Effects of Alternate Format In-service Delivery on Teacher Knowledge Base and Problem-solving Related to Autism & Adaptations: What Teachers Need to Know

by

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ABSTRACT

This study's purpose was to explore effectiveness of alternate format in-service delivery for what teachers needed to know to effectively teach their students with Autism Spectrum Disorder/High Functioning Autism/Asperger Syndrome (ASD/HFA/AS) in the general education setting. The study's research questions included: Did participants learn information they needed as well using asynchronous online in-service format models as when in a traditional face-to-face consultative approach? Did the use of a broad asynchronous online discussion approach to collaboration result in effective student problem-solving for the participants? Did participant attitudes change toward online instruction as a means of collaboration as a result of engaging in alternate in-service delivery models? A fifteen-hour staff development course was developed and taught to 24 teacher/educators in a suburban southwest K-12 public school district. The course content was organized around topics derived from an earlier data collection and included what teachers said they needed to know, from whom, and how. A free, simple asynchronous online environment was created for the course and online participation for learning and collaboration activities was requested of two participant groups, hybrid or online. Quantitative data was collected from Pre-/Post-Tests and survey. Qualitative data was collected from weekly collaborative problem-solving reflections. Results indicated that educators improved knowledge base in ASD/HFA/AS characteristics and adaptations and found collaborative online problem-solving about students effective and personally satisfactory. Results for online participants during the alternate format delivery sessions of the

course were stronger than hybrid format although both appeared to profit from the use of technology. All participants changed their view to positively value asynchronous online formats for learning and collaborating with other teachers to find out what they needed to know to implement in the classroom in efficient and economical ways.

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Chapter 1

INTRODUCTION

Many teachers find students with autism spectrum disorders included in their classrooms – one has only to look to the media recently for the many reports of the increased incidence of autism spectrum disorder (ASD) in children. Improving outcomes for these children related to academic achievement and social adjustment in the classroom depends on informed instructional practices specific to the disorder and to the daily activities of school. However, many teachers do not know enough about students with autism spectrum disorder/high functioning autism/Asperger Syndrome (ASD/HFA/AS) nor about research-based interventions that address the core deficits of the disorder.

A detailed investigation of strategies to improve teacher knowledge base regarding ASD/HFA/AS as well as an investigation of teacher perceptions for what is helpful to problem-solve for the students in their classrooms may increase the overall school outcomes in academics, communication and social/social-emotional areas for students with autism spectrum disorders.

This dissertation is a report of a project to find strategies for teachers to increase their knowledge base and improve their instructional practices for students with ASD/HFA/AS. The study was based primarily on an earlier data collection in a school district about what teachers need to know to work with and improve performance of students with ASD/HFA/AS educated in general education classrooms. From teacher reports of what they needed to know, the study incorporated elements that teachers said would be helpful in the way of

training, types of training, what their district could do related to training, and who and what kind of training.

This study collected specific information about what educator participants learned in an in-service course provided by their district and about their views on the format of the in-service. Findings from this study provide information about suitable resources for teachers to learn what they need to know, in a timely and convenient fashion, provided by available experts in their immediate environment, and practical teacher supports that can be valuable for problem-solving about and teaching students with ASD/HFA/AS.

This first chapter of the dissertation presents the background of the study, describes its significance, and presents an overview of the methodology used. The chapter concludes by noting the delimitations of the study and defining key terms used.

Background of the Study

Participation in general education environments is foundational to special education programming for students with disabilities. Students categorized as ASD and particularly those with higher functioning are routinely members of general education classrooms (Yell, Katsiyannis, Drasgow, & Herbst, 2003). For students with ASD/HFA/AS, the learning and interaction opportunities with typical peers may be very important to skill acquisition, achievement in school, and satisfactory personal lives (Renzaglia, Karvonen, Drasgow, & Stoxen, 2003). Students with autism spectrum disorder likely need at least some measure of specialized support or accommodation for deficit areas that interfere with

learning. For teachers, however, successful educational practices are just becoming known (Renzaglia, et al., 2003) or may be impossible for teachers to access or difficult to implement (Simpson, 2003; National Research Council, 2001).

The latest reauthorization of the Individuals with Disabilities Educational Improvement Act of 2004 (IDEA 2004) requires Individual Education Program (IEP) teams of teachers and parents consider appropriate services and supports to not only the students, but also to the personnel like teachers who work with them. Knowledge of and use of appropriate research-based supports are critical factors in providing appropriate educational services to students with ASD/HFA/AS. Lack of knowledge about ASD/HFA/AS and lack of appropriate strategies with students labeled with autism presents a significant problem for school staff. Teachers are well-meaning and accepting of students with ASD/HFA/AS but may be daunted by the task of teaching such students effectively (McCoy, Gehrke & Bruening, 2009). Teachers need to appear confident and competent for parents of their students. Teachers need and want training to assist their students with ASD and HFA/AS to be successful in general education classrooms.

Information on teaching, supporting and adapting for students with disabilities in the general education classroom exposes the conditions in which students with ASD/HFA/AS go to class - with hardly any help (Iovannone, Dunlap, Huber, & Kincaid, 2003). Furthermore, appropriate practices and interventions for such students are not yet agreed or known to teachers (Stephens, 2005). Add the governmental expectations, such as those found in the No Child

Left Behind Act (2001), and teachers can find the imposed requirements for participation and achievement of students with disabilities, no different than other students in classrooms, beyond their skills.

Challenges faced when educating students with ASD/HFA/AS include:

- Need for a body of knowledge related to ASD characteristics that impact learning in inclusive settings, e.g. academic, social, sensory, peer interactions (Aspy and Grossman, 2007; Dunlap, 1999; Iovannone, et al., 2003; Renzaglia, et al., 2003; Scheuermann, Webber, Boutot, & Goodwin 2003; Simpson, 2003).

- Need to understand the roles and contributions of support services, e.g. Occupational Therapy, Speech Therapy, School Counseling, community service agency resources, and parents (National Research Council, 2001; Scheuermann, et al., 2003; Simpson, 2003; Lamar-Dukes & Dukes, 2005; Peck & Scarpati, 2007; Lee-Tarver, 2006; Myers, G. A., & Whelan, n.d.; Klinger & Vaughn, 2002).

- Need to develop a strong knowledge base related to special education practices, e.g., IEPs, for teachers regarding autism (Billingsley, 2004; Billingsley, et al., 2004; Busch, Pederson, Espin & Weissenburger, 2001; Gehrke & Murri, 2006; Kilgore & Griffin, 1998; Mastropieri, 2001; Whitaker, 2000, 2003).

- Need to provide training in addressing the effectiveness of educational practices, e.g., collaboration, inservice education, responsibilities (Adreon & Stella, 2001; National Research Council, 2001; Renzaglia, et al., 2003; Simpson, 2003; Wagner, 2007; Yell, et al., 2003).

- Need to develop a teacher education delivery system that provides timely, specific and easily accessible interventions (Knobel & Lankshear, 2009; Caverly & Ward, 2008; Chen & Wang, 2009; Hurt, 2008; McCoy, et al., 2009).

Problem statement

Overall, more educational and collaboration opportunities are needed by general and special education teachers to appropriately serve students with

ASD/HFA/AS in general education classrooms. The distinctive characteristics of individual students mean that general or broad-spectrum in-service about teaching approaches for those with ASD/HFA/AS will not satisfactorily address student or teacher needs for supportive intervention. Tag on the fact that disagreements about appropriate and practical approaches to take in the classroom, lack of resources in schools, and time and place limitations for teachers to work together regarding their shared students exist. Taken as a whole, more complex exploration of training factors related to the context of supporting students with ASD and HFA/AS in general education classrooms is necessary.

The purpose of the research was to investigate the effectiveness of a format delivery for knowledge about ASD/HFA/AS for teachers and a collaboration model between general education teachers and special education support staff who provide services to students with ASD and HFA/AS in general education settings.

Context of the Study

Based on the literature and in a prior study (McCoy, et.al., 2009), a school district's teachers indicated critical elements of knowledge base on characteristics of ASD, on adaptations for ASD deficiency areas, about the student's Individual Education Program (IEP) for improving performance in general education, about collaboration, and noted their preferred in-service with hands-on training and familiar/local trainer specialists. See Appendix A for information from 2008 data collection.

This study continues the investigation of the question: "What do teachers need to know to provide services and improve performance of students with ASD/HFA/AS in inclusion settings?" and took the direct information from teachers, both special and general education, to develop a model of learning that met teacher-stated preferences that was also research-based. The in-service was written and taught by the researcher to district teachers. See Appendix B for the in-service course description and relationship to the study. This study measured whether the teacher-driven in-service increased cognitive growth and looked at the perceptions of teachers utilizing asynchronous online discussion as a collaboration technique for problem solving and building a knowledge base related to the needs of students with ASD and HFA/AS who are educated in the general education setting.

Professional Significance

Special and general education teachers have a need and desire for immediate response to addressing the needs of students with ASD/HFA/AS. Shortages of teacher opportunities to learn and meet student needs exist in terms of time, personnel, and the present state of the economy that preclude extensive and expensive teacher professional development.

Many in the real-life settings of school could profit in terms of time, money and effort with more investigation of teacher-proposed methods for their learning, incorporated in simple and available teacher time and settings, and in ways that would be practical for other teachers, schools and districts – anyone interested in the student with ASD/HFA/AS - to implement. When teacher

knowledge increases in ways that teachers are satisfied to participate, better and research-based teacher learning and problem-solving for their students occurs. Ultimately, teachers make the difference in good academic, communication and behavioral achievements of their students with autism included in their classrooms and served by multiple staff at the school.

Much literature exists about collaboration in school settings and a fair amount of very recent literature exists about learning in discussion groups that are online. However, the current literature focuses often on instructors or the setting for the online teaching and learning is in a college or university where such methods of instruction and discussion are more available than in the public schools. Benefits and detriments for online participant learning and collaboration exist, but are unknown specifically for those working with school-age students with ASD/HFA/AS. The efficacy of online, hybrid and face-to-face collaboration for teacher learning and in-service delivery is not well-studied specifically as related to teachers themselves who have students in their classrooms with ASD/HFA/AS. Schools typically provide teachers with traditional models of in-service delivery and may not be able or willing to look at non-traditional methods of teacher learning and collaborating. The time has come for alternative methods for teachers to get the quick information they need to teach their students on the autism spectrum. When students who come to their classrooms exhibit characteristic-specific difficulties, teachers need fast and efficient answers.

Recent research on online teaching and learning for educators supporting students in general education classrooms with ASD/HFA/AS was not found. No

one would stand to benefit more from online learning than teachers of students with ASD/HFA/AS who lack specific knowledge and the time, money or proximity to collaborate and problem solve with others about their students.

Overview of Methodology

The study used a mixed methods design and collected qualitative and quantitative data from a district professional development class on Autism and Adaptations – What Teachers Need to Know.

First, course materials were developed for use in the fifteen hour, five week in-service course. Related to content knowledge, five class session Power Points were created from research-based sources with each lesson containing the five components identified in the October 2008 data collection as what teachers needed to know to successfully teach students with ASD/HFA/AS in their classrooms. Each of the in-service class lessons delivered content across the five areas related to students with autism spectrum disorders, high functioning autism or Asperger Syndrome: characteristics, adaptations for communication/social-emotional & interaction deficits/sensory, information from the IEP, and collaboration strategies with special and general education teachers and paraprofessionals. Each lesson developed each topic of knowledge/content from simple to more complex.

Teaching scripts for standardization of lessons were written. Articles from scholarly journals were located for each of the course content topics. Pre- and post-tests were developed over the knowledge content presented in the course to

measure learning. A rubric for weekly teacher collaborative problem-solving reflections guided teachers and provided data that was analyzed.

The method is fully discussed as part of Chapter 3 of this dissertation. The methods in this study were designed to determine effective instructional in-service for the educational practices of special and general education teachers who are responsible for education of students considered at-risk or difficult due to autism spectrum disorder (ASD) and high functioning autism/Asperger Syndrome (HFA/AS).

Delimitations of the Study

This study has boundaries to acknowledge. Findings may not generalize to all settings in or outside public K-12 education. The nature of the District and its educational staff who participated in the study may be distinctive in terms of previous content knowledge on the topic if autism and adaptations, in preference for models of in-service, and not typical of other school settings. The size of the sample is limited in number of participants, the length of the in-service, and length of participant exposure to the content and delivery method of in-service, restricting the amount of both quantitative and qualitative data to be analyzed in this study. As a result, analysis of the data may miss actual participant meaning. Conversely, mixed methods approaches have been supported for collecting, analyzing and formalizing what happens in schools (Colardarci, Cobb, Minium & Clark, 2008) and for organizing and making sense of what happens in educational settings and with educators such as those in the District (Berg, 2007).

Definitions of Key Terms

Term: broad class to which it belongs (ways in which the term differs from others in its class), then one or two important distinguishing features

Autism spectrum disorder: a disturbance in psychological development in which use of language, reaction to stimuli, interpretation of the world, and the formation of relationships are not fully established and follow unusual patterns

High functioning autism or Asperger Syndrome: a neurological condition that makes it difficult for an individual to react to and communicate with other people; usually considered as part of the spectrum of autism disorders but less severe.

Supports: active help or assistance (actions that educators can take) to structure and facilitate student understanding; for students specifically, prompts that help the student understand what is expected in the classroom setting.

Collaboration: working together with one or more people in order to achieve a common end

Consultation: a discussion aimed at ascertaining opinions or reaching agreement; meeting with an expert in a particular field to obtain advice

Ning: an online platform (commercial and requires a subscriber fee) for "organizers, activists and influencers" to create social experiences that inspire action; created to allow many people coming together and connect around topics they are passionate about; has an educator section among others (i.e. health, politics) (Ning, 2010)

Moodle: an online or virtual learning environment (free to participants around the world); popular among educators as a tool for creating online dynamic web sites for their students; supports active construction of new knowledge through participant interaction.

Online: information or in-service (class session) available through a computer or computer network.

Hybrid: information or in-service (class session) available through a mixture of different methods; in-service that is delivered in both face-to-face and online formats

Face-to-face: information or in-service (class session) in the physical presence of instructor and other participants

Qualitative method: research that assesses quality using words and descriptions (as opposed to size or quantity); inductive analysis of patterns in data from participant responses; based on quality or character (Berg, 2007)

Quantitative method: research that includes counts and measures (as opposed to quality or character); deductive analysis of data from participant responses; based on size or quantity (Coladarci, Cobb, Minium & Clarke, 2008)

Problem-solving reflection: a brief written paper (by in-service participants each week); reflecting on challenges raised relative to particular students or issues; describing collaboration and problem solving with other study participants or instructor about a specific student or situation the participant wanted to address; including a strategy or idea for solving the challenge with the student or situation.

Wiki: a database of pages (written documents) that visitors may edit in real time; documents containing information are built by the additions and comments of those using the wiki

Looking ahead

Readers may expect to find chapters that follow which include review of the literature pertinent to this study, specific methodology of data collection and analysis, interpretation of the data, and summary recommendations.

Chapter 2

REVIEW OF THE LITERATURE

Students with Autism Spectrum Disorders (ASD) and High Functioning Autism/Asperger Syndrome (HFA/AS) in general education classrooms can be a challenge educationally, medically, and socially. Until quite recently, ASD and HFA/AS were low incidence disabilities and few children had the labels. The number of students who fall under the ASD umbrella continues to increase at an almost epidemic rate (Iovannone, et al., 2003). Increasingly, more and more such students are now served in general education classrooms where they are entitled to a free and appropriate public education (Safran, 2001; Safran & Safran, 2001). A surprisingly large number of students, specifically those categorized as High Functioning Autistic (HFA) or Asperger Syndrome disorder (AS) will be educated in inclusive classrooms with little or no special services provided (Iovannone, et al., 2003). Uncertainty and disagreements about best practices and interventions for such students have long delayed student progress in general education (Stephens, 2005). General and special educators may have issues with parents if undertrained in HFA/AS (Scheuermann, et al., 2003). This review discusses the characteristics and needs of students with HFA/AS related to providing services in the general education setting, as well as ideas about partners in the teacher learning and problem-solving process.

Parameters

The search for this literature review included ERIC, e-journals, Dissertation Abstracts International, and Education Full Text Articles seeking empirical studies in the area of Autism Spectrum Disorder, High Functioning Autism/Asperger Syndrome, needs of students with HFA/AS particular to general education settings, teaching students with autism, research-based and targeted interventions for students with HFA/AS, comprehensive programs for students with ASD, and collaboration partners for teachers as they learn about and problem-solve for their students. The review includes studies from 1999 forward. Research studies were limited to those that focused on the needs of teachers who provide services to meet the social and education requirements of students found on the autism spectrum in general education settings. The review did not include studies that were focused on nonverbal individuals or students with dual diagnosis of autism and mental retardation. The review focused on research that addressed strategies that could be used by teachers to build a strong knowledge base to inform their instructional practice.

Definitions of the Disorder

Understanding the spectrum of disorders in autism is essential for teachers who provide services to students classified as autistic (Volkmar, Paul, Klin, & Cohen, 2005). Autism is a disorder with three key features: communication difficulties, social difficulties, and repetitive or intensely focused interests that interfere with daily living and school (American Psychiatric Association, 2000). Autism is evident early in life and affects social interaction, the ability to

communicate ideas and feelings, imagination, and the establishment of relationships with others (National Research Council, 2001). As with many disability conditions, autism spectrum disorders are displayed in a continuum of difficulties from mild to comprehensive and severe, may occur in association with other disorders, and have life-long effects (National Research Council, 2001). In education, autism is a recent addition to eligible disabilities in the school years, recognized only since the Individuals with Disabilities Education Act (IDEA) of 1990 (Yell, et al., 2003). Under the latest federal law related to disabilities, IDEA 2004, autism is defined as **"**a developmental disability that significantly affects verbal and nonverbal communication and social interaction and that adversely affects performance in the educational environment" (National Dissemination Center for Children with Disabilities, 2010). Essential features of the disorder include "impairments in social relationships and verbal and nonverbal communication and by restrictive, repetitive patterns of behavior, interests, and activities" (Barnhill, 2001, p. 260). Appendix C presents characteristics commonly associated with core impairments of individuals with autism.

High Functioning Autism or Asperger Syndrome (HFA/AS) is one of the disorders identified on the autism spectrum. The original description of HFA/AS began about 1943 and evolved over the next fifty years so that today a broader range of individuals with the disorder are included (Aspy & Grossman, 2007). During the last decade, writers began focusing on HFA/AS as distinctive from autism (Adreon & Stella, 2001; Carrington & Graham, 1999; Barnhill, 2001).

Presenting characteristics of ASD/HFA/AS can vary due to co-morbidity with other disabilities or exceptionalities. Commonly occurring conditions associated with ASD/HFA/AS include obsessive-compulsive disorder, learning disabilities, giftedness, and depression. Students with ASD/HFA/AS exhibit a wide range of academic, social and communication skill levels. Some students may have unique skills or special abilities (Simpson, 2003). Teachers will often find variations in behaviors of students who are classified as ASD/HFA/AS. Although the students are labeled with ASD/HFA/AS, their instructional needs may be very different. No "typical" or prescribed treatment regimen fits all students.

Teaching, Supporting and Adapting in the General Education Classroom

Improving outcomes and quality of life for students labeled ASD/HFA/AS is thought dependent on participation with typical peers in general education environments. Inclusive instructional environments have been a foundation of special education (Renzaglia, et al., 2003). Students categorized as ASD/HFA/AS are commonly found in general education classrooms with expectations for services and adaptations in that environment (Yell, et al., 2003). Literature is beginning to emerge on what educational practices are needed for successful inclusion (Renzaglia, et al., 2003).

Important goals to address for students with ASD/HFA/AS go beyond language, social, and adaptive goals, and must include skill development additional to the standard curricula (National Research Council, 2001). However, significant resource limitations exist for families, schools, and communities in the

provision of the non-standard supports required by students with ASD/HFA/AS (Simpson, 2003) and considerable variations exist in what is available in a community or school (National Research Council, 2001). Additionally, the plentiful methods, treatments and lists of interventions may include those which have limited or unfounded effectiveness (Simpson, 2003). "Despite the proliferation of testimonials and anecdotal information for and against various approaches, interventions for autism have surprisingly sparse objective supportive records" (McCoy, 2011, p. 19-20) and popularized ideas, fads and misinformation multiply to confound those working with the students.

The diversity found in students with ASD/HFA/AS, paired with variables in resources and supports (both for students and their teachers), cause challenges to agreement between schools and families on what educational treatments are most effective, economical, and practical for schools to deliver.

Interventions and supports to students with ASD/HFA/AS should be targeted and specific to the characteristics of each individual. Teachers must identify explicit needs for a particular student prior to implementing an instructional approach (Aspy and Grossman, 2007; Dunlap, 2007). The unique characteristics exhibited by students and lack of many basic functional and learning skills may mean the teacher must be familiar with and utilize specialized instructional techniques (Scheuermann, et al., 2003). Teachers need to go beyond the resources for information that many parents utilize to support their child and the disability, such as the internet (Worcester, Nesman, Raffaele Mendez & Keller, 2008).

Teachers who understand students' specific characteristics must select research-and evidence-based practices when educating students with ASD/HFA/AS (Simpson, 2003). Core elements, such as "(a) individualized supports and services for students and families, (b) systematic instruction, (c) comprehensible/structured learning environments, (d) specialized curriculum content, (e) functional approach to problem behavior, and (f) family involvement" (Iovannone, et al., 2003, p. 150) that have empirical support should be included in any sound, comprehensive instructional program for students with ASD. Accommodations are often required for students with HFA/AS. Accommodations are changes made in instructional delivery for the student to access the grade level or same course content (Wagner, 2007). Examples of accommodations for students with HFA/AS may include visual supports like organizers or planners, organizational supports like printed schedules, and note taking assistance (Adreon & Stella, 2001).

Collaboration – The Role of Other Teachers as Teachers Improve Instructional Practices

To successfully teach students with ASD/HFA/AS, teachers must involve themselves with other teachers of the student and functionally approach problem behavior (Iovannone, et al., 2003). Effective research-based intervention plans require teacher collaboration and teaming.

Most commonly, collaboration is characterized as teachers working together with other teachers. Special educators have information from individual assessments, observation and specialized teaching of the student. General

educators have information on state-standards and curriculum, grade level expectations for appropriate personal and behavioral development, and have perspective and suggestions for reasonable and successful classroom adaptations. The assorted teachers of the student with ASD/HFA/AS have information and ideas about the levels of performance and where to start in teaching the general curriculum, in communication, and in behavioral skills. All teachers of the student with ASD/HFA/AS have important contributions to the collaboration team as they learn about and intervene with problem behaviors so that their students may be successful.

The mutual problem-solving of special and general educators in collaborative consultation can work to respond to learning needs of the diverse learner such as the student with ASD/HFA/AS for which all teachers of that student are responsible (Lamar-Dukes & Dukes, 2005). However, teachers come from many backgrounds, frameworks and training programs, all with unique perspectives on what works for students. For students that are shared by general and special education teachers, individual teacher responsibilities and "who does what" is quite varied or needs clarification (Lamar-Dukes & Dukes, 2005). Even though special and general education teachers find themselves in the same spaces with students, real dialogue, sharing and problem-solving for their students may be hard to enact without extra efforts. Teacher collaboration is important as a contributing factor in student success in all types of classes (Peck & Scarpati, 2007). For well-integrated and comprehensive teaching of students with

ASD/HFA/AS, all teachers of the student must be in a collaborative team endeavor (Lee-Tarver, 2006).

Pre-planning is a necessary component of successful collaboration (Lamar-Dukes & Dukes, 2005). In order to collaborate well, the process must be part of teacher routines (Myers, G. A., & Whelan, 1996). However, the disparities of teacher schedules and duties interfere with the time and place needed to consult, plan and problem-solve for shared students. Those associated with special education are painfully familiar with the often frequent and lengthy meetings that are required. Snippets of time during or between classes, email or reliance on non-work days are insufficient and impractical for professional collaboration about students and problem-solving for timely discussions and decisions about student needs or affecting the instructional course toward the next level of skills. Methods of communication such as email, voicemail and sharing written notes and reports have been mentioned in the literature as alternatives to the impediments of time and place needed to collaborate (Lamar-Dukes & Dukes, 2005). While alternative methods of communicating increases the number and quality of collaboration team member "availability", new, simple and time-efficient forms of teacher collaboration models are needed. In order to be good collaboration team members, teachers who have interpersonal skills such as adaptable and flexible will support new and better collaboration (Klinger & Vaughn, 2002).

Collaboration with Additional School Staff or Professional Providers

Working with others both in and outside the school enhances student outcomes, triggering another layer in collaboration. Many "experts" exist for working with and improving results for students with ASD/HFA/AS (Giangreco, Smith & Pinckney, 2006; Gibbons & Goins, 2008; Simpson, McKee, Teeter, & Beytien, 2007). Very often, for those working with students in general education, no teacher communication exists (Giangreco & Broer, 2005). Including all staff in collaboration team discussions, communication, and planning ensures alignment of efforts in the classroom on the appropriate activities and skills students need. No time or effort is wasted when quick and thorough communication is available or when problem-solving is needed.

Collaboration teams are likely better if they can include those other than just teachers of the student (Peck & Scarpati, 2007) or those hired by the school. Utilizing personnel from agencies that also work with the student or family can be overlooked as an important resource of information about what works for a particular individual with ASD/HFA/AS (Stahmer, 2007). So many resource limitations exist today. No one person or small teacher team can ignore the efficiency, effectiveness and economic savings in the provision of consistent services of increased intensity by outside providers (Stahmer, 2007). Outside consultants in ASD/HFA/AS can assist school personnel to understand the common behaviors or characteristics exhibited by the student with ASD/HFA/AS which, in school circles, is still little known or understood (Safran & Safran, 2001). These additional experts to teachers can proficiently discuss what to

expect, best approaches, and specific interventions for autism characteristics such as re-directing obsessive comments, preparation for transitions which may give rise to behavior, or how to incorporate or expand upon interests (Safran & Safran, 2001).

Collaboration, Teacher Learning and Problem-Solving

For smooth and effective teaming to support student welfare and success in the classroom, teacher cooperation, thorough communication, and a knowledge base is needed. Teaming and collaboration techniques are not achieved naturally by teachers. Business management may be a resource for teachers to learn collaboration skills and proficiency and perform at a higher level for their students (Peck & Scarpati, 2007). Models and methods for collaborative learning, discussing and teaming - in addition to the commonly used in school systems - should be considered as ways to legitimately overcome the barriers to successful team functioning. When teacher teams learn models and methods of successfully working together, staff agreements, decisions and more comprehensive action plans for the student with ASD/HFA/AS are enacted quickly and well.

In order for students with ASD/HFA/AS to be successful in the classroom, everyone working in collaboration is strategic, fundamental and vital. When all teachers associated with the student have good collaboration, redundancy, excessive workload and negative encounters vanish. Teachers who are on the same track together for a student learn from each other for their student. For the hard job of teaching, collaboration can be a warranty for smooth, easy, and effective work.

What to Do for Improving Teacher Learning and Problem-Solving: Online Learning and Collaboration Environment

Professional development for teachers of students with ASD/HFA/AS may profit from going beyond the traditional models. Interactive online participation and collaboration is available on a scale today that was unheard of in the 1990's and can bring together group members with common interests or tasks (Knobel & Lankshear, 2009). Computer supported collaborative learning has been studied in very recent years (Chen & Wang, 2008; Guzdial & Turns, 2000; Hewitt, 2005; Aalst & Chan, 2007; King, 2002). Though noted in the literature and growing, results for teaching and learning online are inconclusive (Hurt, 2008) and may not be the answer for all the problems teachers face (King, 2002) to learn more about effectively teaching their students. Use of technology for teacher learning is complex, dynamic, and can be related to how teachers see online supports help or hinder their goals (Zhao & Cziko, 2001).

However, evidence specifically exists that knowledge building can be fostered through asynchronous online discussion environments (Aalst & Chan, 2007) and use of technology for educator professional development (Schrum, Burbank, Engle, Chambers, & Glassett, 2005). Literature exists about the value of participatory social networking to collaboratively construct knowledge (Caverly & Ward, 2008; Resta & LaFerridere, 2007). Information can also be found on effective discussions and social interactions that characterize online discussion forums with findings that, even with the possibilities of off-task social

talk feared by some school districts, learning is supported and groups are guided to solving collaborative problems (Chen & Wang, 2009).

Interestingly, studies from long ago and statistical tests of mob wisdom – or, more professionally stated, the cumulative distribution function of the normal distribution – show that a group, consisting of individuals each with tiny bits of information, can contribute to make all in the group more specifically informed (Liotta, 2008). In other words, by way of the "wisdom of the crowd" (Liotta, 2008), participants discussing, writing and sharing combine knowledge and their perceptions to create understanding (Caverly & Ward, 2008).

Teacher collaboration appears infrequent in online asynchronous environments, such as that found for students in many university settings. Teacher or staff development for those working with students with ASD/HFA/AS that delivers instructional material in an asynchronous or collaborative way is also missing in the literature. Email is a frequent but single asynchronous method for instructional staff collaboration or discussion. However, email is not flexible or inclusive enough for purposes of the collaboration component of a professional development course. Specialists in instructional technology might recommend using Moodle.com as a discussion board appropriate for online collaboration. Directly from the website, see below:

> Moodle is an Open Source Course Management System (CMS), also known as a Learning Management System (LMS) or a Virtual Learning Environment (VLE). It has become very popular among educators around the world as a tool for creating online dynamic web sites for their students.
>
> Moodle is a software package for producing Internet-based courses and web sites. It is a global development project designed to support a social

> constructionist framework of education, that is, people actively construct new knowledge as they interact with their environments.
>
> Moodle is provided freely as Open Source software (under the GNU Public License). Basically this means Moodle is copyrighted, but that you have additional freedoms. You are allowed to copy, use and modify
>
> Moodle provided that you agree to: provide the source to others; not modify or remove the original license and copyrights, and apply this same license to any derivative work.

Other online tools and environments such as wikis, Ning Mini for Educators (Ning, 2010), and others may be appropriate asynchronous online learning and collaboration environments for teacher collaboration and learning. Online asynchronous learning and collaborating environments for teachers should be simple, easy for teachers, and most similar to many university online teaching and learning environments that teachers may have already used. Due to limitations in teacher and other staff time for learning and collaborating, limiting participant learning curve and participant frustrations are important criteria for the online environment choice.

When time, space, money and means for comprehensive staff development are in short supply, those responsible for informing the practices of teachers who have students with ASD/HFA/AS in their classrooms and teachers themselves may want to consider the use of online learning and collaboration environments.

Summary

This review discusses the characteristics and needs of students with ASD/HFA/AS related to providing services in the general education setting. Special education assistance may not accompany the majority of these students

into their general education classrooms. Therefore, the educators working in general classrooms that typically provide the primary service delivery require simple, differentiated, and universally designed teaching practices which can be matched to fit the particular needs of a student categorized as Autism Spectrum Disorder (ASD), High Functioning Autism (HFA) or Asperger Syndrome (AS). Many students with ASD/HFA/AS are under-served by their teachers without quick and easy targeted interventions of varying intensities. Collaboration can be a source of learning and problem-solving for teachers who want their students with ASD/HFA/AS to succeed in general education classrooms.

Comprehensive professional/teacher development is needed to be able to assist students with ASD/HFA/AS (Simpson et al., 2007). Lack of training in ASD/HFA/AS or in appropriate intervention techniques can frustrate the student, the staff member who has poor results, or, in the worst case, injuries result. Professional development can help teachers to learn the skills of collaboration needed to find all the answer for their students. More options in professional development models may enhance opportunities for teacher learning, that matches teacher preferences, and include what teachers themselves say they need to know.

Conclusion

In spite of the relatively recent emergence of students with Autism Spectrum Disorder and High Functioning Autism/Asperger Syndrome in general education settings and many issues for their teachers to address their needs, students legally should be accorded their right to a free and appropriate public education. Understanding autism spectrum disorders and creating research-based

and specific interventions requires extensive professional and personal effort by teachers. Educators must rise to the challenges, or, in the end, will fail students who are entitled to suitable services. Educators must insist and persist in learning about the instructional, communication, and social needs of students with ASD/HFA/AS. General educators must demand information and support which enables them to adapt best practices informed by research. All partners and providers for students with ASD/HFA/AS must work in concert, using effective collaboration techniques, and in a practical and efficient manner. The increased incidence and needs of learners classified as ASD/HFA/AS present enormous challenges. As can be seen, even through the brief literature reviewed, potential means for meeting these challenges are within the reach of teachers in the public schools. Additional models that over-ride the limitations of current teacher learning and consulting with each other about their students will assist students with autism spectrum disorders to achieve better success in school.

Chapter 3

METHODOLOGY

This chapter describes the methods used in carrying out the study with special emphasis in describing the development of course content and methods used for analysis. Results and discussion are found in Chapter 4.

The General Research Perspective

The study followed a mixed methods design as evidenced by the collection of qualitative and quantitative data, resulting in the use of a variety of information sources and enhancing the validity of this study. Data taken during five weeks of a district professional development course, "Autism and Adaptations – What do Teachers Need to Know?" was disaggregated from pre-/post-tests and weekly participant reflections and discussion comments. The purpose of the research was to identify effective instructional in-service formats for the delivery of content and collaboration concerning the educational practices of special and general education teachers who are responsible for education of students who are classified as Autism Spectrum Disorder (ASD) or High Functioning Autism/Asperger Syndrome (HFA/AS). Teacher surveys and comments on the surveys and weekly Collaborative Problem Solving Reflection assignments were the primary sources of information for this project. Asynchronous discussion with supports in specific targeted areas assisted development of a knowledge base focusing on students with ASD/HFA/AS educated in inclusion settings through a weekly Collaborative Problem Solving

Assignment. The Collaborative Problem Solving Assignments provided qualitative information on the development of participant knowledge base for a specific student found on the Autism Spectrum. A Pre-Test and Post-Test including Likert survey were used to assess the students' perceptions of utilizing technology to engage in collaboration activities (See Appendices D and E).

The Research Questions

The review of literature identified gaps in the existing body of knowledge related to teacher training factors in the context of supporting students with ASD and HFA/AS in general education classrooms. The purpose of the intended research was to investigate the effectiveness of format delivery on the ability and perceptions of teachers to provide services to students with ASD in inclusion settings with particular emphasis on collaboration activities and an increase in content knowledge.

Three specific questions were posed:

Question 1: Does the use of asynchronous discussion improve the knowledge base of teachers related to characteristics and needs of individuals with autism as effectively as the current traditional face to face consultative approach?

Question 2: Does the use of a broad asynchronous online discussion approach to collaboration improve the knowledge base of teachers related to characteristics and needs of individuals with autism as effectively as asynchronous discussion with supports in specific targeted areas related to the development of building a knowledge base focusing on students with HFA educated in inclusion settings?

Question 3: Will a teacher's attitudes toward online instruction as a means of collaboration be affected as a result of engaging in an online asynchronous format?

The Research Context

The basis for this study is founded on the current literature ~~base~~ as well as data collected in a previous study in which teachers identified topics critical in providing appropriate services to students with ASD/HFA/AS educated in general education classrooms through a survey and focus group interview (McCoy, Gehrke & Bruening, 2009). Appendices A, B and C provide information from the 2009 study, including a description of participants involved in the teacher survey and a summary of the information gleaned from the focus group interview.

Topical areas for teacher included:

- characteristics
- adaptations for communication deficits
- adaptations for developing social interactions
- adaptations for social-emotional deficits
- adaptations for sensory over-/under-sensitivity
- information teachers would expect to find on the IEP
- collaboration strategies with special and general education teachers when providing services
- collaboration strategies with paraprofessionals assigned in the general classroom to provide assistance

Additionally, McCoy, Gehrke & Bruening (2009) identified teacher beliefs, thoughts and opinions on format delivery of collaboration including:

- using face to face weekly classes as a primary means of contact
- using a weekly meeting in combination with an online asynchronous discussion
- using asynchronous discussion as a primary means of contact

- using asynchronous discussion supplemented with lecture materials
- helpfulness of online collaboration with expert prompts requesting teacher's participation during the class week
- difficulty of using online collaboration supplemented by onsite collaboration
- efficiency and effectiveness of online collaboration without supplements by onsite collaboration
- likelihood of teacher continuation of use of online collaboration as a supplement to face to face collaboration
- asynchronous online in-service delivery which provides interactive components, e.g., discussion groups

The purpose of the current study continued the investigation of the questions: "What do teachers need to know to provide services and improve performance of students with ASD/HFA/AS in inclusion settings?" and "How would teachers respond to technology as a means of collaboration and instructional delivery?" To this end, the current study conducted a five week professional development course which collapsed the topics identified in the McCoy, Gehrke and Bruening (2009) study into five content areas: 1) Characteristics for ASD/HFA/AS; 2) Adaptations for Communication; 3) Adaptations for Social and Social Interaction; 4) Adaptations for Sensory; and 5) what the IEP provides for information to teachers. Each of the five topics was presented each week, e.g., the topic of characteristics was presented in each class as were each of the 4 other topical areas. In response to teacher need for collaborative problem solving, technology was incorporated in the professional

development course to determine teacher receptivity and knowledge growth to three formats face to face, hybrid, and optional online components; Classes One, Two and Five were delivered strictly in a face to face format while Classes Three and Four introduced technology in either a hybrid or online delivery approach.

This current study addressed cognitive growth and the perceptions of teachers utilizing asynchronous online discussion as a collaboration technique for building a knowledge base related to the needs of students with ASD and HFA/AS who are educated in the general education setting and for problem solving about their students. Three factors influencing the development of this study include:

- expressed needs of special and general education teachers for immediate response for addressing the instructional issues of students with ASD/HFA/AS;
- shortage of opportunities in terms of time and personnel for collaboration; and,
- lack of funding due to the present stressed economy to support extensive and expensive teacher professional development.

The study took place in a suburban southwestern United States public education agency. For purposes of confidentiality, the location will be referred to as "the District."

The Research Participants

Twenty four special and general education and general education staff participated in a five-week in-service/professional development class called "Autism and Adaptations – What Teachers Need to Know". Five classes were

delivered to participants, three in a traditional face-to-face format, i.e., Classes One, Two and Five. Two classes, i.e. Classes Three and Four, utilized technology. During the first class, the participants were randomly placed in either the Hybrid (HG) or Online (OG) Group, pertinent to content delivery format in Classes Three and Four. Ten participants were in the HG and fourteen were in the OG. The groups became uneven in number prior to Class Three and Four. Two randomly selected HG participants had situations (family death out of state; supervision conflicts for their own child with a disability) which caused them to ask for an online format in Weeks Three and Four in order to continue in the staff development class. Because the District's staff development guidelines required full "attendance" at all sessions, two participants were granted OG status, causing unequal group sizes.

Results of the demographic survey.

Table 1 presents background information specific to descriptions of OG and HG group membership.

Background	Online group participants	Hybrid group participants
Gender	13 F 1 M	10 F 0 M
Age	21 – 30: 4 31 – 40: 2 41 – 50: 4 .>50: 4	21 – 30: 1 31 – 40: 4 41 – 50: 3 .>50: 2
Highest Degree awarded	Bachelor: 3 Master: 11 Doctorate: 0	Bachelor: 2 Master: 8 Doctorate: 0
Certificates/content specialization	Special Education: 1 Elementary Education: 6 Secondary Ed: 0 Dual (Sped + ELEd): 4 Dual (Sped + SecEd): 2 Other: Professional non-teacher: 1	Special Education: 2 Elementary Education: 3 Secondary Ed: 2 Dual (Sped + ELEd): 1 Dual (Sped + SecEd): 0 Other: Professional non-teacher: 1
Years teaching as General educator	0: 2 2– 5: 5 6– 10: 1 >10: 7	0: 3 2– 5: 1 6– 10: 0 >10: 5
Years teaching as special educator	0: 5 2– 5: 1 6– 10: 1 >10: 4	0: 5 2– 5: 0 6– 10: 1 >10: 2

Table 1. Background information for participants - Demographic information collapsed: OG and HG

The range of previous training in the area of autism for the participants spanned from no professional coursework to several participants having enrolled in at least two courses. Table 2 depicts educational backgrounds and experiences by Online and Hybrid group membership.

	Online group participants	Hybrid group participants
Previous college coursework	No course or briefly mentioned in one course: 7 1 course: 2 2 courses: 4 >2 courses : 0 No response: 1	No course or briefly mentioned in one course: 8 1 course: 1 2 courses: 0 >2 courses : 0 No response: 1
District In-service	School level meeting : 10 District sponsored : 6 Outside district paid training: 8	School level meeting : 6 District sponsored : 6 Outside district paid training: 3
Other	Internet: 12 Books/Articles: 9 Radio/TV/Newspaper: 2 Volunteer/paid work with individual with autism/family member: 6	Internet: 7 Books/Articles: 7 Radio/TV/Newspaper: 0 Volunteer/paid work with individual with autism/ family member: 1

Table 2. Previous educational experiences in the area of autism

Many of the staff members enrolled in the course were currently providing direct services for students with autism. Table 3 depicts the type of work experiences by OG or HG membership.

	Online group participants	Hybrid group participants
Another General Educator	8	5
Another Special Educator	11	8
Reading Specialist	0	2
Paraprofessional or Aide	10	4
Parents	6	2
Volunteers	2	1
Others	0	0

Table 3. Staff members that work with participants to serve students with ASD/HFA/AS

Appendix F gives a narrative of detailed demographic information for study participants.

Instruments Used in Data Collection

Several instruments and recording processes were used in the data collection process. A Pre-Test, Post-Test, measuring content knowledge growth as well as the participants' perceptions regarding the use of technology as a collaboration tool, provided quantitative data. The Pre-Test and Post-Test also had a nine question Likert-style section designed to capture perceptions regarding the use of technology to assist in collaborative problem solving. Opportunity for teacher comment was also available. See Appendices D and E for the Pre-Test and Post-Test.

Qualitative data was collected through the analysis of the weekly Collaborative Problem-Solving Assignment. Data for Q2 came from this staff development course assignment. A copy of the Collaborative Problem Solving Assignment and Rubric can be found in see Appendix G.

Procedure for Data Collection

For Question 1 and Question 3, the Pre-Test and Post-Test measures were given to all participants before and at the end of the staff development course. Both tests asked participants to state what they knew in an open-ended survey about ASD/HFA/AS and adaptations for deficit areas, with additional questions on collaboration. The questions related to content knowledge included an opportunity for the respondent to add one additional comment about reasons for responses. The pretest sought information about the participants' current knowledge base and the post-test rephrased the same questions asking for new facts/thoughts or opinions that have learned through this class.

Q2 involved data collection across the five weeks of the course. Each week participants were asked to engage in collaborative problem solving targeting a problem or potential problem for a specific student found on the Autism Spectrum. Discussion was held each week by the participants over specific challenges they and their colleagues faced when providing services for children and youth on the Autism Spectrum. A reading schedule for supplemental on-topic weekly journal articles was used to support the discussion posted online.

The collaborative problem solving discussion consisted of 2 parts. For Part 1, participants were to describe a situation in which they wanted input from colleagues, instructor or other experts about particular issues they faced. In Part 2, participants were directed to provide insights to one or more of their colleagues in class for their challenges in providing services to children and youth who are on the Autism Spectrum. Participants were to collaborate and problem solve about a specific student or situation that they wanted to address. In the discussion, participants were directed to try to develop a strategy or idea for solving the challenges they had with their student or situation. Participants were then asked to create a brief written reflection paper addressing the challenges classmates have raised relative to a particular child or issue and their contribution to the collaboration problem solving. This discussion and Collaborative Problem Solving Assignment was due each week on or before the next staff development class meeting.

The 24 members of the class classes met face-to-face for Class One, Class Two, and Class Five during the entire three hours of each week's class session.

For classes in Week Three and Week Four, participants were either assigned to an HG (one hour face-to-face and two hours in a lab setting with the instructor and online) or Online Group (OG) online only. The Collaborative Problem Solving Reflection assignment required the participants to rank their satisfaction after the week's consultation or collaboration with any of various experts available to them. Moodles were used as a discussion board appropriate for online collaboration.

In carrying out the research design, several specific procedures were used. The District specialists created the online environment (hereafter called "the Moodle") which was free of charge and the first of its kind in the District approved for staff development purposes. The Moodle was located on the District's server.

The district technology specialists also assisted with creating access for study participants and showing the researcher how the Moodle worked. Collaboration materials (described in next section) were uploaded by the researcher on the Moodle and hidden till the appropriate class session was held. In the case of face-to-face Classes, the researcher had access to the materials online and the students did once the Class was held and for the remainder of the course. For Class Three and Class Four, students in HG were shown the materials on the Moodle during the first hour of the class session including a PowerPoint with topics/content, related articles; participants in the OG saw the materials only online and during their own time. Similar links, activities, materials, procedures and directions were used for each Class, both HG and OG.

Content Knowledge Materials

Five class lessons were developed, each with a similar script for the purpose of standardization (see Appendix H for example) and each delivering content topics, beginning with simple in first sessions to more complex in later ones. All content topics were designated by teachers as what they needed to know to successfully teach students with ASD/HFA/AS in their classrooms (McCoy, Gehrke, and Bruening, 2009). See Appendix I for the knowledge/content materials developed in the five weeks of lessons by class session and topic.

Class Recruitment and Organization

Participants in the staff development course enrolled voluntarily in the District Staff Development class "Autism and Adaptations – What Teachers Need to Know", developed by the researcher. Because the district had monies for training on special education and frequent teacher interest in learning on the topic of autism, enrollees were eligible to be paid a district stipend to reimburse staff for attending the course which was held evenings and outside teacher work hours. Enrollees in the class, once agreeing to participation in the research study, were assigned to either OG or HG at the first class session.

For Classes One and Two, all participants were face-to-face with the Instructor. In the first session, participants were made familiar with the course, the research, course content materials, activities and expectations. Participants reviewed how the class would discuss, collaborate and reflect in the course.

On the first day of Class One a pretest was administered at the beginning of the class. The first pretest solicited information related to the participants understanding of autism (Q1) and the participants' attitudes toward technology as a means of instructional delivery and collaboration (Q3). Weekly discussions held face to face and online began during Class One and were held for each of the four remaining classes (Q2).

A portion of Class One and Class Two were used to show study participants how to use the Moodle, in preparation for Hybrid and Online sessions in Class Three and Four. A Moodle demonstration was given by the District technology specialist and instructor. Practice with discussion and collaborating on problems with students with ASD/HFA/AS was part of the class activity for Week One and Two.

In Class Three and Class Four, participants experienced a training format different from traditional face-to-face delivery. Participants who selected HG status attended Class Three and Class Four face-to-face for one hour with the instructor for the content delivery and were online during the remaining two class hours with instructor support. Participants randomly selecting OG status did not physically come to Class Three or Class Four, but completed learning, collaborating, discussing and reflecting about students with whom they needed help entirely online. Credit for the district Staff Development office was dependent on participant completion of Weekly Problem-Solving Reflection papers in HG and OG formats.

In Class Five, all participants returned once again to face-to-face with the instructor for the session, wrapping up with content, discussion, collaboration and demonstration of new learning in the Post Test. A Post-Test identical in format to the Pre-Test was administered at the end of the fifth and final class. See Table 4 for the schedule of meetings and their format.

	Week 1	Week 2	Week 3	Week 4	Week 5
Group A Online	Face to face	Face to face	Online	Online	Face to face
Group B Hybrid	Face to face	Face to face	Hybrid	Hybrid	Face to face

Table 4. Course meeting schedule and Class format

In face-to-face sessions (Class One, Two and Five) all discussion, learning and reflection was in class.

In HG sessions (Class Three and Four) HG participants and the instructor met face-to-face for one hour in a classroom lab equipped with laptops. In these Hybrid sessions, for the first hour of the three hour session each week, the HG participants met face to face to go over the content for the class session via a PowerPoint presentation, collaborate on class activities, and collaborate/discuss problems and solutions for their students. During the remaining two hours of Class, HG group members worked collaboratively or alone on course assignments, i.e., reading articles, reflecting, and writing assignments online in the lab class setting.

In Class Three and Four OG participants did not come to class at all and only connected with content or their experts/each other online. OG participants were directed to review the content for the week via PowerPoint presentation, use the Moodle environment to perform any class activities noted in the PowerPoint, read and review instructor-provided articles on the topic for the week, and collaborate in a problem-solving activity with others about their student with problems. Collaboration for the OG was completed entirely online through the Moodle Discussion Board.

During Classes Three and Four, class content for HG was available via PowerPoint, appropriate journal activities were posted (for interests related to topics differentiated by elementary and secondary) and the Discussion Board was available for participants to asynchronously discuss, ask for help, give help to others and collaborate on problems they posed for their students with ASD/HFA/AS.

Procedure

Weekly Collaborative Reflection papers based on participant interactions were used to capture the discussion held over specific challenges faced by the participant and their colleagues when providing services for children and youth on the Autism Spectrum. Participants were encouraged to read supplemental articles, posted online, to support the participant discussion posted online.

Directions for the Collaboration or Discussion, either face-to-face, hybrid or online consisted of two components. The first component required the

participants to describe a situation in which the participant wanted input from colleagues, instructor or other experts. The second component required the participants to give insights to one or more classmates for their challenges in providing services to children and youth who are on the Autism Spectrum.

Through the face to face, hybrid and online discussion with classmates and instructor (or other experts), participants were directed to collaborate and problem solve about a specific student or situation that the participant wanted to address. In all formats of collaboration and discussion, participants were asked to try to develop a strategy or idea for solving the challenges they have with their student or situation. The OG, however, had only asynchronous discussion and no physical meetings.

All participants completed a one-two page written reflection addressing the challenges classmates have raised relative to a particular child or issue. The collaboration problem solving discussion and brief paper were due on or before the next class meeting. (See Appendix G for rubric for Collaborative Problem-Solving Reflection.)

Data Collection Analysis Process

The data were analyzed using several strategies. First, demographic data was analyzed, organized and charted. Second, the data for Knowledge in survey questions 1-6 were collapsed and organized for Knowledge topics by broad trends for five identified topic/content areas, then charted. For Q1 which focused on content knowledge responses were analyzed for what was taught by instructor (either face-to-face, hybrid or online) and what respondents mentioned in the Post

Test for that broad topic. Appendix I denotes the five broad topics for Knowledge: Characteristics, Adaptations for Communication, Adaptations for Social – Emotional & Social Interactions, Adaptations for Sensory, and the IEP and what it contains to help teachers and what respondents in each Group responded with that topic/content (demonstrating learning). Data concerning collaboration methods was also gathered as part of the Pre-/Post-Test.

Analysis was approached by organizing, analyzing and drawing conclusions from the data for Q2 using quantitative and qualitative approaches to focus on information related to Collaborative Problem Solving found in the Reflections. See Appendix J for Q1 themes with numeration of participants incorporating weekly topics.

Analysis for Q3 in-service delivery format preferences (or how much did they like/find helpful the various delivery formats) came from Pre-Test and Post-Test Likert scale responses (already noted earlier in Appendices D & E).

Summary of the Methodology

This study used both quantitative and qualitative methods to gather information on teacher learning and preferences for in-service format delivery in "Autism and Adaptations – What Teachers need to Know". Post Test comparison within and between HG and OG were made where appropriate. Particular attention was noted for Class Three and Class Four differences due to the format change from traditional face-to-face in-service delivery and collaboration with experts on problem-solving for their students to HG or OG format.

Chapter 4

RESULTS AND INTERPRETATION

Introduction

As stated in Chapter 1, the study examined content acquisition related to information teachers need about serving students with ASD/HFA/AS in their classrooms, if online collaboration would result in problem solving related to assistance for their students, and if teachers' attitudes toward an online format would change as a result of participation in an online experience. Participants included education staff and teachers in common school settings, i.e., teachers and related services staff assisting students in inclusive classrooms (Iovannone, Dunlap, Huber, & Kincaid, 2003). Findings in this study are relevant for developing in-service models utilizing alternatives to face-to-face format delivery.

This chapter is organized first to provide information related to interpretation of self- report demographic data, followed by a discussion of the results and trends for each of the three research questions posed.

Interpretation of Self-Report Demographic Information

In this study the participants were 23 females and one male ranging in age from 21 to over 50. The participants were evenly distributed in the two treatment groups, i.e., the Online group and the Hybrid group, and looked similar in all demographic areas with the majority of the teachers working in elementary education. This study's participants were teachers and related services staff assisting students in inclusive classrooms (Iovannone, et al., 2003) and all seeking

more knowledge about how to teach them in that environment. The participants overall had a high degree of academic program completion. Prior to this in-service class, most of the participants had school-level meetings, district or district paid in-services related to Autism but demonstrated limited information about appropriate interventions (McCoy, 2011).

Participants in this study appeared to get training on autism but not in college level courses except for minimal mention in college classes. Participants found information to teach their students in the workplace or on their own surfing the Internet and reading, as noted commonly for parents of children with autism to also do (Worcester et al., 2008). Such information-finding methods may not be effective or research-based as cautioned in the literature found on teaching students with ASD/HFA/AS (McCoy, 2011; Renzaglia, Karvonen, Drasgow, & Stoxen, 2003). This group of teachers had endeavored to further their knowledge by seeking helpful resources, by attending District trainings offered by a local paid trainer, attending district-funded commercial professional development seminars, or on their own through reading material, though many limitations exist for their learning in their community or work environments (Simpson, 2003; National Research Council, 2001). In spite of the attempts to learn information, all the participants seemed to have essentially the same level of knowledge regarding content related to autism as demonstrated on the Pre-Test. More detail related to the Pre-Test is found in Appendix J and discussed in detail in narrative related to Q1. The range of previous training in the area of autism for the participants spanned from no professional coursework to a distinct minority

having enrolled in at least two courses which mentioned but did not focus on autism.

Many of the participants in the study were currently providing direct services for students with autism. The participants appeared to have typical support systems with no distinctive differences between the groups regarding how and with whom they networked. The participants, whether special or general educators, reported that they typically collaborated with special education teachers and para-educators (Iovannone, et al., 2003;Lamar-Dukes & Dukes, 2005). Many of the participants reported their attempts to collaborate consisted of meetings, one-to-one demonstrations, charts, and lists; one Hybrid participant mentioned using email. Such methods are found insufficient in terms of immediacy and thoroughness; the give and take of exchange was very limited (Lamar-Dukes & Dukes, 2005).

Results and Trends for each of three Research Questions

Question 1 Discussion

In this section, results related to Question 1 will be discussed in the following order: first, the results related to the Online group (OG) will be reported, then the results of the Hybrid group (HG) will be discussed, and, third, a discussion of the comparison between the two groups will be presented.

Q1: Does the use of asynchronous discussion improve the knowledge base of teachers related to characteristics and needs of individuals with autism as effectively as the current traditional face to face consultative approach?

The study used the research about need for a body of knowledge related to characteristics of ASD/HFA/AS that impact learning in inclusive settings, e.g. academic, social, sensory, peer interactions (Aspy and Grossman, 2007; Dunlap, 1999; Iovannone, et al., 2003; Renzaglia, et al., 2003; Scheuermann, et al., 2003; Simpson, 2003). Information was also incorporated in the course regarding support services (National Research Council, 2001; Scheuermann, Webber, Boutot, & Goodwin, 2003; Simpson, 2003; Lamar-Dukes & Dukes, 2005; Peck & Scarpati, 2007; Lee-Tarver, 2006; Myers, G. A., & Whelan, n.d.; Klinger & Vaughn, 2002) and special education practices, e.g., IEPs, teachers regarding autism (Billingsley, 2004; Billingsley, et al., 2004; Busch, Pederson, Espin & Weissenburger, 2001; Gehrke & Murri, 2006; Kilgore & Griffin, 1998; Mastropieri, 2001; Whitaker, 2000, 2003).

Results and trends for Online Group.

Pretest results.

The average score for the Pretest for OG was 54.7% demonstrating an average 8.2 correct concepts out of a possible average 15 concepts across the Pre-Test. These figures were obtained by counting the number of acceptable responses to questions on each of the five topic areas related to course content produced at the time of the Pre-Test to determine acceptable responses, the team met, coded and categorized responses and came to consensus to determine acceptability of responses. For example, "Provide three facts that you have already learned about (topic Characteristics of students with ASD/HFA/AS, topic Adaptations for Communication deficits of students with ASD/HFA/AS, etc)". OG members

were requested to produce three ideas based on their prior knowledge. Table 5 provides a general breakdown of correctly identified material for the 5 content areas for Week One by number of participants and percentages. Inspection of this table suggests that the participants in the OG, as a group, had limited knowledge of information related to autism in spite of the self-reported attempts at gathering information.

Topic	Total number of acceptable concepts on Pre-Test (See Note 1)	Percentage based on production of 3 responses per area (See Note 2)
Characteristics	31	74%
Adaptations for Communication	18	43%
Adaptations for Social/Social Interaction	18	43%
Adaptations for Sensory	22	52%
IEP information	26	62%
Total of prior knowledge ideas produced	115	54.7%
Average number of acceptable responses	8.2	

Table 5. Pre-Test breakdown of correct responses in content areas by Online participants
Note 1: 14 OG x 1 Week x 3 = 42 possible
Note 2: 14 OG x 5 Weeks x 3 possible = 210

Based on the results of the Pre-Test, few OG participants could produce multiple important and correct pieces of information about what teachers needed to know about their students with autism.

Post-Test results.

As measured by the Post-Test administered at the end of the five class in-service course, OG participants demonstrated new content knowledge. The OG group moved from an average 8.2 ideas on the Pre-Test to an average of 13.4 new ideas on the Post-Test. Overall, every Online participant performed strongly on the in-service course Post-Test and 100% of them had at least one new idea in four of the five knowledge base topics in the course (Characteristics, Adaptations for Social/Social Interaction, Adaptations for Sensory Integration, and IEP information) and more than 90%, 13 of the 14 participants, produced at least one new idea in the final topic, Adaptations for Communication. Of the 14 participants, all produced 2 new ideas in the two areas of Adaptations for Social/Social Interaction and IEPs. Table 6 provides general break down of the total number of new concepts as demonstrated on the Post-Test.

Content Knowledge Topics	Total number of new acceptable concepts produced on Post-Test *out of possible 210	Percentage based on production of 3 responses per area
Characteristics	37	88%
Adaptations for Communication	32	76%
Adaptations for Social/Social Interaction	41	98%
Adaptations for Sensory	39	93%
IEP information	38	90%
Total of new ideas produced	187	89%
Average number of new responses	13.4	

Table 6. Specific breakdown of the total number of new concepts OG produced on the Post- Test.
Note 1: 14 OG x 5 Weeks x 3 possible = 210

Inspection of Table 6 clearly shows that the OG gained knowledge across all content areas. Online participants gleaned additional new facts about their students with autism and in multiple new supports for their students. Table 7 depicts specific percentage of OG participants with 1, 2 or 3 correct new ideas on Post-Test.

Online group Post Test content knowledge Q1 on each of Five Topics	Number of participants with one acceptable new idea	Number of participants with two acceptable new ideas	Number of participants with three acceptable new ideas
Characteristics	14	12	11
Adaptations for Communication	13	10	8
Adaptations for Social/Social Interaction	14	14	13
Adaptations for Sensory	14	13	12
IEP information	14	14	10

Table 7. Number of OG with 1, 2 or 3 acceptable new ideas on Post-Test

Inspection of Table 7 demonstrates clearly that the performance of the OG was successful. In five of the five topics, a majority of the fourteen respondents were able to list three new acceptable ideas.

The nature of OG responses was also more straightforward by the end of the course. Responses for Characteristics went from "communication difficulties" to "ASD kids do not always understand the unwritten rules". In Adaptations for Communication, members of the OG started out saying "literal language" (which is not an adaptation) but ended with the more discrete intervention "teach what idioms mean". For Adaptations for Social/Social Interaction, one OG member wrote on the Pre-Test "know their personal spatial boundaries" but showed enhanced understanding by Post-Test with "picture cues on how to respond to negative behavior". On the Pre-Test, another OG member wrote as an Adaptation for Sensory over-/under-sensitivity "sensory stimulation" which could have many interpretations. However, by the end of the course, that participant wrote

"weighted vest" on the Post-Test, a more concrete and specific adaptation to use. About IEP and what it contains to help teachers with their students with ASD/HFA/AS, one OG member started the course noting Individual Education Program documents contained "the disability", but by the end of the course could correctly state "goals that are measurable and the person who will implement the goals, duration of the goals, resources available for meeting the needs of child." As measured by the Post-Test, OG appeared to learn more information about the content and were more sophisticated and specific in their knowledge.

Results and trends for Hybrid Group.

Pretest results.

The average score for the pretests for the HG was 54% demonstrating an average 8.1 correct concepts out of a possible average 15 concepts across the Pre-Test. Scores reported here were obtained identically to the process used with OG, i.e. counting the number of acceptable responses to questions on each of the five topic areas of the course on the Pre-Test which assessed prior knowledge. Knowledge about Characteristics of autism and IEP information were the stronger areas on Pre-Test for HG with 90% of the group able to state one correct idea. Of the 10 HG participants, 3 could produce 3 correct ideas, 6 had 2 correct ideas, and 7 participants produced 1 correct idea.

For a breakdown of correctly identified material for the 5 content areas by number of participants and percentages, see Table 8.

Topic	Total number of acceptable concepts on Pre-Test *out of possible 30	% based on production of 3 responses per area *out of possible 150
Characteristics	23	76.6%
Adaptations for Communication	11	36.6%
Adaptations for Social/Social Interaction	12	40%
Adaptations for Sensory	15	50%
IEP information	20	66.6%
Total of prior knowledge ideas produced	81	54%
Average number of acceptable responses	8.1	

Table 8. Pre-Test breakdown of correct responses in content areas by Hybrid participants.
Note 1: 10 HG x 1 Week x 3 acceptable responses = 30

Although the individuals in HG described prior efforts to obtain information on the course topics, analysis of HG Pre-Test results suggests that, as a group, participants had limited knowledge of information related to autism and what teachers can use to appropriately adapt for their students in the classroom with the condition. Based on the results of the Pre-Test, only half of the HG participants had gathered solid facts or identified various intervention strategies for their students with autism.

Post-Test results.

Hybrid participants demonstrated an increased content knowledge base as measured by the Post-Test. The HG produced an average of 12.1 new ideas on the Post-Test. HG participants had overall strong performance on the Post-Test for the Autism and Adaptations course. All had at least one new idea in three of

the five knowledge base topics in the course (Adaptations for Social/Social Interaction, Adaptations for Sensory, and IEP information). For the remaining two topic areas of the course, nine of the ten had two new facts for Characteristics and seven in ten HG members had one new idea for Communication. Table 9 provides a general breakdown of the total number of new concepts produced by HG participants on the Post-Test.

Content Knowledge Topics	Total number of new correct concepts produced on Post-Test (See Note 1)	Percentage based on production of 3 responses per area
Characteristics	25	83.3%
Adaptations for Communication	15	50%
Adaptations for Social/Social Interaction	27	90%
Adaptations for Sensory	29	96.6%
IEP information	25	83.3%
Total of new ideas produced	121	80.6%
Average number of acceptable responses	12.1	

Table 9. Breakdown of the total number of new concepts produced on the Post-Test by HG.
Note: 10 HG x 5 concepts x 3 possible equals 150.

Inspection of Table 9 demonstrates that the performance of the HG was successful in learning new content knowledge. For more specific Post-Test performance results for HG, see Table 10 with number and percentage of Hybrid participants with 1, 2 or 3 correct new ideas on Post-Test.

Hybrid group Post Test content knowledge Q1 on each of Five Topics	Number of participants with one acceptable idea	Number of participants with two acceptable ideas	Number of participants with three acceptable ideas
Characteristics	9	9	7
Adaptations for Communication	7	5	3
Adaptations for Social/Social Interaction	10	10	7
Adaptations for Sensory	10	10	9
IEP information	10	9	6
Total number of HG	10		

Table 10. Number of HG with 1, 2 or 3 correct new ideas on Post-Test.

HG members garnered multiple ideas for use in the classroom by the end of the course. HG participants appear to have profited from attending the classes and learning in every topic covered. HG participants had particular gains in new ideas in two areas, Adaptations for Social/Social Interaction and Adaptations for Sensory. HG members' acquisition of new concepts in the course increased greatly in learning a second and third idea in the topical areas of Adaptations for Social/Social Interaction and Sensory Over-/Under-Sensitivity. In the topical area of Characteristics, 9 of 10 HG members had acquired two new knowledge points and 7 of 10 acquired as many as three. For the topic Adaptations for Communication, HG individuals learned the fewest new ideas with 7 of 10 participants correctly giving one new idea on the Post-Test; only 5 of 10 HG had two new ideas by the end of the course and a small group, 3 in 10, had three new ideas to use with students. More successful learning was apparent for HGs in the topics of Adaptations for Social and Social Interaction where all HG participants

produced two new ideas. The strongest overall achievement on the Post-Test for HG members occurred in the topic Adaptations for Sensory, where all but one HG produced three new ideas. Every HG member could list one accurate piece of information about IEP information useful to teachers of student with autism, 9 had two ideas, and more than half had three ideas.

The type and quality of HG responses produced on the Post-Test became more complete than ideas produced on the Pre-Test. On the topic of Characteristics, one HG member grew from an initial response of "can be very quiet" to the extended response "social deficits, cannot organize large bodies of information, communication deficits, sensory over/under sensitivity, don't get body language". Another HG member started out in the course saying "speech services" as an Adaptation for Communication, but ended with an idea that is more practical and immediate and personal for teachers in the classroom "use visuals, model/support, and practice skills to generalize in other settings". For the topic of Adaptations for Social/Social Interaction, one HG member wrote nothing on the Pre-Test but demonstrated understanding of actual research-based ideas by Post-Test with this answer, "social supports like a back-up buddy and social stories". Another HG participant was completely at a loss with the topic Adaptations for Sensory over-/under-sensitivity when starting the course ("I'd like more information on that"); however, on the Post-Test, that participant produced the following ideas to utilize with a student "weighted vests, swing, lower lighting in room, squeeze ball". Regarding knowledge of IEP facts to help with teaching students with ASD/HFA/AS, one HG person on the Pre-Test stated

that IEPs contain “provide extra time”, though by the Post-Test listed “goals, social-emotional history, data from teachers” as additional information to glean from the student record. HG individuals acquired information which appeared to have depth of understanding at the end of the five in-service classes.

HG as a subgroup performed in a more inconsistent manner than the OG and follow research by Hurt (2008) who wrote that online learning results are scattered – sometimes reported as superior, or equivalent to face-to-face, or inferior. The HG were all of the previous descriptors. As specific examples, merely five of the HG knew about the Characteristic imitate/parrot, non-interactive with others and compulsions. None of the HG knew the Adaptation for Sensory, teach student about unique sensitivity, use headphones and move to quiet area.

HG seemed relieved that they were in the combination environment to be supported, in the same room, by the instructor. HG had trouble logging into computers from the remote site of the in-service lab classroom, seemed concerned more about their placement as a HG in the random selection of format groups and attended well to multiple demonstrations for accessing and using the in-service asynchronous environment, Moodle.

Though the HG had potential for dynamic interactive dialogue and substantial per-to-peer interaction with their online environment of Moodle (Zhao & Czido 2001; King, 2002), they appeared to resort to traditional face-to-face methods of discussion, reading paper copies of journal articles, and reading instructor-provided content “on the board” during their two hybrid sessions.

Comparison between OG and HG participant knowledge base (Q1)

Members of the OG and HG groups produced a great deal of new information given during the class, as measured by responses on the Post-Test (that were counted only if appropriate and research-based concepts about ASD/HFA/AS or ideas taught in the course's five sessions). The group of twenty-four was able to list, on average, between 12-13 new acceptable ideas each by the end of the course. Everyone in both groups had at least one new idea for Adaptations for Social/Social Interaction, Adaptations for Sensory, and information contained in an IEP. Both groups' members had two new ideas about Adaptations for Social/Social Interaction. Solid percentage (90% or more) of correct course content was shown on the Post-Test by the total group for Characteristics - one new idea. Adaptations for Communication for the HG and OG differed. All but one of the members of the OG produced one acceptable new idea, in contrast only seven out of ten HG were able to produce at least one acceptable new idea in this area. See Table 11 comparing percentage of new acceptable concepts identified on the Post-Test by OG and HG members.

Post-Test content knowledge Q1	**OG** Percentage of acceptable new concepts produced	**HG** Percentage of acceptable new concepts produced
Characteristics	100% had at least one new idea	90% had at least one new idea
Adaptations for Communication	93% had at least one new idea	70% had at least one new idea
Adaptations for Social/Social Interaction	100% had at least two new ideas	100% had at least two new ideas
Adaptations for Sensory	100% had at least one new idea	100% had at least two new ideas
IEP information	100% had at least two new ideas	100% had at least one new idea
Percentage of possible total new acceptable ideas	88.6% of possible new ideas	80.6% of possible new ideas

Table 11. General comparison of total percentages of new ideas identified on the Post-Test for OG and HG participants.

In looking at how the two groups varied, analysis of the Post-Test responses covering the five topics taught during Autism and Adaptations: What Teachers Need to Know, the OG correctly produced 88.6% of new acceptable ideas possible and the HG produced 80.6% of new content ideas possible. While the overall group shows learning and to a solid degree for at least one idea in four of five topic areas (Characteristics, Adaptations for Social/Social Interaction, Adaptations for Sensory, IEP), other differences exist.

A more detailed analysis of Post-Test data reveals a picture of less solid performance by the Hybrid group. HG participants had notably fewer multiple new knowledge points at the end of the course. Across the board in Adaptations for Communication (for one-two-three ideas) and for multiple (3) new ideas on

Adaptations for Social/Social Interaction, fewer HG participants demonstrated correct new knowledge points. Fewer HG members demonstrated new knowledge in Characteristics (one idea) and IEP information (two ideas and three ideas). See Tables 7 and 10 for comparison.

In no area did HG members out-pace OG members on the Post-Test for knowledge base for Autism and Adaptations: What Teachers Need to Know. At best, the HG participants matched the OG members in new knowledge for three of the topics (Adaptations for Social/Social Interaction for one and two ideas; Adaptations for Sensory for one-two-and three ideas; and IEP for one idea). HG distinctly under-achieved OG in overall production of up-to-three new ideas related to all five topics of the course. (Refer to Table 11.)

OG participants had more members achieve content proficiency in:

- Adaptations for Communication – one, two and three new acceptable ideas
- Adaptations for Social/Social Interaction – three new acceptable ideas.

Additionally, more OG members had proficiency in two more areas:

- Characteristics – one new acceptable idea
- IEP information – one and two new acceptable ideas. (Refer to Table 7 and 10.)

For every topic and multiple ideas, the OG participants demonstrated more Post-Test information than the HG.

How might these results be explained? Pre-Test results for OG and HG participants showed that both groups started out with nearly identical prior knowledge (OG = 8.2 correct acceptable ideas each on the Pre-Test; HG = 8.1 acceptable ideas each on the Pre-Test). Prior knowledge was equivalent across both groups. In-service format delivery for the course, however, was distinctly different for the HG and OG and appears the variable that influenced knowledge acquired.

OG participants produced new acceptable concepts to a greater extent in the course. HG knowledge base performance was, at best, on par with OG participants. Although studies of online learning are emerging (Chen & Wang, 2008; Guzdial & Turns, 2000; Hewitt, 2005; Aalst & Chan, 2007) and do not have solid results that participants learned (Hurt, 2008), this study appears to have found more evidence to support online in-service delivery methods for increasing content knowledge of the participants.

How might in-service format delivery be identified as the variable for learning in this in-service course? OG participants had no face-to-face content or instruction for 40% of the course (two 3-hour classes = 6 of 15 contact hours). For two of the five in-service classes, all knowledge/content was available to OG participants solely in the online asynchronous environment of Moodle. Content/knowledge gained in the course was heavily reliant on learning during the alternative format being tested in this study. What OG members learned in the in-service course was obtained in another and specifically discrete in-service

delivery model than HG. OG members were nowhere near the classroom during their two classes of alternate format delivery. However, OG participants appeared decidedly "in class" for learning what they needed to know about their students with ASD/HFA/AS.

Conversely, HG participants had 40% of their sessions (the same two 3-hour classes as Online members) delivered in a format that included one hour face-to-face and two hours online each during Class Three and Four. HG participants did have to "come to class" for the first part of Class Three and the first part of Class Four. The HG was face-to-face and, to some extent, traditional for in-service format each week, even during the hybrid alternate format of Classes Three and Four. In the two hybrid class sessions, HG members had content delivered in the classroom face-to-face in the first hour. Many of the HG participants stayed, however, for the additional time in the classroom/computer lab. HG classmates held face-to-face discussions with their HG members, had experts at hand in the classroom/lab to discuss their students, ask questions and learn. HG, though they had asynchronous opportunity to do so, often remained in physical presence for a good portion of the online time, got help/gave help physically in class while they were on the Moodle, and had the instructor nearby at the teacher's desk each Class Three and Four for prompts and support. The instructor stayed, too. HG members were not required to participate in any activity online except as a continuation of in-class discussions. HG participants were more dependent for learning and using technology with online in-service resources during their hybrid alternate in-service delivery model in Classes Three and Four. For overall for

purposes of Q1, HG had knowledge base content delivered as face-to-face in a traditional model.

HG members as a group seemed relieved that they were in the combination environment to be supported, in the same room, by the instructor. HG participants had difficulties logging into computers from the remote site of the in-service lab classroom, seemed concerned more about their placement as an HG in the random selection of format groups, and appeared to need the multiple demonstrations for accessing and using the in-service asynchronous environment, Moodle. Though the HG had potential for dynamic interactive dialogue and substantial peer-to-peer interaction using the online environment of Moodle (Zhao & Czido 2001; King, 2002), HG members appeared to resort to traditional face-to-face methods of discussion, read paper copies of journal articles (the printer in the lab/classroom ran and ran), and watched their instructor provide content "on the board" during their two hybrid sessions. HG class members did not leave the classroom, even when allowed for the two hours they were to be online, and seemed to prefer the physical presence of classmates and instructor for their learning.

HG overall performance in the in-service course differed from the OG's overall group performance. This difference may again be explained to result from the type of in-service delivery model. HG participant started out on a similar playing field of prior knowledge as OG participants. However, HG participants did not keep up through the course in order to demonstrate multiple new and research-based facts about their students nor for multiple interventions to use in

the classroom. HG participants learned no better and a little worse. Possibly the hybrid format explains this outcome. Perhaps the HG members did not take the active role in the content required of OG participants. After all, their instructor was in the room every session.

OG format participants gained more knowledge in Classes Three and Four than traditional face-to-face or hybrid format knowledge base about autism and adaptations across 4 of the 5 topics covered (see Tables 7 and 10). The results show that online in-service format delivery was effective and use of instructional technology as an instructional intervention to foster knowledge. Use of technology-supported approaches to learning is new to the literature but has been found effectual by such authors as Aalst & Chan (2007), Resta & Laferridere (2007), Oblinger & Oblinger (2005), and Liotta (2008). Although online learning was, according to King (2002) "not a panacea", the integration of information technology into the class enabled change (Guzdial & Turns, 2000), i.e. assisted teachers to learn what was needed to support their students. Collaborative knowledge construction occurred in the online format in contrast to the hybrid group which had self-selected minimal online time (Caverly & Ward, 2008). The idea that Online group members may have experienced a more active learning process and, therefore, learned more is a reason to support the development of online formats for teacher training (Schrum, Burbank, Engle, Chambers, & Glassett, 2005).

Numerical values for Table 12 represent the number of each group's participants, OG or HG, during the alternate format (Classes Three and Four) who

produced a correct answer on the knowledge portion of the Post-Test for each of 5 topics, e.g., 5/10 means that 5 of the 10 individuals gave a correct content response. The group proficiency percentages listed are an average of the particular format group's correct responses on the Post-Test across the five topics covered in online or hybrid ways during Classes 3 and 4.

Knowledge Topic	HG Class 3	HG Class 4	HG % on Post-Test	OG Class 3	OG Class 4	OG % on Post-Test
Characteristics ASD/HFA/AS	5/10	9/10	70%	10/14	11/14	75%
Adaptation for Communication	10/10	10/10	100%	13/14	14/14	96%
Adaptation for Social/Social Interaction	9/10	9/10	90%	14/14	12/14	93%
Adaptation for Sensory	0/10	0/10	0%	7/14	0/14	25%
IEP - information teachers would expect to find	6/10	8/10	70%	14/14	12/14	93%

Table 132 What HG and OG learned (Q1) during alternate formats in Classes Three & Four

Why did the OG learn more content? Because OG participants had no face-to-face content for 40% of the course, two of the five in-service classes, all knowledge/content required 100 % online participation by OG participants and solely in the online asynchronous environment of Moodle. The OG was forced to learn material through his/her own active engagement with the required content

online and with their colleagues online. Every OG was compelled to learn by also collaborating with others online for much of the course. OG built their knowledge base by actively interacting with others online. No individual in OG could sit on the side and passively absorb in the online format delivery. A constructivist approach to learning, which is mentioned in literature as supported by online learning environments (Resta & Laferriere, 2007), was required of OG participants and appears to have contributed to knowledge base growth in the majority of content in the in-service course. The value of what a variety of authors call participatory social networking to collaboratively construct knowledge (Caverly & Ward, 2008; Resta & LaFerridere, 2007; Liotta, 2008) may have played a part in this study. OG members may also have fared better for retention of new and appropriate learning tools for their students by using each other as a knowledge base rather than depending on previous practices that were neither immediate nor easily accessed, i.e. waiting to be sent by the District to a commercial professional development course that comes to town. The bits and parts from content online, asynchronous but accessible and continuous discussions, and online related journals created a wisdom that built a larger framework of understanding (Liotta, 2008). Online participants were forced to find meaningful content, engage with it, and reach out to others in the in-service. With asynchronous, simple and readily accessible format to do so, OG were forced to engage actively with the material.

HG, in comparison, appears to have depended on the instructor to provide face-to-face information. HG may have depended too much on "going to class"

and on the instructor to provide face-to-face information. In the two hybrid class sessions, nearly all HG stayed for the entire 3 hours – even though they had been told they only needed to stay for one hour and use the other two hours for online learning. HG appeared to be more dependent on the instructor as a knowledge source and may have taken a more passive role as a learner than the OG. Active learning (Resta & Laferriere, 2007) by participants in the physical classroom, in spite of instructor-driven class activities during face-to-face and hybrid format classes, may have been in too short supply. HG did not actively or timely utilize the supportive online materials such as journal articles, even though posted and available beyond the 3 hour class sessions; the instructor continually noted HG members during Classes Three and Four to begin printing and then reading hard-copy of the supportive journal articles rich with content on the topic of the Class Three or Four. Schrum, Burbank, Engle, Chambers, & Glassett (2005) found that recent technology advancements with increased communication and enhanced interactivity among participants using electronic networks can overcome former criticisms of a fully online approach. Those findings are not consistent with the HG results of this study. The difference, however, may be found in differences between the hybrid formats. The hybrid format approach in this study may have been too primitive not allowing the dynamic and complex interaction teachers needed between the content and technology (Zhao & Cziko, 2001). The passive nature of the hybrid format in this study may not have the same kind of expertise as that developed in other hybrid courses.

The case may be made that the HG was, in effect, face-to-face and, to some extent, traditional for in-service format each week for the content or knowledge portion of the course. In Classes Three and Four, HG members had content delivered in the classroom face-to-face, held face-to-face discussions with their HG participants, had experts at hand in the classroom/lab, asked and got help/gave help physically in class, and had the instructor present each Class for prompts and support. HG members were not required to participate in any activity online except as a continuation of in-class discussions. HG were more independent for learning and using technology with online in-service resources during Classes Three and Four, but, overall, HG had all content delivered as face-to-face, in a traditional model with the option of utilizing the posted material for additional review.

Summary results and Trends for Q1

The OG had a higher knowledge base on specific content topics taught over the in-service course and at least comparable knowledge to Hybrid group on all course topics. The OG had a higher knowledge base on specific content topics taught when the in-service format delivery differed from traditional face-to-face. HG was inconsistent in learning during the course that included hybrid format delivery and, at best, were just on par compared to performance with the average of all learners in the traditional face-to-face format, but overall came in behind OG.

Question 2 Discussion

> Q2: Does the use of a broad asynchronous online discussion approach to collaboration improve the knowledge base of teachers related to characteristics and needs of individuals with autism as effectively as asynchronous discussion with supports in specific targeted areas related to the development of building a knowledge base focusing on students with HFA educated in inclusion settings?

This study provided training in addressing the effectiveness of educational practices, e.g., collaboration, in-service education, teacher responsibilities (Adreon & Stella, 2001; National Research Council, 2001; Renzaglia, et al., 2003; Simpson, 2003; Wagner, 2007; Yell, et al., 2003). This study addressed collaboration and the role of others for teachers to improve their instructional practices specific to their students with ASD/HFA/AS. Teachers received a functional approach to problem behavior and partners like other teachers of the student (Iovannone, et al., 2003). Collaboration and teaming with various partners resulted in the participants saying they received effective suggestions for their students. The study's discussions and other supports like journal articles resulted in appropriate and research-based intervention plans and services for students in the participant's classrooms. The participants in this study brought specific information about the student with ASD/HFA/AS to the collaborative problem-solving teams. Adaptations and differentiated strategies for core deficit areas of ASD/HFA/AS were shared for use with learners that had not achieved school skills through traditional teaching methods in the general classroom. Collaborators' distinct skills and suggestions contributed to success and teacher interest to use suggestions now and in the future (Peck & Scarpati, 2007). The

general and special educators in this study worked collaboratively, providing integrated and comprehensive suggestions for use with students (Lee-Tarver, 2006). Needed pre-planning for collaboration (Lamar-Dukes & Dukes, 2005) and convenience of collaboration was woven into teacher routines or worked around them (Myers, G. A., & Whelan, 1996). Evidence of supportive, adaptable, and flexible participants existed for this study's collaboration opportunities (Klinger & Vaughn, 2002). This study allowed for "collaboration at its best" (Safran & Safran, 2001) with dynamic time and place characteristics, allowing essential communication that was uncomplicated, yet comprehensive. The other methods of communication utilized in the collaborative problem-solving discussions (Online and Hybrid) were reported in participant reflections as easy, simple and efficient (Lamar-Dukes & Dukes, 2005). No matter the day or time or place, collaboration team members were "available" and communicated lots of what teachers need to know. The collaboration techniques used in this study actually did come from outside the District resources (Peck & Scarpati, 2007) and a dot.com called Moodle.

For Q2, a key question is whether OG and HG group members were satisfied with the asynchronous supports and ideas they received from alternate format collaborative partners helping them with student problems and whether these same participants thought they had improved knowledge base after receiving advisement from their experts online and/or from the other supports (i.e. instructor responses, instructor prompts, journal articles for the week). Additionally, this question asks if the Online and Hybrid group members used

their experts' ideas with their students. Computer supported collaborative learning, after all, is intended for advancing "deep learning, sustained and critical discourse, and effective discussion" (Chen & Wang, 2009). The study here asks did this happen?

In the structure of this study, OG participants collaborated with the HG members, instructor or other experts, as well their other OG members. Other supports and assistance from posted journal articles on the topic of the week and instructor-provided documents were identical for both HG and OG.

How online and hybrid online and face-to-face professional development supports teacher education is still being studied and many questions remain (King, 2002). Teacher learning and collaborating to problem solve about their students with ASD/HFA/AS were accomplished during this study in a new format for the District in-service participants by utilizing either HG (face-to-face and online with support) or OG (only asynchronous, online) delivery formats during two classes of the five class course. Many aspects of learning accomplished through online discussions are under-studied (Dennen, 2008) and online discussion's contribution to learning may never be fully known (Dennen, 2008).

As part of this study and in an attempt to overcome impediments to quick and effective teacher learning to sufficiently serve students with ASD/HFA/AS in classrooms who can ill afford to wait, the Moodle online was created by District specialists to use as an alternate environment for getting what teachers need to know and participants were provided access and training on how to "be there" for

learning. See Appendix K Moodle Tutorial for the instructional material to train participants on how to access the new online asynchronous learning, discussion, and collaboration environment. All participants enrolled in the professional development in-service used traditional face-to-face discussion for Classes One, Two, and Three. The difference in collaborative problem solving occurred in Classes Three and Four. Would "increased opportunity for rich interaction" (Hurt, 2008) occur? The two groups in this study were differentiated to decide. In Classes Three and Four, the HG held problem solving discussion in their face-to-face portion of the class as well as optionally online during the asynchronous discussion. In contrast, the OG held collaborative problem session solely during asynchronous discussion, as part of their required assignment.

To initiate and build familiarity for the upcoming classes online, all participants familiarized themselves with the system as part Class One and Two in the online environment Moodle through interactions unrelated to course content. Discussions in Classes Three and Four were online for everyone, however, the HG also experienced face-to-face discussions, support and prompts from the instructor, and accessed the Moodle directly in the lab for two of the three online hours of their class. HG was not required to be online during Classes Three and Four although participation was available, intended and encouraged. Discussions for Classes Three and Four for the OG members were required for all aspects of the classes and the expectations were identical as for the HG, i.e. collaborative problem solving for classroom concerns. The researcher/instructor was in the online environment Moodle daily through each week of the course to support or

prompt participants online. Online Moodle discussion comments were obtained for all twenty-four participants and instructor. As can be seen in Appendix L, the number of interactions for the OG was well over a hundred per week in comparison to the OG responses during the weeks when online discussion was not required. The significance of the large number of interactions in part was due to the requirement to be online, however, even the number of interactions for the HG group increased during the online weeks. When considering only numbers of responses, an interpretation could be made that the online discussion generated responses regardless of being required or not. In addition, the number of responses for HG averaged 3.5 for class in Weeks One and Two, 18.5 for Weeks Three and Four. Week Five interactions totaled 8 which may have been influenced by the previous two weeks. For the OG group the average for face-to-face Weeks One and Two was 21.5, for online format Weeks Three and Four was 111.5 and for Week Five face-to-face the number of responses was 30. An interesting pattern occurred relative to the interactions. A slight increase in responses from Weeks One and Two also occurred with the HG who were not required to go online. The OG continued to use the Moodle even during Week Five when not required. Various members of the class asked the instructor if the Moodle could remain active after the end of the course as they wished to continue contacting their classmates for assistance. The effect of the online experience may have influenced the group members to continue using the online format as a medium of exchange even when not required. Collaboration online may have caused a "chain of events" that supported and sustained collaborative learning

searches by the participants (Guzdial & Turns, 2000) just for the intrinsic value of learning.

Appendix L provides insight into topical areas and how exchanges occurred. From Appendix L, the requests for assistance and the respondents were quantified. Interpretation of the quantification suggests that significant discussion was sustained on the online Moodle discussion board. Participants in the study wrote extensively to others about their questions and problems, particularly in Weeks Three and Four alternate in-service delivery format, and participants received considerable responses to their requests to problem-solve. Many "expressions of communication" (King, 2002, p. 239) were used in the alternate delivery formats of hybrid and online which can contribute to the potential for their use in teacher education (King, 2002).

Results for participant reports of learning and problem-solving help received through an online discussion approach.

The analysis of Q2 is qualitative and quantitative and derives frequency and meaning from weekly writings of the participants in this study. Data regarding participant satisfaction and learning was collected with Collaborative Problem-Solving Discussion papers written each week by each participant in the Autism and Adaptations in-service course after discussion with classmates. The discussion held by course participants weekly was designated for collaborative problem solving and targeting a problem or potential problem for a specific student found on the Autism Spectrum. The discussion was specifically to detail challenges faced by participants and their colleagues when providing services for

children and youth on the Autism Spectrum, situated in real-world classroom events, a point made in the literature as effective for learning for the past two decades (Van Aalst & Chan, 2007). A reading schedule for supplemental articles used to support the discussion was posted online. The weekly collaborative discussions had two parts:

- Describe a situation in which the in-service participant would like input from colleagues, instructor or other experts; and
- Provide participant insights to one or more of the other in-service class members for their challenges in providing services to children and youth who are on the Autism Spectrum.

Through discussion with classmates and instructor (or other experts), the participants were to collaborate and problem solve about a specific student or situation that each wanted to address. In the weekly discussion, participants were asked to develop a strategy or idea for solving the personal and particular challenges posed with the student or situation. Through discussion, participants would recognize knowledge building, allow them to make and forward further contributions, and overall enhance concept understanding (Van Aalst & Chan, 2007). Participants then completed a brief written reflection addressing the challenges their in-service classmates have raised relative to a particular child or issue.

Discussion during face-to-face formats in Classes One, Two and Five was held in class and had ready hardcopies of the journal articles related to the class. The one-to-two page reflection writing assignment was completed either in or outside class and submitted to the instructor prior to the next Class session.

Discussion during HG or OG formats allowed participants to enter the discussion on the Moodle asynchronous online environment any time prior to the next class. Similarly to the directions in other sessions, participants were to collaborate over a minimum of one challenge faced by an in-service colleague and to similarly produce a one-two page narrative responding to challenges raised in the discussion. That written reflection was also submitted to the instructor prior to the next Class session.

Results.

In the participant reflection papers written each week that encompassed collaborative problem-solving, every in-service class member participating in the study was asked to present a challenge faced by him/herself or a colleague when providing services for students with ASD in general education classrooms. Data collected from the papers was organized by themes derived from these Weekly Collaborative Problem-Solving Reflection papers into the following broad categories:

- Classmate suggestions helped to broaden knowledge base (gain understanding)
- Classmate suggestions were implemented with effective outcomes
- Classmate suggestions were implemented with ineffective outcomes
- Classmate suggestions were implemented with unknown outcomes
- Classmate suggestions will be implemented in future (according to participant)

Every participant provided a weekly paper for each of the 5 class sessions. The following rubric was given to participants in Class One and directions were

that responses in every reflection paper were to incorporate four components listed in the rubric below:

Describe the situation or challenge that you would like others to assist you with	**Minimum of one important idea from the assigned article related to a challenge - either to your situation or that of one of your classmates**	**Two suggestions for how to address a challenge faced by one or more of your classmates**	**Describe/ explain how you were able to implement suggestions this week**

Every member of the class typically mentioned one challenge they or someone they knew had regarding providing services to students with ASD/HFA/AS and each also gave two suggestions to the person requiring assistance, likely a result of rubric directions to list one problem and two suggestions. Of the suggestions for working with students, the following was reported by participants:

- 25 had effective outcomes (HG=12; OG=13)
- 5 had ineffective outcomes (HG=3; OG=2)
- 4 had unknown outcomes (HG=2; OG=2)
- 17 will be implemented in future (HG=8; OG=9)

Overall, 60 contributions about suggestions of colleagues were recorded for themes related to broadening participant knowledge (19 total; HG=8; OG = 11) or receiving suggestions for how to work with students (41 total; HG=25; OG=37). Examples sometimes came from personal experiences and were not related to course content, such as from Class Two OG wrote, "One suggestion from a cohort was to suggest to my student that his friends were not allowed to come to the lunchroom with him…Another suggestion was to try to reason with my student,

telling him that arguments that may arise between friends are best handled in a more private place than a cafeteria or outside surrounded by a lot of people. “ The responses overall, as in the preceding example, were not observed to be a direct explanation of what to do.

More than ten percent of participants each class and 17% overall said that classmate suggestions helped to broaden their knowledge base about students with ASD/HFA/AS. At least one in ten participants said this every week of the session. In Classes Three and Four when alternate in-service format was online, however, the OG jumped to 27-29% making this statement. Schrum, Burbank, Engle, Chambers & Glassnett (2005) also found that high praise is given to online experiences of participants (both students and instructor) for being useful and applicable in a course.

Typically, both HG and OG participants receiving assistance wrote in their papers about how they thought the implementation of suggestions might go, e.g. an OG in Week 3 said, “I’m trying to follow suit, so we’ll see how it goes next week.” Less than 5% of total participants (five individuals) said classmate suggestions were implemented with ineffective outcomes; four reports occurred during Week Four and two of those reports were by OG. Most often, ineffective outcomes were mentioned by HG (3 reports) versus Online (2 reports). Overall, the suggestions and help from peer participants, such as occurred in the Autism and Adaptations in-service, made a positive difference to participants for the work of teaching (Schrum, et al., 2005).

See Appendix L includes discussion topics and who asked for/gave help on the Moodle and details of activity in the asynchronous online environment discussion board.

Of interest, one OG class member who teaches self-contained elementary autism classroom had this to say about her own frustrations for getting help, all the while helping colleagues who needed the most basic of help to teach students with ASD: "In all of the cases I have been involved, I have been the person to help and educate the team members, while also trying to keep myself educated about new research and interventions, educate the paraprofessionals whom work with these children closely, as well as educating families in advocating for their children. It becomes an overwhelming responsibility especially when many of the team members need basic information but also the complex and specific information to be effective in the classroom." The need for more teachers to know what to do and how to adapt appropriately for their students with ASD/HFA/AS requires more ways for educators to get their learning and supports than the traditional face-to-face asking the one "expert" in the building. The in-service class on autism was needed to support more than the basic teacher. As in the OG participant above, those educators with more experience need relief from the demands for knowledge base and adaptations ideas from their classroom colleagues.

Overall, participants collaborated and reported that suggestions for working with students in the classroom were implemented with effective outcomes. For HG, overall in the course, 16% of the participants stated classmate

suggestions specifically broadened their knowledge base; a slight increase was seen in HG for hybrid Classes Three and Four when 20% found classmates supporting their learning. In OG, 18.8% average commented in reflection papers around the theme classmate suggestions helped to broaden knowledge base (gain understanding), however, in online Classes Three and Four, a significant 28% of OG found their colleagues supporting content knowledge gains. For all five in-service classes, at least one of the study participants in both OG and HG said they received suggestions from "experts" in the course that will be implemented in the future. In Class Three online, however, HG showed only 10% with this reflective comment while OG had 29% echoing the idea. Nearly identical indications appeared in Class Four when, again, 10% of HG and 27% of OG noted classmate suggestions would be implemented in future. Classmate support to others' learning was much more in evidence for OG participants during Classes Three and Four's alternate format online sessions. Possibly, OG participants became more comfortable in asking for help and turning around to share their knowledge with others requesting help. In Class 5, back to face-to-face, the OG participants returned to resemble Class 1 and 2 results, and were at about 17% for peers adding to their knowledge base, much lower than when collaborating in Classes 3 and 4 online. Possibly, online, all participants weighed in to help other teachers versus just a few speaking up in face-to-face classes. Particularly for OG participants, "experts" became readily available any time needed and from locations larger than their own school campus. Possibly, the supports received from their in-service fellow participants outside the class sessions boosted

participant learning and satisfaction for the outcomes for students. In looking at how the participants in this study used collaborative problem-solving to learn and help with issues related to teaching students with autism in their classroom, the majority of help for personal challenges encountered and ideas for what to do with students came during alternate in-service delivery formats. Learning at a distance can help individuals and groups communicate and become educated (Schrum, et al., 2005). However modest, the reported successes of suggestions from other teachers in the very short fifteen hours of the course may indicate that the asynchronous and online model of increasing knowledge base and problem-solving with teacher peers, even when not in proximity, has merit. No longer are nearby post-secondary institutions or commercial in-services in town are the only resource for teachers in the District (Schrum, et al., 2005). The idea that the participants were socially constructing knowledge likely was at work and the approach enhanced participant learning (Van Aalst & Chan, 2007; Caverly & Ward, 2008; Hurt 2008; Resta & LaFerriere, 2007). Bringing participants together online who have the common interests (Knobel & Lankshear, 2009) not only facilitated teachers to appropriately reach and teach students with ASD/HFA/AS but also boosted the possibility of improved student outcomes – and flexible, good quality professional growth opportunity (Hurt, 2008).

Overall for Q2, participants in alternate format found satisfaction and utilization of suggested classroom ideas and used collaborative problem-solving. Participants in the study were very satisfied with the learning and help they received. For 40% of the in-service course, collaboration and supports were in

non-traditional in-service delivery formats and not the usual face-to-face. The results show teachers can be very satisfied with learning about their students and can obtain effective help in working with their students through non-traditional ways. Teachers do not need to a physical meeting to learn and problem-solve together for their students. Students will benefit from utilization of appropriate and research-supported adaptations focused on their needs.

Question 3 Discussion

> Q3: Will a teacher's attitudes toward online instruction as a means of collaboration be affected as a result of engaging in an online asynchronous format?

Question 3 results and discussion

The focus of Q3 is to determine if attitudes toward online as an instructional format could be altered as a result of participating in a well designed course or portion of a course. A comparison of Pre-Test and Post-Test Likert Survey responses provided the answer to the question for the set of teachers involved in this study

Context.

The context of this question is found in an earlier study in which a set of teachers was adamantly opposed to using technology for any kind of learning situation. From the earlier study (McCoy, Gehrke & Bruening, 2009), District teachers reported they would not select online methods of learning more about autism and adaptations, though they indicated more personalized teacher information was needed and in a more timely manner. A focus group interview in

that study had one participant state what she viewed as a key component of professional development that was missing in online classes. She said she did not find it shocking that surveyed teachers did not prefer an online format for an in-service, **"**(We want) the personal piece, about kids on the spectrum, want to hear others' stories, not just reading, personal interaction."

In addition District teachers from the previous study were concerned about timeliness and ability to receive feedback for problems in the classroom. Past practices, such as face to face interaction or notes via email or hard copy, were not proving to be satisfactory. In the previous study's focus group interview (McCoy, Gehrke & Bruening, 2009), teachers reported they needed in-service format that was more timely, "Instead of one day at beginning of the year and that's it, do one hour and then another in a month, on-going. Give training when we have need for it, break it up when it's needed."

The teachers in the McCoy, Gehrke & Bruening study (2009) held very negative or dismissive attitudes toward online instruction. One teacher commented, "Online? Just like going to school…" and said they needed interactions, questions and answers, and a discussion process. The teachers said learning required a "human aspect" and felt "reading with computer is no fun, no interaction" and "like pencil and paper for our ASD kids, not meaningful." The teachers expressed the view that participating in an online format would not be able to provide the type of in-service delivery required, i.e., in-service requires "Hav(ing) someone walk you through the techniques, you see what is done,

(techniques) are modeled." As a group, the teachers held very negative opinions about online learning, although most of the interviewees had never taken an online course.

When questions about what the teachers would like to see in an in-service related to autism and the type of format desired, they indicated strongly that the following items were important to them: timely, readily accessible by all working with the students with ASD, over time/on-going, and whenever they received a student in their classroom (immediacy).

Based on these self-reports the need for quicker response turnaround was apparent. An element of successful teacher learning requires personalized and responsive insights and easy facilitation of collaborative work (King, 2002). An online format could address instructional needs through collaborative problem solving via an asynchronous discussion. Collaborative learning in asynchronous communication brings together "students who are geographically distributed" (Resta & LaFerriere, 2007, p. 67) and heightened the need for flexible time and space (Resta & LaFerriere, 2007). The teachers' attitudes toward online instruction were very negative either due to previous poorly constructed coursework or simply through "urban myths" associated with the format. This negative attitude extended to the administration who would allow no more than 40 percent of a proposed in-service course to be taught with any type of technology other than an overhead projector. As a result, the researcher/instructor received

permission to incorporate technology involving hybrid or online instruction for two weeks of a five week in-service.

Differences in participant attitudes toward in-service format delivery - Results and interpretation of Likert Scale.

Pre- and Post-Test Results: HG.

HG participants reported a marked increase in positive rating for alternate format delivery in their post test from their initial ratings in all areas related to inservice delivery using technology. On a 5 point Likert scale, HG participants moved from average 3 to average 4 about collaboration in a weekly meeting with online discussions added. HG moved in a positive direction for collaboration online supplemented with lecture materials, from about 2 to 4. HG had a clear change in attitude with respect to rating the convenience of online collaboration supplemented with onsite collaboration. Initially members of the HG rated online in Pre-Test as very difficult (.9 of 5 on the scale) and in Post-Test as very convenient (4.7 of 5 rating). HG participants went from not likely (1.85 ranking of 5) to use online collaboration as a supplement to face-to-face to very likely (4.2 of 5) by the end of the course, and they were more interested (Pre-Test 2.15; Post-Test 4.3) in online in-service delivery which provides interactive discussion groups. Although the attitude toward HG instruction was positive, the HG continued to like face-to-face in-service format, rating it about the same as in the pretest (from average 4.0 on Pre-Test to average 4.6 on Post-Test). HG participants found online collaboration as a primary means of contact mid-range helpful (average 3.1 rating on 5 point Likert scale) by the end of the five week

course which usually is interpreted as neutral, neither for nor against. See Table 13 for Hybrid participant feelings toward in-service format delivery; ratings were on a 5 point Likert Scale with 1 being the least and 5 being the most favorable.

Hybrid format group (HG)	Pre-Test	Post-Test
1. Collaboration in face-to-face weekly classes	4.0	4.6
2. Collaboration face-to-face weekly meeting with online discussion	2.95	4.1
3. Collaboration online as primary contact	2.65	3.1
4. Collaboration online supplemented with lecture materials	2.2	4.3
5. Online collaboration with expert prompts requesting participation	2.8	4.2
6. Convenience using online collaboration supplemented by onsite collaboration	.9	4.7
7. How efficient/effective online collaboration without onsite collaboration	1.4	3.3
8. Likely to continue online collaboration as supplement to face-to-face collaboration	1.85	4.2
9. Interest in online in-service delivery with interactive components, e.g. discussion groups	2.15	4.3

Table 13. Hybrid participant feelings toward in-service format delivery on a 5 point Likert scale with 1 being the least and 5 being the most favorable.

Pre- and Post-Test Results: OG.

OG members in Pre-Test had attitudes a little higher, but at best neutral, about alternate format in-service delivery models (5 point Likert range in 2-3's) and became more positive overall in by the end of their in-service course. Table 14 provides Online participant feelings toward in-service format delivery on a 5 point Likert Scale with 1 being the least and 5 being the most favorable.

The OG consistently found the overall in-service format quite helpful and convenient by Post-Test (ranges generally 4 of 5). Although very agreeable at the beginning and end of the course to continue collaborating face-to-face in weekly classes as the primary contact (Pre-Test 4.39 and Post-Test 4.4), OG preferred their in-service format completely online (Pre-Test 2.71; Post-Test 4.2). OG also found greatly increased convenience using online collaboration supplemented by onsite collaboration (from Pre-Test 2.64 to Post-Test 4.4). OG indicated that they were highly likely to continue use of online collaboration as a supplement to face to face meetings (from Pre-Test 2.64 to Post-Test 4.5). OG were very interested by the end of the course in asynchronous in-service delivery that provided interactive discussion groups such as the Moodle environment used in the classes, increasing from 2.21 of 5 Pre-Test ranking to 4.3 of 5 Post-Test ranking. See Table 14 for OG participant feelings toward in-service format delivery, using a scale identical to HG.

Online format group (OG)	Pre-Test	Post-Test
1. Collaboration in face-to-face weekly classes	4.39	4.4
2. Collaboration face-to-face weekly meeting with online discussion	3.5	3.7
3. Collaboration online as primary contact	2.71	4.2
4. Collaboration online supplemented with lecture materials	2.93	4.0
5. Online collaboration with expert prompts requesting participation	2.86	4.3
6. Convenience using online collaboration supplemented by onsite collaboration	2.64	4.4
7. How efficient/effective online collaboration without onsite collaboration	1.79	3.9
8. Likely to continue online collaboration as supplement to face-to-face collaboration	2.64	4.5
9. Interest in online in-service delivery with interactive components, e.g. discussion groups	2.21	4.3

Table 14. OG participant feelings toward in-service format delivery on a 5 point Likert scale with 1 being the least and 5 being the most favorable.

The use of technology to provide a forum for collaborative problem solving for OG and HG with only two of five classes being offered using this technology appealed to OG and HG participants. The educator participants provided self-reported success when engaging in interventions for their students with ASD/HFA/AS. Attitudes toward using online or hybrid instruction for this set of participants were changed in a positive direction as a result of participating in a well designed highly interactive group discussion setting. Effective discussion in asynchronous forums is supported in the literature (Guzdial & Turns, 2000; Johnson, 2001; King, 2002; Oblinger & Oblinger, 2005; Dennen, 2007; Hurt, 2008; Van Aalst & Chan, 2007). Qualitatively, participants had the

following comments about the use of technology for solving everyday classrooms problems with their students and about learning in new ways:

- "I am leaving this class feeling like I have received good advice from those who know best!"
- "I'm glad I took this class! I learned a lot, I networked with other professionals, and I'm ready to possibly receive these students into my classroom next year!"
- "I enjoyed reading others' comments on the Moodle regarding paraprofessionals."
- "Go Moodle!"
- "I, for one, would love to continue the Moodle, or find a connection to do something similar with the general education teachers that I work with."

In spite of a wary eye when the Autism and Adaptations in-service began, participants "saw a new light" about learning and collaborating online. An element of successful teacher learning requires personalized and responsive insights and easy facilitation of collaborative work (King, 2002). Collaborative learning in asynchronous communication brings together "students who are geographically distributed" (Resta & LaFerriere, 2007, p. 67) and afforded participants flexible time and space (Resta & LaFerriere, 2007). Based on the self-reports of teachers, the need for quicker response turnaround (McCoy, Gehrke & Bruening, 2009) and help for working with their students was addressed through online collaboration created in the Moodle online environment.

Summary of Overall Interpretations for the three Research Questions in this Study

Overall, in this study, a high percentage of participants increased their knowledge base about students with ASD/HFA/AS during each professional

development 3-hour in-service class each of five weeks. Evidence lies in the quantitative results from the Post-Test for Knowledge or what participants learned of the content taught each class. OG participants demonstrated more content learning overall, though what teachers need to know for their students was demonstrated by all participants in this multiple-format delivery course. All participants valued asynchronous collaboration with other in-district "experts". Though the total group started out before the first in-service class session rating face-to-face as a preferred method for in-service, all but one participant found online learning in an asynchronous manner with supports more favorable and very positive by the end of the course.

Implications for Education

The purpose of the intended research was to investigate the effectiveness of a collaboration model between general education teachers and special education support staff who provide services to students with ASD/HFA/AS in general education settings.

The results clearly indicate that the participants in this study learned what teachers needed to know, found some measure of a new type of teacher support in the form of collaborating with others in their own positions/in-service previously untapped, and were highly satisfied with online in-service delivery with supports, especially with some face-to-face collaboration. This study used a novel resource and method for learning and problem-solving – and hopefully will be considered by the District as a legitimate and needed ancillary to its totally face-to-face professional development in-service formats currently in place. Participants in

this study came to learn and like an alternative model and method for successfully working together with others in the District and then came to new consensus for what works for the student with ASD/HFA/AS in their classrooms.

This study developed a teacher education delivery system that provided timely, specific and easily accessible interventions (Knobel & Lankshear, 2009; Caverly & Ward, 2008; Chen & Wang, 2009; Hurt, 2008; McCoy, et al., 2009). The District's participants in this study had good outcomes for learning and would seem to support online learning for teachers (Chen & Wang, 2008; Guzdial & Turns, 2000; Hewitt, 2005; Aalst & Chan, 2007) and not inconclusive (Hurt, 2008) for this study. Additionally, the study shows that knowledge building was fostered through asynchronous online discussion environments (Aalst & Chan, 2007) and that teacher groups can collaboratively construct knowledge (Caverly & Ward, 2008; Resta & LaFerridere, 2007) using effective discussions and social interactions in online discussion forums. Districts need not fear that online in-service and teacher collaboration activities to learn are mere social exercises (Chen & Wang, 2009) with little learning. The small group of educators in this study, each with their own unique, and possibly small contributions, made additional and new meaning about their students with ASD/HFA/AS in the general classroom and found successful ways to adapt for them (Liotta, 2008), helping to directly improve the outcomes of their students. These participants discussed, wrote and shared in new in-service ways with their own colleagues, with simple supports, combined knowledge and created understanding (Caverly & Ward, 2008) and ways to help their students now and in the future. The District

invested minimal resources of specialist time to bring up the Moodle online environment and spent no money to maintain. Time and cost to the participants was not different than physically sitting in a classroom receiving in-service. Impediments of time, cost and proximity were curtailed by the Moodle online environment for the District to train their teachers with Autism and Adaptations: What Teachers Need to Know.

Limitations

The District in-service course in the alternate format delivery model involved a small number of class weeks. More weeks with participants, both OG and HG, would have discovered additional data about participant performances and allowed more analysis of group differences regarding the effectiveness of the online and hybrid alternate format delivery models.

The study had a small number of participants in each group. The group size was limited by the district due to the confines of physical space in the face-to-face format sessions. With more participant data, more may have been exposed about participant knowledge base, collaboration and preferences for format delivery.

OG and HG group sizes were uneven in number for each group. Due to two participants having family emergencies during Classes Three and Four (which would have dropped them from the traditional District in-service due to physical absences from class), request for OG assignment was granted. The random assignment was, therefore, modified for two study participants.

Although Q2 addresses the use of technology, face to face interactions are also included to serve as a rough comparison. The face-to-face interactions are a limitation to analyses regarding the use of technology. Also in Q2, although the numbers increased in terms of responses, the responses may have been a small set of participants or could have been one comment per person. Differentiating responses of participants would have been more beneficial.

The OG participants sent 37 responses out of an expected 28. No data is reported for where the extra suggestions occurred or if some participants made additional responses beyond expected.

Future Research

The success levels experienced particularly by Online participants in the study's in-service course for Autism and Adaptations: What Teachers Need to Know suggests additional support for asynchronous online environments as an answer for the dilemmas faced by many schools - how will teachers learn what is needed when students are arriving at alarming rates with unfamiliar characteristics and needs and experts are few and far? Online teacher learning and collaboration is supported as an answer. What more might we find to know?

Rather than focusing on whether the alternate delivery model is better or worse than traditional face-to-face for teacher in-service, examining variables of the online learning itself deserves review. Testing how collective knowledge construction starts, works or is hampered in online teacher collaboration (Resta & LaFerriere, 2007) could be completed. Additional study might provide in-depth

knowledge about group size for online collaboration – what size is optimal for in-service participant learning and collaboration? Would smaller Moodle member groups have done a better job teaching and learning together (Resta & Laferriere, 2007)? What instructor variables affect optimal learning in online formats, particularly for locally-grown professional in-service? Do participant learning styles affect preference for or success with online in-service delivery (Hurt, 2008)? What traits do teachers possess that might predict good candidates for online learning? Would paraprofessionals or parents who are common collaborative partners and sources of great information about students also have similar outcomes to the teacher/educator participants in this study? Finally, what arguments and impediments exist in public education agencies that free technology lies unused and dismissed as effective, even feasible for increasing teacher success with students?

Chapter 5

SUMMARY AND DISCUSSION

This study began as a continuation of a prior data collection in a public K-12 school district, whose teachers needed to know more about ASD/HFA/AS characteristics, about appropriate and specific adaptations for the core deficits of the condition, where to find good information, who and how for such this advisement – all in a quick, convenient, simple, accessible fashion. Problem-solving for teachers about their students with autism was needed in short order. The chances of students with ASD/HFA/AS being enrolled in the teachers' classrooms have gone from historically low, due to previous low incidence nature of autism disorders, to much more likely and growing. The spectrum nature of autism means students present very uniquely in the classroom and no cookie cutter presentation or reference material will necessarily be "the answer". As noted in Chapter 1, more opportunities are needed by general and special education teachers to learn and collaborate on behalf of students served with ASD/HFA/AS in general education classrooms.

Many barriers come between what teachers need to teach students and actually finding, accessing and using what they need when they need. Will others on the school and parent team agree the ideas are the right ones to try? Restrictions of time, location, money and a way to retrieve user-friendly but research and team supported classroom ideas in this comparatively new special education category can prevent teacher acquisition of effective, timely and research-based information about autism and limit results for such students. This

study attempts a more complex exploration of training factors related to the context of supporting students with ASD and HFA/AS in general education classrooms. This study investigated the effectiveness of an asynchronous online format in-service delivery model for teacher learning and teacher collaboration that would improve teacher content knowledge and provided an online environment for continuing teacher discussion and collaboration about problems with their own students with ASD/HFA/AS.

Chapter 2 reviews what is known about ASD/HFA/AS, about answers for what and who and how to intervene in the classroom. The literature also discusses the role of other teachers as teachers improve instructional practices. Collaboration, teacher learning and problem-solving is steeped in research-based methods but what to do for improving teacher learning and problem-solving needed more flexible and more accessible anytime, anyplace by anyone. Online learning and collaboration was explored as an appropriate alternate in-service delivery model for teachers.

A mixed methods approach studied three questions. Did participants learn information they needed as well using asynchronous online in-service format models as when in a traditional face-to-face consultative approach? Did the use of a broad asynchronous online discussion approach to collaboration result in effective student problem-solving for the participants? Did participant attitudes change toward online instruction as a means of collaboration as a result of engaging in alternate in-service delivery models? In the study, data was gathered through prior and post knowledge testing, weekly participant collaborative

problem-solving reflections papers, and a pre-/post attitudes survey collected during a five-week professional development course encompassing fifteen contact hours for 24 teacher/educators in a suburban southwest K-12 public school district. The course content evolved from topics and themes found in an earlier data collection which revealed what teachers said they needed to know, from whom, and how. The Moodle online learning and collaboration environment debuted in the District, allowing examination of whether voluntary online participation for learning and collaboration by the participants' two groups, hybrid or online, would not only be effective for teachers but also preferred.

Results were in line with literature found but gave more support for asynchronous online educational and collaboration environments providing teachers and expanded knowledge in autism and adaptations and for successful and rewarding online collaborative problem-solving about students served with autism in classrooms. Hybrid in-service format results looked much like the results from traditional face-to-face in-service sessions, though this may have been a function of the hybrid participants' proclivity for "being in class" by really being physically in class with their fellow learners and with their instructor. Results for completely online participants were stronger in knowledge base increases, in online participant feelings about whether they supports they got from collaborative partners online helped, and in preferences for type of in-service in future. Teachers found experts in their own District who provided fitting, reasonable and valid supports for themselves and for their students with ASD/HFA/AS.

Overall, this study gave more educational and collaboration opportunities to the participant general and special education staff to appropriately serve students with ASD/HFA/AS in general education classrooms. Teachers found that, while no "typical" or prescribed treatment regimen fits all students, many adaptations for core deficits in autism could be effective even in the short term.

In sum, this study completed a more complex exploration of training factors related to the context of supporting students with ASD/HFA/AS in general education classrooms and, hopefully, with prove to case to cash-strapped districts and time/resource-strapped teachers with a new model to support themselves to better teach their students.

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APPENDIX A

INFORMATION FROM 2008 DATA COLLECTION

Description of the participants – 2008 Teacher Survey

Informant	***License***	***Teaching Assignment***	***Gender***	***State where trained***
#1	Elem K-8; SpED - SLD	SpED resource teacher in elementary 4-6	F	AZ
#2	SpED - Cross Cat	SpED dept chair, inclusion teacher	F	DK
#3	Elem Ed; Early Child	1st grade teacher	F	AZ
#4	SpED - SLD; Admin PreK-12	SpED resource teacher	F	AZ
#5	Elem K-8; SpED - Cross Cat	Self-contained autism teacher in elementary 2-6	F	CA, AZ
#6	Elem K-8	Kindergarten teacher	F	AZ
#7	Sec 7-12; Admin PreK-12; SpED - Cross Cat	Self-contained autism teacher in grades 7-8	F	AZ
#8	SpED - Cross Cat	Self-contained autism teacher in elementary 2-6	F	NY, AZ
#9	Early Child	Self-contained autism teacher in elementary K-2	F	AZ, OH
#10	SpED - Cross Cat	Self-contained autism teacher in elementary K-2	F	DK

#11	SpED - Cross Cat, ED, SLD	SpED resource teacher K-3	F	MN, AZ
#12	Early Child; SpED - Cross Cat	Self-contained autism teacher in elementary	F	OH
#13	SpED - Cross Cat	Self-contained autism teacher in elementary 2-6	F	UT
#14	Elem K-8; SpED - SLD	Self-contained autism teacher in elementary 1-6	F	AZ
#15	SpED - SLD, MR	SpED resource teacher in elementary	F	VA
#16	Admin PreK-12; SpED - SLD, MR, OI, SMR	Self-contained autism teacher in elementary	F	DK
#17	Elem K-8; SpED - ED, SLD	SpED resource teacher in elementary	F	PA
#18	Elem K-8	2nd grade teacher	F	IL, AZ
#19	Elem K-8; Sec 7-12	3rd grade teacher	F	AZ
#20	Elem K-8; Early Child	Primary grade elementary teacher	F	PA, WV
#21	Elem	SpED resource teacher	F	AZ

	K-8; SpED - SLD			

Description of the participants – 2008 Teacher Survey

Informant	***Years teaching***	***Highest degree earned***	***Types of collaborators noted***
#1	More than Elem 10 years	Master	Gen Ed, Other SpED, Para, Parents
#2	6-10 years	Double Master	Gen Ed, Para
#3	More than 10 years	Master	SpED teacher Para
#4	6-10 years	Master	Other SpED, Gen Ed, Para, Parents
#5	2-5- years	Master	Gen Ed, Para, Rel Svcs
#6	2-5 years	Master	Rdg spec, Parents& volun in class
#7	2-5 years	Double Master	None
#8	2-5 years	Master	Para
#9	First year	Bach	Gen Ed, Para, Volun in class
#10	First year	Master	Para, Rel Svcs
#11	More than 10 years	Master	Other SpED, Para
#12	2-5 years	Master	Gen Ed, Para, Parents
#13	2-5 years	Bach	Para, Parents
#14	2-5 years	Master	Gen Ed, Other SpED, Para, Rel Svcs

#15	More than 10 years	Bach	Gen Ed, Other SpED, Para
#16	16 years	Master	Gen Ed, Other SpED
#17	More than 10 years	Master	Gen Ed, Other SpED, Para
#18	2-5 years	Bach	None
#19	More than 10 years	Master	Rdg spec
#20	More than 10 years	Master	SpED teacher,Para, Volun in class
#21	6-10 years	Master	Gen Ed, Parents

Description of the participants – 2008 Focus Group Interview

Informant	***Teaching Assignment***	***Type of collaborators noted***
#7	7-8 LEP teacher	None
#10	K-2 LEP teacher	Para, Related Services therapists
#9	K-2 LEP teacher	Gen Ed, Para, Volunteers in classroom
#13	2-6 LEP teacher	Para, Parents
#4	Junior High Resource teacher	Other SpED, Gen Ed, Para, Parents
Not surveyed	Junior High general education teacher	Came with Junior High Resource Teacher
#19	3rd grade teacher	Reading specialist
#17	Elementary Resource teacher	Gen Ed, Other SpED, Para
#21	High School Resource teacher	Gen Ed, Parents
#16	Elementary LEP teacher	Gen Ed, Other SpED
Not surveyed	Elementary teacher	Came with Elementary Resource Teacher
#11	K-3 Resource teacher	Other SpED, Para
Not surveyed	Elementary teacher	Came with Elementary Resource teacher

APPENDIX B

IN-SERVICE COURSE DESCRIPTION

District Professional Development
Spring 2010
Course Description

"Autism and Adaptations - What do teachers need to know?"

This class will provide information for district staff that have/had/will have students with autism and high functioning autism in their classrooms/programs. Topics will include:

Characteristics of Autism Spectrum Disorders,
Adaptations for Communication/Social/Sensory Deficits,
What IEP's say about students, and
How to Collaborate with Others who have your student.

The class is part of a research and development project. There will be a hybrid as well as an optional online component of the course.

Audience: general and special education teachers - K-12

Class Design:

District staff /researcher will teach this 15 hour course in the school district as part of on-going district staff development. A product is expected at the end of the course for district staff attending.

Participants in the staff development course will be assigned in one of two groups.

	Week 1	Week 2	Week 3	Week 4	Week 5
Group A	Face to face	Face to face	online	online	Face to face
Group B	Face to face	Face to face	hybrid	hybrid	Face to face

During the 5 sessions of three hours each of the course, participants will be asked to complete the following measures which will be analyzed as noted below:

Questions	Measure	Analysis
Q1	Pre-post test measure over the entire content of the 5 classes coded by content	Comparison of scores at the beginning of the 5 classes and at the end
Q2	Collaborative Problem-Solving	Qualitative analysis

	Reflection related to specific problem area for a specific student	of weekly Collaborative Problem-Solving Reflection (or other questions related to solving the problem for a specific student)
Q3	Pre/post attitude survey or reflection re: efficacy of online, hybrid and face to face collaboration delivery	Comparison of ranking of pre and post attitude survey

CHARACTERISTICS COMMONLY ASSOCIATED WITH CORE IMPAIRMENTS OF INDIVIDUALS WITH AUTISM

Social interaction		
Difficulty	**Possible Indicator**	
Contact with others	Stressed and upset when physical contact occurs, i.e. walking in halls, in line	
Understanding how others feel or understanding their reactions	Seeming insensitive or not knowing how to act with others, not attending or participating in class, little effort in order to please teacher or peers	
Social situations	Confusion with changes in schedule, routine or in emergencies, not knowing how to converse or make friends, misinterpreting social "rules" such as turn-taking	
Emotional regulation	Excessive stress, ineffective self management, outbursts, avoidance	

Communication		
Difficulty	**Possible Indicator**	
Expressing needs	Not being able to explain what is needed, not knowing how or when to ask for help, expressing fear or worry in inappropriate ways such as screaming or engaging in repetitive routines	
Understanding what people say	Not following stated or unstated rules, confusion, not understanding what others want or why	
Interpreting body language	Not recognizing "the look", not recognizing threats from aggressors (bullying), not recognizing internal states that body language suggests (disinterest, fear, irritation, power, confidence, confusion, sadness, joy), not referencing for information such as "what should I be doing?"	

Flexibility of Thinking		
Difficulty	**Possible Indicator**	
Sensory Processing	Intolerance when environment is too noisy, hot, loud or sudden noises, aromas, etc., intolerance for uncomfortable clothing, over stimulation, becoming overwhelmed	
Having repetitive patterns of behavior	Needing to hold or play with a comforting item, needing to sit in the same seat or enter same door, self-stimulation (flapping, pacing, humming)	
Having rituals and obsessions	Insisting on same clothes, same seating, same daily teacher greeting	

Imagination	Not predicting consequences of actions, not predicting reaction of others	

APPENDIX D

IN-SERVICE COURSE PRE-TEST

CUSD Staff Development Class – "Autism and Adaptations – What do teachers need to know?

Completing our own K-W-L: **Pre-Test**
As part of a data collection from CUSD general and special education teachers in October 2008, the eight items below were noted as the "W" or "What do you think teachers need to know in order to work with and improve performance of students with High Functioning Autism/Asperger Syndrome educated in the general education classroom?" At this point, the instructor needs to know what you already know about the topics below.

Prior to our first class meeting insert date, please complete this document with your "K" or Knowledge answers. 1-8. This information serves as the "K" or knowledge base about our topic.

Please return your Pre-Test to Diane Bruening @ IRC. Thank you!

Part 1 What I already Know about the topic (K):
Please provide at least 3 facts/thoughts or opinions that you have already learned before taking this class regarding

1. the characteristics of students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.
2. adaptations for communication deficits of students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.
3. adaptations or developing social interactions for students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.
4. adaptations for social-emotional deficits Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome .
5. adaptations for sensory over-/under-sensitivity Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome .

6. information you would expect to find on the IEP for students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome .

7. collaboration strategies with special and general education teachers when providing services to children with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome High Functioning Autism or Asperger Syndrome.

8. collaboration strategies with paraprofessionals assigned in the general classroom to provide assistance for students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.

Part II Format Information

Please rate your feelings about the format delivery.

1. **How would you rate collaboration using face to face weekly classes as a primary means of contact?**

<_____1_____2_____3_____4_____5_____>
unsatisfactory very helpful
Give 1 or more reasons for why you marked this item as you did:

2. **How would you rate collaboration using a weekly meeting in combination with an online asynchronous discussion?**

<_____1_____2_____3_____4_____5_____>
unsatisfactory very helpful
Give 1 or more reasons for why you marked this item as you did:

3. **How would you rate collaboration using asynchronous discussion as a primary means of contact?**

<_____1_____2_____3_____4_____5_____>
unsatisfactory very helpful
Give 1 or more reasons for why you marked this item as you did:

4. **How would you rate collaboration using asynchronous discussion supplemented with lecture materials?**

<_____1_____2_____3_____4_____5_____>
unsatisfactory very helpful
Give 1 or more reasons for why you marked this item as you did:

5. **How helpful do you find online collaboration with expert prompts requesting your participation during the week?**

<_____1_____2_____3_____4_____5_____>

unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

6. **How difficult did you find using online collaboration supplemented by onsite collaboration?**

<_____1_____2_____3_____4_____5_____>

difficult very convenient

Give 1 or more reasons for why you marked this item as you did:

7. **How efficient and effective did you find online collaboration without supplements by onsite collaboration?**

<_____1_____2_____3_____4_____5_____>

unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

8. **How likely would you continue to use online collaboration as a supplement to face to face collaboration?**

<_____1_____2_____3_____4_____5_____>

not likely very likely

Give 1 or more reasons for why you marked this item as you did:

9. **How do you feel about asynchronous online in-service delivery which provides interactive components, e.g., discussion groups?**

<_____1_____2_____3_____4_____5_____>

Not interested very interested

Give 1 or more reasons for why you marked this item as you did:

Please return this Pre-Test to Diane Bruening @ IRC. Thank you!

APPENDIX E

IN-SERVICE COURSE POST-TEST

CUSD Staff Development Class – "Autism and Adaptations – What do teachers need to know?"

Completing our own K-W-L: **Post-Test**
As part of a data collection from CUSD general and special education teachers in October 2008, the eight items below were noted as the "W" or "What do you think teachers need to know in order to work with and improve performance of students with High Functioning Autism/Asperger Syndrome educated in the general education classroom?"

At the end of our last class meeting March 2010, *please complete this document with your "K" or Knowledge answers #1-8 below.* This serves as your product or the "L" or Learned about our topic.

Please return this product for the class –your Post-Test to Diane Bruening @ IRC. Thank you!

Part 1 What I have Learned (L):
Please provide at least 3 new facts/thoughts or opinions that you have learned through this class regarding

1. the characteristics of students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.

2. adaptations for children Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome with communication deficits.

3. adaptations that you have learned about for developing social interactions for students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.

4. adaptations you know for social-emotional deficits Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome .

5. adaptations you know for sensory over-/under-sensitivity Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome .

6. information you would expect to find on the IEP for students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome .

7. collaboration strategies with special and general education teachers when providing services to children with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome High Functioning Autism or Asperger Syndrome.

8. collaboration strategies with paraprofessionals assigned in the general classroom to provide assistance for students with Autism Spectrum Disorders, High Functioning Autism or Asperger Syndrome.

Part II Format Information

Please rate your feelings about the format delivery

1. How would you rate collaboration using face to face weekly classes as a primary means of contact?

<_____1_____2_____3_____4_____5_____>

unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

2. How would you rate collaboration using a weekly meeting in combination with an online asynchronous discussion?

<_____1_____2_____3_____4_____5_____>

unsatisfactory Very helpful

Give 1 or more reasons for why you marked this item as you did:

3. How would you rate collaboration using asynchronous discussion as a primary means of contact?

<_____1_____2_____3_____4_____5_____>

unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

4. How would you rate collaboration using asynchronous discussion supplemented with lecture materials?

<_____1_____2_____3_____4_____5_____>

unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

5. How helpful do you find online collaboration with expert prompts requesting your participation during the week?

<_____1_____2_____3_____4_____5_____>

unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

6. How difficult did you find using online collaboration supplemented by onsite collaboration?

<_____1_____2_____3_____4_____5_____>

Difficult very convenient

Give 1 or more reasons for why you marked this item as you did:

7. How efficient and effective did you find online collaboration without supplements by onsite collaboration?

<_____1_____2_____3_____4_____5_____>

Unsatisfactory very helpful

Give 1 or more reasons for why you marked this item as you did:

8. How likely would you continue to use online collaboration as a supplement to face to face collaboration?

<_____1_____2_____3_____4_____5_____>

Not likely very likely

Give 1 or more reasons for why you marked this item as you did:

9. How do you feel about asynchronous online in-service delivery which provides interactive components, e.g., discussion groups?

<_____1_____2_____3_____4_____5_____>

Not interested very interested

Give 1 or more reasons for why you marked this item as you did:

Please return this Post-Test to Diane Bruening @ IRC. Thank you!

APPENDIX F

DEMOGRAPHIC INFORMATION FOR STUDY PARTICIPANTS

(DETAILED)

Personal characteristics

This study involved teaching staff who were almost entirely female (n=23/24) for both Hybrid and Online groups. The overall age level of the participants was spread fairly evenly over the age range of those in teaching, with as many in the early stages of teaching (n= 5 age 30 and under) as in the later years (n=6 over age 50). The Online Groups had the most in the youngest age range (n= 4/14) and in the oldest (n=4/14). Six of ten Hybrid Group participants and seven of fourteen in the Online Group were in the middle years (age 31-50).

Educational Background

All participants had bachelor's degrees as required of teachers. Eleven of fourteen in the Online group had a master's degree and eight in ten of the Hybrid group did so. Both groups combined had nineteen of twenty-four participants, nearly 80%, with advanced degrees.

More general education primary level teachers (nine) participated in the study than upper grade/secondary general education teachers (two)**.** Greater interest and enrollment in the study's staff development course by elementary teachers may have been affected by the higher Autism-labeled student population in the lower grades (220 elementary versus 100 secondary students currently) in the District. The overall group had about 12% representation of certified special educators, matching the incidence in the student population for those with disabilities in this district. Three Hybrid Group members and seven Online Group

members reported Special Education or dual (Special Education and General Education) certificates. The Online Group had a 50% measure of the dual certified participants (n=7/14), predominantly elementary educators with special education endorsement (n=4). Teachers with secondary endorsements were represented equally in both the Hybrid and Online groups (two each). Other professional non-teaching content specialization/endorsements were minimally represented but found in both Groups (one school psychologist each).

Only one participant (Online) had certification in Autism, which was acquired in another state than the study location. About one third of the participants (7/24) had special education certification in Cross Categorical; two were Hybrid and five were Online. Over one-third, five of fourteen Online and four of ten Hybrid, had MR or ED certification. About 30% (n=3 Hybrid; n=4 Online) of the entire group had Early Childhood endorsement and nearly as many (3 Hybrid; 6 Online) had ESL (English as a Second Language) endorsement. Twice as many Cross Categorical and SLD certified teachers were in the Online Group, with nine Online versus four Hybrid. The Online Group also had more Reading endorsements (three members versus one in Hybrid) and included one teacher with Gifted certification.

Teaching Experience and Setting

Many in the total group had general education teaching experience, with nine of ten reported in the Hybrid Group and thirteen of fourteen reported in the

Online Group. The participants were fairly evenly split between novice teachers (one to five years teaching) and veterans (more than ten years). Half of those participants with general education experience (Hybrid – 5/10; Online – 7/10) had been doing it more than ten years. The Online Group had more novice teachers (five with under 5 years teaching) while the Hybrid Group had only one. Six of fourteen Online Group participants and four of ten Hybrid Group participants were working at schools in the District with self-contained Kindergarten – 8th grade special education autism classrooms for a total 42% of the staff development class enrollment.

Ten of the twenty-four study participants had not taught special education; five in Hybrid and five in Online. Three of the Hybrid and six of the Online Group had been special educators, many (6 of 9) for more than ten years (Hybrid n=2; Online n=4). Two of the twenty-four teacher participants (Hybrid = 1; Online = 1) have current self-contained autism classroom teaching assignments, both in elementary.

Training and Information received about Autism

Previous college coursework about Autism

About two in three participants (Hybrid = 8; Online = 7) had no college course on Autism or Autism was only briefly mentioned in one course. Four out of fourteen Online Group participants did have two or more college level courses,

the only significant college coursework in Autism for study participants. Only one Hybrid participant had one college course about Autism and none had more.

Training through the District In-Service

About two thirds of participants (16 of 24) had attended a school level meeting devoted to the topic Autism, sixty percent of the Hybrid Group (6/10) and over 71% in the Online Group (10/14). Half of all participants (12/14) had attended another district level workshop (such as the class provided in the study); six were in the Hybrid Group and six were in the Online Group. Nearly half (11/24) had attended an outside district paid training on Autism, especially in the Online Group where eight of fourteen (57%) had done so. Whether or not these reported in-services were required by the school (i.e. faculty trainings where everyone was expected to attend) or whether participants chose to attend (i.e. volunteered to attend an outside in-service) is unknown.

Other Training and Information received about Autism

Other information about Autism would have been obtained of teachers' own volition. Nineteen of the twenty-four participants (Hybrid = 7; Online = 12) reported using the Internet as a source of training information on Autism. Two thirds (16 of 24) used books and articles. Seven participants of the twenty-four stated they learned about Autism from volunteers or through their own other paid work with an individual with autism or family member. Media such as radio, TV

or newspaper were insignificant resources about Autism to the participants, mentioned by only two of the twenty four people in the study.

Staff Members who worked with study participants to serve students with ASD/HFA/AS

Slightly more than half (13/24) of the total study participants worked with another General Educator to serve students with Autism and again roughly half in both Hybrid (5/10) and Online (8/14) groups. Nearly eighty percent overall (19/24) and those in both Hybrid (8) and Online (11) Groups worked with a special educator. Few in the study group reported working with reading specialists (two only, both in Hybrid Group), though such a position is not commonly found in the District schools. Fifty-eight percent (14/24) worked with a para-educator or aide, with Hybrid Group (4/10 or 40%) reporting fewer aides as co-workers than the Online Group (10/14 or 71%). One third (8/24) have parents with whom they collaborate, with the Online Group (6/14 or 43%) reporting twice as likely to work together with parents as the Hybrid Group (2/10 or 20%). Seven of the total study participants use a volunteer to work with their students, all but one in the Online Group. Others were not mentioned as working partners to serve students with autism.

APPENDIX G

COLLABORATIVE PROBLEM-SOLVING REFLECTION RUBRIC

Collaborative Problem Solving Reflection

Purpose: To participate in collaborative problem solving targeting a problem or potential problem for a specific student found on the Autism Spectrum.

General Directions: Discussion will be held over specific challenges faced by you and your colleagues when providing services for children and youth on the Autism Spectrum. A reading schedule for supplemental articles used to support the discussion will be posted online. Two parts of this discussion occur. Part 1 is to describe a situation in which you would like input from your colleagues, instructor or other experts. Part 2 is to provide your insights to one or more of your colleagues in class for their challenges in providing services to children and youth who are on the Autism Spectrum.

Through discussion with your classmates and instructor (or other experts), collaborate and problem solve about a specific student or situation that you want to address. In your discussion, try to develop a strategy or idea for solving the challenges you have with the student or situation.

Your participation for the research and development component of the course includes completing a brief written reflection addressing the challenges classmates have raised relative to a particular child or issue. Your contribution to the collaboration problem solving discussion is due on or before the next course meeting.

In **face to face** formats, you

- will hold the discussion in class.
- complete the assignment either in class or if time is needed outside of class.
- are asked to bring the article to class either as a hard copy or

on your laptop.

- are asked to collaborate at a minimum of one challenge faced by your colleague but may address as many of your colleagues as you wish.
- are asked to produce a 1 – 2 page narrative reflection responding to challenges raised in the discussion and submit to the instructor/researcher.

In **hybrid or online** formats, you

- are asked to enter the discussion any time prior to the next class.
- are asked to post your contributions online at a time convenient for your schedule prior to the next class.
- are asked to collaborate at a minimum of one challenge faced by your colleague but may address as many of your colleagues as you wish.
- are asked to produce a 1 – 2 page narrative responding to challenges raised in the discussion and submit to the instructor/researcher.

Participant Identification:_____

Your specialty/content area/ grade level specified:
_____

Please use the rubric below to guide your 1 to 2 page reflection.

Week and Article	**Describe the situation or challenge that you would like others to assist you with**	**Minimum of one important idea from the assigned article related to a challenge - either to your situation or that of one of your classmates**	**Two suggestions for how to address a challenge faced by one or more of your classmates**	**Describe/ explain how you were able to implement suggestions this week**
Week 1 Article:				
Week 2: Article				
Week 3 Article:				
Week 4 Article				
Week 5 Article				

APPENDIX H

SAMPLE SCRIPT FOR IN-SERVICE CLASS

Spring 2009

Teaching Script for Week One

Orientation
As teachers come into the room, have them pick up a packet with Information letter, Demographic info, and Pre-Test; and complete the following:

PowerPoint: Demographic Sheet

PowerPoint: Class Description and Objectives

State the purpose of the class by referring to the course description in the catalog:

> Autism and Adaptations - What do teachers need to know?
>
> This class will provide information for teachers who have/had/will have students with high functioning autism in their classrooms/programs. Topics will include: Characteristics of Autism Spectrum Disorders, Adaptations for Communication, Social/Sensory Deficits, What IEP's say about students, and How to Collaborate with Others who have your student. The class is part of a research and development project. There will be a hybrid as well as an optional online component of the course.
>
> Audience: general and special education resource teachers - K-12. 15 hours for 1 credit or stipend

PowerPoint: Research and Development

Discuss briefly how the research and development component plays out.

State:
*"*You will be asked to complete Pre-/Post- surveys each week/class, whether we are on-ground or online/hybrid. More on that later in this session."

PowerPoint: Pre-Test

Allow sufficient time for all to complete. Remind participants that they do not have to know answers, only a pre-test.

PowerPoint: Tonight's Agenda

Mention break for 15 minutes at about 90 minutes.
Allow time for IRC person to demonstrate how to sign in and find items on Moodle. Have copies of the cheat-sheet for everyone.

PowerPoints: On Active and Brain-Based # 7 - 13

Just a quick overview so everyone knows that lecture is not the intent, they won't just site for hours, and that collaboration or discussion is expected.

PowerPoints: Student characteristics of ASD/HFA/AS # 14 – 15

Quick review

PowerPoint: **Activity:** Student characteristics of Autism Spectrum Disorders

In-class Activity: *The purpose of this activity is to get the students to participate immediately in an active learning activity.*

State:

"In your table team, you will have one broad characteristic to consider. Teams are to compile a more complete listing of examples for their given characteristic.

- Discuss the listed characteristic.
- Make a list: "What exactly does this characteristic mean in the classroom? How exactly does it look?"

- Up to 10 minutes.
- At least one person in your team should record your specifics or examples of this characteristic.
- Team reporters briefly share out to whole class."

PowerPoint: Autism Definition (slide 16)
PowerPoint: Autism Characteristics (slides 17-19)

Fast review of all slides

PowerPoint: Activity: Student characteristics of Autism Spectrum Disorders

10 minutes
Use KM's Chapter 1 student stories to read.

PowerPoint: Adaptations for ASD/HFA/AS characteristics
PowerPoint: Please remember as we look at strategies: There is no "typical" in HFA/AS...
PowerPoint: School Survival Skills
PowerPoint: Adaptation for Communication Deficits
PowerPoint: Adaptation for Social and Social Interaction Deficits
PowerPoint: A Social Interaction example: for the School Skill "Coming Prepared"

Fast review of all slides

PowerPoint: Another important source of information and help to teachers: What the IEP tells you

Fast review

PowerPoint: Collaborating? Let's talk!
PowerPoint: Collaboration with teachers

Fast revie, then read and say below:

State:

"Now we will try our first, call it a practice session, Collaborative Problem-Solving. This is a model for how we will collaborate on specific students throughout our course."

In-class Activity: *Give about 10 minutes, more if time.*

(From PowerPoint #30)

- Partner Activity – collaboration time!
  - What is a main point you took from today's article on the Moodle?
  - What is your own idea that works for collaborating on such students?
  - What doesn't work?

Handout: Collaborative Problem Solving Reflection

State:

"Collaboration will be a requirement each week.

"Throughout our class, I intend that you will be answering questions and solving problems for students with ASD/HFA/AS – your own and that of other teachers in the class - collaborating with other experts. "

"Think of a student you know with ASD/HFA/AS. Think of problems with this specific student. In an effort to solve a problem for that student:
Consult with your instructor about a possible expert who can collaborate with you about the student this week. Ideas for "experts" include another teacher in our staff development class, another teacher at your site or in the district, Autism teacher in the district, outside autism resource people, volunteers in the field of autism, the parent of the student, or

your class instructor. Once approved by your instructor, contact the expert this week."

"Through discussion with your classmates and instructor (or other experts), collaborate and problem solve about a specific student or situation that you want to address. In your discussion, try to develop a strategy or idea for solving the challenges you have with the student or situation. "

"Remember when consulting about your specific student that you substitute a pseudo-name for the student's real name to protect privacy."

PowerPoint: **Wrapping up this class: Class Schedule and Calendar**

State:

"I have found articles for you to review in small teams, discuss and share. We did some of that tonight. What we are doing tonight is a model for class activities throughout our course. I am though, doing an R&D course here. This class is pretty much the same as the way we will be doing even our Class 3 & 4 which we see below will not be face-to-face. Class 3 & 4 are online and hybrid with your classmates, just asynchronously. We will do things in this class, learn together, and I am guessing that we find that face-to-face or online or hybrid, we learn from each other and get help from each other.)

Go over the class calendar and layout for the 5 weeks of on-ground and online/hybrid. Go over the topics and how they were derived from October 08 data collection.

Divide the class in two parts – Group A or Online Group and Group B or Hybrid Group. *Do the drawing randomly from a hat. Then allow teachers a couple of minutes if they want to exchange with each other (i.e. those who would like more support hybrid group).*

State:

"We are going to randomly draw for the type of format delivery you will use to participate in our course, both for content and also for our collaboration with others. If you are Group A, you will be Online (on your own) for Class 3 & 4. If you draw Group B, you will be hybrid (one hour here in our classroom with db and rest of time on the computer here) for Class 3 & 4."

Ask students to fill out the "I am Group A/B" page for instructor to track who is who.

"Let's review our sessions and how they are delivered. *Participants in the staff development course will be randomly assigned in one of two groups. If you are interested to "trade" with a classmate for online or hybrid format, you may. However, once we get started, trades are not authorized without instructor contact. Thank you!*

Group A

- *Week 1 Face to face*
- *Week 2 Face to face*
- *Week 3 online*
- *Week 4 online*
- *Week 5 Face to face*

Group B

- *Week 1 Face to face*
- *Week 2 Face to face*
- *Week 3 hybrid*
- *Week 4 hybrid*
- *Week 5 Face to face"*

PowerPoint: Collaborative Problem-Solving

Fast review. Refer participants back to the rubric handout of same name. Have extra copies for them to look over.

State:

> "Your participation for the research and development component of the course includes completing a brief written reflection addressing the challenges classmates have raised relative to a particular child or issue. Your contribution to the collaboration problem solving discussion is due on or before the next course meeting."

Allow for questions and thorough understanding of what to do.

If time:
As Guided Practice, have partners or teams go through the Collaborative Problem-Solving form, explain it to their team. Note any questions from the team that cannot be answered by the group. One reporter for each group explain the assignment Collaborative Problem-Solving, adding to the understanding of all. After all reporters have shared, go over any questions from teams.

Transition to Summary and end of class session

PowerPoint: Summary

Handout out: *the Stress-o-meter*.

Dismiss

Class One

Stress-O-Meter: Please indicate level of stress for each;

0 is no stress - 10 **is about to blow!**

Staff Development Class _____

Life in General _____

Please rank the following:

1 (feeling comfortable) through 5 (yikes)

_____Purpose of the class

_____Characteristics of ASD/HFA/AS

_____Adaptations for communication, social deficits, social interaction, sensory

_____what IEP's say about a student with ASD/HFA/AS

_____Collaboration with other teachers about students with ASD/HFA/AS

Comments are welcome below, but not mandatory. Thanks for your attention today.

APPENDIX I

CONTENT MATERIALS BY CLASS SESSION FOR FIVE TOPICS

Content materials by Class session for 5 topics

Class One
Peculiar interactions + Sensory abnormalities (Characteristics)
Visual supports (Adaptation for Communication)
Use peer with a script (Adaptation for Social/Social Interaction)
No "typical" or one size fits all students (Adaptation for Sensory Over-/Under-Sensitivity)
Testing information (who/what/when, history, parent input) + Goals (academic, speech, motor, behavior) + Recommendations and Adaptations (What the IEP says about the student)
Class Two
Spectrum nature + Abnormal verbal and nonverbal + Intense interests(Characteristics)
Simplify language(Adaptation for Communication)
Create a story(Adaptation for Social/Social Interaction)
More time + Reduce handwriting + AT to use(Adaptation for Sensory Over-/Under-Sensitivity)
IFSPs for 3-5 year olds + Goals, Services, Setting(What the IEP says about the student)
Class Three
Imitate/parrot + Non-interactive with others + Compulsions(Characteristics)
Break down conversation skills and teach(Adaptation for Communication)
Teacher calm positive tone(Adaptation for Social/Social Interaction)
Teach student about unique sensitivity + headphones + move to quiet area(Adaptation for Sensory Over-/Under-Sensitivity)
Goals specific to individual ASD deficit areas(What the IEP says about the student)
Class Four
Pragmatic social language problems + Uncomfortable/gross/immature + Abnormal sensations(Characteristics)
Teacher communication adapted for consistency + Teacher communicates preparing student in advance(Adaptation for Communication)
Favorite item for comfort/distress + Picture maps or schedules(Adaptation for Social/Social Interaction)
Avoid rushing or extra time(Adaptation for Sensory Over-/Under-Sensitivity)
Balancing IEP goals with some academic skill development – inclusion

helps + Goals/Adaptations + Service time + Related services(What the IEP says about the student)
Class Five
Damage to brain regions for perspective taking + Trouble integrating lots of information(Characteristics)
Teach indirect language or idioms(Adaptation for Communication)
My Calming Sequence + Social story for calming(Adaptation for Social/Social Interaction)
Calming/Alerting weights + Push heavy items + Therapy ball chairs + Music(Adaptation for Sensory Over-/Under-Sensitivity)
Meaningful goals + Evidence-based Instruction + Resources to teacher + Inclusion + Accommodations + Data collection(What the IEP says about the student)

APPENDIX J

Q1 THEMES WITH NUMERATION OF PARTICIPANTS

INCORPORATING WEEKLY TOPICS

Question 1 - Themes

Question 1: Does the use of a broad asynchronous online discussion approach to collaboration improve the knowledge base of teachers related to characteristics and needs of individuals with autism as effectively as asynchronous discussion with supports in specific targeted areas related to the development of building a knowledge base focusing on students with HFA educated in inclusion settings?

Q1	**Measure:** Weekly inquiry form related to specific problem area for a specific student (WEEKLY REFLECTIONS)	**Analysis**: Comparison of ranking of satisfaction (or other questions related to solving the problem for a specific student) on a weekly basis

(Quantitative Portion Indicates Percentage of Students Whose Reflections Incorporated Given Theme)

THEME	**Week 1** Hybrid	Online	**Week 2** Hybrid	Online	**WEEK 3** Hybrid	Online	**WEEK 4** Hybrid	Online	**Week 5** Hybrid	Online
Related article helped to broaden knowledge base and/or was found to be beneficial (gain understanding)	////// 60%	//////// 57%	/////// 60%	/// 21%	///// 50%	//////// 50%	///// 40%	//////// 67%	////// 50%	///// 42%
Information from related article was related to or already known	/ 10%	// 14%	// 20%	///// 36%	/// 30%	//////// 50%	////// 50%	///// 45%	// 20%	///// 42%
Information from related article was utilized/ implemented			/ 10%		/ 10%		/ 10%		// 20%	/ 8%
Related article was not useful or beneficial							/ 10%			
Classmate suggestions helped to broaden knowledge base (gain understanding)	/ 10%	/ 7%	/ 10%	// 14%	/ 10%	//// 29%	/ 10%	/// 27%	//// 40%	// 17%

Classmate suggestions were implemented with effective outcomes	///// 50%	//////// 57%	/// 30%	/ 7%	/ 10%	/// 21%	/ 10%	/ 9%	// 20%	
Classmate suggestions were implemented with ineffective outcomes			/ 10%		/ 10%		/ 10%	// 18%		
Classmate suggestions were implemented with unknown outcomes	/ 10%		/ 10%	// 14%						
Classmate suggestions will be implemented in future (according to student)	/// 30%	/ 7%	/ 10%	// 14%	/ 10%	//// 29%	/ 10%	/ 9%	// 20%	/ 8%
Overall course satisfaction was mentioned			/ 10%	// 14%		/ 7%	/ 10%	// 18%	/ 10%	// 17%
Participant wanted more from suggestions, course, or article	// 20%	/ 7%								

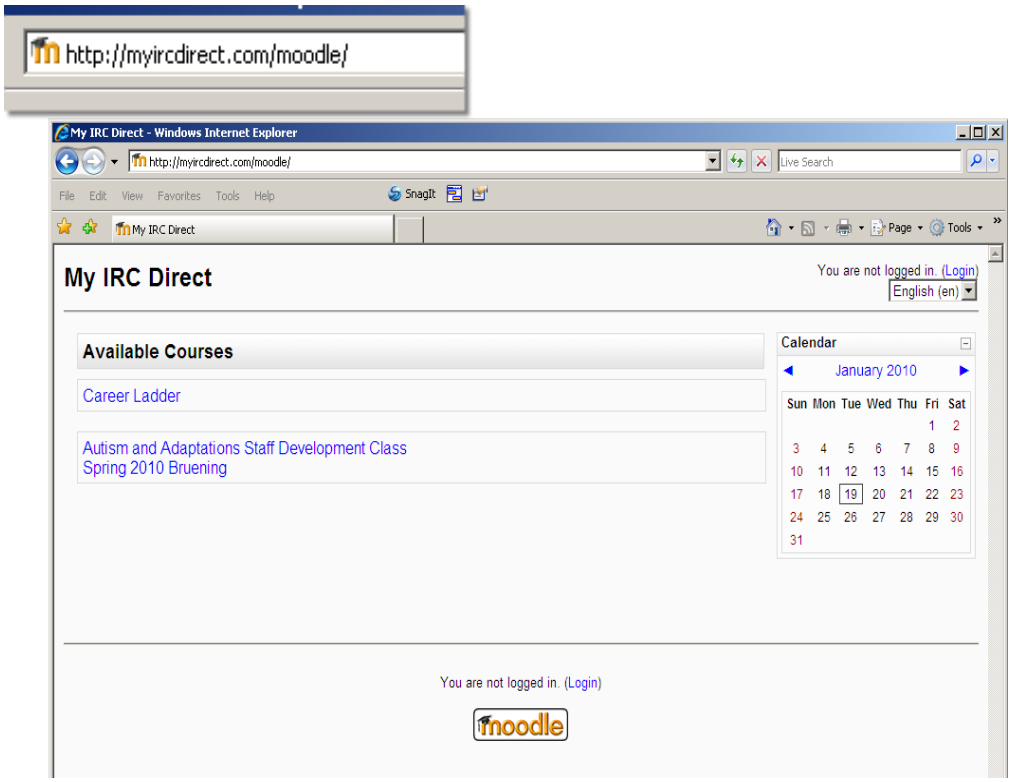
APPENDIX K

MOODLE TUTORIAL

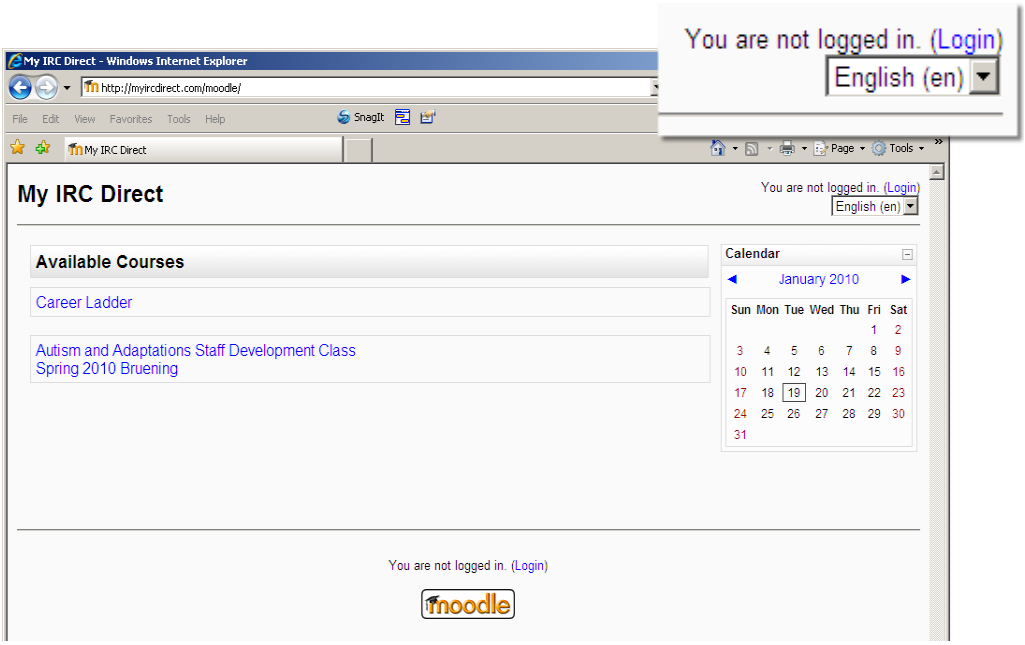
Moodle Tutorial

The following tutorial takes you through the steps of accessing your MOODLE class.

1. Access MOODLE at the following address:



2. Select the Login hyperlink (Login)



3. Enter your username and password. Then select Login

Username:

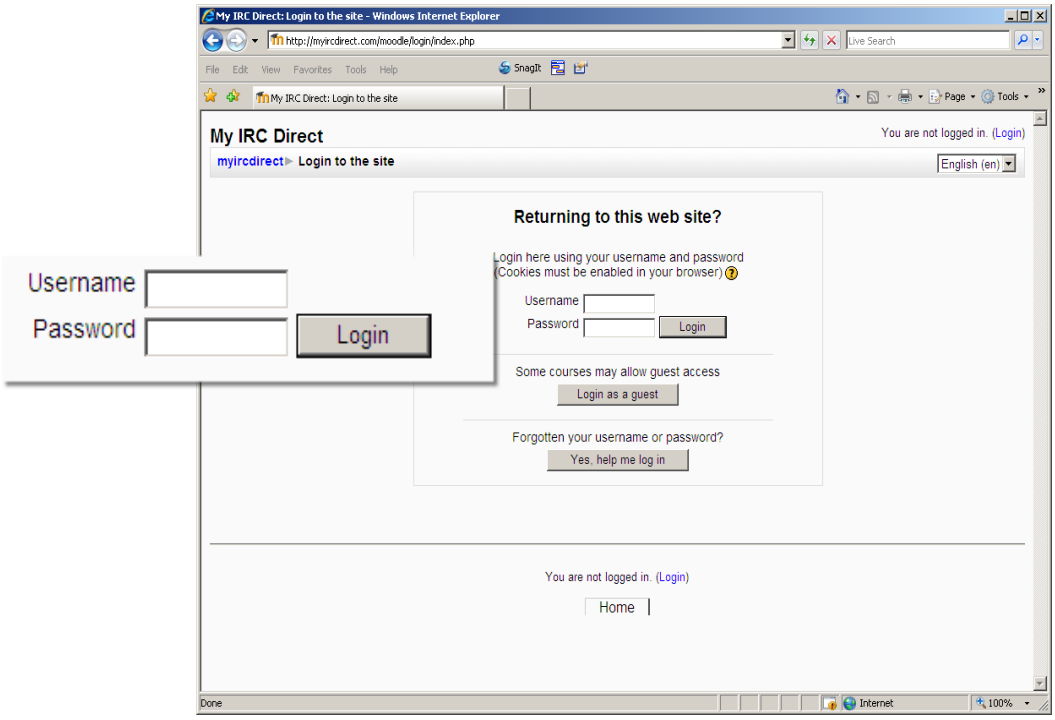
Enter your lastname followed by your first initial.

For example, if your name were **Chandler Arizona**,

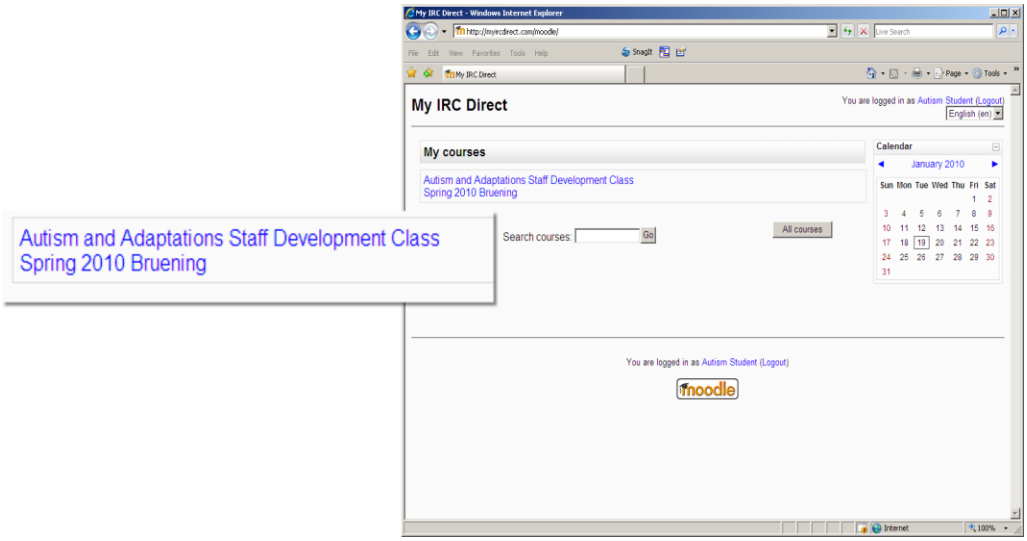
your username would be **arizonac**.

Password:

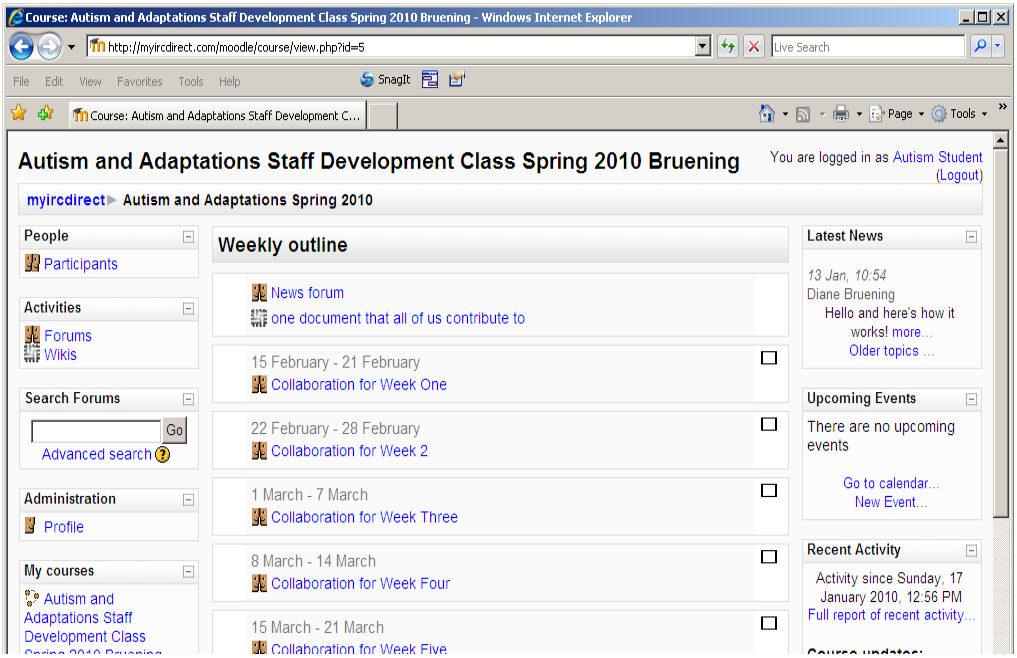
Enter the default password **changeme**. You will be prompted to change your password after you login with this password.



4. Under My Courses select:



5. When you have successfully logged into your class, you should see the following:



APPENDIX L

DISCUSSION BOARD PARTICIPANTS, UTILIZATION AND CONTENT BY CLASS AND SUBJECT LINE OF PARTICIPANTS' POSTING

Class	Online Discussion Forum Topics	Group of member and # of times help was requested in online discussion (O) = Online individual (H) = Hybrid individual (I) = Instructor	Group member and # of helpful responses given in online discussion (O) = Online individual (H) = Hybrid individual (I) = Instructor
Week 1	*Learning and collaborating: what do you think about "discussing" online?	I 1	O 8 H 2
Week 2	*Model for learning and collaborating * Diane needs help on this student, please! *Temple Grandin *Guided practice posting in-class activity/response on Discussion Board	I 1 H 1	I 1 O 6 H 5
Week 3	*Alpha smart keyboards *Resources *Follow up on Should I pull the parents in? *Autism Conference *When parents are non-responsive *Article on nasal spray that helps with	I 0 H 7 O 12	I 8 O 35 H 25

	autism *Student with AS *Transitioning to the next school *Gen ed and SpED collaboration *High school student who is very shy *High School student with AS *Handling the jump from 2nd grade and 3rd *AS student who has trouble loosing (sic) at games *When does a student need s/c versus gen ed with support *How to address physically impulsive behavior by an AS D student while in gen ed classroom? *Autistic student at the prom *Help for early primary gen ed students *Should I pull the parents into the AS child's needs? *Getting parents to address AS		
Week 4	*Inappropriate comments *Lack of control *Parent perception article *Parent in denial!! *Constant skin picking *Loud talker! *Behavior has a function…	I 0 O 8 H 3	I 6 O 22 H 14

	*Approaching an IEP file *Sensory *Having parents and students understand their IEP *Inappropriate behaviors		
Week 5	*Para working with student and has regressed *Head hitter *Collaborating with paras *Gen ed teacher and para roles *Para support with limited time *Para getting to (sic) close to student *Thin line between symptoms of the disability and bad behavior	I 1 O 5 H 1	I 2 O 10 H 6

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