

# Accommodations of Learning Disabilities in Mathematics Courses

*Kathleen Ambruso Acker, Mary W. Gray, and Behzad Jalali*

**T**he requirement of the No Child Left Behind Act (NCLB) [27] that measures of academic progress be disaggregated by groups has renewed focus on the issue of accommodating students with disabilities. Although NCLB does not apply to postsecondary education, over the past fifteen years there has been a substantial increase in the attention directed to learning disabilities in this arena. In particular, questions have been raised by institutions of higher education as well as by testing bodies such as the College Board as to whether some recommended accommodations accomplish the purpose for which they were intended and whether they are fair to other students. However, aside from discussions in law reviews, little attention has been focused on whether the accommodations are legally required in a higher-educational setting. We address the legal framework, focusing on what constitutes a disability from a legal point of view and the nature and appropriateness of accommodations, noting where mathematics courses have been affected. Lastly, we will review suggestions for best practices in accommodating learning disabilities in the mathematics classroom in the light of legal requirements.

## **Legal Framework**

Two federal laws affect college-level instruction: the Rehabilitation Act, Section 504 [39], which prohibits discrimination on the basis of disability by entities receiving federal funds, and the

*Kathleen Ambruso Acker is an independent researcher in mathematics education. Her email address is katie.acker@gmail.com.*

*Mary W. Gray is professor of mathematics and statistics at American University and a member of the District of Columbia Bar. Her email address is mgray@american.edu.*

*Behzad Jalali is director of M/S Educational Services at American University. His email address is bjalali@american.edu.*

Americans with Disabilities Act (ADA) [2], which broadens the prohibition of discrimination by requiring that all services and places of public accommodation, including colleges and universities, be accessible to those with disabilities. As a result of several Supreme Court decisions narrowing the scope of protection, the ADA was amended, with changes effective from January 1, 2009. The Rehabilitation Act was also amended to conform. Some state laws may impose additional requirements, but we deal only with the federal context. The Office of Civil Rights of the U.S. Department of Education (OCR) issues letters of interpretation in response to both complaints and inquiries concerning disability laws.<sup>1</sup> These are intended to provide guidance; although they do not have the force of law, they are given substantial deference by courts should litigation develop.

Both the ADA and the Rehabilitation Act are broadly applicable to many aspects of higher education, but this paper concentrates on colleges and universities and to a lesser extent on testing bodies such as the College Board, the National Board of Medical Examiners, and various state boards of bar examiners.

The ADA (as amended) states that:

The term “disability” means, with respect to an individual—

(A) a physical or mental impairment that substantially limits one or more major life activities of such individual;

(B) a record of such impairment; or

(C) being regarded as having such an impairment.<sup>2</sup>

Focusing for the most part on (A), this paper primarily examines what constitutes a legal disability in the learning disability context and what accommodations may be required.

<sup>1</sup>See, e.g., *OCR re Golden Gate University (CA)* (9 NDR 182), July 10, 1996.

<sup>2</sup>42 U.S.C.S §§12101 et seq. (2009).

To begin, the statutory definition of “substantially limited” is not particularly helpful in that it equates “substantially limited” to the term “materially restricted” without further explanation or clarification. However, the amendments of 2009 do define disability more broadly than courts had done in the recent past. The amended ADA states that “major life activities include, but are not limited to, caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating and working.” [2]

The standards of measurement of impairment are also altered by the amendments, which specifically state that whether one is impaired should be judged without respect to any amelioration. Thus, for example, one whose diabetes is controlled by medication would still be considered disabled for the purposes of protection under the ADA.<sup>3</sup> Whether the impairment must be in comparison to the average person’s ability or to that of a person of similar skills and training has been an issue. For example, should a mathematics graduate student’s reading ability be compared to that of an average member of the general public or to that of other mathematics graduate students? The courts have generally adopted an average person standard.<sup>4</sup>

“Learning disabilities” are generally defined to be specific difficulties in learning when the student is generally of average or above-average intelligence [47]; that is, the student’s performance on some aspect of learning is substantially below what would be expected at a given age and IQ. Exactly what this means has been the subject of much controversy, not to mention litigation, but for the purpose of discussion we accept this characterization. Note also that Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD) are conditions that some label learning disabilities and others denominate as a separate category of disability that may be eligible for accommodation. For the purposes of this paper both conditions are considered learning disabilities. Learning disabilities affect education at all levels and in all subjects; in particular, dyscalculia, dyslexia, ADD, and ADHD create difficulties for students to understand and apply mathematics appropriately.

Under the ADA and the Rehabilitation Act, any “otherwise qualified” disabled person is entitled to “reasonable” accommodations in order to provide access to education. As might be expected, what “otherwise qualified” and “reasonable” mean has been the subject of much litigation. However, more basic is whether a “learning disability” is a

disability for purposes of either act. If not, post-secondary accommodations are not legally mandated, although, of course, a college or university may choose to offer them. It is also important to understand that in order for an adverse action (such as dismissal from a program) to violate the ADA or Rehabilitation Act, there must be a causal connection between it and the disability or perceived disability [4]. For example, many court decisions have noted that a student’s failure or dismissal resulting from an inability to meet academic standards even with reasonable accommodations does not constitute discrimination on the basis of a disability.

There are some who contend that “learning disability is merely a subjective social construct that is inherently tied to underlying politics,” and indeed there is some disagreement about how learning disabilities are characterized [21], [47]. There has been some movement away from the traditional “discrepancy” measurement of learning disability to one that assesses the struggling student’s response to high-quality general education instruction or focuses on an absolute low level of achievement. Such a standard would shift from individual identification to a rulelike process that would not have a “bright” child who performs at a mediocre level classified as learning disabled. More important, however, for the present discussion is the tendency of the courts to declare that under some circumstances “learning disabilities” may not be disabilities for the purpose of the ADA and the Rehabilitation Act and the effect the amendments to the ADA might have on this trend.

### Higher Education vs. K-12 Requirements

In the college setting many difficulties result from failures to distinguish what might have been required at the K-12 level and what is required in the postsecondary context under a different legal framework [26]. Students in K-12 education are protected under the Individuals with Disabilities Education Act (IDEA) [19], whose provisions are designed to guarantee successful outcomes for the disabled, whereas the Rehabilitation Act and the ADA are focused on guaranteeing access. Thus, in K-12 education students with disabilities are entitled to an Individualized Education Program (IEP) developed jointly by their teachers and special education professionals and in consultation with their parents. The goal of an IEP is to assure that the student has a chance to achieve academically in an education setting commensurate with his abilities. The proportion of children classified as learning disabled in the K-12 system has grown enormously in the past several decades, as evidenced by the fact that one in eleven college freshmen self-identify as having a disability, over 50 percent of which are described as “learning disabilities”, an increase by as much as threefold over the past

<sup>3</sup>However, under the 2009 amendments one whose vision is corrected merely by ordinary eyeglasses or contact lenses is not considered disabled.

<sup>4</sup>See, e.g., Singh [44].

twenty years [41]. As a result, IEP beneficiaries have come to expect similar accommodations in college and indeed on licensing exams such as those required for students seeking to become physicians or lawyers. There has been a great deal of litigation about the sufficiency of school districts' individualized plans and also a great deal of controversy about learning disability classification being "affirmative action" for the middle class, as parents and students seek accommodations to secure advantages for their children [23], [42].

At the K-12 level, schools have the responsibility to identify students' disabilities as well as to work cooperatively to develop appropriate accommodations. At the postsecondary level it is up to students to make a focused request to the appropriate administrative office to receive accommodations for their disabilities and to provide appropriate documentation supporting such requests for accommodations [6].

Institutions of higher learning are also constrained by the Health Insurance Portability and Accountability Act of 1996 (HIPAA),<sup>5</sup> which specifically prohibits medical information to be included as part of an educational record, and the Family Education Rights and Privacy Act (FERPA), an act designed to protect the privacy of a student's educational records. "Educational records" as defined by FERPA are records "(1) directly related to a student; and (2) maintained by an educational agency or institution or by a party acting for the agency or institution."<sup>6</sup> Furthermore, the definition explicitly excludes inclusion of records made by physicians, psychiatrists, or psychologists. In other words, records from specialists who diagnose and treat learning disabilities cannot be included as part of the student's education records. Thus, even if the institution requires documentation from specialists to substantiate a student's request for accommodation, this information cannot be shared directly with faculty members. To facilitate open discourse between faculty and students learning to be self-advocating, administrations at many postsecondary schools provide students with appropriately documented learning disabilities a letter detailing what accommodations the student needs. Thus, schools do not contact faculty on behalf of the students, and it is the responsibility of the student to disclose to faculty, on an as-needed basis, the need for accommodations.

### Major Life Activity

A fundamental question, one which has not always been addressed by the courts and hardly at all by colleges and universities, is to what extent a documented learning disability might limit an

activity and whether that activity is a major life activity.

A key Supreme Court case, *Sutton v. United Air Lines* [45], involved twin sisters who applied to be pilots. Although they were severely nearsighted, corrected by glasses their vision was 20-20; nonetheless, they were denied employment based on their eyesight. The Supreme Court decided that with the accommodation of glasses they were not disabled and hence were not entitled to the protection of antidiscrimination legislation. This opened the door to a series of decisions greatly limiting the scope of disability protections, an outcome that the 2009 amendments were enacted to reverse. Nonetheless, ultimately the amendments would most likely not have assisted the sisters, because the airline could very likely justify the requirement for 20-20 uncorrected vision as business related by citing what might happen in an emergency situation to the glasses or lenses on which a pilot was relying.<sup>7</sup>

The Supreme Court further limited the scope of the ADA and the Rehabilitation Act in *Toyota v. Williams* [46] when it overturned a lower court decision that had found that a woman who was unable to perform specific tasks in one job was entitled to reassignment to another job that she was able to carry out successfully. The court said that the specific set of tasks was not a major life activity and hence her limitation in performing them was not covered by the ADA. This is the sort of result that the amendments to the ADA seek to reverse.

Until the *Sutton* and *Toyota* cases the courts had generally assumed that the plaintiff was disabled and then examined whether or not there had been discrimination on the basis of that disability, in particular whether reasonable accommodations had been made (see, e.g., [31], [52]). Subsequently the courts have engaged in detailed individual assessments of whether a "major life activity" was implicated and, if so, whether it was "substantially limited". This is likely to continue under the amended statute, albeit under relaxed standards [37].

Applying this back to an educational setting, we see that there are many cases that examine accommodations where the courts have declared that the fact that the examinees have done as well as they have by getting into college, law school, or medical school with accommodations demonstrates that they are not disabled. One example is the case of *McGuiness v. University of New Mexico School of Medicine* [25]. Essentially McGuiness had completed several degrees, including a bachelor of science in chemistry and biology as well as a doctorate in psychology, prior to entering medical school. Throughout his educational experience McGuiness

<sup>5</sup>Public Law 104-191, 104th Congress.

<sup>6</sup>20 U.S.C. section §1232g.

<sup>7</sup>In any case, the sisters would not have been considered disabled and thus entitled to protection if only ordinary glasses were needed to correct their vision to 20-20.

worked through anxiety in taking chemistry and mathematics classes without accommodations. However, his medical school grades did not meet the standards set by the medical school. The courts determined that his inability to satisfy medical school requirements did not substantially limit the broader life activity of “working”, as it excluded him only from certain limited types of jobs. Furthermore, the court held that his claim of anxiety did not meet the definition of disability under either the ADA standard or the Rehabilitation Act.

In a licensing exam case at the district court level, *Price v. National Board of Medical Examiners* [35], the “learning” involved was declared to be a “major life activity”, but since the plaintiff’s prior academic record, achieved without accommodation, was above average, the court held that Price was not disabled and hence not entitled to protection. Whether these cases would have been decided differently under the 2009 amendments is not entirely clear, but it would appear that they would not have been, since neither of the plaintiffs would have met the broadened definition of disability.

Although the amended ADA leaves open the ability of the courts to find that those who have achieved an advanced level without accommodation are not disabled and hence not entitled to the particular accommodation they might now seek, it augurs a different outcome for those who have achieved their current status with accommodations. In particular, they cannot now be deemed not disabled because the ameliorating effects of accommodations have reduced or eliminated any impairment they might otherwise experience. In other words, they are entitled to continued assistance in the form of appropriate accommodations, but it may be questionable whether the impairment they face without accommodations constitutes a limitation in a major life activity.

The underlying issue not directly addressed by the ADA amendments is, as noted above, whether when deciding that a person is impaired, should the comparison be with the average person or with a group of peers (e.g., other students in the same academic program) [4], [35], [44]. Anyone who has progressed to taking a bar exam or even being admitted to college, for example, might on the basis of that achievement be held to be not impaired in the major life activity of “learning” or of “working” since most jobs certainly do not require passing a bar exam and many do not require a postsecondary education. Thus a student could be able without assistance to perform at the level of an “average person” and hence not be considered legally disabled, but not be successful in a program for law students, medical students, or other professionals.

In the case of *Singh v. George Washington University (GWU)* [44], Carolyn Singh was dismissed from George Washington’s medical school due to poor academic progress, primarily on timed mul-

tipl-choice exams. Singh’s suit against GWU asserted that they did not accommodate her claimed learning disability. After a complicated pair of rulings in the lower court, the appellate court remanded the case for consideration of whether Singh was legally disabled, mandating the “average person” rather than other medical students as the appropriate standard for comparison. It also found that test taking is not in and of itself a major life activity but rather a component of “learning”, so that the determination of impairment should be with regard to the totality of “learning”.

### Otherwise Qualified

The concept of “otherwise qualified” is intertwined in a complicated way with the notion of “reasonableness” of accommodations. Although others have attempted to identify gaps in existing law and to consider them in the context of real-world implementation by educators and test administrators [41], we confine our discussion to the existing situation and what may develop under the newly amended ADA and Rehabilitation Act.

A person with a disability who can perform the “essential functions” of a job or meet the requirements for services with “reasonable accommodations” can be considered “otherwise qualified”. Therefore, if students are unable to make satisfactory progress with reasonable accommodations, it would appear that they are not otherwise qualified, the case of a blind person seeking employment as a bus driver being an extreme example. As noted above, there are many cases involving medical students who do well with or without accommodations until they reach the clinical stage of their training. Then, in spite of repeated accommodations having to do with stretched-out scheduling of clinical rotations, repeated attempts at exams, special supervision and other adjustments to their program, they are unable to achieve a standard acceptable to their institutions. In *Falcone v. University of Minnesota* [11, p. 160] the court said “the University is not required to tailor a program in which Falcone could graduate with a medical degree without establishing the ability to care for patients.” Similarly, in *Powell v. National Board of Medical Examiners and the University of Connecticut* [34], the court determined that the plaintiff was not entitled to the protection of the ADA, as even with many accommodations she could not do the required clinical rotations.

In a relatively early lower court case, *Pandazides v. Virginia Board of Education* [29], the court said that an accommodation must not “fundamentally alter the measurement of the skills or knowledge the examination is intended to test.” The outcome of *Falchenberg v. New York State Department of Education* [10] was similar. Falchenberg had received multiple accommodations concerning time requirements and a reader and a scribe on



an exam required for employment as a New York State teacher; however, Falchenberg, a dyslexic, was required to spell and punctuate correctly on her own. Falchenberg felt that this stipulation did not amount to a reasonable accommodation for her disability. Since proper grammar and spelling were integral components of the exam,<sup>8</sup> the court found that Falchenberg was looking for an accommodation that would fundamentally alter the purpose of the exam and thus ruled in favor of the Department of Education. In other words, even with reasonable accommodations there was no way Falchenberg could be considered otherwise qualified.

### Appropriate Accommodations

If a student is not “disabled” under the terms of the law, academic judgment as to what is an “appropriate accommodation” may not have legal significance. However, under the amended ADA, courts are more likely, but not certain, to classify a traditional “learning disability” as a legal disability. Moreover, universities may choose to offer accommodations to those with learning disabilities despite the question of legal obligation. As stated earlier, OCR’s stance on treatment of disabled students is given deference should litigation develop.

The test for reasonableness of requested accommodations rests either on whether the accommodation was administratively or financially burdensome or on whether it required a fundamental alteration in an educational program. The issue of administrative or financial burden has arisen in part because, unlike at the K-12 level, where the school system is responsible for providing sufficient services to ensure an appropriate education, in higher education the student assumes responsibility. It is generally the case that post-secondary students must provide documentation by professionals at their own cost. This potentially creates a barrier for low-income but undiagnosed learning-disabled students who struggle to achieve academically. In addition, learning-disabled students often bear the cost burden of private tutors, although many schools provide free tutoring support for all students by way of open labs.

In determining whether a requested accommodation is reasonable, the totality of circumstances must be considered [53]. Administrative or financial burdens may also arise concerning such accommodations as adjustments in exam schedules, provisions for conducting an oral exam, and developing alternative exam forms. Generally, however, the question of the burden has not been as significant as has whether the proposed accommodation would alter the course or the program to the extent that it is unrecognizable. Thus the key to the determina-

<sup>8</sup>Courts have generally held that academic judgments about academic requirements should be granted substantial deference [34], [38].

tion of the appropriateness of an accommodation is usually whether the requested accommodation requires a fundamental alteration in an academic program or lowers standards, in which case the accommodation is not required.<sup>9</sup>

A case often cited as validating the accommodation of learning-disabled students, *Guckenberger v. Boston University* [17], is worth examining. The provost of the university became concerned about the substantial increase in the number of learning-disabled students receiving accommodations, some of which he felt were inappropriate. After some intemperate remarks from the provost characterizing learning-disabled students as slackers and instituting a requirement for revalidation of documentation of learning disabilities under new standards, a suit was filed by students seeking accommodations, asking for, among other things, a waiver of any courses in mathematics and foreign languages required for graduation.

Although few examples of requests for waiver of the mathematics requirement and no documentation of the waiver being granted were presented, the mathematics department had agreed to allow students to choose an alternative course to meet the requirement. Among the possible substitutes listed were Anthropology of Money, Economics of Less Developed Regions, and Introduction to Environmental Science. Instead of a foreign language students were permitted to take such courses as African Colonial History and Arts of Japan. The court held that the plaintiffs had failed to present scientific evidence that any learning disability was sufficiently severe to preclude sufficient proficiency with appropriate accommodations short of substitution of courses. In the case of the foreign language requirement the court opined that no course in English could substitute fully for the foreign language requirement but that the university had not established the essentiality of such a requirement in the degree program at issue. The actual result of the case was to remove the authority to decide on accommodations from the provost, to modify the documentation of disabilities requirements, and to establish a faculty committee to study the issue of whether eliminating the foreign language requirement would constitute an undesirable alteration in the academic program leading to a degree in the Boston University College of Liberal Arts.<sup>10</sup>

The Boston University case highlights the significance of careful consideration by a university

<sup>9</sup>In a case that achieved much publicity, the Supreme Court decided that allowing a disabled golfer to use a cart did not alter the fundamental nature of the competition nor was it unfair to other competitors, as it preserved fatigue as a component of the game [33].

<sup>10</sup>The committee later decided that it would and the requirement was retained and not subject to waiver. However, the point made was that a decision as to graduation requirements required a process of academic deliberation.

as to what accommodations are reasonable. In response to a complaint at another institution, the Office of Civil Rights reviewed the situation of a woman with severe dyscalculia who enrolled in a mathematics course that had been required by her choice of major. Despite using all services available to her through the college, she failed the course. She then petitioned the college to take a course substitution (an option unavailable to her) or to waive the mathematics requirement. The petition was denied and the student was told to retake the course. An investigation by OCR found that the college did not consider the course substitution as a possibility because their policy on course substitutions was undeveloped and in general course substitutions were not granted. OCR determined that this lack of consideration for this sort of academic adjustment was a violation of ADA. They also found that the school did not present evidence why the mathematics class was an essential requirement of the course of study, nor was there evidence of a collegiate dialogue debating whether granting the course substitution would then be considered a fundamental alteration of the program of study. OCR also noted, "Absolute rules against any particular form of academic adjustment or accommodation are disfavored by the law."<sup>11</sup> The view of the OCR, if not necessarily of the courts, may indicate that more flexibility may be required of an institution at the undergraduate level than in graduate programs, particularly medicine, where the stakes of lowered standards may be greater.

For the learning disabled, the most common accommodation requested is increased time for exams, although provision of a note taker, access to a faculty member's lecture notes, oral instead of written examinations, audio or video recordings of lectures, adjustments in course loads, extension of deadlines, and an isolated place in which to take exams are also commonly prescribed. A more unusual accommodation at American University was the rescheduling of a special section of a mathematics class for learning-disabled students to 11:10 a.m. rather than the "early" hour of 9:55.<sup>12</sup>

In many universities, determination of what constitutes an "appropriate accommodation" is done exclusively by special education professionals in an office of disability services or similar unit.<sup>13</sup> While such experts have a role to play in, for example, dealing with the issue of documentation and matching accommodations to amelioration of

a disability, it is not clear whether those outside the discipline in question should decide whether a requested accommodation might require a fundamental alteration in a course or program or create unfairness. For example, the University of California statement on Practices for the Documentation and Accommodation of Students with Learning Disabilities states in part:

It is the responsibility of a Learning Disabilities Specialist, the Program Director, or other staff member designated by the Director to determine appropriate accommodations and services. This determination will be made after interviewing the student and reviewing the information furnished by the diagnosing professional(s).<sup>14</sup>

No mention is made of consultation with the instructors. Since privacy requirements may preclude making clear to instructors why students need accommodation, it may be difficult to formulate accommodations that ameliorate the disability without fundamentally altering the course.

Nonetheless, often accommodations are presented to the instructor of a course without consultation either as to the administrative burden or the alteration in the fundamental nature of the course or program. However, were either of these effects found to result from the proposed accommodations, the accommodations would unlikely be deemed reasonable by the courts. In general there has been great reluctance from courts to decide academic issues such as whether the nature of a course has been altered [8], [53]. Courts have been clear that an institution need not lower its standards as it defines them in order to accommodate disabilities [10], [52]. For example, the Betts court [4] noted that teachers do not have to grant accommodation requests that in their opinion substantially alter the fundamental aspects of the coursework.

Whether the academic freedom of an instructor to determine how to conduct a course absent a showing of a fundamental alteration of the course or lowering of standards trumps the requirement to make accommodations has not been tested in the courts. In a situation involving a mathematics course at the University of California, Berkeley, the Department of Education's Office of Civil Rights declared that an instructor's academic freedom claim did not supersede the ADA's requirement to make reasonable accommodations.<sup>15</sup> A subsequently filed suit was settled before going to trial.

Traditionally, when working with a student who has academic difficulties, regardless of the origin,

<sup>11</sup>[http://www.galvin-group.com/dspsresources/assets/CA\\_OCR\\_Letter\\_Mt\\_San\\_Antonio.pdf](http://www.galvin-group.com/dspsresources/assets/CA_OCR_Letter_Mt_San_Antonio.pdf) (accessed 02/15/2009).

<sup>12</sup><http://www.american.edu/american/registrar/schedule.cfm> (accessed 03/10/2009).

<sup>13</sup>In the Boston University case, however, apparently the mathematics department had been consulted by those in learning services about the accommodations to be offered.

<sup>14</sup><http://dsp.berkeley.edu/learningdisability.html> (accessed 03/09/2009).

<sup>15</sup>OCR re Golden Gate University (CA) (9 NDR 182), July 10, 1996.

most faculty members strive to do what is best for the students in the professional judgment of the faculty member. When presented a list of accommodations from the administration accompanied by mandates to follow, some faculty feel alienated from the process, as well as experiencing a diminished sense of academic freedom [20], [40] and a concern for fairness to other students.

### Are Accommodations Fair?

A discussion of the fairness of an accommodation for a learning-disabled student begins by looking at how it may affect other students [21], [22], [42].<sup>16</sup> As noted, a common accommodation is granting students additional time to work on exams. Time might not be considered a skill that a test is intended to measure but rather as incidental to the form the test takes, so that extending time does not significantly alter the academic requirement. But can quick thinking be fundamental? Some cases have found that it may be essential in making a medical diagnosis.<sup>17</sup> In the medical school context courts have been very clear that certain accommodations may so impede a student's training as to endanger future patients. Although the seriousness or immediacy of harm may be less in other situations, the argument of the necessity of the quickness of judgment can be compelling. In fact, courts have generally deferred to academic judgments about whether certain accommodations are "reasonable" as they did in the Falchenberg case described above. However, if time is not an essential element of the test taking, should not all students be permitted extra time?

Some students require use of technology to complete an exam. For example, a student who may have difficulty with physical transcription may be granted the use of a computer to complete an essay for an exam. In the context of a mathematics course, one could ask whether allowing those diagnosed as having a learning disability to use a calculator when other students are not permitted to do so is fair. Would the use of a calculator alter the skill a test is intended to measure? Are the accommodated students as well qualified as those who have met the requirements without accommodations? And who decides these issues—a learning service office, the relevant department, the course instructor, or the school administration? The Office of Civil Rights conducted an investigation after a student complained of alleged discrimination when prevented from using a calculator during the mathematics placement exam despite being diagnosed with dyscalculia. This resulted in the vice chancellor of the system reminding college presidents that calculators were indeed allowed for all mathematics examinations, placement or

otherwise, provided the student was appropriately classified as learning disabled.<sup>18</sup> However, whether this was a considered academic judgment or not is unclear. What might happen should a student without a documented learning disability challenge the differential treatment is also not clear.

As an "appropriate accommodation" some students request video and/or audio taping of the course lecture. This presents two challenges for consideration. First, if a student records the class, who protects the privacy of the other students in the class? Consider then the student who does not feel comfortable participating in a class where recording occurs. In essence, is it fair to "accommodate" one student while unintentionally discriminating against another? Currently no cases of record to date have dealt with this issue. Parkland College policy regarding audio-taped lectures, like that of many institutions, gives the professor permission to tell the class that recording will be occurring but does not prescribe how to deal with objections to such a policy.<sup>19</sup> Second, faculty members have long maintained copyrighted ownership of course materials unless otherwise specified by contract with their associated academic institution. Tapes would be included under course materials protected by copyright law.<sup>20</sup> Again, as is common practice, Parkland College policy allows the instructor to ask the student to sign a taping agreement noting copyright and requiring permission of the instructor for derivative dissemination. California State University at San Bernadino provides each student requesting accommodation a handbook that specifically states that audio tapes must be disposed of at the end of the semester.<sup>21</sup> Wallace Community College informs students that they cannot share tapes with nonstudents, agencies, or media, but they do have the option of donating the tapes back to Disability Support Services.<sup>22</sup> However, little in-depth attention has been given to intellectual property rights in general when considering accommodation requests.

There have been arguments made that the use of standardized examinations is per se discriminatory.<sup>23</sup> As long as they are not the only criterion for success, their use generally has been

<sup>16</sup>Fuchs and Fuchs [14] have discussed this in a K-12 context.

<sup>17</sup>See, e.g., Wong [51].

<sup>18</sup><http://www.baruch.cuny.edu/counsel/documents/BM-2-92.pdf> (accessed 03/10/2009).

<sup>19</sup><http://www.parkland.edu/ods/handbook/AudioTapedLectures.pdf> (accessed 03/10/2009).

<sup>20</sup><http://www.copyright.gov/circs/circ1.pdf> (accessed 02/14/2009).

<sup>21</sup><http://enrollment.csusb.edu/~ssd/Documents/Faculty%20Handbook%20-%20Accessible.pdf> (accessed 03/10/2009).

<sup>22</sup>[http://www.wallace.edu/student\\_resources/dss/policies.php](http://www.wallace.edu/student_resources/dss/policies.php) (accessed 03/10/2009).



upheld. Ninety percent of those receiving accommodations on standardized tests have been diagnosed with learning disabilities rather than other disabilities such as physical limitations [41]. Is the fairness problem resolved by “flagging” exams taken under accommodations or courses in which exam modifications or other accommodations were made? It used to be the case that SATs were so flagged, and LSATs and medical school exams still are [41]. Obviously, flagging identifies a person as disabled and could result in discrimination.<sup>24</sup> On the other hand, in the absence of flagging, it could be argued that inaccurate pictures of qualifications are presented,<sup>25</sup> which may prove to be unfair to the accommodated students if they are unable to carry out academic programs or jobs for which they have allegedly qualified, as well as being unfair to their competitors.

It could also be said that “rewarding” disabilities creates an incentive for people to define themselves as disabled, thus constituting a moral hazard [23]. Even if not a moral hazard, do the accommodations unfairly ameliorate a disability? Given that the diagnostic regimen required to establish a learning disability at the collegiate level can be expensive, does that mean that students from lower-income families are unfairly disadvantaged? Should there be the possibility for all students to be tested at the university’s cost? Or should anyone who wants accommodations get them? There are many features of higher education that disadvantage low-income students; is this another to be lived with, or should there be expanded legal protection for students who might potentially benefit from a diagnosis they cannot afford to obtain? Beyond the question of whether accommodations might constitute alterations in the fundamental nature of a program, we can ask, do the accommodations really address the disability? For example, is more time for mathematics exams really needed to accommodate slowness in reading, given the limited amount of reading normally required in mathematics exams?<sup>26</sup> If a student has difficulty writing, more time may directly ameliorate the limitation. However, there is

also anecdotal evidence that excessive time for an exam may in fact be detrimental if eventual fatigue causes students to alter work that was earlier correctly completed.

Consider the following: if a course would be fundamentally altered by an accommodation, then the accommodation is not appropriate. Students routinely transfer credits from one institution to another. Is it possible that upon review some of the credits would not be transferrable because the student received accommodations that, if provided by the second institution, would have fundamentally altered the second institution’s course?

### Learning Disabilities and Mathematics

Among examples of learning disabilities are some which are mathematics specific, such as dyscalculia, and others that impact the ability to learn mathematics, such as dyslexia. Dyscalculia is an umbrella term used to describe a collection of challenges students encounter when solving mathematics problems. For example, some students lack number sense, others cannot interpret graphs, and yet others cannot solve problems that rely on sequencing or algorithms for their solution; i.e., they can’t solve an equation for  $x$  [49]. The degree to which students have one or more of these deficiencies varies. Dyslexic students may have issues reading word problems and number transposition, and since math can be considered a language, decoding of characters may become problematic [43].

Above we note that often in higher education instructors are told to accommodate without necessarily being given specific information as to why an accommodation might be necessary or being consulted as to whether it might fundamentally alter the course requirements. This is unfortunate, particularly for mathematics instructors. Teachers who have knowledge about learning styles and how their students learn may be able to adapt their instruction without compromising the standards of the course, so that students can construct mathematical knowledge for themselves in spite of disabilities [13], [32]. In fact, many “accommodations” are simply techniques that may enhance the learning of all students: supplemental notes, online access to classroom material, audio or video recordings available for replaying as required, access to tutors, ample in-person and/or virtual office hours.

Calculator use in the mathematics classroom, as we have already noted above, is not always left up to the instructor, but perhaps an instructor might dictate the type of calculator to be used and still appropriately accommodate learning-disabled students. Mathematics is cumulative by nature. One has to learn to count before adding or subtracting. One has to understand the order of operations before learning to solve equations. Basic calcula-

<sup>23</sup> *The National Collegiate Athletics Association has rules regarding minimum SAT scores for eligibility for participation in college athletics and for scholarships. They also require a certain number of acceptable high school courses, with courses designated as special education not qualifying unless they can be certified as equivalent to regular courses. Clearly this provides scope for controversy (see e.g., [5], [36]).*

<sup>24</sup> *The ADA prohibits discrimination on the basis of perceived disability, whether or not the person is actually disabled.*

<sup>25</sup> *It has been shown, for example, that accommodated SAT scores overpredict first-year college GPAs [37].*

<sup>26</sup> *If an exam consists primarily of word problems, dyslexia or other difficulties in reading may indeed be a disability.*



tors perform the four fundamental operations of addition, subtraction, multiplication, and division; but advances in technology have created calculators that will solve equations, simultaneously graph and create tables of data for functions, and even generate statistical analysis. It could be the case that a learning-disabled student cannot keep track of sequential steps necessary to solve the problem on paper, but that same student can program a calculator to find the answer. Should we expect students to understand fundamentals such as finding the least common denominator of two fractions, a skill they should have developed before college, or should we be more interested in how the students use the answer found by the calculator to solve the problem? Does this “fundamentally alter” a course? Is this fair to the other students in the class, who may not have been allowed to use any technological help? In light of the outcomes related above, how can this issue best be addressed?

From cases above, it is clear that speed of judgment can be an indicator of qualifications for a program or profession. But does mathematics need to be done quickly? We might ask whether an untimed or extended-time mathematics test really measures the skills or knowledge the exam is intended to measure. When does a mathematics student or a mathematician have to think or calculate quickly?

Research on best practices on teaching K-12 students with learning disabilities in math is available. A meta-analysis from the Center on Instruction in Portsmouth, New Hampshire, listed several pedagogical techniques, including problem-specific step-by-step explicit instruction for finding a solution, student verbalization of steps employed during problem solving, visual representation of math concepts presented in conjunction with traditional problem-solving techniques, and a wide array of examples, to name a few [16]. At the collegiate level the classroom pace is faster, more material is covered, and generalized approaches to solving a problem tend to be presented. With in-class examples to guide them, students are expected to go and explore the concepts outside of class independently. It may be the case that the majority of these techniques can be best applied while working with individual students outside the classroom.<sup>27</sup>

Ideally, the expertise in learning disabilities of a specialist ought to be combined with the subject matter knowledge of a classroom instructor in order to best serve all students. If the use of a calculator is mandated by a learning disabilities

<sup>27</sup>Some institutions establish a special section of required courses specially designed for learning-disabled students, the purpose being to assure maximum assistance without altering the nature of the course or disadvantaging other students. <http://www.american.edu/american/registrar/schedule.cfm> (accessed 3/10/2009).

professional on placement exams, might that mask an inability to deal with fractions that will later pose a handicap if the student is placed at a higher level than might be mandated were the calculator not used? More fundamentally, is an inability to do well in a college mathematics course without accommodations a disability for purposes of the ADA? Could the “average person” do better? If not everyone is guaranteed a university education that requires a college mathematics course, should a university nonetheless seek to accommodate students with difficulties not legally classifiable as disabilities, especially if the accommodation disadvantages other students?

## Conclusion

Instructors faced with requests or demands for accommodations for the learning disabled should not necessarily passively comply. Although they cannot make judgments as to whether the accommodations may be legally required, faculty can and should ask whether the proposed accommodations are actually reasonable and appropriate. Do the accommodations ameliorate the disability, do they fundamentally alter the course or program requirements or lower the academic standards, and are they fair to other students?

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