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THE GAME HAS CHANGED: DO ACCOMMODATIONS LEVEL THE PLAYING FIELD, OR ALTER THE SPORT?

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ABSTRACT

Accommodations and modifications are two words frequently confused or misused in the educational world. This mistake can lead to harmful consequences for students when it comes to state standardized testing. Even when the distinction between accommodations and modifications is known, there is still a wealth of problems and lack of evidence for the ten most common accommodations: Braille, Computer/machine response, dictation, extended time, interpreter for instructions, large-print edition, mark answers in the test booklet, oral accommodations, clarifying directions, and test breaks. Currently there are many issues relating to the use of accommodations in the classroom: a dearth of evidence, most studies are conducted in elementary schools, teacher accommodation selection pitfalls, and the use of blanket accommodations. With the implementation of Universal Design for Learning (UDL), a proactive approach to try and alleviate the current downfalls of accommodations, schools may be able to better level the playing field.

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Chapter 1

The Current School Climate

The phrase “leveling the playing field" is frequently encountered in educational research and policy when attention turns to meeting the needs of diverse learners. Some ways in which educators adapt curriculum include accommodations, modifications, and interventions (Harrison, Bunford, Evans, & Sarno Owens, 2013). Chapter 2 defines each of these changes in detail. These changes to the intended curriculum of the general student body are said to “level the playing field.” In other words, these changes help remove barriers that prevent the student from accurately reflecting their knowledge of the subject matter.

Individualized Education Programs (IEPs) are meant to identify and smooth out these bumps in the playing field (Byrnes, 2008b). IEPs are legally binding documents that educators are required to implement (Howard & Potts, 2013). As of 1993, eleven states required an IEP to list accommodations, and since 2003, all fifty states have required that accommodations be explicitly recorded in an IEP (Lazarus, Thurlow, Lail, & Christensen, 2008). Three of the eleven states in 1993 also specified that the accommodations were to be used both in the classroom and during assessments; as of 2005, forty-seven states included this stipulation (Lazarus et al., 2008).

Currently, most researchers advocate for similarity between testing conditions and instructional conditions (Bolt & Thurlow, 2004; Bunce & Simaska, 2013; Byrnes, 2008a; Dolan, Hall, Banerjee, Chun, & Strangman, 2005; Howard & Potts, 2013; Salend, 2008; Scanlon & Baker, 2012; Scarpati, Wells, Lewis, & Jirka, 2009). Given that these accommodations are meant to help improve the validity of state standardized tests, selecting appropriate and valid accommodations proves to be vital because of the ramifications for everyone from the state down

to the individual (Elbaum, 2007; Lazarus et al., 2008). Outcomes potentially impacted by accommodations include grade promotion, graduation, teacher salaries, and school funding (Bolt & Thurlow, 2004).

What makes an accommodation valid? Many researchers agree that for an accommodation to be valid, it must result in a significantly greater improvement for the students who need the accommodation than for the rest of the student population (Bouck & Yadav, 2008; S. W. Cawthon, 2007; Elbaum, 2007; Fletcher et al., 2009; Fletcher, Francis, Boudousquie, & Copeland, 2006; Fuchs, Fuchs, Eaton, Hamlett, & Karns, 2000; Harrison et al., 2013; Jiang & Grabe, 2007; Lovett, 2010; Pariseau, Fabiano, Massetti, Hart, & Pelham, 2010; Sireci, Scarpati, & Li, 2005; Thurlow & Bolt, 2001). Philips (1994) described this difference in improvement as a "differential boost." For example, a test provided with enlarged text should only benefit the scores of students with visual impairments, not all students. The enlarged text allows the test to measure content rather than the ability to see the text.

Who decides which accommodations should be valid and listed in a student's IEP? The IEP team consists of the parent(s) or guardians, at least one general education teacher, at least one special education teacher, an administrator, and sometimes the child (Howard & Potts, 2013; Neal, 2012). Of those mentioned, the general education teacher and the special education teacher are often likely to be the most knowledgeable about available accommodations. Neal (2012) found that 85% of the special education teachers but only 27% of the general education teachers surveyed said they always actively participated in the IEP process.

Not only are a small percentage of general education teachers actively crafting the IEP, but research has also shown that teachers often over prescribe accommodations that the student does not require (Elliott, Kratochwill, & McKevitt, 2001; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Neal, 2012). Accommodations when not needed can have a negative effect on a student's performance. Pariseau et al. (2010) found that students

with ADHD are actually negatively affected by extended time, thus making it an invalid accommodation. This can be particularly troubling given that extended time is one of the most common accommodations awarded (Abedi, 2008; Bolt & Thurlow, 2004; Brockelman, 2011; S. W. Cawthon, 2007; Edgemon, Jablonski, & Llyod, 2006; Elliott et al., 2001; Filce & Lavergne, 2011; Newman & Gonzalez, 2006; Ofiesh & Highes, 2002; Pariseau et al., 2010).

This begs the question then, which accommodations are valid? This question is proving harder to answer than one would expect. Extended time may not be valid for some students (Abedi, 2008; Beddow, 2012; Bolt & Thurlow, 2004; Bouck & Yadav, 2008; Byrnes, 2008a; Edgemon et al., 2006; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Lovett, 2010; Pariseau et al., 2010; Sireci et al., 2005; Thurlow & Bolt, 2001). But others have found evidence to the contrary (Abedi, 2008; Brockelman, 2011; Byrnes, 2008a; Edgemon et al., 2006; Lazarus et al., 2008). Note that many of the studies and reviews listed are found to be both for and against extended time as a valid accommodation.

The current literature shows that there is a dearth of research with conclusive data about accommodations (Abedi, 2008; Brown, Cook, Kelly, & Park, 2011; Byrnes, 2008a; Harrison et al., 2013; Jiang & Grabe, 2007; Jindal-Snape, Douglas, Topping, Kerr, & Smith, 2005; Jordan, 2009; Lazarus et al., 2008; Lovett, 2010; Pariseau et al., 2010; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). Another theme of the literature entails moving away from an emphasis on individually administered accommodations and moving toward Universal Design for Learning (UDL) (Brand & Dalton, 2012; Brown et al., 2011; Dolan et al., 2005; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Gartland & Strosnider, 2004b; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008; Lovett, 2010; Sireci et al., 2005; Stanford & Reeves, 2009; Suritsky, 1993; Thurlow & Bolt, 2001). UDL focuses on creating a classroom that proactively addresses various types of learners. A third motif from the literature is that of the diversity of learners and the need to consider the student not their disability alone; this

entails addressing the specific student when choosing accommodations rather than assigning all students with the same disability a prescribed set of accommodations (Cawthon & Wurtz, 2010; Dolan et al., 2005; Elliott et al., 2001; Fletcher et al., 2006; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Hamilton & Kessler, n.d.; Howard & Potts, 2013; Irving, Nti, & Johnson, 2007; Lazarus et al., 2008; Morales, 2011; Salend, 2008; Scanlon & Baker, 2012; Thurlow & Bolt, 2001).

This literature review will address all of the abovementioned topics while addressing the current state of accommodations in practice, the issues with the current way accommodations are selected and used, and finally how implementing Universal Design for Learning may help alleviate some of these issues. The paper begins with the diversity of learners in the classroom today, followed by the legislation that led to the inclusive classroom. Next, definitions and differences between interventions, accommodations, and modifications are discussed. The review then turns to a discussion on valid accommodations, including the ten most common accommodations as described by Bolt and Thurlow (2001), with evidence for and against most. Another very common accommodation, preferential seating, is also described with respect to writing explicit accommodations (Byrnes, 2008b). Other issues and topics include accommodations "bundling;" IEPs; and assistive technologies, specifically the Livescribe Pen; and Universal Design for Learning.

Different Types of Learners

Classrooms are now a source of great diversity. There are your everyday, 'baseline,' students (average students with no distinct challenges to learning). There are gifted students who generally receive modifications that add to the curriculum (Bossé, 2007; Howard & Potts, 2013). Also there are students with disabilities. These disabilities have a great range from cognitive to bowel and bladder disabilities (Filce & Lavergne, 2011). There are psychiatric disabilities that

students may have: depression, Bipolar Affective Disorder (BAD), Borderline Personality Disorder (BPD), schizophrenia; anxiety disorders (Souma, Rickerson, & Burgstahler, 2006). Howard & Potts (2013) also included other disabilities: specific learning disability, emotional disturbances, autism, deafness, orthopedic impairment, traumatic brain injury, and visual impairment.

The National Longitudinal Transition Study-2 (NLTS2) found that two-thirds of those receiving special education in secondary schools are considered to have a learning disability (Newman & Gonzalez, 2006). Students with learning disabilities are not limited to elementary or secondary schools; in today's inclusive environments, students with disabilities are going on to study at postsecondary institutions. Brown et al. (2011) have reported that 11.3% of college students reported a disability. Souma et al. (2006) found that there are more than 400,000 students reporting a disability.

Students with different learning styles provide benefits for everyone in the classroom. The presence of students with disabilities in the general education classroom has shown to have benefits for both those with disabilities and those without (Gaona, 2004; Newman & Gonzalez, 2006). Newman & Gonzales (2006) also report that inclusive education can yield better behavior and higher levels of achievement for students with disabilities, and more comfort with diversity for students without disabilities.

Another reason to support inclusion is that it saves money. Inclusive classrooms save school districts 25-60% of what it would spend on a student in self-contained special education settings, primarily due to reduced costs for personnel and materials (Gaona, 2004). Aron & Loprest (2012) report that in the 1999-2000 school year, the United States government spent roughly $50 billion on self-contained special education and $27.3 billion for students who spent at least part of each day in inclusion classrooms. The total—$77.3 billion—represents 21% of federal money spent on primary and secondary education that year; per capita, nearly 90% more

was spent on students in special education than on students without known disabilities (Aron & Loprest, 2012).

As of 2001, the United States Department of Education found that 12.8% of students had a disability, with a specific learning disability being the largest subset: specific learning disability 50.0%, speech-language impairments 28.9%, intellectual disability 10.6%, emotional disturbance 8.3%, "other health impairments" 5.1%, multiple disabilities 2.1%, orthopedic impairments 1.3%, deafness/hearing impairment 1.2%, developmental delay 0.5%, blindness/visual impairments 0.4% (Abell and Lederman, 2007).

Some of these percentages have changed over the years. The United States Department of Education in its *29th Annual Report to Congress on the Implementation of the Individuals with Disabilities Act 2007*, reported that some disabilities are dynamic and others are static (listed as 0.0% change from 1996 to 2005): specific learning disability -.3%, speech-language impairments 0.0%, intellectual disability -0.2%, emotional disturbance 0.0%, "other health impairments" +0.6%, multiple disabilities 0.0%, orthopedic impairments 0.0% (2010). Deafness/hearing impairment, developmental delay, blindness/visual impairment figures were not listed. These numbers indicate that for the most part, diverse learners are here to stay—but this wasn't always the case. Inclusive classrooms are the result of a few key pieces of legislation.

Legislation that Led to Inclusion

The Rehabilitation Act of 1973, specifically section 504, set the stage for diverse learners being included in the school system in general (Aron & Loprest, 2012; Howard & Potts, 2013). Section 504 mandated that any institution that receives federal funding had to serve any individual with a disability—that they could not discriminate against an individual because of their disability (Aron & Loprest, 2012; U.S. Department of Education 2013). Two years later the

Education for All Handicapped Children Act of 1975 was passed, and was updated in 2004 to the Individuals with Disabilities Education Act (IDEA) (Alquraini & Gut, 2012; Howard & Potts, 2013). Section 504 helped remove barriers, but IDEA helped protect diverse learners' rights and also was the first law to require that schools identify students with disabilities (Aron & Loprest, 2012; Howard & Potts, 2013). IDEA also helped stress that diverse students' needs are to be met free of charge and in the least restrictive environment (Aron & Loprest, 2012; Hawpe, 2013; Howard & Potts, 2013).

Thanks to these legislative changes, roughly ten years after IDEA, diverse learners spent more than 79% of a normal school day in the regular education classroom; now, more than 90% of students with disabilities receive their education in the general education classroom (Alquraini & Gut, 2012).

Time in the classroom was not the only thing increasing with inclusion (Newman & Gonzalez, 2006). Students with severe disabilities at the elementary level increased their reading skills by 31.7% and math skills by 23.9%, and their peers' reading skills increased by 13.8% and math skills by 12.5% (Alquraini & Gut, 2012). Diverse learners' peers also become more aware of human differences by being a part of the inclusive classroom (Newman & Gonzalez, 2006).

Inclusion vs. Mainstreaming

It is important to note that federal law does not require inclusion, only the least restrictive environment (Stout & Huston, 2001). It is also important to differentiate between "mainstreaming" and "inclusion." Both involve providing diverse learners with their civil right to be in the general education classroom, but inclusion is more complete (Alquraini & Gut, 2012). Inclusion entails bringing students with mild to severe disabilities into the general education classroom for the majority, if not all of, the day (Alquraini & Gut, 2012; Bender, Vail, & Scott,

1995; Stout & Huston, 2001; Voltz, 2006). It also includes bringing the services to the student, not taking the student to the services (Stout & Huston, 2001). Friend and Pope (2005) point out that inclusion is a belief system—that all students can achieve and belong in the general education classroom.

Mainstreaming on the other hand, is the selective placement of some students in the general education classroom, and it is often viewed that a student must "earn" this right to be in the general education class (Stout & Huston, 2001). Inclusion is more effective than mainstreaming because it has shown to have not only academic benefits for students with severe disabilities, but also social and communicative benefits (Alquraini & Gut, 2012).

No Child Left Behind

The next major legislative change to educating diverse learners came in 2001 in the form of No Child Left Behind (NCLB) (Bouck & Yadav, 2008; Lazarus et al., 2008; McGinnis, 2013). NCLB required that all students be included in state assessments, as well as accountability systems (Aron & Loprest, 2012; Bouck & Yadav, 2008; Bush, 2001; Edgemon et al., 2006; Elbaum, 2007; Fletcher et al., 2009; Gartland & Strosnider, 2004a; Pariseau et al., 2010; Salend, 2008). NCLB requires that students be tested yearly from third grade through eighth in literacy and mathematics, and once again while in tenth, eleventh, or twelfth grade (Bouck & Yadav, 2008; Bush, 2001, 2001; Darling-Hammond, Rustique-Forrester, & Pecheone, 2005). Diverse learners must now be included in accountability to determine if schools are meeting adequate yearly progress (Aron & Loprest, 2012). As of 2004, of the schools with a large enough population of diverse learners to be counted as a separate subgroup (Harr-Robins et al., 2013), 36% did not make adequate yearly progress (Aron & Loprest, 2012). What happens if adequate yearly progress is not met?

Ramifications of Testing

"States, districts, and schools that improve achievement will be rewarded. Failure will be sanction" (Bush, 2001, p. 2). Some of these rewards and sanctions come in the form of graduation, grade promotion, salaries, and federal funding for resources (Bolt & Thurlow, 2004). As of 2005, at least half of the states had an exit exam as a requirement for graduation (Darling-Hammond et al., 2005). In Pennsylvania, the eleventh grade PSSA tests were recently replaced by Keystone exams in literature, biology, and algebra I. For 2012-2013, the Keystones became the new measure of adequate yearly progress and a graduation requirement. Thus, states are using statewide tests for both NCLB and a graduation requirement. Gartland and Strosnider (2004a) warn that doing so requires that tests need to be examined for reliability for each use and that students have "protection against high-stakes decisions based on a single test" (p. 68). Urban schools are feeling especially hard hit because of a lack of funds and resources to prepare students to do well on these tests (Voltz, 2006).

Schools that fail to make adequate yearly progress in three consecutive years may lose students and Title I funding, and students can transfer to a higher-performing public, or even a private, school (Bush, 2001). Assessments also shape and sometimes even determine the curriculum taught and also the presentation of the material (Fensham & Cumming, 2013). This does raise the concern that if the goal of instruction is high test grades, curriculum and instruction may become distorted (Gartland & Strosnider, 2004a).

Very often there is the misconception that the use of the same assessment is fair and valid for all students (Fensham & Cumming, 2013). Historically, students with disabilities were excluded from large scale assessments due to the fact that the tests were not accessible to them (Bolt & Thurlow, 2004). Whether it is the inability to read a test at grade level, or simply the inability to read, some tests are not accessible to all learners. If these students were still excluded

then their outcomes would have no effect on the rewards or sanctions from NCLB (Bolt & Thurlow, 2004).

Chapter 2

Accommodations, Modifications, and Interventions

Three ways to make not only a test, but the entire curriculum, more accessible for diverse learners is through accommodations, modifications, and interventions. Each has its own definition and different ways of adjusting the general curriculum expected of all students in the classroom so that it is accessible to everyone.

Definition of Interventions

Interventions are systematic changes to develop or enhance social skills, behaviors, or knowledge (Harrison et al., 2013). Interventions are often linked with behavior modifications or preventions. It is also often associated with efforts to improve a child's reading skills (Selfridge & Kostewicz, 2011). In this modern age, behavior modification includes things like school councilors preventing or controlling sexting (McEachern, McEachern-Ciattoni, & Martin, 2012) and combatting obesity (Belser, Morris, & Hasselbeck, 2012). More classically, interventions for behaviors also include cognitive cue cards for developing cognitive control and correspondence training between what students say they will do and what they actually do (Richie, 2005).

Examples

Examples of interventions include providing both remedial reading and grade-level reading to a student struggling with literacy skills (Harrison et al., 2013). School councilors'

attempts to change inappropriate behaviors like sexting (McEachern et al., 2012) and poor eating habits (Belser et al., 2012) also constitute interventions.

As mentioned above, interventions are very diverse and include much more than just academics. They are not the focus of this review, which is concerned with instructional methods that help reduce barriers of access to diverse learners. Two ways to do that in both instruction and testing are modifications and accommodations.

Definition of Modifications

Modifications are deliberate changes made to the curricular expectations of a student (Alquraini & Gut, 2012; Bolt & Thurlow, 2004; S. W. Cawthon, 2007; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008). These are often reductions to compensate for a disability (Alquraini & Gut, 2012; Hamilton & Kessler, n.d.; Harrison et al., 2013). Although Bossé (2007) and Weinfeld et al. (2005) use the word accommodations, what they both are really describing are modifications for gifted learners and twice exceptional learners (gifted learners with some type of disability). Thus, modifications are not only for reducing expectations, but also for raising the bar.

Examples

Modifications include a wide array of changes to the curriculum. Allowing a student to take a different English class that tests at a different grade level due to a reading disability would constitute a modification (Harrison et al., 2013). A reduction of homework or class work also constitutes a modification (Hamilton & Kessler, n.d.). A major change to expectations also includes switching from letter grades to a pass/fail system based on work completion (Hamilton

& Kessler, n.d.). Nearly 30% of general education teachers modify grading criteria for diverse learners (Newman & Gonzalez, 2006). Modifications can also take on the form of emphasizing communication skills for students with autism (Jindal-Snape et al., 2005).

If there is a change to a test construct, then it is a modification (Bolt & Thurlow, 2004; S. W. Cawthon, 2007; Lazarus et al., 2008). In the late 1990's, the United States Department of Education went as far as to allow some states to modify standards for students with severe disabilities (Aron & Loprest, 2012; Salend, 2008). If it is not a change to a test construct or curricular expectation, then it is not a modification. Rather, it is most likely an accommodation.

Definition of Accommodations

Accommodations are the means by which a student overcomes a barrier which allows him to demonstrate his knowledge without letting his disability interfere, while at the same time not giving an advantage to the student with disabilities (Alquraini & Gut, 2012; Bolt & Thurlow, 2004; Bunce & Simaska, 2013; Edgemon et al., 2006; Elliott et al., 2001; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008; Scanlon & Baker, 2012; Scarpati et al., 2009; Souma et al., 2006; Thurlow & Bolt, 2001). They help "level the playing field" (Bouck & Yadav, 2008; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Hamilton & Kessler, n.d.; Sireci et al., 2005). Accommodations increase the validity of assessments by ensuring that assessments are measuring the skill they are intended for (e.g., by not requiring extensive reading in a math test), and by increasing accessibility (Beddow, 2012; Byrnes, 2008b; Lazarus et al., 2008; Thurlow & Bolt, 2001).

They are also a right to students with disabilities under the Individuals with Disabilities Education Improvement Act of 2004 (Alquraini & Gut, 2012; Bouck & Yadav, 2008; Byrnes, 2008a, 2008b). It is important that accommodations are used both in testing and during

instruction so that the student becomes acclimated to the accommodations (Bunce & Simaska, 2013; Byrnes, 2008a, 2008b; Scanlon & Baker, 2012). “It is the responsibility of the instructor to provide the accommodations. It is the student’s responsibility to fulfill the academic requirements of the course” (Souma et al., 2006, p. 3). Recall that modifications change the academic requirements; accommodations do not. Educators have to legally reduce the barriers that prevent a student from achieving in their class, but they are not legally bound to make the class easier.

Unfortunately, some accommodations on large-scale tests are fairly recent. The National Assessment of Educational Progress (NAEP) tests have been monitoring student progress for years, but it wasn’t until 2004 that accommodations first became available (U.S. Department of Education, 2013).

The Five Types of Accommodations

Over the years, the types of accommodations have evolved. Some researchers list four principal types of accommodations (Bunce & Simaska, 2013; Edgemon et al., 2006; Gartland & Strosnider, 2004b; Harrison et al., 2013), while others list five (Howard & Potts, 2013; Kieffer, Lesaux, Rivera, & Francis, 2009; Salend, 2008). The classic four are presentation, time, setting, and response. The fifth type of accommodation now listed is that of aid. Given recent advances in technology, it is no surprise that this is the newest accommodation type. All five will be discussed below.

Presentation

Presentation accommodations alter the way in which the material (assessments, assignments, etc.) is delivered to the student (Harrison et al., 2013; Salend, 2008). These

accommodations help answer questions like, “How well does the student read?” (Gartland & Strosnider, 2004a; Howard & Potts, 2013). Presentation accommodations include changes like presenting the test in Braille, large-print, read-alouds (Edgemon et al., 2006), and hearing aids (Bunce & Simaska, 2013). Salend (2008) mentions “language accommodations” as a fifth type of accommodation, but translating a test is treated here as a presentation accommodation.

Time

Time, or time/scheduling (Gartland & Strosnider, 2004a; Harrison et al., 2013), accommodations are those that adjust the time permitted for assignments, activities, and tests (Edgemon et al., 2006; Harrison et al., 2013). Scheduling accommodations may stipulate whether a student is allowed to take breaks during tests or at what point during the day the student will test (Edgemon et al., 2006; Gartland & Strosnider, 2004a). These accommodations try to answer the questions, “Does this student need more time than her peers?” (Howard & Potts, 2013) and “Can the student focus for the entire test?” (Gartland & Strosnider, 2004a). Time accommodations include changes such as frequent breaks (Bolt & Thurlow, 2004; Bunce & Simaska, 2013; Fensham & Cumming, 2013; Filce & Lavergne, 2011; Fletcher et al., 2009; Souma et al., 2006; Thurlow & Bolt, 2001) and extended time (Abedi, 2008; Alquraini & Gut, 2012; Bolt & Thurlow, 2004; Bouck & Yadav, 2008; Bunce & Simaska, 2013; Byrnes, 2008a; Fensham & Cumming, 2013; Filce & Lavergne, 2011; Fletcher et al., 2009; Hamilton & Kessler, n.d.; Lovett, 2010; Ofiesh & Highes, 2002; Pariseau et al., 2010; Scanlon & Baker, 2012; Sireci et al., 2005; Souma et al., 2006; U.S. Department of Education, 2013; Trammell, 2011). Extended time is one of the most commonly given and researched accommodations (Abedi, 2008; Bolt & Thurlow, 2004; Brockelman, 2011; Cawthon, 2007; Cawthon & Wurtz, 2010; Edgemon et al., 2006; Elliott et al.,

2001; Filce & Lavergne, 2011; Newman & Gonzalez, 2006; Ofiesh & Highes, 2002; Pariseau et al., 2010).

Setting

Setting accommodations alter where a student works or a teacher presents (Harrison et al., 2013). These accommodations address the questions, "Does the student engage in or react to distracting behaviors?" (Gartland & Strosnider, 2004a) and "Does the student need to be in a small group for this activity?" (Howard & Potts, 2013). Setting accommodations include small group administration or a room change (Cawthon, 2007; Edgemon et al., 2006; Salend, 2008).

Response

Response accommodations change the way in which a student demonstrates his or her knowledge (Edgemon et al., 2006; Harrison et al., 2013). These accommodations try to address the questions, "Can the student write?" (Gartland & Strosnider, 2004a; Howard & Potts, 2013) and "Can the student copy answers from a test booklet to an answer sheet?" (Gartland & Strosnider, 2004a). Response accommodations include writing in the test booklet rather than a separate answer sheet (Edgemon et al., 2006; Thurlow & Bolt, 2001), dictating to a scribe, or using a word processor (Bolt & Thurlow, 2004; Edgemon et al., 2006; Thurlow & Bolt, 2001).

Aid

Aid accommodations are those that involve technological devices that assist in learning (Edgemon et al., 2006; Howard & Potts, 2013). These accommodations attempt to answer the

question, “Does the student need assistive technology?” (Howard & Potts, 2013). A classic example is the calculator (Bouck & Yadav, 2008; Edgemon et al., 2006; Elbaum, 2007; Howard & Potts, 2013), but accommodations may also include new technologies like the Livescribe pen (Naone, 2008).

Confusion between Accommodations and Modifications

One of the issues facing special education and its literature is confusion over the terms accommodations and modifications. Bender (1995) described preferential seating as a “minor modification,” but because this does not describe a change to curriculum it would more appropriately be considered an accommodation. Alquraini & Gut (2012) mention “curriculum adaptations,” which they describe as “changes made to what is expected of the student, the way the course is taught, and the tools used to teach the course” (p. 48). The first half of the quote, “what is expected,” describes a modification. The “way the course is taught, and the tools used,” describe accommodations. Thus their use of “curriculum adaptations” includes both modifications and accommodations.

Harrison et al. (2013) note that often teachers are including more modifications than accommodations in IEPs; yet, upon reexamination, the reason is because the items listed as modifications were actually accommodations. Why is this mistake significant? It is because accommodations are allowed on high-stakes state-wide assessments, but modifications cannot be applied (Harrison et al., 2013). Thus, if extended time were classified as a modification in an IEP, it would not be allowed to be applied to NCLB-type tests.

Using the abovementioned definition of accommodations—“Accommodations are the means by which a student overcomes a barrier which allows him to demonstrate his knowledge

without letting his disability interfere, while at the same time not giving an advantage to the student with disabilities"—begs the question, "What makes a good, or valid, accommodation?"

Valid Accommodations

For an accommodation to be valid it must provide a differential boost for the student with the disability, while not increasing a non-disabled peer's performance significantly (Bouck & Yadav, 2008; Phillips, 1994). The term "interaction hypothesis" conveys the same idea as a differential boost (Fletcher et al., 2006; Sireci et al., 2005). It also focuses on reducing barriers of irrelevant constructs being measured—like the ability to read on a math test—to improve the validity of tests (Byrnes, 2008a; Dolan et al., 2005; Fletcher et al., 2006; Kieffer et al., 2009; Sireci et al., 2005). This is why accommodations for sensory or physical disabilities are not held in high contention (Phillips, 1994; Thurlow & Bolt, 2001). Accommodations for students with cognitive disabilities can be much more controversial (Thurlow & Bolt, 2001). For example, if all students benefit from extended time, but only those with a disability are allowed to use this accommodation, then the scores of the student with the disability will be inflated and invalid (Fletcher et al., 2006).

The reasoning behind these accommodations is to allow a student to more accurately convey his or her knowledge of the subject matter being tested (Bolt & Thurlow, 2004; S. W. Cawthon, 2007; Elbaum, 2007; Fletcher et al., 2009; Kieffer et al., 2009; Lazarus et al., 2008; Pariseau et al., 2010). Translating a test verbatim for a student who does not speak English could be a valid accommodation. But, if in the translation the test becomes easier—then it is invalid and also a modification (Kieffer et al., 2009).

Beddow (2012) identified three attributes of a valid accommodation: "(a) unchanged constructs, (b) individual need, (c) differential effects…" (p. 103). Tindal & Fuchs also include

the stipulation that it should be in regard to individuals, not overall score increases (Tindal & Fuchs, 2000). An *unchanged construct* is part of the definition of an accommodation (if the construct changes, it is then a modification) (Hamilton & Kessler, n.d.; Tindal & Fuchs, 2000). The *individual need* is important because if everyone can benefit from it, or requires it, then it should be given to the entire population as a part of the test—not an accommodation to it. This relates to the idea of the Universal Design for Learning (Brand & Dalton, 2012; Brown et al., 2011; Dolan et al., 2005, 2005; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Gartland & Strosnider, 2004a; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008; Lovett, 2010; Sireci et al., 2005; Stanford & Reeves, 2009; Suritsky, 1993; Thurlow & Bolt, 2001). Finally, the *differential effects* are the same idea as Phillips's (1994) differential boost. To sum up, a valid accommodation does not change the construct of the test and provides a differential boost for students with a disability.

Why Are Valid Accommodations Important?

When it comes to the state testing NCLB mandates, if the accommodations are not valid, then the results are invalid as well. Test scores are designed to have a high degree of accessibility for all students (Beddow, 2012). Accessibility is the degree to which an assessment allows a student to demonstrate his or her knowledge (Beddow, 2012). Beddow (2012) identifies four major components of accessibility: perception, reception, cognition, and emotion. Perception is sensory access. Reception is the ability to read and understand the text. Cognition involves working memory. Finally, emotions are largely tied to self-efficacy (2012).

The goal of a valid accommodation is to increase access, not the outcome of a test (Byrnes, 2008a; Elliott et al., 2001; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Souma et al., 2006). Thus, if an accommodation increases access to a test it should also increase the validity of the

results of the test. Given the ramifications of state tests from NCLB (Bolt & Thurlow, 2004; Bush, 2001), it is important that state-wide assessments allow students to accurately display their knowledge. This will protect school funding and identify what a student actually knows (Bolt & Thurlow, 2004). Identifying what students actually know is the goal of state-wide testing (Darling-Hammond et al., 2005), so valid accommodations are needed to allow the collection of valid data. So what are the accommodations most often given out, and what evidence is there to support these accommodations? Are these accommodations "leveling the playing field" or changing the game entirely?

Chapter 3

Most Common Accommodations

Bolton & Thurlow (2001) identified the ten most common accommodations allowed in state-wide testing: Braille, computer machine response, dictations, extended time, interpreter for instructions, large-print, mark answers in the test booklet, oral accommodations, read/reread/simplify/clarify test directions, and test breaks. The following is a breakdown of each accommodation entailing who may benefit from it, evidence for and against the accommodation, and state legislation regarding the accommodation.

Braille

As mentioned above, Braille falls under the category of sensory or physical disabilities with blindness, and thus is not under major contention as a valid accommodation (Phillips, 1994; Thurlow & Bolt, 2001). Braille consists of sixty-three dot combinations that can be read by touch (Barraga, 1983). Thurlow & Bolt (2001) also echo the notion that making a blind student take the normal printed version of the test measures their visual disability, not their academic abilities.

Blindness

The World Health Organization (WHO) defines blindness as, "presenting visual acuity of less than 3/60 or a corresponding visual field loss to less than 100 in the better eye" (Morone, Cuena, Kocur, & Banatvala, 2012; World Health Organization, 1992). Using this definition, the WHO estimated in 2010 that thirty-nine million people in the world are blind and 82% of those

people are over age 50 years old (Morone et al., 2012). Braille does not have to be used by only blind students—any student with a visual impairment may benefit from it. There are two-hundred and forty-six million individuals with low vision in the world according to the WHO estimates, just over twenty-six million of them living in the Americas (Morone et al., 2012).

Evidence For

Because a fully blind student cannot take a written test without some form of an accommodation, Braille has little controversy surrounding its use as a valid accommodation. Students who have normal vision should not benefit from a Braille test (differential boost), nor should a Braille test change the validity of the test (Thurlow & Bolt, 2001).

Evidence Against

The largest point of contention with Braille tests involves symbol laden problems, such as math problems with tally marks or diagrams (Abedi, 2008; Bolt & Thurlow, 2004; Thurlow & Bolt, 2001). Another issue with Braille tests is the increased time needed to read the test (Phillips, 1994; Thurlow & Bolt, 2001).

State Legislation

In 1993, sixteen of twenty states with accommodation policies allowed Braille; in 2005, forty-five of fifty allowed Braille tests (Lazarus et al., 2008). Thurlow & Bolt (2001) suggest that the reason for some states not allowing Braille may only be that a Braille test has not having been developed yet.

Computer/machine Response

Computers are a part of most students' everyday lives. Some students need a computer to provide their responses to assessments due to an inability to even hold a pencil (Abedi, 2008; Thurlow & Bolt, 2001). An added benefit of computer assessments is the potential to offer many different accommodations (read alouds, large print, translations, etc.) (Thurlow & Bolt, 2001).

When considering whether or not to assign a student a computer response accommodation, it is important to first make sure that the student has the skills needed to use the machine (Bunce & Simaska, 2013; Thurlow & Bolt, 2001). If a student lacks these skills, then this accommodation may hinder, rather than improve, performance (Thurlow & Bolt, 2001).

Evidence For

Thurlow & Bolt (2001) examined numerous studies relating to computer responses. Most studies related to computer responses were for writing assignments (essays, grammar, etc.), but none of these studies provided much evidence for or against computer response accommodations. There is some evidence that computer based assessments may be a valid accommodation for English Language Learners (ELL) students (Abedi, 2008). Fensham & Cumming (2013) noted eloquently, "Consider how traditional assessment modes in school would impact on the capacity of Stephen Hawking to demonstrate his scientific excellence" (p. 336).

Evidence Against

Thurlow & Bolt (2001) did find evidence in nine other non-writing computer response studies, which mostly concluded that students perform better on paper-and-pencil tests. Students also said they prefer to use paper-and-pencil tests in surveys (Thurlow & Bolt, 2001). Technology

in the classroom has greatly changed since 2001, and thus a more up-to-date study is needed. Another issue regarding computer based essays is that of grading—often judges are harsher on word-processed essays than traditionally handwritten ones (Thurlow & Bolt, 2001).

State Legislation

As of 2005, nineteen of fifty states allowed a computer/typewriter response with restrictions (Lazarus et al., 2008).

Dictation

Some students have trouble reading and need help reading tests. Other students can read, but they cannot write. Dictating to a scribe is one way to resolve this issue. Dictation is used for a variety of disabilities: learning disabilities, behavioral disorders, mild intellectual disability, physical impairments, and communication disabilities (Thurlow & Bolt, 2001).

Evidence For

Lazarus et al. (2008) identified three studies supporting the use of dictation for students with learning disabilities. Thurlow & Bolt (2001) identified seven studies related to dictations; the majority found that the test scores of students with disabilities increased with dictation.

Evidence Against

The same Thurlow & Bolt (2001) research above also cautioned as to the nature of the increase—it may not be a valid increase, but rather a change of the construct of the test and therefore a modification. Another issue with dictation is a low level of perception of efficacy and feasibility by teachers (Bolt & Thurlow, 2004; Thurlow & Bolt, 2001). Bolt & Thurlow (2004) also found mixed results regarding a differential boost for student performance in three studies: two studies provided evidence for a differential boost, and two studies provided evidence against a differential boost. There is already a limited amount of research regarding dictation accommodations, and the findings are often contradictory (Thurlow & Bolt, 2001).

State Legislation

As of 1993, only four of twenty states allowed dictation with restrictions; as of 2003 seventeen of fifty states allowed dictations with limitations (Lazarus et al., 2008). Some states require that all spelling and punctuation must be dictated as well (Thurlow & Bolt, 2001).

Extended Time

Extended time is one of the most common accommodations listed for diverse learners (Abedi, 2008; Bolt & Thurlow, 2004; Brockelman, 2011; S. W. Cawthon, 2007; Stephanie W. Cawthon & Wurtz, 2010; Edgemon et al., 2006; Elliott et al., 2001; Filce & Lavergne, 2011; Lovett, 2010; Newman & Gonzalez, 2006; Ofiesh & Highes, 2002; Pariseau et al., 2010). Extended time ranges from time and a half, to unlimited time (Abedi, 2008; Ofiesh & Highes, 2002; Sireci et al., 2005; Thurlow & Bolt, 2001). The rationale behind extended time is that diverse learners take longer to complete an assignment due to barriers such as reading speed,

translations, reading Braille, etc. (Ofiesh & Highes, 2002; Thurlow & Bolt, 2001). This is also why extended time is often given in conjunction with other accommodations in a bundle (Edgemon et al., 2006; Fletcher et al., 2009; Thurlow & Bolt, 2001; Trammell, 2011).

There are differences in how extended time is specified: how much time, where it is given, such as on tests and quizzes or tests alone (Byrnes, 2008a). If time is not a construct of the test, then extended time is considered an accommodation, but if time is being measured, then extended time would be a modification (Abedi, 2008; Bolt & Thurlow, 2004).

Evidence For

Bolt & Thurlow (2004) examined twenty-one studies and found evidence supporting extended time as a valid accommodation in six of those studies and mixed results in six studies. Seven studies used a differential boost perspective, and one found a statistically significant boost for students with disabilities (2004). Many educators find extended time easy to use and to implement (Bolt & Thurlow, 2004; Thurlow & Bolt, 2001). Brockelman (2011) found that STEM faculty found extended time to be more effective than non-STEM faculty did. Studies have shown that educators most often use accommodations they perceive as easy and effective (Brockelman, 2011; Cawthon & Wurtz, 2010; Neal, 2012; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). There are some who believe that extended time is simply good testing practice (Lazarus et al., 2008).

Evidence Against

In the twenty-one studies Bolt & Thurlow (2004) examined mentioned above, five did not find extended time to be a valid accommodation. Of the seven studies using a differential boost as criteria for a valid accommodation, six did not find a statistically significant change (Bolt & Thurlow, 2004). ELL students had mixed results when examined to see whether extended time helped them significantly (Abedi, 2008). Sireci et al. (2005) also echoed the lack of evidence of the interaction hypothesis. Pariseau et al. (2010) also follows suit in identifying a theme of a lack of a differential boost between students with disabilities and those without.

Whether or not students' scores are increasing with the implementation of extended time is not under contention—it is the differential boost that is the issue at hand. Students with and without disabilities benefited in nearly all of the studies, but only a small fraction of the studies found that diverse learners perform statistically significantly better than their peers (Fuchs, Fuchs, Eaton, & Hamlett, 2000; Thurlow & Bolt, 2001). Harrison et al. (2013) in their review of research, said that they cannot conclude that extended time is a valid accommodation because of the lack of coherence over a differential boost.

Other issues with extended time include the possibility that it may change the validity of the test (Beddow, 2012), the scheduling of extended time, and the location (Byrnes, 2008a). Another point of contention is what exactly are students benefiting from? The extended time score increases may only be due to a decrease in test anxiety, not the actual increase in time (Lovett, 2010; Thurlow & Bolt, 2001).

ADHD

Attention-deficit/hyperactivity disorder (ADHD) is a continuum of conditions, and thus cannot easily be broadly covered by blanket accommodations (Lovett, 2010). Extended time is frequently given to all students with ADHD (Lovett, 2010; Pariseau et al., 2010). Pariseau et al. (2010) investigated whether or not a fifteen minute (time and a half) increase benefited students with ADHD. The authors found that contrary to what was then believed, the students completed significantly more problems correctly per minute in regular time when compared with extended time (2010). Thus, extended time may benefit some students, but it may harm others. This is why blanket accommodations can actually be more harmful than helpful (Abedi, 2008; Dolan et al., 2005; Elbaum, 2007; Elliott et al., 2001).

State Legislation

Out of the fifty states, thirty-two allow extended time, with five states allowing it on some items while banning it on others (Thurlow & Bolt, 2001). Two states prohibit the use of extended time (Lazarus et al., 2008; Thurlow & Bolt, 2001).

Interpreter for Instructions

Hard of hearing students cannot follow oral directions the same as their non-disabled peers unless they are able to lip read or use an interpreter (Thurlow & Bolt, 2001). Interpretations can be the entire test or just the directions and can take the form of American Sign Language, finger spelling, or signing and speech (Thurlow & Bolt, 2001).

Evidence For

Bolt & Thurlow (2004) identified a survey study in which students indicated that they had an easier time understanding a signed test.

Evidence Against

In the Bolt & Thurlow (2004) study mentioned above, the students did find the signed test easier to understand, but also stated that they preferred the standard administration because it took less time. If the student is not familiar and comfortable with their interpreter or interpretation then they are more likely to become frustrated (Thurlow & Bolt, 2001).

State Legislation

As of 1993, of the twenty states with accommodation policies, two allowed an interpreter with restrictions; as of 2005, thirty-one states allow an interpreter with restrictions (Lazarus et al., 2008).

Large-print Edition

Students with visual disabilities may benefit from an enlarged-text copy of an activity. Students who are distracted by a cluttered test or very young students may also benefit from a large-print test (Thurlow & Bolt, 2001). Large-print may refer to fourteen or sixteen size font, or double the normal size of text (Thurlow & Bolt, 2001).

Evidence For

Most studies suggest that this accommodation does not unfairly affect anyone's scores, nor should it not provide a differential boost for students with vision disabilities (Thurlow & Bolt, 2001). It should not change tests either. For example, a large print version of the SAT showed no significant changes to the constructs of the test (Thurlow & Bolt, 2001).

Evidence Against

When investigating the effects of a large-print edition of a test, Thurlow & Bolt (2001) found that most studies suggest that large-print has no significant effect on students with learning disabilities' scores. Another factor working against large-print tests is that some teachers find this accommodation hard to implement in their classroom (Bolt & Thurlow, 2004).

State Legislation

As of 1993, of the twenty states with accommodation policies, fifteen allowed a large-print test; as of 2005, forty-eight states allow a large-print version of an assessment (Lazarus et al., 2008).

Mark Answers in Test Booklet

This accommodation removes the middle man in testing—the separate answer sheet. For students who lack the attention and motor skills required to go from the test to the answer sheet, this accommodation should be effective (Thurlow & Bolt, 2001).

Evidence For

Thurlow & Bolt (2001) found one study that had a significant differential boost for students with disabilities writing directly in the test book.

Evidence Against

In the Thurlow & Bolt (2001) study mentioned above, there were four studies found, and three did not find a significant differential boost. Tindal et al. (1998) concluded that students with and without disabilities were not affected by the manner in which they recorded their answers. The literature and data on this accommodation are very limited.

State Legislation

Twenty-eight states allow marking answers in the test booklet, and five states allow it on only parts of the booklet (Thurlow & Bolt, 2001).

Oral Accommodations

Oral accommodations include changes such as having the test read aloud to the student, having the student read the test aloud, and allowing the student to answer orally (Bouck & Yadav, 2008; Dolan et al., 2005; Elbaum, 2007; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Sireci et al., 2005; Thurlow & Bolt, 2001). The test read aloud is the most common of these and the most common presentation accommodation (Dolan et al., 2005). The rationale behind this accommodation is that reading the test aloud allows for a more accurate measure of a students' ability, unless the construct being measured is reading ability (Thurlow & Bolt, 2001).

Evidence For

Fuchs et al. (2000) examined the effects of oral accommodations by testing students with four parallel tests: standard administration, extended time, large-print; students reading aloud. The authors concluded that students with learning disabilities performed significantly better than their non-disabled peers when provided with oral accommodations (2000). Thurlow & Bolt (2001) found five studies that examined differential boosts in regards to oral accommodations. Three of these studies concluded that students with learning disabilities benefit significantly more than their non-disabled peers (2001). Tindal et al. (1998) found that both students with and without disabilities benefited when a math test was read aloud; but, students with learning disabilities significantly improved more than their non-disabled peers. Sireci et al. (2005) found ten studies involving oral accommodations using differential boost as criteria for a valid accommodation; five of these studies found evidence that supported a differential boost on math tests.

Evidence Against

Sireci et al. (2005) also therefore found five studies that did not support a differential boost for students with learning disabilities; also, these results are for math tests alone—not all tests. Elbaum (2007) actually found a differential boost for students without disabilities on math tests.

Another problem with read alouds is the variety in quality due to human influence and student reluctance or inability to ask for a reread (Dolan et al., 2005). Beddow (2012) labeled oral accommodations as "impact[ing] the validity of test score inferences" (p. 104). This may not be true of math tests as mentioned above, but is certainly true for reading tests as it substitutes

listening skills for reading skills (Phillips, 1994; Thurlow & Bolt, 2001). Finally, Dolan et al. (2005) also point out the issue that accommodations should be both on assessments and in instruction. Reading every item on every resource would be very time consuming.

State Legislation

As of 1993, of the twenty states with accommodation policies, seven allowed oral accommodations; as of 2005, forty-three states allow oral accommodations (Lazarus et al., 2008).

Clarify Directions/ Reread/ Simplification of Directions

If a student cannot read or understand the directions of the test, they cannot accurately demonstrate their knowledge. Students may have the directions read aloud, paraphrased, or clarified with further examples (Thurlow & Bolt, 2001). This accommodation is frequently paired with the read aloud oral accommodation (Thurlow & Bolt, 2001).

Evidence For

Logically this accommodation should not change the test constructs unless it is literally testing one's ability to read directions; test makers, teachers, and policy makers also agree that this is generally a valid accommodation (Thurlow & Bolt, 2001).

Evidence Against

There is very limited research on this accommodation (Thurlow & Bolt, 2001; Tindal & Fuchs, 2000). “The absence of evidence is not the evidence of absence” (Sagan, 2002). Although the lack of evidence is not proof that clarifying directions is an invalid accommodation, it is, as with many of the most common accommodations listed so far, unsettling that there is so little research to prove its worth.

State Legislation

Thirty-one states allow some form of clarifying directions on state assessments and one state fully disallows this accommodation (Thurlow & Bolt, 2001). One state blocks the clarification aspect of the rereading directions (Thurlow & Bolt, 2001).

Test Breaks

Many state-wide tests include breaks between subtests, but for some students these breaks are not enough (Thurlow & Bolt, 2001). More, or longer, breaks can help a student overcome fatigue and regain concentration to better demonstrate their knowledge on an assessment or task (Thurlow & Bolt, 2001). Students may endure fatigue from using assistive technology like computers, or may have a disability that causes fatigue under any circumstance (Filce & Lavergne, 2011; Souma et al., 2006; Thurlow & Bolt, 2001).

Test Breaks for Students with Psychiatric Disabilities

Students with psychiatric disabilities may require more frequent breaks due to either their disability or their medication (Souma et al., 2006). Some side effects of medications include drowsiness, fatigue, blurred vision, and slow response time; some functional limitations include: restlessness, shortened attention span, reduced sustained energy, and anxiety (Souma et al., 2006).

Test Breaks for Students with Bowel & Bladder Disorders

A group of students that is often overlooked is students with bowel and bladder disorders. These students require more frequent breaks, and often preferential seating as well (Filce & Lavergne, 2011). Filce & Lavergne (2011) surveyed 106 parents of children with bowel and bladder disorders and found 45% of these students missed more than a week of school and 7.9% did not attend at all. Thus, appropriate and valid accommodations could result in these students spending more time in the classroom learning rather than at home.

Evidence For

Thurlow & Bolt (2001) did not identify any research that directly addressed frequent breaks; rather, the closest analogue was testing over multiple days. Of the two studies identified, one study found that low and middle ability readers benefited from multiple day assessments, but there is no mention of a differential boost (Thurlow & Bolt, 2001).

Evidence Against

As seen in many of the other accommodations mentioned above, roughly half of the studies Thurlow & Bolt (2001) found are also evidence against the accommodation. The second of the two studies found that students without disabilities performed better on the multiple day administrations and that there was no differential boost (Thurlow & Bolt, 2001). But again, these are for multiple day assessments, not frequent breaks. There appear to be no studies that explicitly reviewed the effects of test breaks. It has been suggested that frequent test breaks may derail a problem solving rhythm and thus harm more than help a student (Thurlow & Bolt, 2001).

State Legislation

Twenty-eight states allow test breaks with five states having restrictions such as only between subtests (Thurlow & Bolt, 2001).

Another Major Accommodation: Preferential Seating

Although not listed as one of Thurlow & Bolt's (2001) ten most common accommodations allowed in state policy, preferential seating is an accommodation often mentioned in IEPs (Byrnes, 2008b; Hamilton & Kessler, n.d.). Souma et al. (2006) labeled it as a "classroom" accommodation, separate from their labeling of "assessment." Because preferential seating is not believed to have a major effect on state-wide testing it is likely not researched nearly as much; preferential seating therefore does not have any real research base to draw evidence for or against, nor literature about legislation. Another major issue with preferential seating accommodations is the vague nature of the accommodation.

Confusion/Lack of Clarity

Byrnes (2008a) surveyed thirty-three general education teachers and twelve special education teachers about their explanations of certain accommodations. Twenty-five stipulations surfaced: "close to teacher," "small group," "near visuals," "back of room for attention," etc. (2008a, p. 311). Preferential seating generated the largest number of interpretations and the most contradictory responses; only seven of the stipulations were listed by both general education teachers and special education teachers (2008a). "Close to the teacher" was one of these seven and appeared in 48% of the general educators' responses and 50% of the special educators' responses (2008a). Harrison et al. (2013) investigated "teacher proximity" as an accommodation but found that this did not clearly fit the definition of an accommodation, but may be more of a "change in school practices" (p. 577). Either way, the validity of preferential seating is unclear and currently has some of the same level of confusion as the difference between accommodations and modifications demonstrated years ago.

Writing Explicit Accommodations

One way to start to combat the confusion over unspecific accommodations like preferential seating is to write explicit, unambiguous accommodations (Byrnes, 2008b). Extended time and dictation to scribe also had a large number of interpretations; given that these are both part of the ten most common accommodations allowed by states, it is paramount to write explicit accommodations (Byrnes, 2008a, 2008b). Byrnes (2008b) identified five steps to writing explicit accommodations: "(1) State the disability (2) Describe the educational impact of the disability (3) Consider upcoming educational tasks (4) Identify barriers related to the disability (5) Write

unambiguous accommodations" (p. 20). Sometimes though, a specific accommodation is not the key to leveling the playing field—rather multiple, bundled, accommodations are the trick.

Accommodation Bundles

In current practice students rarely receive only one accommodation; frequently, many are bundled together (Fletcher et al., 2009; Sireci et al., 2005). The research community is divided on this idea: will one accommodation be too weak by itself and need to be compounded with another or should each accommodation be researched on its own to assess its individual impact (Fletcher et al., 2006). Some educators feel that there is a list of accommodations often put together that most students are automatically assigned to (Scanlon & Baker, 2012). Extended time is often bundled with many other accommodations such as an interpreter for instructions or other accommodations that may slow a student down (Thurlow & Bolt, 2001).

Evidence For

Harrison et al. (2013) found seven studies relating to bundled accommodations; of these seven, four had an experimental design with evidence supporting a differential boost for students with disabilities. Elliot et al. (2001) found that there was a large effect for 63.4% of students with disabilities and a 42.9% increase for students without disabilities; 75% had a medium to large effect for students with disabilities, and 55% had a medium to large effect for non-disabled peers. Fletcher et al. (2009) did find a significant boost for students with disabilities also.

Evidence Against

In an attempt to reproduce similar results with older students, Fletcher et al. (2009) tested bundled accommodations on middle school students. This study did not provide evidence for a differential boost (2009). Also, Harrison et al. (2013) concluded that packages of accommodations were not actually accommodations because the two studies they examined both did not show sign of a differential boost either. Thus as a motif of all the accommodations listed so far, there is either a large amount of evidence against the accommodation, or there is not enough research on that accommodation (Abedi, 2008; Brown et al., 2011; Byrnes, 2008a; Harrison et al., 2013; Jiang & Grabe, 2007; Jindal-Snape et al., 2005; Lazarus et al., 2008; Lovett, 2010; Pariseau et al., 2010; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). This paucity of empirical research is only one of the issues regarding accommodations as they are currently implemented.

Chapter 4

Problems with Accommodations Currently

To be valid, an accommodation must provide a differential boost for those whom it has been deemed need the accommodation (Phillips, 1994). But the volume of research that was contrary or mixed for a differential boost for the ten most common accommodations was astounding, and some of the accommodations had no research at all (Thurlow & Bolt, 2001). Those studies that were performed were usually with elementary students, leaving high school students without much evidence to draw from (Edgemon et al., 2006; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Harrison et al., 2013; Scanlon & Baker, 2012; Sireci et al., 2005). Even with research, often teachers failed to select the best accommodations for students or over prescribed accommodations, wasting resources and efforts (Elliott et al., 2001; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Neal, 2012). These accommodation pitfalls are also often a result of considering the disability, not the individual student (Cawthon & Wurtz, 2010; Dolan et al., 2005; Elliott et al., 2001; Fletcher et al., 2006; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Hamilton & Kessler, n.d.; Howard & Potts, 2013; Irving et al., 2007; Lazarus et al., 2008; Morales, 2011; Salend, 2008; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). Thus, we seem to have lost track of the "individual" in Individualized Educational Programs. To sum up, some of the problems with accommodations today include a lack of evidence, most studies are conducted with elementary students, teacher accommodation selections are riddled with pitfalls, and a lack of by-case basis for accommodations.

A Dearth of Research and Evidence

Harrison et al. (2013) stated, "[W]e found that experts in the field recommend many accommodations; yet few have scientific evidence of effectiveness" (p. 583). There is simply a dearth of conclusive data on the validity of accommodations (Abedi, 2008; Brown et al., 2011; Byrnes, 2008a; Harrison et al., 2013; Jiang & Grabe, 2007; Jindal-Snape et al., 2005; Jordan, 2009; Lazarus et al., 2008; Lovett, 2010; Pariseau et al., 2010; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). Dolan et al. (2005) listed read alouds as the most common presentation accommodation, and Thurlow & Bolt (2001) labeled read alouds as the most controversial of the ten most common accommodations. With non-disabled peers benefiting 50% (Elliott et al., 2001) or better (Elbaum, 2007) with accommodations, using accommodations only for those with a disability is a legal Pandora's box of testing fairness. And with NCLB, inflating test scores serves no purpose for assessing adequate yearly progress.

Most Studies Are Done in Elementary Settings

Even with the small amount of evidence there is for and against accommodation use, most of it is for elementary students (Edgemon et al., 2006; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Harrison et al., 2013; Scanlon & Baker, 2012; Sireci et al., 2005). NCLB requires testing from third grade through eighth grade and again in high school (Bouck & Yadav, 2008; Bush, 2001, 2001; Darling-Hammond et al., 2005). Thus, a large portion of the population engaged in NCLB testing has not been accounted for in the research. Harrison et al. (2013) identified that the vast majority of studies were done on Caucasian males in elementary schools. This leaves a wide variety of diverse learners also unaccounted for—especially ELL students (Abedi, 2008). Further compounding the issue, most studies are done on assessment, not

instruction and assessment (Scanlon & Baker, 2012). An alignment between instruction and assessment is needed for students to become acclimated to using their accommodations in elementary or secondary schools (Bolt & Thurlow, 2004; Bunce & Simaska, 2013; Byrnes, 2008a; Dolan et al., 2005; Howard & Potts, 2013; Salend, 2008; Scanlon & Baker, 2012; Scarpati et al., 2009).

Teacher Selection Pitfalls

The limited evidence, and thus resources, available for teachers to make sound decisions impacts their ability to choose appropriate accommodations for students (Lazarus et al., 2008). On top of this, teachers and IEP teams often are not fully up-to-date on state legislation (Lazarus et al., 2008). Further compounding this issue is the fact that if there is not a lot of research, then there is not much to base legislation on. Cawthon (2007) very eloquently phrased it: "Although strong research does not guarantee strong policy, weak research can only lead to weak policy" (p. 73). This lack of evidence and lack of sound policy makes it very hard to select appropriate accommodations. Teachers are not blind to this issue though. In Irving et al.'s (2007) survey of meeting the needs of students with learning disabilities in science classrooms, 100% of respondents said they need help teaching students with learning disabilities.

Along these lines, sometimes students who need accommodations are missed. Fuchs et al. (2000) used computer generated data to select accommodations for students, and found that this generated differential boosts for more students than the teacher selected accommodations did. Far too often, teachers select numerous accommodations for students—most of which are not needed (Elliott et al., 2001; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Neal, 2012).

Blanket Accommodations

These blanket accommodations often fail to take into account the student and instead consider the disability (Cawthon & Wurtz, 2010; Dolan et al., 2005; Elliott et al., 2001; Fletcher et al., 2006; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Hamilton & Kessler, n.d.; Howard & Potts, 2013; Irving et al., 2007; Lazarus et al., 2008; Morales, 2011; Salend, 2008; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). Not all students are the same, and not all disabilities are the same. ADHD exists on a continuum. For some students with ADHD, extended time may help, but for others it is a hindrance (Pariseau et al., 2010). Autism is another spectrum disorder in which not all students need the same accommodations. Blindness exists in three categories (World Health Organization, 1992); a student with some vision (category 3) does not always require the same accommodations that a fully blind (category 5) student does. Not all deaf students are fluent in American Sign Language or can read lips (Cawthon, 2007). Finally, not all ELL students are the same either. Abedi (2008) found that of seventy-three accommodations provided for ELL students, only eleven were helpful (the author does not state if "helpful" means a differential boost). To sum up, the individual--not just the disability--needs to be taken into consideration.

Individualized Education Program

IEPs literally call for the consideration of the individual. These legal documents are the way in which students have access to their accommodations and modifications (Lazarus et al., 2008). IEPs are crafted by parents, a general education teacher, a special education teacher, an administrator, and sometimes the child (Howard & Potts, 2013; Neal, 2012). Elements to consider when creating an IEP include knowledge of accommodations, state standards, and experience

matching accommodations to students (Edgemon et al., 2006). IEPs contain the student's current performance, services, goals, accommodations, modifications, and transitions (Neal, 2012).

Accommodations also do not need to be provided for every test; each Keystone Exam is listed separately with a column for "without accommodations" and "with accommodations" (Pennsylvania Department of Education, n.d.). Thus the individual student, and the individual needs (those in math, those in science, etc.) can each be accounted for in the IEP. So if a student experiences a differential boost with extended time on a math test, but not on a reading test, then this can be stipulated in the IEP to prevent an unfair advantage. Keep in mind Byrnes's (2008b) five steps to writing explicit accommodations: "(1) State the disability (2) Describe the educational impact of the disability (3) Consider upcoming educational tasks (4) Identify barriers related to the disability (5) Write unambiguous accommodations" (p. 20).

Assistive Technology

Do not forget that we exist in the modern age with technology as an integral component of the classroom, from laptops to graphing calculators and smart phones (Howard & Potts, 2013). Technologies are also advancing to help diverse learners. These can include electronic dictionaries for ELL students or speech to text readers for students incapable of talking (Howard & Potts, 2013). These technologies are another aspect to include in an IEP.

There are two types of assistive technology: Type 1, closed system; Type II, open system (Howard & Potts, 2013). Type 1 entails a device not connected to the internet that performs a specific function. Type II includes more flexible and/or networked devices such as a tablet or smart phone. These two types of technology are important to keep in mind for writing explicit accommodations. New technologies are constantly being created and need to be considered when providing students with accommodations (Howard & Potts, 2013).

Livescribe

One such new technology is the SmartPen, a small recording device that can help students take better notes (Howard & Potts, 2013). These pens, specifically the Livescribe Pulse pen, photograph what is being written and record what is being said up to 2 GB worth (Naone, 2008). The pen records its position on specially patterned paper (a non-repeating pattern the size of Europe and Asia) and will play back the audio that was recorded when the pen wrote there (Naone, 2008). These pens may benefit students with short term memory trouble (Beddow, 2012; Thurlow & Bolt, 2001; Trammell, 2011). But this technology may also benefit every student in the classroom.

Chapter 5

Universal Design for Learning and Conclusions from the Literature

When every student in the classroom can benefit from an accommodation, it is no longer an accommodation, but is rather just good practice. The goal of creating classrooms in which everyone can benefit and barriers to access are minimalized—and everyone can benefit—is known as Universal Design for Learning (UDL) (Brand & Dalton, 2012; Brown et al., 2011; Dolan et al., 2005; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Gartland & Strosnider, 2004b; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008; Lovett, 2010; Sireci et al., 2005; Stanford & Reeves, 2009; Suritsky, 1993; Thurlow & Bolt, 2001).

Basis

UDL stems from the field of architecture (Brown et al., 2011; Friend & Pope, 2005; Stanford & Reeves, 2009). It began in the 1950's in the United States, Europe, and Japan with removing environmental barriers and progressed into integrating everyone into every environment in the 1970's (Brown et al., 2011). Education caught wind of the idea and began adapting the architecture principles to students in the 1990's (Brown et al., 2011; Friend & Pope, 2005). In architecture, the idea is that "[i]t is much easier to build a home…that is accessible and easily reachable than to adapt or retrofit an environment" (Stanford & Reeves, 2009, p. 3). In education this refers to planning for diverse learners from the beginning, not by providing accommodations later. In architecture terms, integrate features like ramps, wide doorways, and handholds into the core design, rather than adding them years later. UDL is a way of reducing accommodations needed in the classroom. If all students benefit from an instructional feature,

then perhaps it should be available to all students, not just those with a disability. Accommodations will still be necessary for some students. UDL facilitates new accommodations from the start, such as machine-readable tests, which can be printed in Braille or large print or even some future format. Now a blind student can have an accommodation available when one is needed. UDL does not entail having all students take a Braille test, rather it emphasizes proactivity and preparedness. We need to keep in mind that if accommodations are present in an IEP, legally they have to be provided. So UDL can reduce the need for accommodations by making them available to everyone, but if they are stipulated in an IEP they must be provided.

UDL has four core principles, the multiple means of representation (knowledge), expression (affective), engagement (strategic), and assessment (knowledge, affective, and strategic networks) (Brand & Dalton, 2012). Along with these four core principles are also nine major foci.

Major Foci

There are seven foci of the Universal Design for architecture: (1) Equitable Use, (2) Flexibility in Use, (3) Simple & Intuitive, (4) Perceptible Information, (5) Tolerance for Error, (6) Low Physical Effort, and (7) Size and Space for Approach and Use (Brand & Dalton, 2012). Another two principles were added for educational UDL: (8) Community of Learners, and (9) Instructional Climate (Brand & Dalton, 2012). These extra two are marked with an asterisk below.

Equitable Use

Course information should be available in multiple formats (Brand & Dalton, 2012). These may include Braille, online formats (potential for large-font or computer read alouds), print, and verbally. One does not need to accommodate a single student if multiple forms of the resource were created at their inception. Again, UDL is about being ready to accommodate students, rather than scrambling to assist them as the problems arise.

Flexibility in Use

Instruction should not take a single form, but rather a variety of forms (Brand & Dalton, 2012; Fensham & Cumming, 2013). A single form of teaching will not accommodate all learners, "especially when the teacher's style is a mismatch of the student's style" (Stanford & Reeves, 2009, p. 3). Material should be presented in discussions, groups, lectures, videos, etc. not just one style (Brand & Dalton, 2012). Assessments should also be varied.

Simple & Intuitive

Grading should be clear and straightforward (Brand & Dalton, 2012). Not everything needs to be graded for correctness. Some items could be graded on completion, similar to the modification of pass/fail grading (Hamilton & Kessler, n.d.). Have grading rubrics accessible and easy to read (Brand & Dalton, 2012).

Perceptible Information

This relates back to equitable use. When presenting a video, have closed captioning on for the hard of hearing, or a translated caption for ELL students (Brand & Dalton, 2012). This is similar to how airports and other crowded establishments always have closed captioning on their televisions.

Tolerance for Error

Provide frequent feedback, more often than midterms or end of quarter grades (Brand & Dalton, 2012). This also means providing detailed constructive feedback.

Low Physical Effort

On the architectural side, this referred to ideas such as switching from doorknobs to handles; educationally this entails steps like providing guided notes to students who have trouble taking notes (Brand & Dalton, 2012). It can also mean reducing cluttered tests for some students (Thurlow & Bolt, 2001), or sound amplifications devises for students hard of hearing.

Size and Space for Approach and Use

This returns to the idea of preferential seating. Set up the classroom such that everyone has a preferable seat. Have the students all facing each other and near the teacher—such as circular seating (Brand & Dalton, 2012).

Community of Learners*

Relating back to assistive technology, students can learn outside of the classroom, working with peers using tools like Facebook groups or simply emails (Brand & Dalton, 2012). This can also help improve social skills and tolerance skills (Gaona, 2004; Newman & Gonzalez, 2006).

Instructional Climate*

Emphasize that the classroom is an inclusive and accepting classroom right from the start in the syllabus (Brand & Dalton, 2012).

Potential Benefits of UDL

UDL is fairly recent so there is not a great deal of research proving its effectiveness; nor is it easy to pin down all nine principles and their effectiveness individually (Brand & Dalton, 2012). Another seven principles have been proposed for UDL-compliant tests: (1) Inclusive assessment population; (2) Precisely defined concepts; (3) Accessible, non-biased items; (4) Amenability to accommodations; (5) Simple, clear, and intuitive instructions and procedures; (6) Maximum readability and comprehensibility; and (7) Maximum legibility (Gartland & Strosnider, 2004a; Lazarus et al., 2008). Use of these seven principles can help end the discussion on finding cure-all accommodations for certain disabilities or types of learners (Lazarus et al., 2008). It can help with issues regarding extended time, but accommodations like Braille tests will still be needed for students who cannot see. A UDL designed test can also help students who may not have been identified. Often students may have an undiagnosed disability, or may not have an IEP. UDL assessments can help these students demonstrate their true abilities.

UDL is a solution to the issues regarding low or no differential boost in the literature. It may eliminate unintended, irrelevant constructs that the test was actually testing. Removing these irrelevant constructs will improve the validity of the test. NCLB should be about valid measures of student performance, not just checking the adequate yearly progress box. Universal Design for Learning is meant to universally help all learners do better—ELLS, gifted students, and students with varied learning disabilities and other challenges, including, depression, BAD, BPD, schizophrenia, anxiety disorders, emotional disturbances, autism, deafness, orthopedic impairments, traumatic brain injuries, and reduced vision. And it also helps these students' non-disabled peers learn better. It allows every student to play the same game on the now leveled playing field.

An exploratory mini-study was conducted on data gathered from an assessment in a college Biology class. This Biology class attempted to integrate many of the foci of UDL into the classroom and course structure. A video representation of the inner workings of a cell was presented and students informally (not for course points) recorded the structures and processes of a cell, at the beginning and end of the semester. The responses were coded for the number of correct items listed.

The initial goal of the study was to test whether or not the video gauged the students' understanding similarly to that of the homework and tests (grouped together as total course points). This analysis attempted to capture whether or not the video assessment was an example of a reliable, varied assessment. A second goal explored a potential correlation between motivation (determined by the number of correct items listed) and the ratio of correct items to the ratio of total course points. Explicit details of the study can be found in Chapter 6.

Conclusion

There still exists some confusion regarding the terms, "modification," and, "accommodation." A modification is a change in the curricular expectations for a student (Alquraini & Gut, 2012; Bolt & Thurlow, 2004; Cawthon, 2007; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008). Accommodations are the means by which a student overcomes a barrier which allows him to demonstrate his knowledge (Alquraini & Gut, 2012; Bolt & Thurlow, 2004; Bunce & Simaska, 2013; Edgemon et al., 2006; Elliott et al., 2001; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008; Scanlon & Baker, 2012; Scarpati et al., 2009; Souma et al., 2006; Thurlow & Bolt, 2001).

The purpose of the ten most common accommodations allowed on state-wide testing (Braille, computer response, dictation, extended time, interpreter for instructions, large-print, marking answers in the test booklet, oral accommodations, clarifying directions; test breaks) Thurlow & Bolt identified (2001) are meant to "level the playing field" (Bouck & Yadav, 2008; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Hamilton & Kessler, n.d.; Sireci et al., 2005). Unfortunately, there is a dearth of research supporting and refuting these accommodations as valid (Abedi, 2008; Brown et al., 2011; Byrnes, 2008a; Harrison et al., 2013; Jiang & Grabe, 2007; Jindal-Snape et al., 2005; Jordan, 2009; Lazarus et al., 2008; Lovett, 2010; Pariseau et al., 2010; Scanlon & Baker, 2012; Thurlow & Bolt, 2001). To be valid, an accommodation must not change the construct of the test and provide a differential boost for students with a disability (Bouck & Yadav, 2008; S. W. Cawthon, 2007; Elbaum, 2007; Fletcher et al., 2009, 2006; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Harrison et al., 2013; Jiang & Grabe, 2007; Lovett, 2010; Pariseau et al., 2010; Sireci et al., 2005; Thurlow & Bolt, 2001). Accommodations and

modifications are legally binding elements of an IEP, and must be followed. Accommodations need to consider the student, not the disability (Stephanie W. Cawthon & Wurtz, 2010; Dolan et al., 2005; Elliott et al., 2001; Fletcher et al., 2006; Fuchs, Fuchs, Eaton, & Hamlett, 2000, 2000; Hamilton & Kessler, n.d.; Howard & Potts, 2013; Irving et al., 2007; Lazarus et al., 2008; Morales, 2011; Salend, 2008; Scanlon & Baker, 2012; Thurlow & Bolt, 2001), and be explicit (Byrnes, 2008b).

The research, confusion, and debate over accommodations and modifications may be ending with the implementation of the principles of the Universal Design for Learning, whose goal is to reduce as many barrier to performance as possible (Brand & Dalton, 2012; Brown et al., 2011; Dolan et al., 2005; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Gartland & Strosnider, 2004b; Hamilton & Kessler, n.d.; Harrison et al., 2013; Howard & Potts, 2013; Lazarus et al., 2008; Lovett, 2010; Sireci et al., 2005; Stanford & Reeves, 2009; Suritsky, 1993; Thurlow & Bolt, 2001). Currently, accommodations do not have enough evidence to back them (Abedi, 2008; Brown et al., 2011; Byrnes, 2008a; Harrison et al., 2013; Jiang & Grabe, 2007; Jindal-Snape et al., 2005; Jordan, 2009; Lazarus et al., 2008; Lovett, 2010; Pariseau et al., 2010; Scanlon & Baker, 2012; Thurlow & Bolt, 2001), are mostly researched in elementary schools only (Edgemon et al., 2006; Elbaum, 2007; Elliott et al., 2001; Fletcher et al., 2009; Harrison et al., 2013; Scanlon & Baker, 2012; Sireci et al., 2005), are not selected effectively by teachers (Elliott et al., 2001; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Neal, 2012), and lack an individual basis (Cawthon & Wurtz, 2010; Dolan et al., 2005; Elliott et al., 2001; Fletcher et al., 2006; Fuchs, Fuchs, Eaton, Hamlett, et al., 2000; Fuchs, Fuchs, Eaton, & Hamlett, 2000; Hamilton & Kessler, n.d.; Howard & Potts, 2013; Irving et al., 2007; Lazarus et al., 2008; Morales, 2011; Salend, 2008; Scanlon & Baker, 2012; Thurlow & Bolt, 2001).

In response to the title question, “Do accommodations level the playing field, or alter the sport,” the answer is that the play is still under further review. Some accommodations will always be a necessary part of the game. But, why not just change the game to Universal Design for Learning so that everyone can play?

Chapter 6

UDL in a Biology Classroom and an Exploratory Study

Initially, a large lecture style Biology class consisted almost entirely of multiple choice tests and multiple choice homework assignments. This class was the classic archetype of teacher centered, lecture instruction. When the instructor of the class changed, the format of the class largely evolved as well. The following are ways in which the class changed from a classic lecture-only class into a class more closely associated with UDL. Each focus is addressed in ways that the new classroom attempts to meet these foci.

"Equitable use" was addressed by the presence of the course syllabus available online. This allows a student with a visual impairment to increase the size of the text. Students with no perceptible vision can also use a text-to-speech program to access the syllabus. This also applies to the homework assignments. Tests were computerized which allows for the same accommodations to be present during assessment.

"Flexibility in use" was largely integrated into the classroom, and is addressed further in this chapter in an exploratory study. Videos were often presented in class and in conjunction with homework assignments. Worksheets were provided for in class assignments with the intention of scaffolding discussions between students and Lecture Assistants (LAs). LAs were students who had taken the class previously and now attended lecture. The LAs are also another example of "flexibility in use." LAs were able to promote group discussions and answer student questions during instruction. These peer-leaders could rephrase and present material in a different form that may better accommodate a student's learning style. LAs also held office hours outside of the classroom to accommodate students who needed help.

Assessments were also varied to accommodate different learners. There was an informal video analysis which was used for an exploratory study later in this chapter. Students were also asked to research and write a scientific paper. Homework assignments consisted of watching videos, researching information, and examining diagrams. Tests were multiple choice, but attempted to probe at deeper understanding than had been done in the previous class structure. Students were asked to demonstrate analysis of course material rather than simply recalling knowledge. A brief informal examination of the changes to the exams from the previous instructor to the current showed that test questions were shifting to probing at a deeper understanding. Using Bloom's Taxonomy as a guide, questions were shifting from largely knowledge based to more application and analysis based. The specifics of the analysis go far beyond the scope of this paper.

In regards to "simple and intuitive," LAs graded homework based on a combination of correctness and completion. Homework was graded out of five points, but not every question had to have the correct answer to get all five points. A student who attempted to answer every question correctly, but had minor errors could still receive full credit. When students wrote a paper, a rubric was drafted by all of the LAs and made available to all students when presented with the assignment.

"Perceptible information" was not addressed directly in the classroom. Possible modifications that could address this focus include closed captioning on all videos and providing translated assignments for students.

"Tolerance for error" greatly improved between instructors. In the previous instructor's design, feedback was based almost entirely on four exams. Students could not gauge their progress at any other point. In the current classroom, feedback was provided weekly on homework assignments, in class discussions with LAs, and in LA office hours. Students had six exams to gauge their understanding and the ability to meet with the professor or an LA to discuss

their grade. Students could also meet with an LA to discuss their incorrect answers on the homework. Students, who reviewed their homework with an LA, received half of the credit for each missed question they corrected in the discussion.

"Low physical effort" and "size and space for approach and use" can both be combined in addressing the presence of the LAs in lecture. LAs were strategically placed in the classroom to allow for maximum accessibility to all students. Each LA sat in an empty row so that students could raise their hand and an LA could reach them. Students were also probed with questions to assess their understanding. This design allows for most seats to fall under the category of "preferential seating." The LAs were also able to function as an example of an amplification device for students. LAs could repeat and rephrase what the professor said to students who either did not hear, or could not understand the content. Although it did not occur, an LA could also serve as a translator for some students in the future.

"Community of learners" was addressed by the LA office hours and review sessions. LAs could bring students together outside of the classroom, as well as inside, to discuss the topics presented in lecture. Review sessions focused on bring students together to discuss the material before an exam. LAs could also help students create social media groups (Facebook groups, email chains, etc.) to discuss the material.

Finally, "instructional climate" was indirectly addressed by the LAs bringing all students together for discussions. Leading group discussions was one of the initial reasons for implementing an LA program so that all students could take part in classroom discussions. LAs were trained to help lead discussions and include all students.

Exploratory Analysis of "Flexibility in Use"

An introductory exploratory study of extant assessment data available from the Biology class was used to investigate the UDL major focus "flexibility in use," focusing on the idea of using various forms of assessment (Brand & Dalton, 2012; Fensham & Cumming, 2013). Flexibility in use was chosen to investigate because it was one of the largest changes from the previous instructor to the current. The video, "The Inner Life of the Cell," (Liebler, 2006) was shown at the beginning of the semester and again shortly before the final exam in a college level Biology classroom (n= 412). The final exam was the formal assessment of what the students learned in the class; the video was an informal assessment to see how students' perception and understanding of the structures and processes of a cell changed from pre-instruction to post-instruction. The video shown was not narrated; thus, any students with limited English understanding or hearing difficulties were not affected, keeping in mind the UDL focus of "perceptible information" (Brand & Dalton, 2012). The data was collected in 2012, prior to the start of this study, thus no conditions for the collection of data were stipulated for this research purpose. This is an exploratory study of extant data.

Students were asked to record all of the structures and processes observed in the video. The answers were recorded at the beginning of the semester ("pre," n= 327) and at the end of the semester ("post," n= 185). The pre-tests did not contain an identifier, but the post-tests did contain an identifier. The decline in responses is the result of students dropping the class, as well as the loss of some of the data for the post-test. Because this was not a formal assessment, it is also possible that students did not turn in a response. This high mortality rate, along with the inability to sort out the pre-tests of only those who submitted a post-test, undoubtedly has an effect on the data. This study is only an introductory exploratory study, additional data and analysis is required for valid conclusions to be drawn.

Responses were coded as the number of items listed, the number of correct items (present in the video), and the percentage correct. The percentage correct of the post-test was then paired with the student's percentage of total course points (n= 172). There were no course points assigned to the video assignment. Some responses either lacked an identifier, or the identifier listed could not be matched with a student's score.

Internal Review Board (IRB) approval was not required for this exploratory study. The data is presented such that students are anonymous. Students were not ever made aware of their score on either the pre-test or post-test. These were scored 2 years after the students were in the classroom. The total course points are presented as a ratio score in a graph with a resolution that prevents discerning an exact score, thus students cannot be individually identified in the results. All other data is presented in an aggregate form also preserving anonymity. Students requiring accommodations in the class were not specifically investigated due to the small population (n= 2). These students would be identifiable, and thus anonymity would not be preserved. This population is also too small for any generalizations to be drawn from the trends.

The goal of this analysis was to gauge whether or not the video analysis captured a change in students' understanding of the structures and processes of the cell, and if the results of the post-test were correlated with final course grades. Null hypothesis 1 states that there is not a significant increase in the number of attempted items between the pre-test and post-test. Null hypothesis 2 states that there is not a significant increase in the number of correct items from the pre-test to the post-test. Null hypothesis 3 states that post-test scores are statistically independent of total course points earned by students.

Hypotheses 1 & 2 were addressed using an unpaired student T-test. The pre-tests lacked an identifier, thus the pre- and post-tests could not be attributed to a specific student. Table 1 concerns Hypothesis 1 and Table 2 concerns Hypothesis 2. Table 2 also contains the average percent correct. Hypothesis 3 was tested by analyzing the coefficient of determination of the

percent of correct items on the post-test versus the percent of the total course points as shown in Figure 1. The R^2 value, 0.0753 is also presented on the figure.

Table 1 Hypothesis 1 Data

Average Number of Items Listed/ Student		
	Pre-Test	Post-Test
Mean	6.63	12.21
SD	3.01	5.71
N	327	185
	t= 14.4766	p= .0001

Table 1 contains the data used to run the student T-test to examine the significance between the number of items listed of structures and processes in a cell during the pre-test and post-test.

Table 2 Hypothesis 2 Data

Average Number of Correct Items Listed/ Student		
	Pre-Test	Post-Test
Mean	4.69	10.03
SD	2.75	5.00
N	327	185
Average % correct	70.65	82.20
	t= 15.5949	p= .0001

Table 2 contains the data used to run the student T-test to examine the significance between the number of correct items listed of structures and processes in a cell during the pre-test and post-test. The average percent correct is also listed.

Figure 1. Coefficient of Determination of Post-Test and Course Points

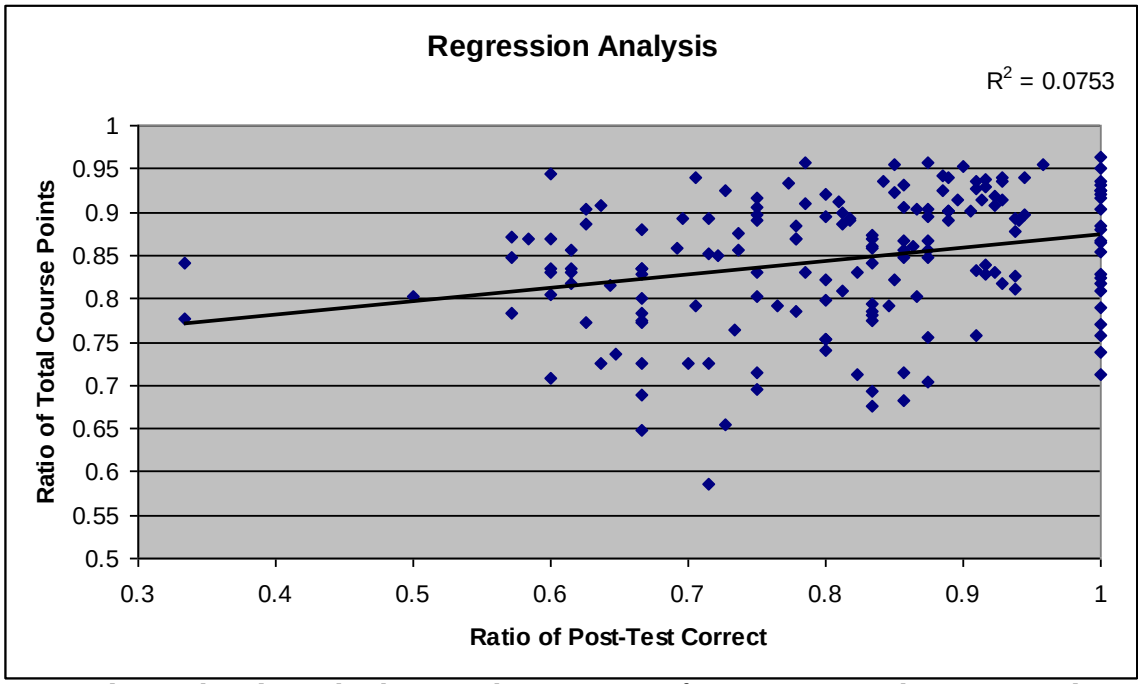

Figure 1 depicts the relationship between the percentage of correct items on the post-test video and the percent of course points earned in the Biology class (n= 172).

Null hypothesis 1 is rejected by the data in Table 1 (p= 0.001). There is a statistically significant increase between the number of items students provided on the pre-test (mean 6.63) and the post-test (mean 12.21). The number of items recorded nearly doubled between the two tests. Thus, there is evidence to reject null hypothesis 1. But, the number of items only captures whether or not students wrote more between tests. Null hypothesis 2 addresses whether or not the number of correct (nonrandom) items changed between tests. Table 2 shows that the average percent correct increased by 11.55% between the pre-test (70.65%) and the post-test (82.20%). This finding provides evidence against the possibility of random response. The difference between the mean of pre-test (4.69) and post-test (10.03) is also significant (p= 0.0001), showing an increase in correct responses. This provides evidence against null hypothesis 2. The number of correct responses more than doubled, in combination with the number of items increasing (both hypothesis 1 and 2). Thus, there is evidence to support the claims that students significantly

increased the number of correct items provided on the post-test than on the pre-test. This evidence suggests that both null hypothesis 1 & 2 can be rejected, but the high mortality rate from the pre-test to post-test has potential to skew the data. Those students who remained in the class are likely to have scored higher on the pre-test. This mortality problem results in the lower scoring students likely not being present in the post-test.

Figure 1 shows that the correlation between the percent of correct post-test items and the percent of total course points earned has an R^2 value of 0.0753. The low coefficient of determination does not provide evidence to reject null hypothesis 3. A positive R^2 value indicates that there is a weak relationship between post-test scores and total course points. More data is required to investigate the significance of the relationship. The slope of the line is positive (0.155), thus as post-test item scores increased, the percent of total course points increased as well. The low R^2 value does not disprove the use of varied assessments, but it does not provide solid evidence in favor of the video being a reliable predictor of a most students' total course points.

With only 41.75% of the class data being able to be matched to total course points, there is the possibility for a response bias or error. A lack of practice with such an activity may be another reason for the lack of correlation. Students' inability to transfer two-dimensional representation to three-dimensional representations may also factor into the low correlation. Because it was an informal assessment, there is also the possibility that a lack of motivation may have caused a decrease in response. Students who are extrinsically motivated by points alone may not value the assessment, and record few to no responses. Students who are intrinsically motivated should still be motivated to complete the assessment regardless of a point value.

To explore the idea of motivation influencing the students' scores, another exploratory analysis was conducted. The number of correct points was used to bin each data point (1-5, 6-10, 11-15; 16-28). The binning is based upon the assumption that students with low motivation to the

task will provide fewer items due to a lack of effort. 1-5 items is considered very low motivation, 6-10 and 11-15 are assumed to be average motivation, and 16-28 is considered to be high motivation. The expectation was that there would be a change in the correlations between the ratio of correct items and total course points across the groups (1-5, 6-10, 11-15; 16-28). Figures 2-5 explores whether or not the correlation changes across four different regression lines.

Figure 2. Regression Analysis for 1-5 Correct Items (Low Motivation)

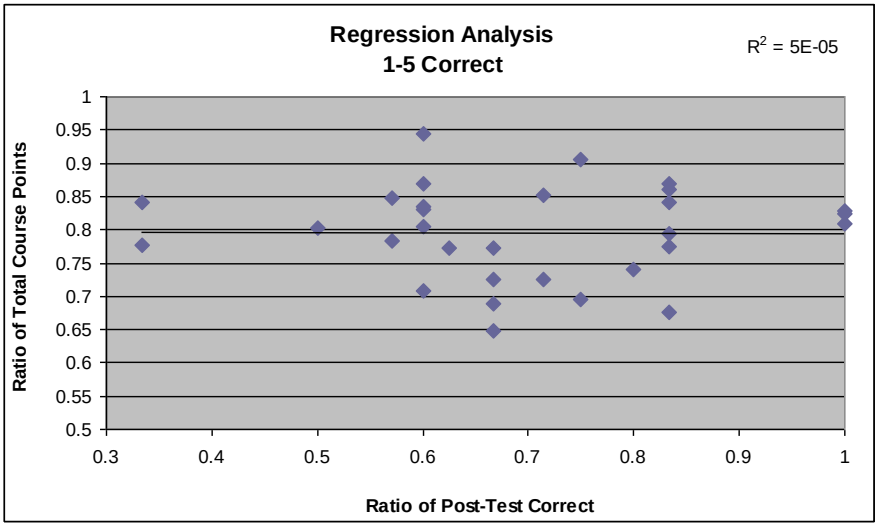

Figure 2 investigates the relationship between the ratio of correct items for 1-5 correct items (n= 30) on the post-test compared to the ratio of total points. The coefficient of determination is 0.00005.

Figure 3. Regression Analysis for 6-10 Correct Items (Low-end Average Motivation)

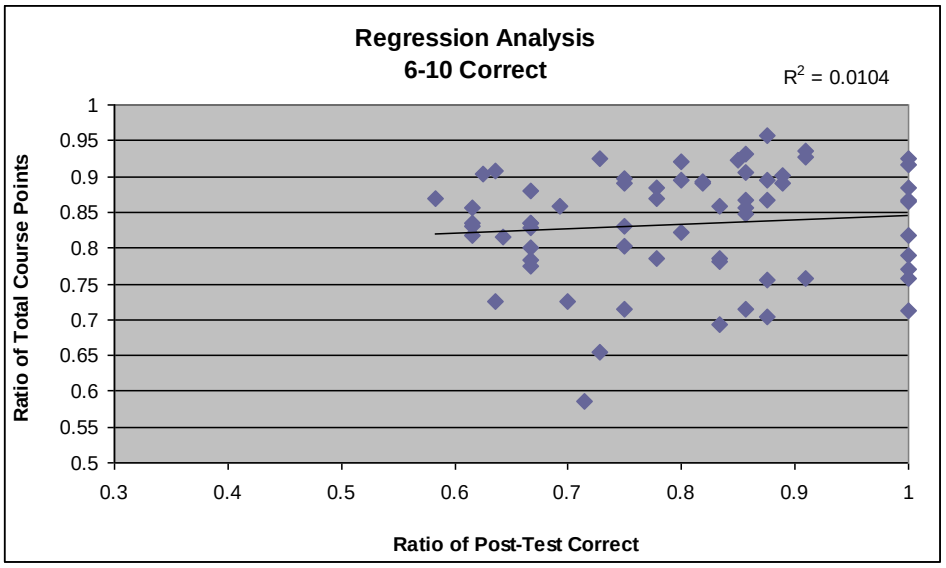

Figure 3 investigates the relationship between the ratio of correct items for 6-10 correct items (n= 64) on the post-test compared to the ratio of total points. The coefficient of determination is 0.0104.

Figure 4. Regression Analysis for 11-15 Correct Items (High-end Average Motivation)

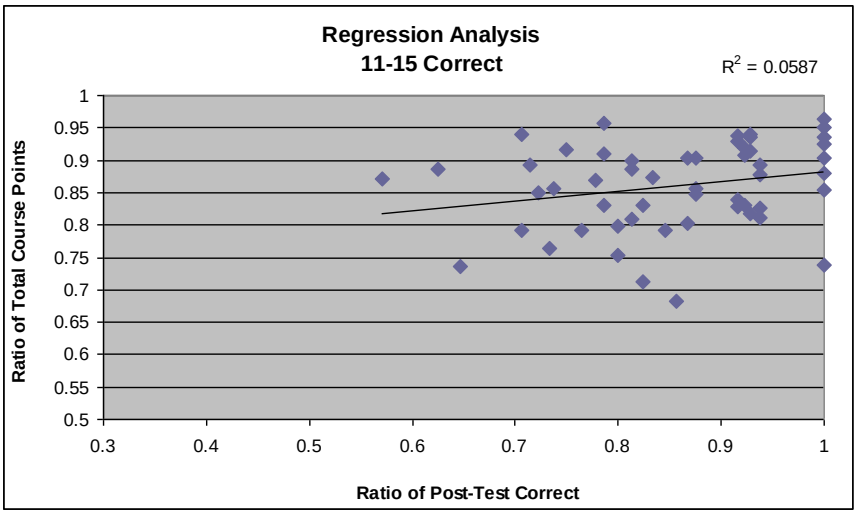

Figure 4 investigates the relationship between the ratio of correct items for 11-15 correct items (n= 52) on the post-test compared to the ratio of total points. The coefficient of determination is 0.0587.

Figure 5. Regression Analysis for 16-28 Correct Items (High Motivation)

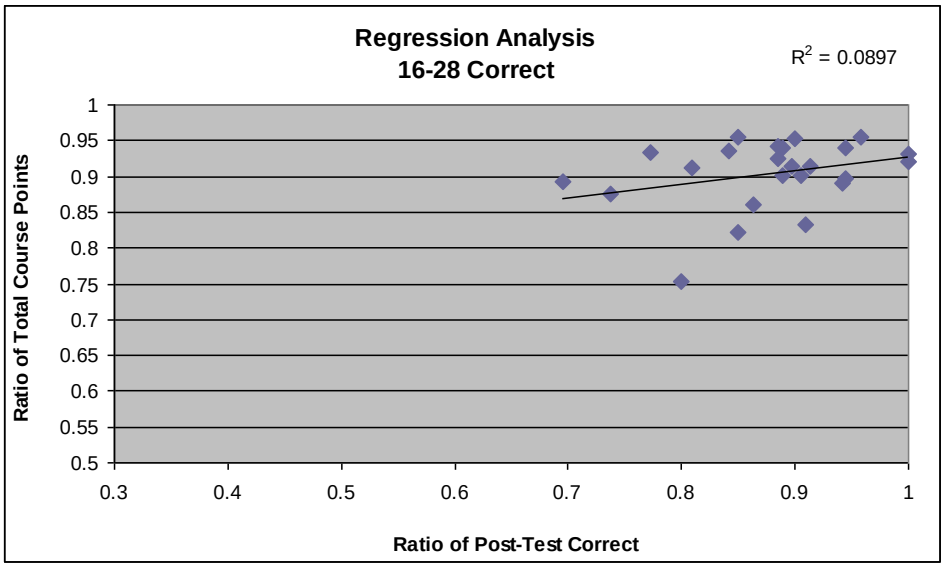

Figure 5 investigates the relationship between the ratio of correct items for 16-28 correct items (n= 23) on the post-test compared to the ratio of total points. The coefficient of determination is 0.0897.

Figures 2-5 show that the R^2 value does change (a difference of 0.08965 from 1-5 to 16-28) and increases as the number of correct items increases across the groups. Figure 5 cannot prove to be a better fit of the data than Figure 4, or 3, etc. More data is needed to investigate this relationship further. The data does not prove that there is a correlation between motivation towards the assessment and the number of correct items listed. According to the assumptions assigned to each group, the highly motivated students have the strongest correlation (0.0897) between ratio of correct items to ratio of total course points, and low motivation students have the weakest correlation (0.00005). Average was broken into the low-end average (0.0104) and high-end average (0.0587) to further provide evidence for an increase in correlation as the number of correct items increased. The increase in correlation (0.08965) provides evidence for, but does not prove, that motivation is a major factor in the reliability of this particular informal video assessment. The change in R^2 values raises the questions if higher performing students either

perform better on this type of assessment, or if there is a correlation between intrinsic motivation and this assessment. But, this question cannot be proven with the currently available data. This is only an introductory exploratory study.

In conclusion, this exploratory study found that students recorded more correct, nonrandom items of structures and processes in a cell after instruction compared to pre-instruction. There exists a positive correlation between the post-test scores and the total course points. The R^2 value increases with the number of correct items which data suggests may be the result of an increase in motivation. But, these results need to be qualified with the fact that there was a high mortality rate. These results are likely skewed by higher-performing students being over represented in the post-test compared to the population in the pre-test. A future study would need to include identifiers on the pre-test so that those results can be removed if the student drops the class.

Appendix A
Research Methodology

Search Engines

ERIC, ProQuest, and Google Scholar were employed to discover peer-reviewed studies of accommodations and modifications in educational literature. No particular timeframe was set due to the dearth of relevant articles. Only studies with full-text available online were investigated.

Keywords

"Effective accommodations," was the initial query. More clarification was required to sort the results. "Accommodations definition," and "modifications definition," were used to net additional resources that differentiated between accommodations and modifications. The studies that resulted were then used to generate the term, "most common accommodations." This led to the discovery of the Thurlow & Bolt (2001) study, which lead to inquires into each of the ten common accommodations separately. These subsequent searches provided the articles relating to each specific accommodation, extended time (29 studies) having the most results. These studies raised further inquiries into subjects such as "valid accommodations," "deafness accommodations," etc. The papers generated at this stage had motifs that were then used to further research. These included "Universal Design for Learning/ UDL," "Legislation and accommodations," "inclusion," and "state testing and accommodations/ modifications."

Methods

Using the keywords mentioned above, forty-eight studies were identified as relevant to the literature review and were saved to a Zotero bibliography. These studies were identified by their relevance in the titles and abstracts of the papers. The articles were then read and coded with tags using the Zotero bibliography. Some of these tags include: “access, not outcome, 4 types of accommodations, 5th type of accommodation, accessibility, access skills, accommodation and modification confusion, accommodation definition, ADHD”, etc. All of the tags are listed in the tables below, along with a breakdown of what each study contains. Studies that did not register with one of the tags were removed from the table.

While reading the articles it was discovered that the Sireci (2005) and Phillips (1994) articles were frequently listed in many of the resources. These and other studies were then added to the pool and a total of eighty-one studies were gathered. These studies were sorted and classified using the tags in the Zotero bibliography. Large motifs became section headings (“Ten Most Common Accommodations,” “Legislation that Lead to Inclusion,” etc.) and were organized around the theme of presenting why accommodation and modifications exist, followed by what the ten most common accommodations are, and closing with a short discussion on Universal Design for Learning. Other motifs and themes are discussed in the findings above.

Table 3. Research Articles relating to Accommodations, Problems with Accommodations, and Universal Design for Learning

Authors	Accommodations, Modifications, & Interventions													Problems with Accommodations					UDL	
	Accom. Defn.	Valid Accom.	Blindness	Oral Accom.	Extended Time	Clarifying Direc.	Writing on Test	Frequent Breaks	Types of Accom.	Bundling Accom.	Accom. & Mod.	Mod. Defn.	Interventions	Consider Student	Dearth of Evidence	Studies in Elemen.	Teacher Selection	Blanket Accom.	UDL (general)	Major Focuses
Abedi, J.			1		1										1			1		
Alquraini, T., & Gut, D.	1				1						1	1								
Aron, L., & Loprest, P.	1											1								
Barraga, N.			1																	
Beddow, P. A.	1			1	1	1														1
Bender, W. N., Vail, C. O., & Scott, K.											1									
Bolt, S., & Thurlow, M.	1		1	1	1			1		1		1								
Bossé, M. J.																				
Bouck, E., & Yadav, A.	1	1		1	1															
Brand, S., & Dalton, E.																			1	1
Brockelman, K. F.					1															
Brown, S., Cook, B., Kelly, R., & Park, H. J.															1				1	1
Bunce, C., & Simaska, D.	1			1	1			1	1											
Byrnes, M. (a)	1				1										1					
Byrnes, M. (b)	1																			
Cawthon, S. W.		1			1							1								
Cawthon, S. W., & Wurtz, K. A.	1				1									1						
"Disability law."																				
Dolan, R., Hall, T. E., Banerjee, M., Chun, E., &				1										1				1	1	

Strangman, N.																			
Edgemon, E., Jablonski, B., & Llyod, J.	1				1				1							1			
Elbaum, B.		1														1		1	1	
Elliott, S. N., Kratochwill, T. R., & McKevitt, B. C.	1				1					1				1		1	1	1	1	
Fensham, P., & Cumming, J.				1	1			1											1	
Filce, H., & Lavergne, L.					1			1												
Fletcher, J., Francis, D., Boudousquie, A., & Copeland, K.		1								1				1						
Fletcher, J., Francis, D., O'Malley, K., Copeland, K., Mehta, P., Caldwell, C., Vaughn, S.		1		1	1			1		1						1			1	
Friend, M., & Pope, K. L.																			1	
Fuchs, L., Fuchs, D., Eaton, S., & Hamlett, C.		1	1	1	1									1			1			
Fuchs, L., Fuchs, D., Eaton, S., Hamlett, C., & Karns, K.	1			1	1									1			1			
Gaona, J.																				
Gartland, D., & Strosnider, R. (a)	1				1				1										1	1
Hamilton, K., & Kessler, E.	1			1	1							1		1					1	
Handbook of research on science education.																				
Harrison, J., Bunford, N., Evans, S., & Sarno Owens, J.	1	1							1	1		1	1		1	1			1	

Harr-Robins, J., Song, M., Hurlburt, S., Pruce, C., Danielson, L., Garet, M., Jacobson, J.																			
Howard, L. A., & Potts, E.	1								1			1		1					1	
Irving, M., Nti, M., & Johnson, W.														1						
IV. Participation in state and local assessments.													1							
Jiang, X., & Grabe, W.		1													1					
Jindal-Snape, D., Douglas, W., Topping, K. J., Kerr, C., & Smith, E. F.												1			1					
Kieffer, M. J., Lesaux, N. K., Rivera, M., & Francis, D. J.		1																		
Lazarus, S. S., Thurlow, M. L., Lail, K. E., & Christensen, L.	1				1							1		1	1				1	1
Lovett, B. J.		1			1										1				1	
McGinnis, J. R.																				
Morales, M.														1						
Neal, T.																	1			
Newman, L., & Gonzalez, P.					1							1								
Ofiesh, N., & Highes, C.					1															
Pariseau, M. E., Fabiano, G. A., Massetti, G. M., Hart, K. C., & Pelham, W. E.		1			1										1					
Phillips, S. E.		1																		
Richie, G.													1							
Rutherford, F. J.																				

	Accom. Defn.	Valid Accom.	Blindness	Oral Accom.	Extended Time	Clarifying Direc.	Writing on Test	Frequent Breaks	Types of Accom.	Bundling Accom.	Accom. & Mod.	Mod. Defn.	Interventions	Consider Student	Dearth of Evidence	Studies in Elemen.	Teacher Selection	Blanket Accom.	UDL (general)	Major Focuses
Salend, S. J.	1								1					1						
Scanlon, D., & Baker, D.	1				1					1		1		1	1	1				
Scarpati, S. E., Wells, C. S., Lewis, C., & Jirka, S.	1			1																
Sireci, S., Scarpati, S., & Li, S.		1		1	1											1			1	
Souma, A., Rickerson, N., & Burgstahler, S.	1			1	1			1				1							1	
Stanford, B., & Reeves, S.																			1	1
Suritsky, S.																			1	
The nation's report card	1				1															
Thurlow, M., & Bolt, S.	1	1	1	1	1		1	1		1				1	1				1	
Trammell, J.	1				1															
U.S. Department of Education.																				
Voltz, D. L.																				
Weinfeld, R., Barnes-Robinson, L., Jeweler, S., & Roffman Shevitz, B.																				
# of Appearances in Articles	23	14	5	14	29	1	1	7	6	7	2	12	3	14	11	7	4	4	19	6
	Accommodations, Modifications, & Interventions													Problems with Accommodations					UDL	

Table 4. Research Articles relating to Diverse Learners, Government, and Miscellaneous

Authors	Diverse Learners						Government				Miscellaneous					
	Statistics of Disabilities	Deafness	ELL	Gifted	ADHD	Inclusion	Legislation	IEPs	Money on SPLED	State Testing	Improve Access	Preferential Seating	Short Term Memory	Assistive Technology	Calculators	Science for All Americans
Abedi, J.			1													
Alquraini, T., & Gut, D.							1									
Aron, L., & Loprest, P.							1		1							
Barraga, N.																
Beddow, P. A.											1		1			
Bender, W. N., Vail, C. O., & Scott, K.						1										
Bolt, S., & Thurlow, M.							1			1						
Bossé, M. J.				1												
Bouck, E., & Yadav, A.							1								1	
Brand, S., & Dalton, E.																
Brockelman, K. F.																
Brown, S., Cook, B., Kelly, R., & Park, H. J.	1						1									
Bunce, C., & Simaska, D.		1														
Byrnes, M. (a)											1	1				
Byrnes, M. (b)							1	1								
Cawthon, S. W.		1														
Cawthon, S. W., & Wurtz, K. A.		1														
"Disability law."							1									
Dolan, R., Hall, T. E., Banerjee, M., Chun, E., & Strangman, N.																
Edgemon, E.,	1							1								

Jablonski, B., & Llyod, J.																
Elbaum, B.										1					1	
Elliott, S. N., Kratochwill, T. R., & McKevitt, B. C.											1					
Fensham, P., & Cumming, J.																
Filce, H., & Lavergne, L.	1											1				
Fletcher, J., Francis, D., Boudousquie, A., & Copeland, K.																
Fletcher, J., Francis, D., O'Malley, K., Copeland, K., Mehta, P., Caldwell, C., Vaughn, S.																
Friend, M., & Pope, K. L.						1										
Fuchs, L., Fuchs, D., Eaton, S., & Hamlett, C.											1					
Fuchs, L., Fuchs, D., Eaton, S., Hamlett, C., & Karns, K.																
Gaona, J.	1					1			1							
Gartland, D., & Strosnider, R. (a)							1									
Hamilton, K., & Kessler, E.												1				
Handbook of research on science education.	1															
Harrison, J., Bunford, N., Evans, S., & Sarno Owens, J.								1	1							
Harr-Robins, J., Song, M.,							1									

Hurlburt, S., Pruce, C., Danielson, L., Garet, M., Jacobson, J.																
Howard, L. A., & Potts, E.	1						1	1						1		
Irving, M., Nti, M., & Johnson, W.																1
IV. Participation in state and local assessments.								1								
Jiang, X., & Grabe, W.																
Jindal-Snape, D., Douglas, W., Topping, K. J., Kerr, C., & Smith, E. F.																
Kieffer, M. J., Lesaux, N. K., Rivera, M., & Francis, D. J.																
Lazarus, S. S., Thurlow, M. L., Lail, K. E., & Christensen, L.							1	1								
Lovett, B. J.			1													
McGinnis, J. R.							1									1
Morales, M.																
Neal, T.							1	1								
Newman, L., & Gonzalez, P.	1															
Ofiesh, N., & Highes, C.																
Pariseau, M. E., Fabiano, G. A., Massetti, G. M., Hart, K. C., & Pelham, W. E.					1											
Phillips, S. E.																
Richie, G.																
Rutherford, F. J.																1

Salend, S. J.											1					
Scanlon, D., & Baker, D.																
Scarpati, S. E., Wells, C. S., Lewis, C., & Jirka, S.																
Sireci, S., Scarpati, S., & Li, S.																
Souma, A., Rickerson, N., & Burgstahler, S.	1										1	1				
Stanford, B., & Reeves, S.																
Suritsky, S.										1						
The nation's report card																
Thurlow, M., & Bolt, S.													1			
Trammell, J.													1			
U.S. Department of Education.	1													1		
Voltz, D. L.						1										
Weinfeld, R., Barnes-Robinson, L., Jeweler, S., & Roffman Shevitz, B.				1												
# of Appearances in Articles	9	3	2	3	1	4	13	7	3	3	6	4	3	2	2	3
	Statistics of Disabilities	Deafness	ELL	Gifted	ADHD	Inclusion	Legislation	IEPs	Money on SPLED	State Testing	Improve Access	Preferential Seating	Short Term Memory	Assistive Technology	Calculators	Science for All Americans
	Diverse Learners						Government				Miscellaneous					

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ACADEMIC VITA

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DESIDERATUM

To ignite or kindle an eternal love of science in the minds of students as a Secondary Education Biology teacher who crafts a fostering learning environment, dialogues eloquently and professionally, and interweaves science and myself into the community

DISCIPLINE

The Pennsylvania State University — 2009 – Present
University Park, PA — Expected Graduation: May 2014
Bachelor of Science in Biology — Masters of Curriculum & Instruction

DEDICATIONS

Heritage Reservation: **Farmington, PA**

Camp Counselor (2005-2009)

- Instructed students on subjects ranging from weather to medicine in an outdoor environment
- Ensured that staff morale and productivity remained high for the duration of the summer

Ecology & Conservation Assistant Director (2010)

- Demonstrated leadership and maturity while still teaching students subjects of ecology and conservation
- Supervised twenty (or more) campers when they sojourned to Fort Necessity for an archeological field trip
-

Ecology & Conservation Director (2012-2013)

- Proving leadership skills by helming the Ecology and Conservation area
- Will be in charge of five staff members as well as educating, supervising paperwork, and addressing public relations for the area as a whole

Pennsylvania State University: **University Park, PA**

Lecture Assistant (2011)

- Disseminated information in a seven-hundred person molecular biology class
- Graded homework for thirty-five students
- Held a weekly office hour

Course Planning Assistant (2011-2012)

- Assisting the professor from the abovementioned biology class in planning the course to train the new lecture assistants
- Refurbishing the order and some content of the class itself

Peer Tutor (2012)

- Piloting a peer-to-peer tutoring class for an ecology course for fifty minutes once a week

DECORATIONS

- Pennsylvania State University: Dean's List: 2009 – Present
- Bethel Park High School: National Honor Society President (2008); Treasurer (2007)
- Eagle Scout (2007)
- Heritage Reservation: Most Valuable Staffer 2010; Best Teacher 2013

DICTATIONS

References available if desired.