuals with ASDs analyzed, and the survey data collected all point to a desire to interact with online settings indirectly. Quite simply, Web spaces present enough challenges to individuals with ASDs that they would rather participate in conversations via e-mail, Really Simple Syndication (RSS), and specialized “feed” interfaces capable of aggregating text information.

Because there are a variety of special needs, no one environment is ideal for all students with ASDs. Researchers have not yet identified “which environments are more accessible than others, [but] they have highlighted a number of accessibility issues” (Seale, 2006, p. 30). If the findings presented in this chapter are generalizable, they point to a need to provide alternative routes to participation instead of attempting to create a set of Web-based design recommendations.

Online Writing

University composition and technical writing instructors often attempt to explain that writing is a skill our students will use throughout their lives. We explain that writing is more than academic papers. Writing includes everything from text messages composed on phones to status updates on Facebook. From business forms to Facebook

status updates, writing is more ubiquitous than ever—even if it doesn't always appear as ink on paper.

High-functioning individuals with autism spectrum disorders engage in acts of composition similar to their peers. From participating in online communities to creative writing for personal enjoyment, composing with texts is an important form of self-expression. This research project found the following evidence indicating how interwoven writing is in lives of many individuals with ASDs .

- 42 of 82 blogs analyzed were maintained by individuals self-identified as autistic.
- 85.0 percent of survey respondents have at one time maintained a blog.
- 790 posts were made to the Yahoo Group “AspergersSupport” in June 2009.
- 30,741 registered members belonged to WrongPlanet, a Web portal that limits membership to individuals with ASDs, as of November 2009.
- 87.5 percent had belonged to an online community dedicated to members with ASDs.
- 60,130 postings appeared in the “Arts, Writing and Music” forum on WrongPlanet.
- 77.5 percent of survey respondents engaged in writing outside work or school.
- 1689 original creative works by individuals with ASDs appeared on WrongPlanet as of November 2009.
- 65.0 percent of survey respondents engaged in creative writing.

As the data for this research project indicate, writing is an important skill within the autism community. The majority individuals surveyed for this project engage in online interactions, as evidenced by their awareness of the survey component, which was announced via Web site and e-mail communities for individuals with ASDs.

For university writing instructors and researchers, the finding that writing is common among this population presents a number of opportunities. While scholarship indicates there are philosophical obstacles between our disciplines and the manners in which individuals with ASDs approach knowledge (McDonagh, 2007), obstacles explored earlier within this project, we can explain that all academic and professional disciplines communicate discoveries and share knowledge via texts. Today, many of those texts are in digital forms.

The key finding is that this population of individuals, often with unique intelligences and abilities, is actively engaged in digital and traditional forms of writing. At least five of the study participants were English, rhetoric, or composition majors at one point in the postsecondary educations. The assumption that all individuals with ASDs are destined to be mathematicians, scientists, or engineers (Anthes, 1997; Attwood, 1998; Grandin, 2001) is disproved by these findings. While the majority are likely to fit this stereotype, there are exceptions (Attwood, 2007; Harpur et al., 2004).

Text-Based Environments

There is a definite preference for text-based online interactions among individuals with ASDs, based on popular online communities analyzed and the survey data collected during this project. The sample population did not want to participate in

virtual simulations, they wanted to read and write textual interactions. A review of the online spaces popular within the autism community reveals how text-oriented these communities are.

- Every online community included options for participation via e-mail.
- Every blog was available via Really Simple Syndication (RSS).
- Every blog was e-mail enabled, allowing the authors to update the content via any device capable of sending e-mail.
- 29 percent of bloggers with ASDs included video links, compared to 46 percent of non-autistic blog authors.
- No autistic blogger included audio of any kind within their sites.
- The portal examined included e-mail and RSS support for interactions.
- 80.5 percent of survey respondents had at least some preference for discussion boards.
- 73.2 percent of survey respondents had some preference for e-mail lists.

Recall that 61.5 percent of survey respondents had difficulty using online communities that included animations or graphics. One participant wrote, “If such things exist and I can’t disable them I probably will not be a part of the community.” This supports research indicating that graphical representations of human emotions are not useful for many with ASDs (Frith, 2001; Grandin, 2006; Klin, 2000; Moore et al., 2005). In fact, such representations demand interpretation—an emotionally draining task for many study participants.

The individuals surveyed for this project want, and even need, text-only or text-dominant, communities. Recall that a participant explained of the communities for

individuals with ASDs, “It is a text based world.” The text-based online communities were perceived as liberating because, for individuals with autism, words mean precisely what they are defined as meaning. This is a challenging, even disconcerting way to process language for many in our disciplines, but it is a key trait of autism to use and expect only concrete, literal language (Attwood, 2007; Bogdashina, 2006; Frith, 1991; Robison, 2007; Wing, 1981).

As a study participant explained, text interactions are less reliant on emotional cues, at least within communities for individuals with ASDs.

Online discussions in general are a positive experience for me, because they are easier to process due to being visual rather than verbal, in general they focus on the issue at hand with much less emotional subtext than in-person discussions...

There are social cues in online environments (Mayer et al., 2003; Monroe, 2004; Tanis & Postmes, 2003; Walther et al., 2005). However, for individuals with ASDs, these are not as important. In fact, studies show that a key deficit within autism is the ability to detect or even consider social cues (Attwood, 2007; Bogdashina, 2006; Klin, 2000; Tantam, 1991; Wing, 1981). Knowledge and information are valued, not the emotional content of conversations.

Usability specialist Ellen Lupton (2004) has written that text-based interfaces might be better suited to some tasks than graphical software interfaces. Lupton argues that text-based systems can be more efficient, and even more universal, than the popular graphical interfaces that have emerged in the last decade.

Another common assumption is that icons are a more universal mode of communication than text. Icons are central to the GUIs (graphical user interfaces) that routinely connect users with computers. Yet text can often provide a more specific and understandable cue than a picture. Icons don't actually simply the translation of content into multiple languages, because they require explanation in multiple languages. The endless icons of the digital desktop, often rendered with gratuitous detail and depth, function more to enforce brand identity than to support usability. In the twentieth century, modern designers hailed pictures as a "universal" language, yet in the age of code, text has become a more common denominator than images — searchable, translatable, and capable of being reformatted and restyled for alternative or future media. (Lupton, 2004, p. 74)

RSS and E-Mail as Accommodation

The surveys for this research project, supported by comments I have read on advocacy Web sites, revealed that the designs of Web communities are less important than initially presumed. Instead of interacting directly with Web sites, many individuals with ASDs use RSS and Atom feeds. Content is maintained via e-mail or specialized software. I should have considered my own Internet computer use, which does seem to parallel that of other individuals with special needs.

There are literally hundreds of applications for reading RSS feeds from Web sites, blogs, and specialized portals. Many e-mail programs, including Apple's Mail and Mozilla Thunderbird, can collect, organize, and search RSS feeds automatically. RSS and Atom are open standards, meaning any company or individual can develop software

that interacts with RSS-enabled Internet content. This content does not have to exist on the Web; it only has to be online via the Internet in some way.

RSS feeds are text-based. The content is usually not formatted, nor does it contain any non-text elements. The user can customize the appearance of the content based on whatever application is being used to receive, read, and respond to RSS feeds. If the RSS feed is from a Web-based site, the design of the site is immaterial—the reader never has to visit the Web page, not even to subscribe to the feed.

LiveJournal and Yahoo Groups include members who have never visited the online versions of the communities to which they belong. As the moderator of several Yahoo Groups, I have observed that many members do not even realize a commercial site is storing and distributing community discussions. Again, the Web-based aspects of these communities are inessential to the membership.

Applications such as MarsEdit, MacJournal, Scribe, and Ecto were mentioned by survey participants. These applications allow a blog author, and in some cases readers, to interact with a blog without a Web browser. Blog editors and readers again separate the content from the Web-based design of a blog. If a blog is hosted using any of the major platforms (Blogger, Blojsom, Drupal, MovableType, Nucleus, SquareSpace, TypePad, and WordPress) there are standardized programming routines for reading and writing content. Any programmer is allowed to use these methods without royalty fees or fear of legal complications.

Implications

Technology has, paradoxically, enabled designers to create communities with stunning visuals and rich multimedia content that can in turn be circumvented by

members of the communities who want nothing more than textual content. For individuals with ASDs, any effort invested in the design of a virtual space is less important than enabling RSS and e-mail interactions.

Online Courses

Within the survey population, 77.1 percent had enrolled in a college or university writing course. Only 17.1 percent enrolled in a writing course with any online content or participation. By comparison, 75.8 percent had taken a course with at least some online content or participation. Online courses are becoming an accepted part of postsecondary education within the sample population. Of the survey respondents with postsecondary course experiences,

- 44.1 percent have taken an all-online course;
- 23.5 percent have taken a hybrid course; and
- 75.8 percent have had a course with supplemental materials online.

The University of Minnesota, which has a site license for the WebVista platform, is representative of many colleges and universities. Within the sample population with postsecondary experiences, 55.6 percent had used Blackboard classroom management software and 19.4 percent had used WebCT/WebVista. The dominance of Blackboard platforms indicates that comparing online and hybrid courses at the University of Minnesota to the needs of students with ASDs is a reasonable culmination to this research project.

Of those participants in survey component of this project with postsecondary experiences, the following course preferences were indicated:

- 29.0 percent prefer all-online courses, though many did not want online interactions with other students required;
- 22.6 percent prefer a traditional course with materials available online, but no required online participation; and
- 19.4 percent prefer a traditional course with no online materials or participation.

While it might be reassuring for proponents of online education that 51.6 percent of survey respondents embraced at least the optional delivery of course materials via the Internet, this overstates the enthusiasm of the survey population for online courses. The availability of materials online is merely a convenience, with minimal pedagogical implications. In some cases, the online materials replace course packets of photocopied materials. Instead, we should consider why only 29.0 percent prefer an all online course and why many of those seek a course that is the equivalent of independent study. In effect, the sample population was seeking the modern implementation of correspondence courses.

One explanation for this might be found within the reported effectiveness of online courses. Within the sample population, the following was found:

- 40.0 percent considered online less effective than traditional courses;
- 50.0 percent considered online and traditional courses equally effective; and
- 10.0 percent considered online courses more effective.

When only 10.0 percent indicate online education is more effective, despite the challenges students with ASDs encounter in traditional classroom settings, there is

definitely need for improvement. I theorize that the students would prefer the online delivery methods of their communities to the Web-centric participation demanded by Blackboard and similar CMS platforms. The sample population does not want “virtual learning environments” that mimic and even exacerbate the challenges experienced in traditional classrooms. The VLE concept, while appealing to some instructors and students, does not correspond to the needs of students with ASDs.

None of the men in the survey sample interacted with other students in hybrid or all-online courses. Only women and those self-selecting “other” as gender interacted with peers in online class settings. Of those interacting with peers online, 36.8 percent considered it easier to interact than in a traditional classroom. Most of these, 80.0 percent, used online discussion forums to interact with peers.

Having avatars or simulations for an online academic composition or technical writing course is unlikely to appeal to students with ASDs, based on the dominant online communities for these individuals and the survey data collected. The sample population seeks e-mail and discussion forums, accessible via user-controlled applications that tailor the reading and writing experience to the special needs of individuals with disabilities. Even complying with Section 504/508 and Web Accessibility Initiative (WAI) guidelines is unlikely to meet the needs of students with ASDs who are sensitive to some colors, sounds, and video. A simulated classroom quite literally represents the worst possible mix of digital stimuli.

It is essential for students with special needs that instructors be both approachable and appreciative of their needs. Unfortunately, 42.9 percent of survey respondents indicated instructors did not appreciate the special needs associated with

autism. As the comments from respondents illustrated, even when there was an appreciation for accommodations, it was with “minimal complaint” or even perceived as an “excuse” for poor academic performance. Online instructors were generally perceived as even less responsive than instructors overall.

- 37.8 percent considered online instructors less responsive to students
- 10.0 percent considered online instructor more responsive

When 37.8 percent of surveyed students with ASDs consider online instructor less responsive, it is reasonable to predict complications within online courses, especially writing courses that are inherently social in nature. Of even more concern, the students with ASDs need to be reminded of tasks more often than other students because of poor executive functions (Harpur et al., 2004; Palmer, 2006; Wolf et al., 2009). Autism has been compared to a severe form of ADHD when it comes to organization and planning (Kennedy & Banks, 2002).

The intrinsic motivation theorists suggest is required for online education (Eaton, 2005; Maeroff, 2003) proved to be a challenge for many in the sample population. Though these students are not the “irresponsible” writing students that scholars have considered (Breuch, 2005, p.146), they do lack the ability to focus on subjects that are outside personal interests. This reflects a core deficit within autism (Attwood, 1997).

Design Concerns: Sensory

The sensory issues associated with autism are reflected within the sample population surveyed for this research project. Many of the participants indicated they would rather not be “coerced” or “forced” to use a Web-based interface over which they

had no control. Instead, the overwhelming majority sought communities and Web services that could be accessed via alternative means. Even Amazon has developed an open interface that can be accessed with custom software, as one participant noted. Quite simply, the Web sites are seldom flexible enough for those with unusual sensitivities.

- 34.1 percent reported a medical and/or autism related challenge when using computers;
- 46.2 percent reported discomfort or stress related to autism when using computers;
- 65.8 percent reported light and/or color sensitivity when viewing computer screens; and
- 75.0 percent reported that specific colors, animations, or sounds caused stress.

Though students with autism surveyed for the study, and the Web communities dedicated to autism that were analyzed, indicate a preference for subdued colors, minimal graphics, and the ability to avoid all multimedia content, these preferences are unlikely to be limited to the population studied for this project. Previous research indicates that many Web users prefer the minimalist approach of Google or Facebook to the hyperkinetic designs of sites such as Yahoo or MySpace (Lindberg, 2009). Therefore, it seems likely the preferences detected during this project can be generalized to the larger student population.

Research does indicate that individuals with autism often have hypersensitivity to stimuli. Even saturated colors can be physically painful for some individuals with

autism, as reflected by survey comments. Though more data should be collected, analyses conducted for this project indicate bright red, yellow, and orange colors are particularly difficult for individuals with autism. Ironically, the colors of the University of Minnesota are gold and maroon—among the worst for many of the individuals participating in this study indicating color sensitivities.

It is possible, however, that the color preferences indicated within surveys and site analyses reflect issues of both legibility and readability associated with computer screens. Intense colors might be the issue, as noted by some study volunteers, and not the specific ranges of the color spectrum. As several commented, “neon” and “bright” colors are painful for some with ASDs.

The desire to avoid multimedia content is potentially more complicated than issues of onscreen colors. Autism is often associated with seizure disorders, including epilepsy (Exkorn, 2005; Schreibman, 2005). The strobe effect resulting from low frame rate video found on many websites can apparently trigger both headaches and seizures, according to the individuals with autism surveyed for this project. In the past, researchers found some video games and even music videos could trigger seizures among sensitive populations. Because seizure disorders occur at a higher rate among students with autism than the general population, concerns about multimedia content might resist generalization.

Many students with autism notice flicker on some of the older cathode ray tube monitors and are distracted by the pixels or tiny dots of colour seen on pictures on screen.... (Draffan, 2009; 226)

Audio sensitivity is also common among individuals with autism. Researchers have found sensitivity is not consistent; some individuals are sensitive to low frequency sounds, while others are sensitive to high frequencies (Schreibman, 2005). The compression algorithms used for digital music often reduce both high and low frequency extremes. It would be interesting to examine the effects of compression on auditory sensitivity, but that is beyond the scope of this project. What is clear, based on the surveys and site analyses, is that individuals with autism spectrum disorders would prefer the ability to block or otherwise control online audio.

What can be generalized about multimedia content is that not every setting is conducive to the playback of audio or video for any student. Therefore multimedia content should not automatically play when a student navigates to a webpage.

Arguably the best approach for accommodating the visual and auditory needs of students with autism is also the best approach for all students: customization via client-side settings that can override the defaults of a course management system. While we can implement the best general design for an online classroom, some students will still prefer other design choices. Whether due to a medical conditions such as autism, a diagnosed learning disability, a physical disability, or mere preference does not matter. Allowing our students to customize the appearance of virtual class spaces should enhance the learning experience.

Design Concerns: Decoding

Language can be particularly confusing for those coming from different linguistic backgrounds. Every language has unique idioms, clichés, and “hidden meanings” obvious only to longtime speakers, especially those native to the linguistic

community. Individuals with autism spectrum disorders tend to favor concrete, clear, and concise language. They often misunderstand expressions used in daily speech, and metaphors or other figurative language common to written expression can frustrate individuals with autism. The challenges decoding language experienced by individuals with autism are similar to the challenges presented to second language learners.

Online spaces using concrete and obvious language for menus and functionality are less likely to confuse individuals with autism. Even visual metaphors, such as icons for functionality, can confuse this population (Frith, 2001). Survey participants complained that icons were confusing and frustrating. One mention the toolbars of Microsoft Word, in particular, as an example of a frustrating and exhausting interface. If we design online courses to accommodate the language processing of individuals with autism, we are also designing better spaces for non-native speakers of the classroom language.

Individuals with autism report memorizing “unobvious” language. Adult learners of additional languages might engage in the same memorization and translation process. A virtual classroom that recognizes this translation challenge by offering additional cues, might aid student writers.

Because writing instruction should explore figurative language and the vagary of written communication, we should not insulate our students from these important linguistic experiences. However, we can provide additional support for students struggling to translate words and phrases into meaningful communication. Online spaces are particularly flexible when we want to provide different levels of support for

students within our writing classes. Admittedly, some students will need to make an extra effort to discover the meanings of texts and visual compositions.

Writing instructors increasingly recognize the need to be digital literacy instructors (Breuch, 2004; Kress, 2003; Monroe, 2004; Selfe, 2004; Selfe & Hawisher, 2004). Students with autism should not be exempt from learning skills required to fully participate in an increasingly digital democracy. I am suggesting that students be able to obtain clarifying information online easily to help develop their decoding skills.

Even students who find online spaces liberating find online education difficult. In discussions with autistic students, via online message board and e-mail, several have explained that they enjoy exploring information online, but find it difficult to engage in synchronous “chats” with others. Because language decoding is difficult for these students, they make social and academic “errors” because they misunderstand messages they are expected to quickly comprehend in “real-time” environments.

These students also explain that the metaphors and complexity of online courses can be overwhelming. Online course software often uses unfamiliar icons, which are visual metaphors. These applications also use unfamiliar metaphors in their textual content. While other students quickly decode the online space, the autistic students soon appear “slow” to others in a course.

Design Concerns: Social

Among the survey participants, 70.0 percent attributed a negative online experience to autism. These included three participants who received death threats. Moderation, especially in an online classroom, is vital to the success of an online community. Academic composition and technical writing classrooms are inherently

social spaces. In virtual classrooms, the potential for conflict must be appreciated and addressed by writing instructors.

Traditionally, the writing classroom is a space in which students learn to argue for their interpretations of academic data and theories. Discussions in the writing classroom can become emotional, and even heated. It is the responsibility of the writing teacher to demonstrate and explain the value of civil discourse when addressing complex issues.

Eight individuals expressed a sense that their scientific or mathematical interests were “insulted” by instructors in the humanities. This is not a minor finding; we cannot be perceived as “anti-science” even if the actual message in our classes is more nuanced. Individuals with ASDs do consider “truth” and “facts” concretely (Attwood, 1998; Grandin, 2006; Johnson, 2005; Wolf et al., 2009). Any challenge to this is likely to be perceived as a challenge to their areas of expertise. As memoirs and interviews indicate, the notion that things are subjective causes real, and serious, physical pain for some autistic individuals. The notion of an unsolvable math problem leaves Daniel Tammet shaking and even angry (Johnson, 2005; Tammet, 2007).

Suggestions of “gray areas” and ethical quandaries can lead to extreme serious emotional distress for individuals with ASDs (Bowler, 2007; Exkorn, 2005; Schreibman, 2005; Tantam, 1991; also see Haddon, 2003). Researchers have found individuals with ASDs develop rigid value systems, which resist change. Many individuals with ASDs cannot lie, not even a social “white lie” (Attwood, 2007; Bogdashina, 2006; Bowler, 2007; Exkorn, 2005; Frith, 2001; Grandin, 2006; Grinker, 2007; Harpur et al., 2004; Howlin, 2004; Klin, 2000; Martin, 2009; Schreibman, 2005;

Shore, 2003; Tantam, 1991). Socially, we seldom expect the blunt, unemotional statements of individuals with ASDs. They will tell a classmate when he or she is perceived to be in error. Students with ASDs are also likely to correct instructors (Attwood, 2007; Harpur et al., 2004; Wolf et al., 2009).

How a writing instructor deals with such moments is important to the well-being of the student. When a student has an autism spectrum disorder, it is essential that the teacher be able to moderate and facilitate interactions between that writing student and other students in the classroom. Students with autism require assistance at times when trying to understand the intentions of their classmates. An online space must allow the instructor an equivalent to wandering between groups so the teacher can monitor interactions regularly to anticipate potential conflicts. Past research in technical writing supports the need for instructor involvement.

Many students complained that instructors would not participate in group discussions, respond to posted messages, or even return email. (Eaton, 2005, p. 39)

At the beginning of this project, I presumed that since existing scholarship indicates individuals with ASDs have difficulty interpreting social cues (Attwood, 2007; Cohen, 2005; Exkorn, 2005; Frith, 1991; Tantam, 1991; Wolf et al., 2009), individuals with ASDs would express a preference for online instruction. Unfortunately, after conducting research for this project, I am inclined to agree with research suggesting that online virtual environments are not suited to some, if not most, students with ASDs.

Preliminary evidence concerning adults with autism suggests that they may have difficulty understanding social conventions in a virtual environment (Parsons, 2001). ... [A] mixed message has emerged from their study regarding the interpretation and understanding of VEs, and they cautioned that VEs may not be suitable for all people with autism.... (Moore et al., 2005, p. 234)

Dissatisfaction with instructors and an intolerance for peers, made obvious by study participant comments, is almost certain to produce conflict. I do not believe it is possible, or even preferable, to alter all writing courses to ameliorate all potential misunderstandings. Unless we alter the underlying pedagogies of most writing instruction, debate and negotiation are inherently part of composition and technical writing courses.

Memoirs and Published Interviews

There are a great many books available about and by individuals with autism, including personal memoirs. General books on autism have also exploded onto the market. This is a relatively new trend and one that autism self-advocates consider important for future students.

According to the Autism Resources web site by Jim Wobus (2000), from 1935 to 1959 only three nonfiction books were written about autism. This increased to 24 in the 1960s, 78 in the 1970s, 129 in the 1980s and a phenomenal increase to 338 in the 1990s. This boom in nonfiction reading material on autism helps make society more tolerant and appreciative of the contributions people on the autism spectrum can make. (Shore, 2003, p. 137)

This research project looked at some of the memoirs to compare data from the survey component to experiences described by individuals with ASDs. In part, this was to offset the lack of direct interviews with survey volunteers, due to the potentially vulnerable nature of the sample population. Relying on published accounts of university experiences and personal traits also demonstrates the representational nature of the sample population that participated in this project.

The memoirs and biographies examined were those of individuals with at least some postsecondary education. Many have earned graduate degrees; some possess doctorates in their fields. This is a group that represents both the difficulties of postsecondary education for students with ASDs and the possibilities for success.

Once I had entered college, I never wanted to leave—and still haven't— as I continue to study at one college while teaching at another. I like the predictable structure of the school day. (Shore, 2003, p. 89)

Aquamarine Blue 5: Personal Stories of College Students with Autism (Prince-Hughes, 2002) contains essays, letters, and interviews with a dozen individuals with various ASDs. Some have obtained graduate degrees, while others have struggled to complete undergraduate programs. Many of the names are pseudonyms, as is “Michael” who related his college experiences in *Succeeding with Autism* to an education professor (Cohen, 2005). Palmer (2006) recorded the journey of her son, Eric. As Happé found (1991), the writing by autistics is admittedly uneven (Prince-Hughes, 2002) and often difficult to follow.

Several of the authors are or have been teachers (Cohen, 2005; Grandin, 2006; Prince-Hughes, 2002; Shore, 2003; Shore, 2004; Tammet, 2006; Willey, 1999). For

“Michael” (Cohen, 2005), Shore (2003), and Willey (1999), teaching did not always go well, even though they were masters of their disciplines. For Shore and Willey, navigating the administrative aspects of teaching proved challenging. The *Chronicle of Higher Education* has examined how professors with autism can struggle with the social and bureaucratic aspects of teaching (Diament, 2005).

If I could have spent all my time and energies on my students, I think I might still be teaching. But of course, this could never have been. I had to interact with administrators, counselors, parents, and other teachers, no matter the discomfort. (Willey, 1999, p. 69)

Shore writes that losing a college teaching post was emotionally “painful” because he thought he followed “all the procedures I thought necessary” to be a good teacher (2003, p. 117). What he failed to appreciate were the perceptions of colleagues.

Writing

Many of the individuals with autism who have authored, or more often co-authored (Happé, 1991), autobiographical works struggled with writing in academic settings. Unfortunately, as discussed in the review of scholarship, many autism experts suggest students with ASDs avoid humanities courses (Willey, 1999). Michael reflects one possible explanation for why writing courses are particularly challenging.

Michael: I just didn’t write. No one ever made me write more than a sentence. We used a lot of workbooks and had to fill in the blanks. I remember that the first paragraph I wrote was in seventh grade. I was never a creative person, but my seventh through ninth grade teacher, who I had for all subjects, was very into

writing. So until that teacher forced me, I didn't write, and then I started writing.

I like right and wrong answer tings—like spelling and math. (Cohen, 2005, p. 43)

I believe that writing is an important skill, one essential to the success of autism self-advocacy. The writings of individuals with ASDs are forming the foundation for a culture, one that does not require physical gatherings. As anthropologist Dawn Prince-Hughes observes,

People on the autistic spectrum do, indeed, have a culture—one separate from the “normal” world they must live in. Further, the autistic people who have contributed here have all expressed a belief that writing is the best way for an autistic person to communicate, and I agree. (Prince-Hughes, 2002, p. xiii)

Writing is not easy for students with ASDs, according to their comments. As was theorized before data collection, the primary challenge is relating to the unknown audience when composing a document.

[Darius:] When I am writing papers for my courses, I have to take into account that other people do not think in the same way that I do. It takes a bit of extra work, as I cannot simply assume, the way most people do, that the other person is like myself in most respects and will have the same type of emotional and cognitive responses to a certain event or piece of information I'd have. (Prince-Hughes, 2002, p. 39)

Sensory Issues

Just as the respondents to the survey component of this research project indicated sensory sensitiveness interfered with their learning experiences, the published authors with ASDs struggled with both physical and online spaces. Sometimes, the only perceived option was to leave a course, regardless of the consequences.

I only sporadically attended my college algebra class, again without concern for my grade, because the instructor's voice aggravated me beyond my limits. And I dropped out of one of my favorite dramatic arts classes because the room we met in was dark, musty, windowless, and creepy.... (Willey, 1999, p. 50)

The sensory input of a traditional classroom or workplace can be so overwhelming that the individual with an ASD withdraws as a form of self-preservation.

[Jim:] In my first attempt at college, I withdrew after less than a semester. I was unable to deal with the environment. Fluorescent lights, noisy equipment—noisy by my standards. (Prince-Hughes, 2002, p. 74)

I frequently attempt to escape the pain of sensory overload. As Nazeer explains, this withdrawal allows the individual with an ASD time to process and consider sensory inputs. Dealing with other people, especially other students, is simply asking too much of the autistic mind at times.

[A]utistic individuals try to focus on simple tasks, and tasks that don't involve other people. In this way, they begin to manage the throughput of sense data.

As managing our own minds was such a challenge, it was unsurprising that we weren't curious about one another. We had enough going on. (Nazeer, 2006, p. 69)

This is one reason some think online settings might be less stressful, though I now realize there are other stresses from the technology. As the data and comments for this project reveal, every situation has its own potential for sensory overload.

Math, Science, and Patterns

Most of the authors with ASDs studied math, science, or technology. Even those with other interests express a fascination with science and technology (Willey, 1999). Grandin (2006) claims that anytime she visits a science department at a university or a technology company she can identify individuals with ASDs. Shore seeks patterns constantly, which is why music and accounting appealed to him.

I liked music theory and accounting because they both involved analyzing entities via their small parts. With music theory, a composition can be analyzed melodically for keys and for formal structure. Accounting can be used to analyze a business via its day-today financial transactions and financial statements. (Shore, 2003, p. 90)

“Michael,” the math teacher profiled by Cohen (2005), finds math and science comforting, while he struggles with abstract disciplines.

Michael desires certainty in an unpredictable world and he derives great satisfaction from mathematics being exact and something he can always rely on. (Cohen, 2005, p. 20)

The suggestion to focus on concrete topics is mentioned by both a professor with autism (Willey, 1999) and the parent of a college student with autism (Pamer, 2006). In both cases, struggles and even failures in courses with abstract topics posed a challenge to completing undergraduate degrees.

Some students on the autism spectrum do better in courses that are focused on more concrete information, courses that require more memorization skills.

Philosophy courses, for example, may be too abstract and more difficult for some students. (Palmer, 2006, p. 107)

Language and Meaning

The authors with ASDs who discuss their love for language do so by way of their fascination with patterns and rules (Prince-Hughes, 2002; Tammet, 2007; Willey, 1999). Those students with ASDs interested in language seem to be drawn into linguistics and cognitive sciences.

[Susan:] Once I entered high school, this interest in etymology evolved into an obsession about linguistics. I discovered the discipline of historical linguistics, the primary activity of which is the reconstruction of ancient protolanguages through the careful comparison of cognates in descendent languages. (Prince-Hughes, 2002, p. 95)

Tammet has developed his own language, with strict spelling and grammar rules, similar to Esperanto (Johnson, 2005; Tammet, 2007). I have notebooks in which I created languages and alphabets during elementary school. These were strictly rules-based languages, similar to computer programming code. For students with ASDs,

language is meant to adhere to the rules; they do not appreciate “misuse” of language or grammar, though puns are often interesting to individuals with autism (Attwood, 1998).

Willey, a professor of linguistics observes:

It was all about details and pedantic rules and one-way semantics. I never considered a statement had more than one meaning. I always assumed the meaning I inferred was the intent of the speaker. (Willey, 1999, p. 21)

Even as a professor of linguistics and education, Willey looks for the one, precise meaning of an author.

Language appeals to me because it lends itself to rules and precision even more often than it does to subjectivity. Put together in the right sequence, taking into account things like tone, perspective, implications and intent, a writer can tweak and bend words until they say precisely what they should. (1999, p. 35)

Some of the authors with ASDs also discuss experiences editing publications during college (Cohen, 2005; Willey, 1999). Unfortunately, these experiences were not always positive. For “Micheal,” editing an academic publication led to conflicts with faculty members and classmates (Cohen, 2005). For the individuals writing about college experiences in *Aquamarine Blue 5*, language is always foreign, despite desperate attempts to comprehend peers.

[Jim:] Rather broadly stated, I didn’t think the same way as those around me.

It’s not as if I thought in another language—as best I can tell my thought processes were (and still are) different. I never understood how others think, and

aside from a few individuals I don't expect I ever will. (Prince-Hughes, 2002, p. 68)

For Willey, language became a barrier to interacting with classmates at the university.

I think the real problem laid just below the surface of another of my most mysterious and difficult AS traits—my inability to understand my peers' conversations. I understood their language, knew if they had made grammatical errors in their speech, and I was able to make replies to anything that was spoken to me; but, I never came to hear what they were really saying. I never understood their vernacular.... It was frustrating... (Willey, 1999, p. 56)

Truth and lies are addressed later in this section, but the notion that a metaphor is a lie might be difficult for a writing instructor to understand. Roth (2007) found autistic authors prefer simile to metaphor because similes make clear the comparison offered. A metaphor implies something that cannot be true.

The Social Nature of Classes

To interact with classmates in university courses, most of the authors indicated a need to develop internalized rules for interactions. One of the participants in this research project wrote of observing and memorizing how her classmates interacted with each other and instructors before she would participate in class discussions. Temple Grandin explains why rules are important for her.

Since I don't have any social intuition, I rely on pure logic, like an expert computer program, to guide my behavior. I categorize rules according to their

logical importance. It is a complex algorithmic decision-making tree. There is a process of using my intellect and logical decision-making for every social decision. Emotion does not guide my decision; it is pure computing. (Grandin, 2006, p. 108)

Grandin believes this helped her with some teachers, who appreciated her attention to details, but resulted in distance between her and other students. As she describes it, her rules helped her “stay out of trouble” with faculty (p. 108). Willey also believes that her need for rules helped with courses, but not with her peers.

As long as things followed a set of rules, I could play along. Rules were—and are—great friends of mine. I like rules. They set the record straight and keep it that way. You know where you stand with rules and you know how to act with rules. Trouble is, rules change and if they do not, people break them. (Willey, 1999, p. 43)

Most of the authors, again reflecting the open-ended comments of study volunteers, wanted to work alone on academic projects. Shore (2003) writes of a desire to be given a task and allowed to complete it in his own way. Shore finds other people slow, more often an obstacle to his own learning style, which is extremely independent.

The negative view of other students reflected in the data and comments from participants in this project are also reflected within the memoirs and biographies. Even Michael, a teacher, cannot hide his disdain for honors students who are not serious about their subject areas.

Michael did have difficulty with the social aspects of being a student in the honors college. He quickly became disenchanted with other students who did not take college life as seriously as he did.... Michael also had difficulty concealing his negative opinions about some of the other students. The directness and bluntness in Michael's language was not diplomatic and did little to obscure what some saw as disdain for them. (Cohen, 2005, p. 34-5)

Michael seems to parallel the comments of other gifted autistic individuals when asked about the general population.

There are so many dumb people in the world, dumber than me. I thought people were smarter. Even teachers disappoint me. (Cohen, 2005, p. 227)

Being gifted is never easy. Maybe this explains why some individuals with ASDs are attempting to find ways to celebrate their unique skills. Grandin (2006) and Robison (2007) are among those with ASDs using superlative comparisons, which in a manner celebrates being apart from others, including other students and scholars.

So I'm not defective. In fact, in recent years I have started to see that we Aspergians are better than normal! And now it seems as though scientists agree: Recent articles suggest that a touch of Asperger's is an essential part of much creative genius. (Robison, 2007, p. 240)

I do wonder if what began as a coping strategy for me and many others with ASDs, the need to avoid other students because of sensory overload, evolves into something potentially destructive. That is one reason I, as a teacher, prefer that students learn to work together and recognize each other's unique talents. It is not always easy

for me to tolerate other people, but I at least want to try. Others with ASDs have decided isolation is preferable, especially in academic settings. For Prince-Hughes, completing her doctorate meant locating a university at which she could work alone, away from the distractions of other students. She had no desire to be anything other than a research scientist, so teaching and other social interactions were to be avoided.

I literally searched the world for a doctoral program that would permit me to continue to work in the solitary manner which had brought me so far. I quickly learned that Europe was far ahead of the United States.... (p. 119)

Reading the biographies, I found myself experiencing a definite sense of empathy, or maybe it was the familiarity of the experiences that made it possible to appreciate the words. The social isolation described by men and women who are now professors or noted researchers appears to be common among students with ASDs.

[Prof. O'Neal:] Sometimes when I'm at Penn State, I see things—the dorm I lived in as an undergraduate, a shop I used to frequent in the evenings—that remind me of past times. Amidst the nostalgia, unpleasant memories also live there, the isolation and rejection that I felt in my then-still-immature soul.

(Prince-Hughes, 2002, p. 87)

Autism advocate Phil Schwarz writes that the social pressures of college were simply too overwhelming for him.

...I had begun that 17-year trek through outpatient psychotherapy in college to help me skate around the edges of a nervous breakdown in my junior year. And I had learned over the years to conceal, suppress, and avoid as much as I could of

anything for which I might be considered weird or clueless. Not a particularly secure way to live. (Schwarz, 2004, p. 145)

Truth and Lies

Possibly the greatest challenge for students with ASDs in writing and literature courses is that they dislike lies, inaccuracy, and metaphors (Attwood, 2007; Grandin, 2006; Robison, 2007; Roth, 2007; Wellcome Trust, 2008). The blunt nature of many students with ASDs causes conflicts with some peers—and instructors. The notion that telling the truth is sometimes “wrong” is difficult for individuals with ASDs to internalize.

Autistic people tend to have difficulty lying because of the complex emotions involved in deception. I become extremely anxious when I have to tell a little white lie on the spur of the moment. To be able to tell the smallest fib, I have to rehearse it many times in my mind. ...I panic. Lying is very anxiety-provoking because it requires rapid interpretations of subtle social cues to determine whether or not the other person is really being deceived. (Grandin, 2006, p. 156)

Even what might be classified as normal conversation is often interpreted as a series of lies and misstatements by individuals with ASDs. Nazeer recounts knowing as a child that conversations were acts, and he did not like the games involved.

As a child, I had regarded these exact practices as inauthentic—for example, the adult feigning interest in my comics; or damaging—because analysis should be thorough and it should be complete; it and the people engaging in it were worthy of sulky contempt. (Nazeer, 2006, p. 27)

Technology

Similar to the comments offered by some of the survey participants for this research project, the authors with autism consider technology an important adaptive opportunity. Computers and the Internet allow individuals with ASDs, especially those with verbal processing difficulties, a chance to interact with other individuals and to pursue their intellectual interests in ways that were not possible in the past. As Shore (2003) writes, “Cyberspace can be a good place for those on the autistic spectrum” (p. 142).

There is also an interesting attraction to the definite routines and rules of technology, identified by Attwood (1998) and commented on within the works of individuals with ASDs. For example, Temple Grandin (2006) writes of her appreciation for, and unusual ability to repair, the mainframe computers she used for data analysis as a student. This ability to “relate” to machines and visualize how they function is mentioned by several of the authors with autism disorders. John Elder Robison, a technical savant, writes of his passion for computers and machines.

Many people with Asperger’s have an affinity for machines. Sometimes I think I can relate better to a good machine than any kind of person. (Robison, 2007, p. 151)

Robison’s life was changed when his father brought home an early computer. My own experiences are similar, with my father ordering various computer kits while I was in elementary school. For Robison, these devices revealed how special his mind is.

The college engineering textbooks used equations to describe how things worked, but I didn't understand the math. I could visualize the equations in my head, but the ones in my head seemed to have nothing in common with those on the page. It was as though I thought in an entirely different language. When I saw a wave in a book, it was printed next to an equation with symbols I didn't understand. When I saw a wave in my mind, I associated it with a particular sound. (Robison, 2007, p. 62)

When I think of computer programming, I literally see the code. I can even sense the code in ways that I have never been able to explain. It is as if I understand the "thoughts" of a computer better than I do those of other people. Shore (2003) also writes that, "There are times when I feel that communicating with computers is easier than talking with people" (p. 143). This might explain why so many autism experts advise students with ASDs to consider technical careers.

Employment using computers is often a good avenue for individuals with autism or Asperger Syndrome. I might have gone into computer programming....
(Shore, 2003, p. 144)

Shore explains that he uses "a 'virtual computer' in my mind" (p. 143) to consider tasks, a sentiment echoed by Grandin (2006), who frequently compares her thoughts to a hard drive, DVD, and CD-ROM.

Additional Thoughts

Mark Haddon's *The Curious Incident of the Dog in the Night-Time* (2003) is a fictional work, but this Whitbread Book of the Year accurately reflects many of my

experiences as an individual with an ASD. The narrator, 15-year-old Christopher, is an autistic savant with excellent math and logic skills. Haddon, who worked with autistic youth, explores the difficulties students with ASDs have understanding metaphors, the inability to understand why people lie, and sensory overload.

Christopher finds comfort and stability in numbers and patterns, similar to comments made by autistic authors in their personal memoirs. What Christopher cares about are numbers, even more than his own wellbeing. People are, generally, a source of stress and confusion.

I mention this work because though the memoirs and biographical works explain some aspects of the “autistic experience,” Happé (1991), Roth (2007) and other scholars have noted that autistic writers have difficulty recognizing what is unique about their experiences. To the autistic individual it is hard to imagine that the world does not seem loud, smelly, and far too bright to everyone (Willey, 1999). We really do lack the ability to imagine what others experience (Frith, 2001; Lombardo et al., 2009). The best we can do is relate our experiences and hope that others can empathize. As Durig (1996) suggests, autism is a phenomenological condition, a disorder defined by the experiences of individuals with ASDs.

Writing Courses and Course Management Systems

The Department of Writing Studies at the University of Minnesota suggests that instructors use either the Moodle or WebVista course management system (CMS) for online courses or the distribution of supplemental materials. As the earlier review indicates, the CMS platforms from Blackboard and Moodle dominate higher education,

so the experiences of writing instructors at the University of Minnesota might be representative of online writing instruction. There is a secure, password-protected, Intranet for composition instructors at the University of Minnesota. From this Intranet it is possible to request a Moodle or WebVista “classroom” for a composition course section. I believe allowing such choices is important, as instructors might have their own unique skills and needs when developing online writing spaces.

After comparing the features of these two CMS platforms, it is apparent that Moodle can be customized more thoroughly to meet the needs of students with ASDs. It is likely that this platform, which is open source and free to any institution wishing to use it, can be extended to include student customizations that are appropriate for sensitivity to stimuli. According to the Moodle documentation, users can already customize displays, similar to the functionality of LiveJournal.

User themes: If the option `allowuserthemes` is enabled, each user may select their preferred theme on the Edit profile page. All Moodle pages will be displayed in the user's theme, apart from courses where a course theme has been set. (http://docs.moodle.org/en/Theme_settings, 2009)

Blackboard is a closed, proprietary system that seems to lack the essential flexibility to meet the needs of students with ASDs. According to a May 2009 “Tech Note” on the Blackboard Inc. Web site (<http://www.blackboard.com>), only network administrators can create RSS feeds. It is not possible to create feeds for a particular course. Nor can an e-mail relay be created, though e-mail is clearly a preference of the individuals with ASDs surveyed for this research project.

According to the Moodle documentation (<http://docs.moodle.org>), virtual spaces can include external RSS feeds as well as generate RSS feeds to which members can subscribe. Discussion forums can be shared as RSS feeds, for example, a key feature of the Web-based autism communities analyzed for this project. E-mail processing is also part of Moodle, allowing content to be forwarded to any e-mail account chosen by a Moodle community member.

It does not seem possible to submit new content to Moodle via standard blog application programming interfaces. There is work underway to add this functionality, according to a 24 July 2009 discussion post on the Moodle Web site. Of course, this would require an educational institution update their Moodle server to the “2.0” version of Moodle when it becomes available in either 2010 or 2011.

Moodle includes detailed instructions on how to allow students near-complete control of colors and fonts within the Moodle classroom. This flexibility might reduce the importance of including support for specialized authoring and reading software used by bloggers with ASDs. If individuals can select colors and fonts that match their sensitivities, then the need for external reader support is greatly diminished.

Moodle even includes a feature referred to as “Chameleon” that allows a student or instructor the ability to change screen elements while interacting with course content. This means a student never has to accept the course design imposed by an instructor—if Chameleon is enabled.

Unfortunately, Blackboard offers no such controls to students. The course designs are controlled by the instructor, meaning every student has exactly the same experience in a particular virtual classroom. While this reduces confusion by ensuring

consistency of layout within a course, it comes at the expense of accessibility. Design skills vary from instructor to instructor, and, more importantly, even a great visual design might not be optimal for some students with special needs.

It is my conclusion, based on the findings of this research project, that Moodle best aligns with the preferences, needs, and online experiences of individuals with ASDs. The flexibility of Moodle to support customization and RSS feeds are reason enough to prefer it to the Blackboard platforms. Additionally, it is evident that Moodle will support the “BlogAPI” (application programming interface) within the next two years. This means students with special needs will be able to interact with Moodle using the software of their choice, in place of a Web browser. Some special needs, such as vision impairment, are best met with custom software.

I encourage the writing instructors to consider Moodle as the preferred CMS platform for courses with content, participation, or course meetings conducted online. Moodle has features absent from current Blackboard systems that are essential to the success of students with special needs.

Discussion

Both the survey component of this research project and the available memoirs by individuals with autism indicate that students with ASDs have been present at colleges and universities for at least the last 40 years, and probably since the first formal universities were established. What has changed is our awareness of autism and the expanded definition of autism spectrum disorders. In fact, 11 participants had attended postsecondary institutions before the DSM III introduced the concept of high-

functioning autism in 1992. Whether or not the actual incidence of autism is increasing, students with ASDs are likely to increase in numbers on our campuses.

The survey data found 20 of 48 respondents, 41.7 percent, were diagnosed after the age of 25. Most of these individuals had attended a college or university before their diagnoses. Some indicated a sporadic and difficult road through their higher educations, but 21 of the participants had completed at least a bachelor's degree and 11 of those individuals had completed graduate degrees.

Furthermore, 77.1 percent of survey respondents who had attended postsecondary institutions enrolled in at least one writing course. This indicates that students with ASDs do have a demonstrated history of completing degree programs and fulfilling university composition requirements. The collected data indicated grammar, editing, and technical writing courses were also common among this cohort.

One might wonder if the evidence of past academic success is sufficient to assume no accommodation for students with ASDs is necessary within composition and technical writing courses, especially those conducted in online settings. Since only 17.1 percent of the respondents who attended postsecondary institutions had enrolled in a writing course with any online content, it is impossible to know if the online setting substantially changes the success rate of students with ASDs.

Yet we would never point to the success of some disadvantaged students and suggest that they are evidence that are pedagogical assumptions are ideal. The writing disciplines are constantly seeking ways to improve and enhance the learning experience in composition and technical writing courses. Therefore, we should not point to

individuals with ASDs who have earned degrees as evidence that our classes are sufficiently accommodating.

In fact, we might argue that our classes risk becoming less accommodating as we embrace new technologies and collaborative pedagogies. None of the men in the survey cohort interacted with their class peers in online courses. Of even greater importance, I theorize, is even the lack of social online gaming among all the male participants. These are individuals with limited need, desire, or even ability to engage in casual socializing. They have no desire to work with peers.

This desire to work alone was not only mentioned within the survey responses, but it also reflects the comments of professionals interviewed by ComputerWorld (Anthes, 1997; Mayor, 2008) and memoir reflections by individuals with ASDs. This is a group that, truly, does not do well when asked to work in groups. While we have all witnessed students resistant to group work, especially high-achieving students, students with ASDs can be emotionally traumatized by some group interactions.

We should consider how university writing has evolved since the 1960s and 70s. If we are requiring more collaboration, then students with ASDs will struggle within our classes, real and virtual. Add to this that our online courses in composition and technical writing are evolving away from textual environments towards simulations of virtual classrooms, the students with ASDs will be encountering another obstacle on top of pedagogical challenges to their very natures.

I pose these questions before offering my conclusions. We should consider, carefully, what we are defining as both normal and expected of our student populations. If we expect “normal” students to enjoy and even be motivated by simulations, what

does this convey to a student uninterested in these spaces? What do our philosophies convey to students who are naturally disposed to think of learning as the gaining of concrete, quantifiable knowledge? The data for this study indicate we are likely to be confronting difficult questions as the number of university students with ASDs increases and they take seats in our writing classroom—real and virtual classrooms.

CHAPTER 6: CONCLUSIONS

Introduction

This research project challenged a number of my personal beliefs regarding both writing pedagogy and virtual classroom design. While as a student I disliked and resisted some of the practices within both composition and technical writing courses, I had attempted to naturalize pedagogical theories and actively embrace them within my own teaching. In effect, I was, and to some extent remain, committed to practices as an instructor that have resulted in me, as a student, withdrawing from courses on numerous occasions.

Studying online communities, analyzing survey data, and interpreting the comments of other individuals with ASDs, it is clear that students with ASDs want, and might need, to focus on their areas of interest without distractions. New research indicates that autism is not really about the self, or auto. If anything, autism causes the individual difficulties interpreting the needs of all humans, including his or her needs. As Lombardo and his colleagues (2009) found via MRI studies, “Individuals with autism are impaired in both self-referential and other-referential social cognitive processing.” This is why the autistic individual might have poor dietary and grooming habits, but never forget a detail about a field of special interest. It is not a self-conceit; it is a mind focused on things and patterns, not people.

Our writing classrooms, both traditional and virtual, are social spaces. What I view as the potential challenge is that as we increase the sociability within our virtual spaces, the benefits to the majority of students might be perceived as outweighing any difficulties created for students with special needs. New technologies allow us to create

rich simulations, spaces that not only can resemble physical writing classes but can offer visual and multimedia experiences beyond what is possible in the physical world. There is no question in my mind that a generation familiar with online games, three-dimensional computer-generated animated films, and lives lived and shared “online” will find virtual writing spaces exciting and intellectually engaging.

Smart instructors choose to incorporate only the technology they need to help students learn. Adding bells and whistles without strong pedagogical rationale will only annoy this population of students. (Eaton, 2005, p. 40-41)

But what does this mean for students with disabilities? A multimedia-enhanced online classroom seems to inherently assume every student is able-bodied and without special needs. Any accommodations are, by definition, a step from the immersion in a virtual setting. Suddenly, the shared experience is not truly shared—and differences are emphasized, not integrated smoothly into the learning experience of students. I tried to experience Second Life, a virtual environment now used by companies, non-profit organizations, and some universities. Like some of the survey respondents, I found myself physically ill, with both a severe migraine and nausea. A class in such an environment is not welcoming; it is exclusionary.

One of the characteristics of gifted high-functioning individuals with autism is the ability to navigate systems and organizations sufficiently enough to succeed. Liane Holliday Willey (1999) described her experiences as “pretending to be normal,” a sentiment echoed within memoir collections edited by Dawn Prince-Hughes (2002) and Stephen Shore (2004). But this ability to mimic social norms will be tested by virtual classrooms, spaces where observation of others and memorization of norms might prove

challenging. This was mentioned by a survey respondent who explained she spent the first days of any class memorizing how people interacted.

As I completed this project, a Centers for Disease Control report was released with an estimate that 1 in 110 eight-year-olds meets the criteria for an autism diagnosis (Allen, 2009). We must consider the needs of students diagnosed with autism spectrum disorders; they will be entering universities in greater numbers. There are role models for students with ASDs and their families, such as professors Temple Grandin, Lars Perner, Stephen Shore, and Dawn Hughes-Prince. Awareness and role models are good, but we must not stop considering how to improve composition and technical writing instruction.

Past academic success in traditional spaces has not been easy for many individuals with ASDs. This research project explored the writing habits and educational experiences of a subset of the autism community, those with the least debilitating forms of autism spectrum disorders. This is not to suggest the sample population is without challenges. Pointing to their successes as an indication that we should continue with current trends in online writing instruction is, at least for me, unacceptable.

Implications for Course Design

The individuals participating in the survey for this project were asked if they had suggestions for online courses. Their suggestions go beyond online courses to the very core of current university writing practices. Again, I must disclose that my own desires and needs as a student do correspond to the views expressed by survey participants.

Taking the survey data and open-ended responses into consideration, the top eight suggestions for an “ideal” composition or technical writing course were:

- Make extensive use of standardized documents, templates, and guidelines that could be followed to meet assignment requirements;
- Focus on the academic and professional writing expectations;
- Avoid, as much as possible, “insulting” science and empiricism;
- Feature a detailed online calendar, with e-mail reminders for deadlines;
- Notify students via e-mail of all new content added by the instructor or peers;
- Allow complete customization of any required Web-based classroom;
- Avoid requiring any video or audio content, ideally offering text or static-image alternatives; and
- Never require group work, as direct collaboration is a challenge even for employed professionals with ASDs.

Pedagogical Concerns

The first three suggestions are not specific to the classroom setting, yet they were emphasized by those survey respondents who offered ideas for course improvement. This project aimed to determine optimizations for online course settings that would accommodate students with ASDs, which means the suggestions should be considered in terms of technological implementations.

Having assignments, samples, and grading rubrics available online would assist not only students with special needs, but likely benefit all students in online

courses. Because students in an online course can feel disconnected from the instructor, as reflected by the data from the survey component of this project, having clear expectations available online could assist students who desire precise assignment guidelines.

Within online courses, writing instructors should find it more convenient to share templates and sample documents. Students in online composition or technical writing courses could download templates for common documents. This is particularly true in technical and professional writing courses, since many of the documents must follow established structures. We can critique these forms and ask students to analyze the effects of standardized practices, but professional journal articles, business proposals, and other documents do adhere to traditional models. Making examples available online would be valuable for students.

The desire to focus on academic and professional expectations reflects a vocational emphasis among the individuals with ASDs participating in this project. Most universities aim to be more than vocational training, so while the desire for a vocational focus might be understandable, it is probably not desirable. I believe scholars in the writing studies are correct to suggest that our courses can and should be more than vocational skills training (Blyler & Thralls, 1993; Clark, 1994; Connors, 2004; Grabill, 2004; Miller, 1979; Selfe & Hawisher, 2004; Wahlstrom & Clemens, 2005).

The final of the three general, and most common, suggestions was to avoid insulting other fields of study. This reflects a tension that has existed within academia for generations and one that is unlikely to change. The reality is that many of our

students take writing courses because they are required courses. From these courses, the students appear to seek basic skills, more than critical thinking development.

Writing scholars might recognize the course suggestions of individuals with ASDs as a return to Samuel Chandler Earle and his *The Theory and Practice of Technical Writing*, published in 1911 (Connors, 2004). However, recall that a significant number of survey participants indicated that they believed instructors in the humanities had insulted the scientific and engineering fields. This is unacceptable at a time when science is too often challenged by skeptics.

He [Earle] condemned the attitude of English teachers that saw engineers as philistines, to be proselytized to about the superior virtues of culture and literature over engineering. (Connors, 2004, p. 81)

The “mystique of absolute scientific truth” (Miller, 1979, p. 613) is a concrete, neurologically determined aspect of autism, according to current research. To imply to students with ASDs that their brains are inherently flawed, somehow less evolved, is unacceptable—but it is the experience of survey respondents. It is also my personal experience.

E-Mail Interactions

The dominant technical suggestion was to incorporate e-mail throughout online courses. This does not necessarily mean instructors should expect their inboxes to “flooded” with e-mail from students. Instead, a system such as Moodle allows individual users, both students and instructors, the option of receiving content and updates via e-mail. For those those of us who prefer to access course e-mail online, we

would continue to read and respond to students within the virtual space. If, however, you would rather use an e-mail account, an option can be set to forward messages to any valid e-mail account.

From the analysis of popular communities for individuals with ASDs, we know that e-mail notifications and even e-mail submission of content is an available option in every community. We also know that all major blogging platforms support e-mail submissions and subscriptions. Since Moodle supports this same technology, there is no reason not to accommodate students who want, or need, e-mail based interactions with a writing course in an online setting.

Online Space Customization

The desire to customize a virtual classroom is not unique to individuals with ASDs. We know individuals customize software applications, Web spaces, and even the “virtual desktops” of their personal computers. Some of this personalization is merely stylistic, but some is also adaptive. Enlarging on-screen fonts is an example of an adaptive personalization.

Customization of a virtual classroom should be personal, in the sense that changes one student makes do not affect other students. Even customization of a “personal profile” should not override what another user wants or needs while within the virtual environment. Though students might want to demonstrate visual designs to each other, there must always be a way to override visual choices.

Unless there is a pedagogical necessity for a particular design choice, nothing but text should be mandatory. It is possible that many students might

embrace the creation of avatars, for example, and yet students with ASDs or other special needs should have the ability to request a text-only interface. This is also an accommodation for those who use text-to-voice adaptive technologies.

Alternatives to Multimedia Content

We must provide alternative to multimedia content. This can be a challenge for many of us in composition and technical writing embracing audio and video production in our classes. But, with 75.0 percent of survey respondents indicating difficulty using online communities that included multimedia content, we must carefully consider how audio and video affect individuals with special needs.

As an instructor, my personal interests include audio and video production, as well as new media rhetoric. I am not certain the thematic compositions courses I have taught, including one first-year composition course titled “Art in the Digital Age,” could be adapted to students with some sensitivities. However, I also experience severe migraines when attempting to view some online videos, so I am aware of the need to consider situations in which an alternative might be necessary.

We can provide transcripts of audio and video for students with some special needs, including ASDs. Because autism can affect processing, it is not always easy for students with ASDs to watch a video and process any spoken words. As we would accommodate students with hearing or vision impairments, we can provide the same accommodations to students with neurological processing impairments.

Collaboration and Group Work

I have given the issue of collaboration a great deal of thought. As a student, I withdrew from any course with a collaborative requirement. By finding courses without collaborative components, I did complete journalism and English degrees as an undergraduate, despite my limitations. In the workplace, I have always sought out jobs where I complete my tasks, and then pass the product along to a superior. I admit to my students that I have never met the editor I work under at a small magazine, yet I have written for the same publisher for four years.

Some people do work, relatively speaking, in isolation. This is a personal choice, certainly, and limited to certain fields. But, the reality is that students can pursue careers in which collaboration is rare and nothing like what we practice in academic composition courses. The programmers with ASDs profiled by ComputerWorld (Anthes, 1997; Mayor, 2008) are specialists who work from home. My wife, an engineer and technical writer, meets with her supervisor once a month. As she describes it, her coworkers do not and would not tolerate direct supervision—they have an impressive collection of patents to prove their value to the company.

I have been a proponent of collaboration because I imagined my need to avoid group projects was not representative of other students. It is fair to conclude that I have little patience for others and my few attempts at group work ended badly; I was placed on independent study in high school for a reason. Researchers have determined my needs are not unusual for someone with an ASD (Harpur et al., 2004; Wolf et al., 2009). Autism researchers even suggest that group work can lead to academic failure and

rejection (Harpur et al., 2004). One of the survey respondents who experienced challenges with collaboration wrote:

Ha! Questioning group work in pedagogical circles is like questioning the virgin birth at a Catholic convention or the wisdom of Barack Obama at a MoveOn conference. :-)

The respondent is apparently familiar with pedagogical theories, leading this participant to compare collaborative practices to faith, rather than a tested and proven methodology for instruction. Admittedly, working on this project has affected my own views on collaboration and the need to always emphasize a clear purpose supporting group work.

If we must have collaborative projects, we need to support and guide students through these experiences. We, as writing instructors, must be mediators and facilitators. Online, we can provide ways for students to interact that might reduce the potential for conflicts. Our online courses must guide students through appropriate responses to their peers. Solutions might range from rubrics that require only checkboxes to online lessons that explain appropriate responses during the editing and reviewing stages of the writing process.

Within the survey data, it was found that individuals with ASDs were not composing new content for collaborative projects, such as Wikipedia, but they were compelled to correct and edit content. Maybe this is a role for students with ASDs in the writing classrooms. It is possible that these students can be editors and organizers, embracing their strengths.

Recommendations for Further Study

Gender Differences and Students with Autism

Though not anticipated, the survey data for this research project indicate there might be gender differences among high-functioning individuals with ASDs. The survey component was not designed to explore such differences and no conclusions should be reached based solely on the data gathered for this research project. I believe these differences are important to explore, especially since the diagnostic rate is much higher for autism among young boys than girls. The women in this study were diagnosed at later ages and received fewer accommodations during their early educations.

In the sample population surveyed, the men were far less “social” online. Are the women with ASDs simply reflecting social conventions and acculturation, or are there neurological differences? Such questions would require in-depth studies by social scientists, anthropologists, and neurobiologists. Even fields such as evolutionary psychology might pursue the possible gender differences with the autistic community.

Online versus Traditional Classroom Writing Instruction

There has been insufficient research to know how online writing instruction compares to traditional instruction for students with ASDs. There is the possibility that online courses are not inherently better experiences for students with ASDs. Testing this possibility, directly challenging some assumptions about autism and accommodation, might lead universities currently recommending online studies to students with ASDs to reconsider this advice. However, it is unlikely that the trend towards online and hybrid

courses will reverse. The insights gained from this study could improve online courses not only for students with autism, but for all students.

Observational Research Needed

Qualitative research is conducted in “natural” settings, observing the subjects as they engage in discourse. Marshall and Rossman (2006) write of qualitative researchers that:

They are intrigued by the complexity of social interactions expressed in daily life and by the meanings that the participants themselves attribute to these interactions. These interests take qualitative researchers into natural settings, rather than laboratories, and foster pragmatism in using multiple methods for exploring a topic. Thus, qualitative research is pragmatic, interpretive, and grounded in the lived experiences of people. (Marshall and Rossman, 2006, p. 2)

Such research tends to be presented as narratives, stories reflecting the lived experiences of the subjects.

The evocative case study, the rich description of ethnography, the narratives of complex personal journeys all are the products of systematic inquiry. (Marshall and Rossman, 2006, p. 9)

The only certain way to test online writing courses and their effectiveness for students with ASDs is evaluative research (MacNealy, 1999). In evaluative research, subjects would be asked to enroll in specific online writing courses and their experiences analyzed. Methods for potential analysis vary, but the goal would be to

assess students' improvement in both writing and the interactions within the virtual classroom.

Creative Writing and Autism

Several individuals diagnosed with ASDs have informed me that they enjoy writing “fan fiction” because the parameters of these stories have been firmly established. The characters are known, as are settings and timelines. Web sites dedicated to fan fiction often feature detailed information that all writers are expected to use. Breaking established canon, especially timelines, is considered unacceptable. Peer review and comments are essential within these communities. Some individuals surveyed for this project are involved in fan fiction and similar forms of composition.

We know from Happé (1991) and Roth (2007) that individuals with autism engage in creative writing. Though both researchers found the writing does reflect the impairments of the autistic authors, creative writing represents an opportunity to explore the connections between creativity and autism. Also, the number of memoirs and personal reflections now in print indicate individuals with autism are finding that writing is a powerful form of self-advocacy.

I believe we can and should study the writings of individuals with autism. These works can be studied as we might explore other sets of expression: rhetorical analysis, textual analysis, genre analysis, and so on. The writing studies can and should find ways to incorporate the literature of autism into our scholarship.

Final Thoughts

My experience as an instructor and student has been that colleges and universities view online courses as an accommodation for individuals with autism and related conditions. However, I found the online experience substantially more challenging, not less challenging, as an individual officially diagnosed with “characteristics of high-functioning autism” (Sorti, 2006). The difficulties I had with hybrid courses led me to wonder if I was unique or if other students diagnosed with autism spectrum disorders (ASDs) found virtual classrooms more frustrating than physical classroom spaces. This personal experience is a direct challenge to what had become an accepted assumption: online courses in their existing form must be better for university students with autism than traditional classrooms.

At times, I did want to be more like other students, but only because it would reduce conflict with instructors and the structure of some courses. I am not unique. My attempts to embrace pedagogies that contradicted my own learning experiences was also an uncritical embrace of teaching practices that reject the emotional, intellectual, and even neurological nature of autism spectrum disorders.

REFERENCES

- Allen, J. (2009). One percent of U.S. children have autism. *Reuters Online*.
- American Psychiatric Association. (1968). *Diagnostic and statistical manual of mental disorders* (2nd ed.). Washington D.C.: American Psychiatric Association.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington D.C.: American Psychiatric Association.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington D.C..
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington D.C.: American Psychiatric Association.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington D.C.: American Psychiatric Association.
- Andrew, R., & Shafer, D. (2006). *HTML Utopia: Designing without tables using CSS*. Victoria, Australia: SitePoint Pty, Ltd.
- Anson, C. M. (2003). Distant voices: Teaching and writing in a culture of technology. In V. Villanueva (Ed.), *Cross-Talk in Comp Theory* (pp. 797-818). Urbana, ILL: National Council of Teachers of English.
- Anthes, G. (1997). My coding just flies. *ComputerWorld*.
- Asperger, H. (1944). Die 'Autistischen Psychopathen' im Kindesalter. In U. Frith (Ed.), *Autism and Asperger syndrome* (pp. 37-92). Cambridge: Cambridge University Press.
- Attwood, T. (1998). *Asperger's syndrome: A guide for parents and professionals*. London; Philadelphia: Jessica Kingsley Publishers.
- Attwood, T. (2007). *Complete guide to Asperger's syndrome, The*. London; Philadelphia: Jessica Kingsley Publishers.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, Mass.: MIT Press.
- Baron-Cohen, S. (2004). *The essential difference: Male and female brains and the truth about autism* (1st pbk. ed.). New York: Basic Books.
- Baron-Cohen, S., & Bolton, P. (1993). *Autism: The facts*. Oxford; New York: Oxford University Press.
- Baron-Cohen, S., Ring, H. A., Wheelwright, S., Bullmore, E. T., Brammer, M. J., Simmons, A. et al., (1999). Social intelligence in the normal and autistic brain: An fMRI study. *European Journal of Neuroscience*, *11*, 1891-1898.
- Baron-Cohen, S., Tager-Flusberg, H., & Cohen, D. J. (2000). *Understanding other minds: Perspectives from developmental cognitive neuroscience* (2nd ed.). Oxford; New York: Oxford University Press.

- Batorsky, B., & Renick-Butera, L. (2004). Using role-plays to teach technical communication. In T. Bridgeford, K. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (pp. 148-167). Logan: Utah State University Press.
- Bauman, M. L., & Kemper, T. L. (2005). *Neurobiology of autism, The* (2nd ed.). Baltimore: Johns Hopkins University Press.
- Baylor College of Medicine. (2008). Poor recognition of 'self' found in high functioning people with autism. *ScienceDaily*.
- Berlin, J. A. (2003). *Rhetorics, poetics, and cultures: Refiguring college English studies*. West Lafayette, Ind.: Parlor Press.
- Berlin, J. (2003). Rhetoric and Ideology in the Writing Class. In V. Villanueva (Ed.), *Cross-talk in comp theory: a reader* (2nd ed., pp. 717-737). Urbana, Ill.: National Council of Teachers of English.
- Bernhardt, S. A. (1993). The Shape of Text to Come. *College Composition and Communication*, 44(2), 151-175.
- Bettelheim, B. (1967). *The empty fortress; infantile autism and the birth of the self*. New York: Free Press.
- Bissell, J. (2004). Teachers' construction of space and place: the method in the madness. *Forum*, 46(1), 28-32.
- Blackboard, Inc. (2009). Blackboard support web site. Retrieved December 18, 2009, from <http://www.blackboard.com>.
- Blakeslee, A. M. (2004). Bridging the workplace and the academy: Teaching professional genres through classroom-workplace collaborations. In J. M. Dubinsky (Ed.), *Teaching Technical Communication* (pp. 348-371). Boston, MA: St. Martin's.
- Blyler, N. R., & Thralls, C. (1993). *Professional communication: The social perspective*. Newbury Park, Calif: Sage.
- Bogdashina, O. (2006). *Theory of mind and the triad of perspectives on autism and Asperger syndrome: A view from the bridge*. London: Jessica Kingsley Publishers.
- Bolter, J. D. (1991). *Writing space: The computer, hypertext, and the history of writing*. Hillsdale, N.J: L. Erlbaum Associates.
- Bolter, J. D., & Grusin, R. A. (1999). *Remediation: Understanding new media*. Cambridge, Mass: MIT Press.
- Bowler, D. M. (2007). *Autism spectrum disorders: Psychological theory and research*. Hoboken, NJ: John Wiley & Sons.
- Bradbard, D. A., & Peters, C. (2010). Web accessibility theory and practice: An introduction for university faculty. *The Journal of Educators Online*, 7(1), 2-46.

- Breuch, L.-A. K. (2003). Post-process "pedagogy": A philosophical exercise. In V. Villanueva (Ed.), *Cross-talk in comp theory: A reader* (2nd ed., pp. 97-125). Urbana, Ill.: National Council of Teachers of English.
- Breuch, L.-A. K. (2004). Thinking critically about technological literacy: Developing a framework to guide computer pedagogy in technical communication. In J. M. Dubinsky (Ed.), *Teaching Technical Communication* (pp. 481-499). Boston, MA: St. Martin's.
- Breuch, L.-A. K. (2005). Enhancing online collaboration: Virtual peer review in the writing classroom. In K. C. Cook & K. Grant-Davie (Eds.), *Online education: Global questions, local answers* (pp. 141-156). Amityville, NY: Baywood Publishing Company.
- Bridgeford, T., Kitalong, K. S., & Selfe, D. (2004). *Innovative approaches to teaching technical communication*. Logan: Utah State University Press.
- Brock, S. E. (2006). *Identifying, assessing, and treating autism at school*. New York: Springer.
- Bruffee, K. A. (2003). Collaborative learning and the "conversation of mankind". In V. Villanueva (Ed.), *Cross-talk in comp theory: A reader* (pp. 415-436). Urbana, ILL: National Council of Teachers of English.
- Bryant, S. L., Forte, A., & Bruckman, A. (2005). Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia. Paper presented at the Proceedings of the 2005 International ACM SIGGROUP conference on supporting group work.
- Bundy, J. (2004). University tailors a program for autistic students. *Associated Press*.
- Burke, K. (1969). *A rhetoric of motives*. Berkeley: University of California Press.
- Byron, K., & Baldrige, D. C. (2007). E-Mail recipients' impressions of senders' likability. *Journal of Business Communication*, 44(2), 137-160.
- Carnevale, D. (2007). Judge dismisses lawsuit against Capella U. Retrieved January 7, 2010, from <http://chronicle.com/blogPost/judge-Dismisses-Lawsuit>.
- Chew, K. (2007). Fractioned idiom: Metonymy and the language of autism. In M. Osteen (Ed.), *Autism and representation* (pp. 133-144). New York: Routledge.
- Clark, G. (1994). Ethics of technical communication: A rhetorical perspective. *IEEE Transactions of Professional Communication*, PC 30(3), 190-195.
- Cohen, D. J., & Volkmar, F. R. (1997). *Handbook of autism and pervasive developmental disorders* (2nd ed.). New York: J. Wiley.
- Cohen, J. H. (2005). *Succeeding with autism: Hear my voice*. London: Jessica Kingsley Publishers.
- Cohen, S. (2007). *Targeting autism: What we know, don't know, and can do to help young children with autism spectrum disorders* (3rd ed.). Berkeley: University of California Press.

- Coleman, M. (2005). *Neurology of autism, The*. New York: Oxford University Press.
- Connors, R. J. (2004). The rise of technical writing instruction in America. In J. M. Dubinsky (Ed.), *Teaching technical communication: Critical issues for the classroom* (pp. 77-96). New York, NY: Bedford/St. Martins.
- Conrad, R.-M., & Donaldson, J. A. (2004). *Engaging the online learner: Activities and resources for creative instruction*. (1). San Francisco: Jossey-Bass.
- Cook, K. C. (2005). An argument for pedagogy-driven online education. In K. C. Cook & K. Grant-Davie (Eds.), *Online education: Global questions, local answers* (pp. 49-66). Amityville, NY: Baywood Publishing Company.
- Cook, K. C., & Grant-Davie, K. (2005). *Online education: Global questions, local answers*. Amityville, N.Y: Baywood Pub.
- Corbett, E. P. J. (1972). Rhetoric, the enabling discipline. In E. P. J. Corbett, N. Myers, & G. Tate (Eds.), *The writing teacher's sourcebook* (4th ed., pp. 26-35). New York: Oxford University Press.
- Corbett, E. P. J., Myers, N., & Tate, G. (2000). *The writing teacher's sourcebook* (4th ed.). New York: Oxford University Press.
- Covino, W. A. (2001). Rhetorical pedagogy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 36-53). New York: Oxford University Press.
- Critchley, H. D., Daly, E. M., Bullmore, E. T., Williams, S. C. R., Van Amelsvoort, T., Robertson, D. M. et al. (2000). The functional neuroanatomy of social behaviour: Changes in cerebral blood flow when people with autistic disorder process facial expressions. *Brain*, 123, 2203-2212.
- Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, Mass.: Harvard University Press.
- Dawson, G., Toth, K., Abbott, R., Osterling, J., Munson, J., Estes, A. et al. (2004). Early social attention impairments in autism: Social orienting, joint attention, and attention to distress. *Developmental Psychology*, 40(2), 271-283.
- Diament, M. (2005). A secret syndrome. *Chronicle of Higher Education*.
- Draffan, E. A. (2009). Assistive technology. In Pollak (Ed.), *Neurodiversity in higher education: Positive responses to specific learning differences* (pp. 217-242). Hoboken, NJ: Wiley.
- Dubinsky, J. (2004). The status of service learning. In T. Bridgeford, K. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (pp. 15-30). Logan, UT: Utah State University Press.
- Dubinsky, J. M. (2004). *Teaching technical communication: critical issues for the classroom*. New York, NY: Bedford/St. Martins.
- Durig, A. (1996). *Autism and the crisis of meaning*. Albany: State University of New York Press.

- Eaton, A. (2005). Students in the online technical communication classroom. In K. C. Cook & K. Grant-Davie (Eds.), *Online education: Global questions, local answers* (pp. 31-48). Amityville, NY: Baywood Publishing Company.
- Erb, R. (2008). Autism no longer an obstacle for students seeking college degrees. *Detroit Free Press*, March 10).
- Exkorn, K. S. (2005). *The autism sourcebook: Everything you need to know about diagnosis, treatment, coping, and healing*. New York: ReaganBooks.
- Ferreira-Buckley, L., & Horner, W. B. (2001). Writing instruction in Great Britain: The eighteenth and nineteenth centuries. In J. J. Murphy (Ed.), *A Short history of writing instruction: From ancient Greece to modern America* (2nd ed., pp. 173-212). Mahwah, NJ: Erlbaum.
- Flora, C. (2006). An aspzie in the city. *Psychology Today*.
- Freire, P. (1998). *Pedagogy of freedom: Ethics, democracy, and civic courage*. Lanham: Rowman & Littlefield Publishers.
- Frith, U. (1991). *Autism and Asperger syndrome*. Cambridge ; New York: Cambridge University Press.
- Frith, U. (2001). Mind blindness and the brain in autism. *Neuron*, 32, 969-979.
- Galegher, J., Sproull, L., & Kiesler, S. (1998). Legitimacy, authority, and community in electronic support groups. *Written Communication*, 15, 493-530.
- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: framework, principles, and guidelines* (1st ed.). San Francisco: Jossey-Bass.
- George, A. (2001). Critical pedagogy: Dreaming of democracy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 92-112). New York: Oxford University Press.
- Grabill, J. (2004). Technical writing, service learning, and a rearticulation of research, teaching, and service. In T. Bridgeford, K. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (pp. 81-92). Logan, UT: Utah State University Press.
- Grandin, T. (2006). *Thinking in pictures: And other reports from my life with autism* (2nd Vintage Books ed.). New York: Vintage Books.
- Grandin, T. (2001). *Genius may be an abnormality: Educating students with Asperger's syndrome, or high functioning autism*.
- Grant, D. (2009). The psychological assessment of neurodiversity. In D. Pollak (Ed.), *Neurodiversity in higher education: Positive responses to specific learning differences* (pp. 33-62). Hoboken, NJ: Wiley.
- Grinker, R. R. (2007). *Unstrange minds: Remapping the world of autism*. New York: Basic Books.
- Gross, A. G. (2006). *Starring the text: The place of rhetoric in science studies*. Carbondale: Southern Illinois University Press.

- Gurak, L. J. (2001). *Cyberliteracy: Navigating the Internet with awareness*. New Haven, Conn.: Yale University Press.
- Gurak, L. J. (2004). Internet studies in the twenty-first century. In D. Gauntlett & R. Horsley (Eds.), *Web studies, 2nd edition*. London: Oxford University Press.
- Haddon, M. (2003). *The curious incident of the dog in the night-time* (1st ed.). New York: Doubleday.
- Hane, R. E. J. (2004). Communicating through advocacy and self-disclosure: Four ways to connect. In S. M. Shore (Ed.), *Ask and tell: Self-advocacy and disclosure for people on the autism spectrum* (pp. 1-32). Shawnee Mission, KS: Autism Asperger Pub.
- Happé, F. G. (1991). The autobiographical writings of three Asperger syndrome adults: Problems of interpretation and implications for theory. In U. Frith (Ed.), *Autism and Asperger syndrome* (pp. 207-242). Cambridge ; New York: Cambridge University Press.
- Harpur, J., Lawlor, M., & Fitzgerald, M. (2004). *Succeeding in college with Asperger syndrome: A student guide*. London ; New York: J. Kingsley Publishers.
- Harris, S. (2004). *The end of faith: Religion, terror, and the future of reason*. New York: W. W. Norton.
- Hawisher, G. E., & Pemberton, M. A. (1997). Writing across the curriculum encounters asynchronous learning networks or WAC meets up with ALN. *Journal of Asynchronous Learning Networks*, 1(1), 52-72.
- Hawisher, G. E., & Selfe, C. L. (1991). The rhetoric of technology and the electronic writing class. *College Composition and Communication*, 42, 55-65.
- Hobbs, C. L., & Berlin, J. A. (2001). A century of writing instruction in school and college English. In J. J. Murphy (Ed.), *A short history of writing instruction: From ancient Greece to modern America* (2nd ed., pp. 247-289). Mahwah, NJ: Erlbaum.
- Hobson, E. H. (2001). Writing center pedagogy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 165-182). New York: Oxford University Press.
- Howard, R. M. (2001). Collaborative pedagogy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 54-70). New York: Oxford University Press.
- Howlin, P. (2004). *Autism and Asperger syndrome: Preparing for adulthood*. London: Routledge.
- Howlin, P., Baron-Cohen, S., & Hadwin, J. (1999). *Teaching children with autism to mind-read: A practical guide for teachers and parents*. Chichester; New York: J. Wiley & Sons.

- Jarratt, S. C. F. (1991). *Rereading the sophists: Classical rhetoric refigured*. Carbondale: Southern Illinois University Press.
- Jarratt, S. C. F. (2001). Feminist pedagogy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 113-131). New York: Oxford University Press.
- Johnson, R. (2005). *A genius explains*.
- Kalmbach, J. (2004). Hypermediating the resume. In T. Bridgeford, K. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (pp. 135-147). Logan: Utah State University Press.
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-250.
- Kennedy, D. M., & Banks, R. S. (2002). *The ADHD autism connection: A step toward more accurate diagnosis and effective treatment* (1st ed.). Colorado Springs, Colo.: Waterbrook Press.
- Kirschner, P., Strijbos, J.-W., Kreijns, K., & Beers, P. J. (2004). Designing electronic collaborative learning environments. *Educational Technology Research and Development*, 52(3), 47-66.
- Klin, A. (2000). Attributing social meaning to ambiguous visual stimuli in higher-functioning autism and Asperger syndrome: The social attribution task. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, 41, 831-846.
- Konstan, J. A., Rosser, B. R. S., Stanton, J., & Edwards, W. M. (2003). The story of subject naught: A cautionary but optimistic tale. *Journal of Computer-Mediated Communication*, 10(2), Articles 11.
- Kowitt, B. (2009). Blackboard software rules the schools. *Fortune* <http://cnmmoney.com/>.
- Krause, J. (2002). *Color index [1]*. Cincinnati, Ohio: HOW Design Books.
- Krause, J. (2007). *Color index 2* (1st ed ed.). Cincinnati, Ohio: HOW Books.
- Kreijns, K., Kirschner, P. A., & Jochems, W. (2002). The sociability of computer-supported collaborative learning environments. *Educational Technology & Society*, 5(1).
- Kreijns, K., Kirschner, P. A., Jochems, W., & Van Buuren, H. (2004). Determining sociability, social space, and social presence in (a)synchronous collaborative groups. *CyberPsychology & Behavior*, 7(2), 155-172.
- Kress, G. R. (2003). *Literacy in the new media age*. New York: Routledge.
- Lee, E.-J. (2007). Deindividuation effects on group polarization in computer-mediated communication: The role of group identification, public-self-awareness, and perceived argument quality. *Journal of Communication*, 57, 385-403.

- Licklider, J. C. R., & Taylor, R. W. (1968). Computer as a communication device, *The Science and Technology*, 21-41.
- (2008). Living with autism in college. *Associated Press*.
- Lindberg, O. (2009). The secrets of Google's design team: Google's director of user experience reveals all. Retrieved December 20, 2009, from <http://www.techradar.com/news/internet>.
- Lombardo, M. V., Chakrabarti, B., Bullmore, E. T., Sadek, S. A., Pasco, G., Wheelwright, S. J. et al. (2009). Atypical neural self-representation in autism. *Brain: A Journal of Neurology*, 132(12), 306-320.
- Lovaas, O. I. (2002). *Teaching individuals with developmental delays: Basics intervention techniques*. Austin, Tex.: Pro-Ed.
- Lunsford, A. A. (2003). Cognitive development and the basic writer. In V. Villanueva (Ed.), *Cross-talk in comp theory: A reader* (2nd ed., pp. 299-310). Urbana, Ill.: National Council of Teachers of English.
- Lupton, E. (2004). *Thinking with type: A critical guide for designers, writers, editors, & students*. New York: Princeton Architectural Press.
- MacNealy, M. S. (1999). *Strategies for empirical research in writing*. Boston: Allyn and Bacon.
- Maeroff, G. I. (2003). *A classroom of one: How online learning is changing our schools and colleges*. New York: Palgrave Macmillan.
- Marshall, C., & Rossman, G. B. (2006). *Designing qualitative research* (4th ed.). Thousand Oaks, Calif: Sage Publications.
- Martin, N. (2009). Asperger syndrome: Empathy is a two-way street. In D. E. Pollak (Ed.), *Neurodiversity in higher education: Positive responses to specific learning differences* (pp. 149-168). Hoboken, NJ: Wiley.
- Matthews, J. L., & Williams, J. (2000). *The self-help guide for special kids and their parents*. London; Philadelphia: Jessica Kingsley Publishers.
- Mayer, R. E., Sobko, K., & Mautone, P. (2003). Social cues in multimedia learning: Role of speaker's voice. *Journal of Educational Psychology*, 95, 419-425.
- Mayor, T. (2008). Asperger's and IT: Dark secret or open secret? *ComputerWorld*
- McDonagh, P. (2007). Autism and modernism: A genealogical exploration. In M. Osteen (Ed.), *Autism and representation* (pp. 99-116). New York: Routledge.
- McFarland, D. S. (2004). *Dreamweaver CS3: The missing manual*. Sebastopol, Calif: O'Reilly.
- McGregor, J. (2004). Space, power and the classroom. *Forum*, 46(1), 13-18.
- Milani, A. A. (1996). Disabled students in higher education: Administrative and judicial enforcement of disability law. *Journal of College and University Law*, 22, 989-1043.

- Miller, C. R. (1993). Rhetoric and community: The problem of the one and the many. In T. Enos & S. C. Brown (Eds.), *Defining the new rhetorics* (pp. 79-94). Newbury Park, CA: Sage Publications.
- Miller, C. R. (1979). A humanistic rationale for technical writing. *College English*, 40(6), 610-617.
- Monroe, B. J. (2004). *Crossing the digital divide: Race, writing, and technology in the classroom*. New York: Teachers College Press.
- Moodle Trust. (2009). Moodle support. Retrieved December 18, 2009, from <http://moodle.org/support/>.
- Moore, D., Cheng, Y., McGrath, P., & Powell, N. J. (2005). Collaborative virtual environment technology for people with autism. *Focus on Autism and Other Developmental Disabilities*, 20, No. 4, 231-243.
- Moore, D., McGrath, P., & Thorpe, J. (2000). Computer-aided learning for people with autism - a framework for research and development. *Innovations in Education and Training International*, 37(3), 218-228.
- Moran, C. (2001). Technology and the teaching of writing. In G. Tate, Rupiper, Amy; Schick, Kurt (Ed.), *A guide to composition pedagogies* (pp. 203-223). New York: Oxford University Press.
- Murphy, D. J. (2002). Surveys and questionnaires. In L. J. Gurak & M. M. Lay (Eds.), *Research in technical communication* (pp. 93-110). Westport, CT: Greenwood Publishing Group.
- Murphy, J. J. (2001). *A short history of writing instruction: From ancient Greece to modern America* (2nd ed.). Mahwah, NJ: Erlbaum.
- Murray, D. M. (2003). Teach writing as a process not product. In V. Villanueva (Ed.), *Cross-talk in comp theory: A reader* (2nd ed., pp. 3-6). Urbana, Ill.: National Council of Teachers of English.
- Mutnick, D. (2001). On the academic margins: Basic writing pedagogy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 183-202). New York: Oxford University Press.
- Myers, G. (2003). Reality, consensus, and reform in the rhetoric of composition teaching. In V. Villanueva (Ed.), *Cross-talk in comp theory: A reader* (2nd ed., pp. 437-459). Urbana, Ill.: National Council of Teachers of English.
- Nack, J. (2009). Why your Web content will look darker on Snow Leopard. Retrieved 26 Nov 2009, http://blogs.adobe.com/jnack/2009/09/why_your_web_content_will_look_darker.html.
- Nagel, T. (1986). *The view from nowhere*. New York: Oxford University Press.
- National Institute of Mental Health. (2004). Autism Spectrum Disorders (Pervasive Developmental Disorders). <http://www.nimh.nih.gov/publicat/autism.cfm>.

- Nazeer, K. (2006). *Send in the idiots: Stories from the other side of autism* (1st U.S. ed.). New York, NY: Bloomsbury Pub.: Distributed to the trade by Holtzbrinck Publishers.
- Neuman, W. L. (2007). *Basics of social research: Qualitative and quantitative approaches* (2nd ed.). Boston: Pearson/Allyn and Bacon.
- Nicol, D. J., Minty, I., & Sinclair, C. (2003). The social dimensions of online learning. *Innovations in Education and Teaching International*, 40(3), 270-280.
- O'Reilly, T. (2007). Design patterns and business models for the next generation of software. *Communications & Strategies*, 1, 17.
- Oberman, L., Hubbard, E. M., McCleery, J. P., Altschuler, E. L., Ramachandran, V. S., & Pineda, J. A. (2005). EEG evidence for mirror neuron dysfunction in autism spectrum disorders. *Cognitive Brain Research*, 24(2), 190-198.
- Ong, W. J. (2002). *Orality and literacy: The technologizing of the word*. London ; New York: Routledge.
- Oppenheimer, T. (2003). *The flickering mind: Saving education from the false promise of technology*. New York: Random House.
- Osteen, M. (2007). *Autism and representation*. New York: Routledge.
- Ozonoff, S. E., Rogers, S. J., & Hendren, R. L. (2003). *Autism spectrum disorders*. Arlington, VA: American Psychiatric Publishing, Inc.
- Palloff, R. M., & Pratt, K. (2001). *Lessons from the cyberspace classroom: The realities of online teaching*. San Francisco: Jossey-Bass.
- Palmer, A. (2006). *Realizing the college dream with autism or Asperger syndrome: A parent's guide to student success*. London/Philadelphia: Jessica Kingsley Publishers.
- Passantino, D. (2007). Autism on campus: The other diversity. *The Nation*.
- Perelman, C., & Olbrechts-Tyteca, L. (1969). *The new rhetoric: A treatise on argumentation*. Notre Dame: University of Notre Dame Press.
- Perner, L. (2003). Colleges. <http://www.larsperner.com/autism/colleges.htm>.
- Piaget, J., & Inhelder, B. (1969). *The psychology of the child*. New York: Basic Books.
- Pollak, D. e. (2009). *Neurodiversity in higher education: Positive responses to specific learning differences*. Hoboken, NJ: Wiley.
- Preece, J. (2001). Sociability and usability in online communities: Determining and measuring success. *Behaviour & Information Technology*, 20, 347-356.
- Prince-Hughes, D. (2002). *Aquamarine blue 5: Personal stories of college students with autism*. Athens: Swallow Press/Ohio University Press.
- Prince-Hughes, D. (2003). Understanding college students with autism. *Chronicle of Higher Education*.

- Rimland, B. (1964). *Infantile autism; the syndrome and its implications for a neural theory of behavior*. New York: Appleton-Century-Crofts.
- Robey, D., Khoo, H. M., & Powers, C. (2004). Situated learning in cross-functional virtual teams. In J. M. Dubinsky (Ed.), *Teaching technical communication* (pp. 541-568). Boston, MA: St. Martin's.
- Robison, J. E. (2007). *Look me in the eye: My life with Asperger's*. North Sydney, N.S.W New York: Bantam [Crown Publishers : Random House].
- Robledo, S. J., & Ham-Kucharski, D. (2005). *The autism book: Answers to your most pressing questions*. New York: Penguin.
- Ross, J. (2009). A new frontier of online learning. *Star Tribune*.
- Roth, I. (2007). Imagination and the awareness of self in autistic spectrum poets. In M. Osteen (Ed.), *Autism and representation* (pp. 145-165). New York: Routledge.
- Rubens, P., & Southard, S. (2005). Students' technological difficulties in using Web-based learning environments. In K. C. Cook & K. Grant-Davie (Eds.), *Online education: Global questions, local answers* (pp. 193-206). Amityville, NY: Baywood Publishing Company.
- Saidi, N. (2008). 'Naughty auties' battle autism with virtual interaction. CNN.com, 2008 (March 28).
- Sanders, R. S. (2004). *On my own terms: My journey with Asperger's*. Murfreesboro, Tenn.: Armstrong Valley Pub. Co.
- Schiappa, E. (2003). *Defining reality: Definitions and the politics of meaning*. Carbondale: Southern Illinois University Press.
- Schreibman, L. E. (2005). *The science and fiction of autism*. Cambridge, Mass: Harvard University Press.
- Schwarz, P. (2004). Building alliances: Community identity and the role of allies in autistic self-advocacy. In S. M. Shore (Ed.), *Ask and tell: Self-advocacy and disclosure for people on the autism spectrum* (pp. p. 143-176). Shawnee Mission, KS: Autism Asperger Pub.
- Seale, J. (2006). *E-learning and disability in higher education: Accessibility research and practice*. Abingdon, Oxon: Routledge.
- Selfe, C. L. (1999). *Technology and literacy in the twenty-first century: The importance of paying attention*. Carbondale, IL: Southern Illinois University Press.
- Selfe, C. L. (2004). Toward new media texts: Taking up the challenges of visual literacy. In A. F. Wysocki, J. Johnson-Eillola, C. L. Selfe, & G. Sirc (Eds.), *Writing new media: Theory and applications for expanding the teaching of composition* (pp. 67-110). Logan, UT: Utah State University Press.
- Selfe, C. L., & Hawisher, G. E. (2004). A historical look at electronic literacy: Implications for the education of technical communicators. In J. M. Dubinsky

- (Ed.), *Teaching technical communication* (pp. 505-540). Boston, MA: St. Martin's.
- Selfe, D. (2004). Collaborating with students. In T. Bridgeford, C. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (p. 197). Logan, Utah: Utah State University Press.
- Selfe, D. (2004). Learning with students: Technology autobiographies in the classroom. In T. Bridgeford, K. S. Kitalong, & D. Selfe (Eds.), *Innovative approaches to teaching technical communication* (pp. 197-218). Logan, UT: Utah State University Press.
- Sellin, B. (1995). *I don't want to be inside me anymore: Messages from an autistic mind*. New York: BasicBooks.
- Sherman, D. A. (2007). *Autism: Asserting your child's right to a special education*. Oxford Churchill.
- Shore, S. M. (2003). *Beyond the wall: Personal experiences with autism and Asperger syndrome* (2nd ed.). Shawnee Mission, Kan.: Autism Asperger Pub.
- Shore, S. M. (2004). *Ask and tell: Self-advocacy and disclosure for people on the autism spectrum*. Shawnee Mission, KS: Autism Asperger Pub.
- Sia, C.-L., Tan, B. C. Y., & Wei, K.-K. (2002). Group polarization and computer-mediated communication: Effects of communication cues, social presence, and anonymity. *Information Systems Research*, 13(1), 70-90.
- Sohn, D., & Leckenby, J. D. (2007). A structural solution to communication dilemmas in a virtual community. *Journal of Communication*, 57(3), 435.
- Solomon, A. (2008). Autism rights movement, The. *New York Magazine*.
- Sorti, S. (2006). *Cognitive neuropsychological assessment of Christopher S. Wyatt*.
- Spears, R., & Lea, M. (1992). Social influence and the influence of the social in computer-mediated communication. In M. Lea (Ed.), *Contexts of computer-mediated communication* (pp. 30-65). New York: Harvester/Wheatsheaf.
- Sproull, L., & Kiesler, S. (1986). Reducing social context clues: Electronic mail in organizational communication. *Management Science*, 32, 1492-1512.
- Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication & Information*, 2(1), 23-49.
- Symonds, H. (2009). Teaching, learning and assessment: 'It's not like you think.' In Pollak (Ed.), *Neurodiversity in higher education: positive responses to specific learning differences* (pp. 243-268). Hoboken, NJ: Wiley.
- Szasz, T. S. (2003). *Pharmacracy: Medicine and politics in America* (1st Syracuse University Press ed.). Syracuse: Syracuse University Press.
- Tammet, D. (2007). *Born on a blue day: The gift of an extraordinary mind* (1st Free Press ed.). New York: Free Press.

- Tanis, M., & Postmes, T. (2003). Social cues and impression formation in CMC. *Journal of Communication, December*, 676-846.
- Tantam, D. (1991). Asperger syndrome in adulthood. In U. Frith (Ed.), *Autism and Asperger syndrome* (pp. 147-183). Cambridge: Cambridge University Press.
- Tate, G., Rupiper, A., & Schick, K. (2001). *A guide to composition pedagogies*. New York: Oxford University Press.
- Taylor, T. (1997). The persistence of difference in networked classrooms: Non-negotiable difference and the African-American student body. *Computers and Composition, 14*, 169-178.
- Tobin, L. (2001). Process pedagogy. In G. Tate, A. Rupiper, & K. Schick (Eds.), *A guide to composition pedagogies* (pp. 1-18). New York: Oxford University Press.
- Tollett, J., Williams, R., & Rohr, D. (2002). *Robin Williams' Web design workshop*. Berkeley, Calif: Peachpit Press.
- Trimbur, J. (2003). Consensus and difference in collaborative learning. In V. Villanueva (Ed.), *Cross-talk in comp theory: A reader* (2nd ed., pp. 461-478). Urbana, Ill.: National Council of Teachers of English.
- Tu, C. H. (2002). The measurement of social presence in an online learning environment. *International Journal on E-Learning, April-May*, 34-45.
- Uddin, L. Q., Iacoboni, M., Lange, C., & Keeman, J. P. (2007). The self and social cognition: The role of cortical midline structures and mirror neurons. *Trends in Cognitive Sciences, 11*(4), 153-157.
- Villanueva, V. (2003). *Cross-talk in comp theory: A reader* (2nd ed.). Urbana, Ill.: National Council of Teachers of English.
- Wahlstrom, B. J., & Clemens, L. S. (2005). Extreme pedagogies: When technical communication vaults institutional barriers. In K. C. Cook & K. Grant-Davie (Eds.), *Online education: Global questions, local answers* (pp. 301-318). Amityville, NY: Baywood Publishing Company.
- Wallis, C. (2009). A powerful identity, a vanishing diagnosis. *The New York Times*.
- Walsh, J. (2007). A school where autistic kids aren't alone. *Minneapolis Star Tribune*, 10 Dec 2007).
- Walther, J. B., & Burgoon, J. K. (1992). Relational communication in computer-mediated interaction. *Human Communication Research, 19*(1), 50-88.
- Walther, J. B., Loh, T., & Granka, L. (2005). Let me count the ways: The interchange of verbal and nonverbal cues in computer-mediated and face-to-face affinity. *Journal of Language and Social Psychology, 24*(1), 36-65.
- Weinstein, C. S. (1979). The physical environment of the school: A review of the research. *Review of Educational Research, 49*(4), 577-610.

- Wellcome Trust. (2008). People with autism make more rational decisions, study shows. Retrieved 15 Oct, 2008, from www.sciencedaily.com/releases/2008/10/081015110228.htm.
- Willey, L. H. (1999). *Pretending to be normal: Living with Asperger's syndrome*. London ; Philadelphia: Jessica Kingsley.
- Williams, D. (1992). *Nobody nowhere: The extraordinary autobiography of an autistic*. New York: Times Books.
- Wiltshire, S. (2009). About Stephen. Retrieved 10 Nov, 2009, from www.stephenwiltshire.co.uk.
- Wing, L. (1981). Asperger's syndrome: A clinical account. *Psychological Medicine*, 11, 115-130.
- Wing, L. (1991). The relationship between Asperger's syndrome and Kanner's autism. In U. Frith (Ed.), *Autism and Asperger syndrome* (pp. 93-121). Cambridge: Cambridge University Press.
- Wolf, L. E., Brown, J. T., Bork, G. R. K., Volkmar, F. R., & Klin, A. (2009). *Students with Asperger syndrome: A guide for college personnel*. Shawnee Mission, Kan: Autism Asperger Pub. Co.
- Wright, R. (2005). Researching Internet-based populations: Advantages and disadvantages of online survey research. *Journal of Computer-Mediated Communication*, 10(3), Article 11.
- Wysocki, A. F., Johnson-Eillola, J., Selfe, C. L., & Sirc, G. (2004). *Writing new media: Theory and applications for expanding the teaching of composition*. Logan: Utah State University Press.
- Wysocki, A. F. (2004). Opening new media to writing: Openings and justifications. In A. F. Wysocki, J. Johnson-Eillola, C. L. Selfe, & G. Sirc (Eds.), *Writing new media: Theory and applications for expanding the teaching of composition* (pp. 1-42). Logan, UT: Utah State University Press.
- Yapko, D. (2003). *Understanding autism spectrum disorders*. London: Jessica Kingsley Publishers.

APPENDIX A: COMPLETE SURVEY

The survey data collected for this research project used a single questionnaire, administered during November and December of 2009.

Demographic Questions

1. What do you consider your gender?
 - a. Male
 - b. Female
 - c. Other

2. What is your age in years?
 - a. 18 – 24
 - b. 25 – 34
 - c. 35 – 44
 - d. 45 or older

3. From the following list, when were you first officially evaluated as having an autistic spectrum disorder? (High-Functioning Autism, Asperger's, PDD-NOS, etc.)
 - a. Before age 8
 - b. On or between ages 8 through 12
 - c. On or between ages 13 to 18
 - d. On or between ages 19 to 25
 - e. After age 25
 - f. Do not know / recall

4. If you recall, was the evaluation performed by:
 - a. A private-practice psychologist / psychiatrist
 - b. A specialist employed by or contracted by a school system
 - c. Do not know / recall

5. Did you receive any special assistance or accommodations? (Mark all that apply)
 - a. Before grade 4 ("early elementary")
 - b. In or between grades 4 through 6 ("upper elementary")
 - c. In grades 7 or 8 ("middle school")
 - d. In grades 9 through 12 ("high school")
 - e. During college / university studies
 - f. Do not know / recall

Questions about Technology Use

1. Do you ever have challenges using a computer related to a medical condition, including any problems related to an autism spectrum disorder?

- a. Yes
- b. No

Could you explain the challenges?

2. Does using a computer ever cause you discomfort or stress?

- a. Yes
- b. No

Is the discomfort related to an autism spectrum disorder?

- a. Yes
- b. No

What aspects of the computer cause discomfort?

Are there any screen elements or colors that cause stress? Please explain what these are and how they affect you.

3. Do you participate in any online communities?

- a. Yes
- b. No

4. Do you belong or have you belonged to any of the following?

- a. FaceBook
- b. MySpace
- c. Twitter
- d. LinkedIn
- e. Yahoo Groups
- f. LiveJournal

5. Do you belong to any online communities dedicated to members with autism?

- a. Yes
- b. No

6. Do you have a preference for asynchronous (e-mail, blog, threaded discussion) or synchronous (real-time chat) interactions?

7. Do animations, graphics, and other visual elements affect your ability to use an online community? If so, in what way?

8. Have you experienced any misunderstandings online that you might attribute to the design or moderation of the community?

Were there positive or negative experiences you attribute to your autism spectrum disorder? If so, in what way?

9. Do you play online, interactive games?

- a. Yes
- b. No

Questions about Writing

1. Do you use a computer to compose academic papers?
 - a. Yes
 - b. No

2. Which software do you use? (Select the one you use most often.)
 - a. Microsoft Word
 - b. OpenOffice
 - c. Apple Pages
 - d. WordPerfect
 - e. Other

What do you like about the software?
 What do you dislike?

3. Does someone review your papers for you?
 - a. Yes
 - b. No

Are revisions done on computer or paper?

 - a. Computer
 - b. Paper

If on computer, do you use the “reviewing” tools of software?

 - a. Yes
 - b. No

4. Do you do any creative writing on your own time?
 - a. Yes
 - b. No

What type of writing?
 Do you ever share this writing, online or in print?

 - a. Yes
 - b. No

Do you receive feedback from others?

 - a. Yes
 - b. No

5. Have you ever contributed to an online Wikipedia or other collaborative project?
 - a. Yes
 - b. No

What was the project?
 Did others edit your contribution?

 - a. Yes
 - b. No

Have you edited existing online works?

 - a. Yes
 - b. No

6. Do you now or have you ever maintained a blog?
- Yes
 - No
- Did others comment on your posts?
- Yes
 - No
7. Have you ever posted to a media sharing site, such as YouTube or Flickr?
- Yes
 - No
- Did others comment on your posts?
- Yes
 - No
8. If you have maintained a blog or shared media online, did you respond to comments?
- Yes
 - No

For University Students

Complete if you are or have been a university or college student.

- When did you first attend university or college (year)?
- What is your current standing at the university or highest degree obtained?
 - Freshman
 - Sophomore
 - Junior
 - Senior/Bachelor's
 - Master's
 - Doctorate
- Did you enroll directly or did you attend another institution first?
 - Directly enrolled from high school
 - Enrolled after some time (year or more) out of school
 - Attended a community / junior college
 - Attended another university and transferred
- When was the university informed of your ASD status?
 - Before my first day of classes
 - During my first semester enrolled
 - During my first academic year at the university
 - After my first academic year on campus
 - I did not notify the university officially
- What services and/or accommodations do you receive at the university?
 - None requested or used
 - Informative letters or meetings with instructors
 - Training sessions on skills such as time management and organization

- d. An ASD support group or student organization
 - f. In-class accommodations (use of a computer, recording device, or note taker)
 - g. Additional time on tests or assignments
 - h. Interpretation / explanation of assignments and guidelines
 - i. Other services not listed
6. Have you disclosed your condition to any instructors?
- a. How was this information disclosed?
 - b. Have you met individually with the instructor?
 - c. Was the disclosure prompted by any difficulties with the course material or course environment?
 - d. Do you believe the instructor appreciated your situation?
7. Have you disclosed your condition to other students?
- a. How was this information disclosed?
 - b. Do you feel these students have been supportive?
8. Have you ever taken on all-online course?
- a. Yes
 - b. No
9. Have you taken a course that is primarily online, but with some classroom meetings? (Also known as a “hybrid” course.)
- a. Yes
 - b. No
10. Have you taken a course that used online resources to supplement traditional classroom sessions?
- a. Yes
 - b. No
- Can you describe which materials were online?
11. Did any course use the following course management systems? (Mark all that apply)
- a. Blackboard
 - b. WebCT / WebVista
 - c. Moodle
 - d. Angel
 - e. Sakai
 - f. Other (name)
- What did you like about the online system(s), both features and visual design?
What did you dislike about the system?
12. Which of the following is your preference?
- a. An all-online course
 - b. A class that is primarily online, but with some classroom meetings
 - c. A classroom course with materials online and some online participation
 - d. A classroom course with materials posted online, but no online participation
 - e. A traditional, classroom-based course

13. Have you ever withdrawn from or received an incomplete in any course?
 - a. Yes
 - b. No

14. Have you ever withdrawn from a class that was all online or primarily online?
 - a. Yes
 - b. No

Answer only if you have enrolled in an online course, whether or not you completed the course.

15. The online course(s) were
 - a. More effective than traditional instruction
 - b. As effective as traditional instruction
 - c. Less effective than traditional instruction

16. The instructor was
 - a. More responsive than in a traditional course
 - b. As responsive as in a traditional course
 - c. Less responsive than in a traditional course

17. I interacted with other students online
 - a. At least once a week
 - b. Less than once a week
 - c. Never directly interacted

18. My interactions with students online were
 - a. Easier than in a traditional classroom
 - b. The same difficulty as in a traditional classroom
 - c. More difficult than in a traditional classroom
 - d. I did not interact with other students

19. Interactions were primarily via
 - a. E-mail
 - b. Discussion forums
 - c. Live “chat” online
 - d. Equally split between forums and live chats

20. For an online course, what elements of the course would you change and why?
Are the changes related to autism? If so, in what way?

21. Have your experiences changed your preference for online or traditional courses?
Are you more or less interested in online courses?

APPENDIX B: DIAGNOSTIC CRITERIA FOR AUTISM

DSM-IV

Autism Spectrum is diagnostic criteria 299.00 in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision, 2000, American Psychiatric Association. The criteria are:

- (A) A total of six (or more) items from (1), (2), and (3), with at least two from (1), and one each from (2) and (3)
- (1) qualitative impairment in social interaction, as manifested by at least two of the following:
- a. marked impairments in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body posture, and gestures to regulate social interaction
 - b. failure to develop peer relationships appropriate to developmental level
 - c. a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people)
 - d. lack of social or emotional reciprocity (note: in the description, it gives the following as examples: not actively participating in simple social play or games, preferring solitary activities, or involving others in activities only as tools or “mechanical” aids)
- (2) qualitative impairments in communication as manifested by at least one of the following:
- a. delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime)
 - b. in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
 - c. stereotyped and repetitive use of language or idiosyncratic language
 - d. lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level
- (3) restricted repetitive and stereotyped patterns of behavior, interests and activities, as manifested by at least two of the following:
- a. encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
 - b. apparently inflexible adherence to specific, nonfunctional routines or rituals
 - c. stereotyped and repetitive motor mannerisms (e.g hand or finger flapping or twisting, or complex whole-body movements)
 - d. persistent preoccupation with parts of objects

(B) Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.

(C) The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder

ICD-10

The International Statistical Classification of Diseases and Related Health Problems (ICD, Tenth Edition) of the World Health Organization (WHO).

[<http://www.who.int/classifications/apps/icd/icd10online/> accessed 6 December 2006]

F84 Pervasive developmental disorders

A group of disorders characterized by qualitative abnormalities in reciprocal social interactions and in patterns of communication, and by a restricted, stereotyped, repetitive repertoire of interests and activities. These qualitative abnormalities are a pervasive feature of the individual's functioning in all situations.

Use additional code, if desired, to identify any associated medical condition and mental retardation.

F84.0 Childhood autism

A type of pervasive developmental disorder that is defined by: (a) the presence of abnormal or impaired development that is manifest before the age of three years, and (b) the characteristic type of abnormal functioning in all the three areas of psychopathology: reciprocal social interaction, communication, and restricted, stereotyped, repetitive behaviour. In addition to these specific diagnostic features, a range of other nonspecific problems are common, such as phobias, sleeping and eating disturbances, temper tantrums, and (self-directed) aggression.

Autistic disorder

Infantile:

- autism
- psychosis

Kanner's syndrome

Excludes: autistic psychopathy (F84.5)

F84.1 Atypical autism

A type of pervasive developmental disorder that differs from childhood autism either in age of onset or in failing to fulfill all three sets of diagnostic criteria. This subcategory should be used when there is abnormal and impaired development that is present only after age three years, and a lack of sufficient demonstrable abnormalities in one or two of the three areas of psychopathology required for the diagnosis of autism (namely, reciprocal social interactions, communication, and restricted, stereotyped, repetitive behaviour) in spite of characteristic abnormalities in the other area(s). Atypical autism arises most often in profoundly retarded

individuals and in individuals with a severe specific developmental disorder of receptive language.

Atypical childhood psychosis

Mental retardation with autistic features

Use additional code (F70-F79), if desired, to identify mental retardation.

F84.2 Rett's syndrome

A condition, so far found only in girls, in which apparently normal early development is followed by partial or complete loss of speech and of skills in locomotion and use of hands, together with deceleration in head growth, usually with an onset between seven and 24 months of age. Loss of purposive hand movements, hand-wringing stereotypies, and hyperventilation are characteristic. Social and play development are arrested but social interest tends to be maintained. Trunk ataxia and apraxia start to develop by age four years and choreoathetoid movements frequently follow. Severe mental retardation almost invariably results.

F84.3 Other childhood disintegrative disorder

A type of pervasive developmental disorder that is defined by a period of entirely normal development before the onset of the disorder, followed by a definite loss of previously acquired skills in several areas of development over the course of a few months. Typically, this is accompanied by a general loss of interest in the environment, by stereotyped, repetitive motor mannerisms, and by autistic-like abnormalities in social interaction and communication. In some cases the disorder can be shown to be due to some associated encephalopathy but the diagnosis should be made on the behavioural features.

Dementia infantilis

Disintegrative psychosis

Heller's syndrome

Symbiotic psychosis

Use additional code, if desired, to identify any associated neurological condition.

Excludes: Rett's syndrome (F84.2)

F84.4 Overactive disorder associated with mental retardation and stereotyped movements

An ill-defined disorder of uncertain nosological validity. The category is designed to include a group of children with severe mental retardation (IQ below 35) who show major problems in hyperactivity and in attention, as well as stereotyped behaviours. They tend not to benefit from stimulant drugs (unlike those with an IQ in the normal range) and may exhibit a severe dysphoric reaction (sometimes with psychomotor retardation) when given stimulants. In adolescence, the overactivity tends to be replaced by underactivity (a pattern that is not usual in hyperkinetic children with normal intelligence). This syndrome is also often associated with a variety of developmental delays, either specific or global. The extent to which the behavioural pattern is a function of low IQ or of organic brain damage is not known.

F84.5 Asperger's syndrome

A disorder of uncertain nosological validity, characterized by the same type of qualitative abnormalities of reciprocal social interaction that typify autism, together with a restricted, stereotyped, repetitive repertoire of interests and activities. It differs from autism primarily in the fact that there is no general delay or retardation in language or in cognitive development. This disorder is often associated with marked clumsiness. There is a strong tendency for the abnormalities to persist into adolescence and adult life. Psychotic episodes occasionally occur in early adult life.

Autistic psychopathy

Schizoid disorder of childhood

F84.8 Other pervasive developmental disorders

F84.9 Pervasive developmental disorder, unspecified (PDD-NOS, not otherwise specified)

APPENDIX C: AUTISM IN FEDERAL LAWS AND REGULATIONS

Autism in IDEA 2004

IDEA 2004

Public Law 108-446
108th Congress

An Act

To reauthorize the Individuals with Disabilities Education Act, and for other purposes.
<<NOTE: Dec. 3, 2004 - [H.R. 1350]>>

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, <<NOTE: Individuals with Disabilities Education Improvement Act of 2004. 20 USC 1400 note.>>

(602)(a)(3) Child with a disability.—

- (A) In general.—The term ‘child with a disability’ means a child—
- (i) with mental retardation, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (referred to in this title as ‘emotional disturbance’), orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities; and
 - (ii) who, by reason thereof, needs special education and related services.

(662)(b)(2)

- (G) Developing and improving programs to train special education teachers to develop an expertise in autism spectrum disorders.

SEC. 663. Technical Assistance, Demonstration Projects, Dissemination of Information, and Implementation of Scientifically Based Research.

- (a) <<NOTE: Grants. Contracts. 20 USC 1463.>> In General.—The Secretary shall make competitive grants to, or enter into contracts or cooperative agreements with, eligible entities to provide technical assistance, support model demonstration projects, disseminate useful information, and implement activities that are supported by scientifically based research.
- (c) Authorized Activities.—Activities that may be carried out under this section include activities to improve services provided under this title,

including the practices of professionals and others involved in providing such services to children with disabilities, that promote academic achievement and improve results for children with disabilities through—

(8) focusing on the needs and issues that are specific to a population of children with disabilities, such as providing single-State and multi-State technical assistance and in-service training—

(D) to schools and personnel providing special education and related services for children with autism spectrum disorders;