LANDMARK COLLEGE

OFFICE OF THE PRESIDENT

House of Representatives Presentation Testimony

Peter Eden, Ph.D. President

Summary. Landmark College opened in 1985 to students with language-based learning challenges such as dyslexia. Unlike most colleges and universities, we did not – and still do not - assume that our students learn the same way, or the way neuro-typical individuals learn. We continue to serve only students with a learning disability/difficulty ("LD" writ large for this report) such as dyslexia, but also students with attention deficit disorder (ADD) and/or autism spectrum disorder (ASD). Until two years ago Landmark College offered 2 year associate degree programs but now we offer 2- and 4- year programs in STEM and other disciplines (as well as a graduate-level certificate program for educators and professionals). We are unique among other institutions of higher education in this regard i.e. we do not offer just an optional resource or program to students with LD but rather we *only* serve students with LD. This year we have the highest enrollment (about 500 students) in our history and we are constructing a new Science and Innovation Center on campus to support our students and our grant-funded research.

We understand that dyslexia is a language-based processing disorder that can affect an individual's ability to read, write, spell and speak and often this impedes social interactions and self-esteem. Perceptual accuracy, phonological impairments, slower auditory processing speed, and short term memory are all areas of deficit for a dyslexic, and thus impede various school-related abilities that rely on both receptive and expressive processes. Dyslexia is the most prevalent specific learning disability, comprising at least 50% of the LD population. As described by the International Dyslexia Association, "as many as 15–20% of the population as a whole have some of the symptoms of dyslexia, including slow or inaccurate reading, poor spelling, poor writing, or mixing up similar words. Not all will qualify for specific resources and assistance in education, but they are likely to struggle with many aspects of academic learning and are likely to benefit from systematic, explicit, instruction in reading, writing, and language." In terms of incidence in higher education a conservative estimate is that 1.2% of college population in the U.S. suffers from disorder. According to the National Center for Education Statistics, there are 21 million students enrolled in U.S. colleges and universities; therefore, there may be at least 250,000 college students with dyslexia. The majority (about 83%) of these learners are not obtaining post-secondary accommodation for their LD. Retention and graduation rates for students with LD such as dyslexia are below national averages for all learners, and employment rates suffer.

Landmark College blends universal design for learning (UD) principles and integrated technologies within a comprehensive model of support in and out of the formal learning environments, starting with initial assessment and curriculum track placements. Our student outcomes are strong, e.g. our students ultimately earn baccalaureate degrees at a rate higher than the national average for all learners. We conduct discovery and applied research in the field of LD (including recent support from NSF to LCIRT, the Landmark College Institute for Research and Training) and we are quickly developing new platform in online/web-based programming to better serve students with LD and to reach educators struggling to keep up with the heterogeneity of learners in their classrooms.

I. The Field of Dyslexia and LD

The field of dyslexia is being driven by a confluence of three strands of thinking: (1) innovative educational practices, (2) new medical research about dyslexia and the dyslexic brain, and (3) amendments and reauthorization of legal mandates re. equal access and non-discriminatory policies.

Innovative Educational Practices. One approach is the paradigm of universal design (UD; also Universal Design for Learning or UDL). Some helpful links: www.cast.org and www.udi.uconn.edu. UD is significant as an alternative to the current Accommodation model which can stigmatize students with disabilities as well as creating barriers to obtaining services. UD obviates the need to identify students with dyslexia by building supports, such as accessible text and universally available lecture notes, into the curriculum.

Mobile technologies offer advantages as well. For example, modifying content according to user preference and need in a ubiquitous environment, without the need to access specialized offices or study labs (e.g. digitized text available on a smartphone, with built in text-to-speech and modifiable font size and format).

Another area of innovative educational practice is the area of *cognitive training*, particularly in the arena of video games and gamification. Landmark College is working with Akili (an associate of the UCSF Gazzaley lab) on the benefits of video games on students' attention. LCIRT at Landmark College, together with MIT and TERC, Inc. has recently received NSF funding for a 2.5 year project that seeks to explore patterns of learning examined through psychological, physiological and cognitive markers, while students engage in science-based video games.

New medical research. We now know that dyslexic symptomologies can be attributed to more than a deficit in phonological processing (i.e. speech to print association). The brain is a dynamic ecosystem [1] and new understanding of the neuroplasticity of the human brain is creating a more hopeful landscape for dyslexia than ever before. We now know that the pathway to dyslexia is multi-factorial and different subgroups within this umbrella term need different solutions for success.

In their book titled the *Dyslexic Advantage*, Drs. Brock and Fernette Eide (2011) point out that the dyslexic brain is better viewed as a trade-off model rather than a deficit model. They talk of the MIND strengths where, for example, a brain that is especially attuned to viewing information in 3-D images (especially advantageous for architects), may also engage in reversing letter and numbers (symptoms often associated with pure dyslexics).

Legal mandates. The *Individuals with Disabilities Education Act (IDEA)* governs how states and public agencies provide early intervention, special education, and related services to children with disabilities. It addresses educational needs of children with disabilities from age 3 to age 18 or 21 (whichever comes earlier in graduating from school). The focus of IDEA is academic success through programs that support school students in accessing the general curriculum. IDEA ensures free appropriate public education (FAPE) to all and applies to all institutions receiving federal funding.

Americans with Disabilities Act Amendments Act of 2008 (ADA AA). The ADA is a non-discrimination law not a special education law like IDEA. The ADA will be 25 years old in 2015. The ADA enables society to benefit from the skills, talents and purchasing power of individuals with disabilities and facilitates fuller,

more productive lives for all Americans. It defines an individual with a disability as someone who has a physical or mental impairment that substantially limits one or more major life activities or bodily functions, has a history or record of such impairment, or is perceived by others as having such impairment. The ADA does not specifically name all of the impairments that are covered.

Any institution receiving federal funding falls under the purview of the ADA. And recent thinking after the 2008 Amendments includes that the burden of proof should not rest on the individual alone in establishing eligibility as an individual with a disability and need for reasonable accommodations, and that a request for proof of disability cannot be burdensome, but institutions can still require proof.

Higher Education Reauthorization Act. The Higher Education Opportunity Act (Public Law 110-315) (HEOA) was enacted on August 14, 2008, and reauthorizes the Higher Education Act of 1965 as amended (HEA)**.** The 2008 reauthorization of HEOA included provisions to increase postsecondary education opportunities for students with disabilities by creating new and sustaining existing programs to increase access, recruitment, retention and completion rates; identify and promote effective transition practices; increase access to instructional materials, and disseminate best practices related to postsecondary students with disabilities.

One of the best practices articulated in the HEOA is UD (or UDL). The Higher Education Opportunity Act of 2008 includes in its language both a formal definition of UD and guidelines for providing UDL training to future teacher educators. The HEOA defined UD as "Universal Design for Learning means a scientifically valid framework for guiding educational practice that (A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and (B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient [HEOA, P.L. 110-315, §103(a) (24)]."

In other words, under the HEOA, universal design for learning has been explicitly defined and is integrated into the programs that are part of the law. The law states that recipients of 'teacher quality partnership grants' and 'teach to reach grants' must offer preparation programs that enable teachers to understand and use "strategies consistent with the principles of universal design for learning" [P.L. 110-315, §202(d)(1)(A)(ii)], and "to integrate technology effectively into curricula and instruction, including technology consistent with the principles of universal design for learning" [P.L. 110-315, §204(a)(G)(i)].

The inclusion of UD in the reauthorization of the HEOA demonstrates its escalating importance in the education field. UDL concepts and practices are not yet broadly integrated into all education policy and this is an important need. *Landmark College has been implementing UD/UDL principles in its pedagogical practices for a long time and well before UDL was adopted by the HEOA*.

II. Realities and Challenges Relating to LD and Dyslexia in Post-Secondary Education

The 2005 U.S. Survey of Income and Program Participation (SIPP) suggests that 1.8 percent of the U.S. population aged six years or older has been diagnosed with a learning disability, a figure which translates to approximately 4.67 million Americans.

- 2.4 percent for those aged 6-11 years
- 3.4 percent for those aged 12-17 years
- 2.7 percent for those aged 18-24 years (the typical age of college students)

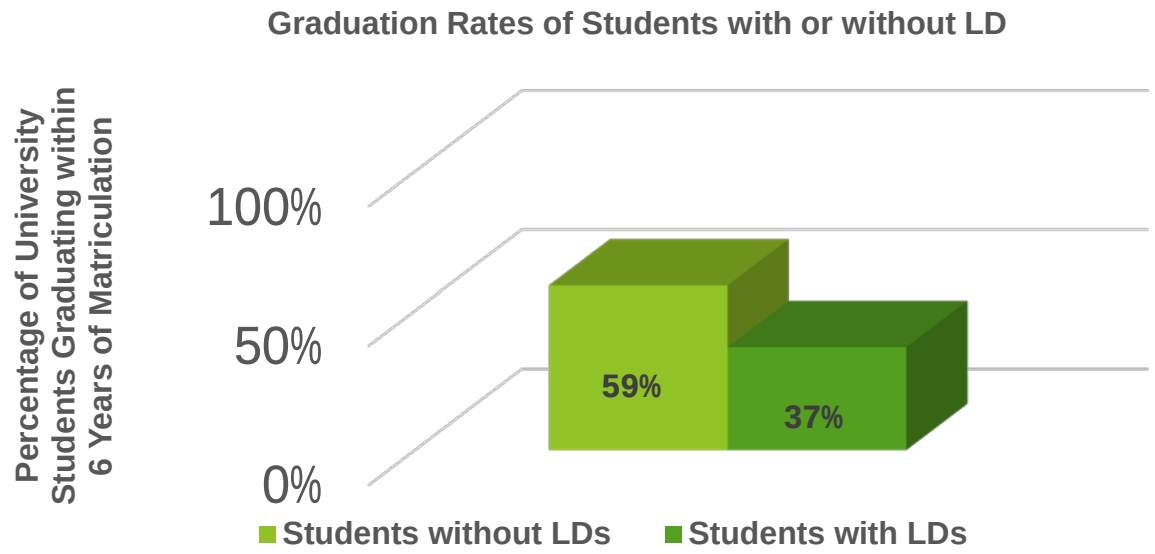
About one third of students with disabilities have a diagnosis of LD, ADHD, and/or ASD (United States Government Accountability Office, 2009) [2] with numbers in all three categories on the rise.

Dyslexia is the most prevalent specific learning disability, comprising at least 50% of the LD population. This suggests that 1.2% of college population in U.S. suffers from disorder. According to the National Center for Education Statistics, there are 21 million students enrolled in U.S. colleges and universities. Therefore, *there are approximately 250,000 college students with dyslexia*.

Impact on Higher Education Outcomes. Findings gathered by the National Center for Learning Disabilities indicate that students with LD are less likely to gain access to higher education. In 2011, just 68 percent of students with specific learning disabilities (SLD) graduated with a regular high school diploma. Close to half of secondary students with LD perform more than three grade levels below their enrolled grade in essential academic skills (45% in reading, 44% in math).[3]

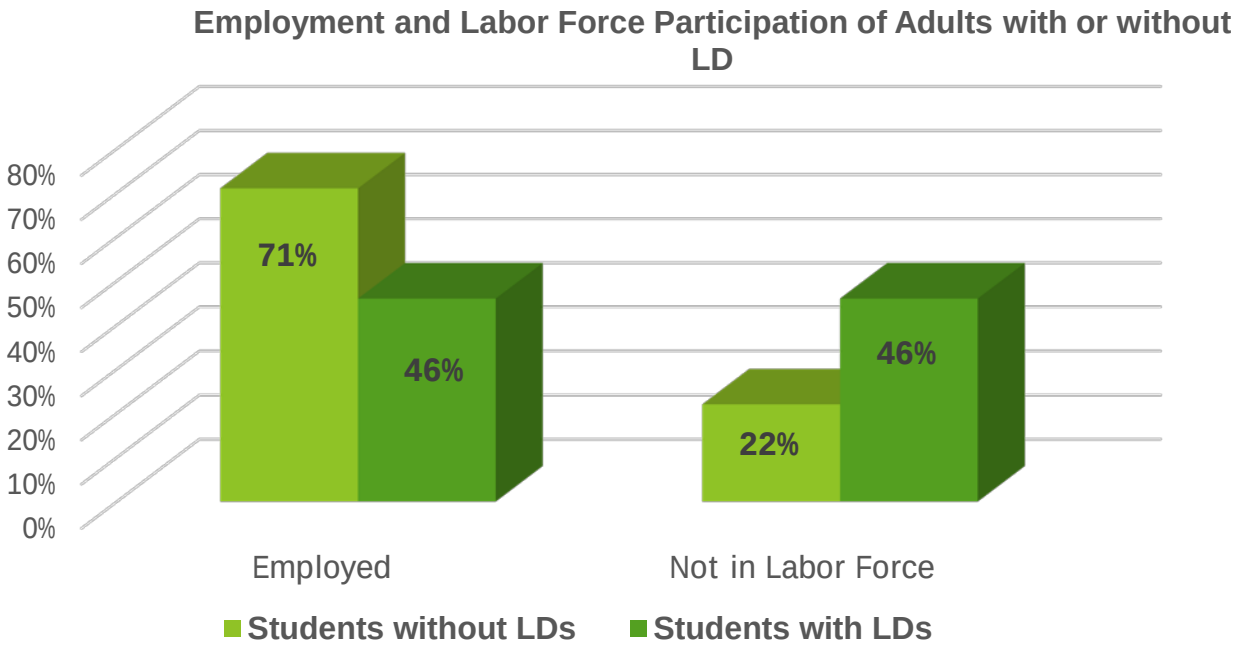
Students with LD cluster in two-year colleges; young adults with LD attend two-year or community college at more than double the rate of the general population. About 10% of students with LD are enrolled in a four-year college within two years of leaving school, compared with 28% of the general population.[4] Indeed, young adults with LD attend four-year colleges at half the rate of the general population.[5] In terms of graduation rates, *students with LD who do enroll in 4-year colleges are less likely to graduate within 6 years.*[6]

Overall, people with disabilities (Note: all disabilities) complete college at a statistically significant lower rate than people without disabilities. Those who do complete college have a persistently lower rate of employment irrespective of the level of degree attainment (associate, bachelor's, and higher) (Bureau of Labor Statistics, 2012).[7]



Other studies have found 6-year graduation rates for students with specific learning disabilities (over half of whom have dyslexia) as low as 29%[5], and one study has reported a 34% 8-year graduation rate for students with LD.[8]

Employment: Partially as a result of lower levels of success in higher education, students with LD are less likely to be gainfully employed.[9]



Availability of Higher Education Support Services for Students with Dyslexia and other Specific Learning Disabilities. Only 17 percent of young adults with LD received accommodations and supports in postsecondary education because of their disability, compared to 94 percent in high school[8]. This indicates that 83% of students with dyslexia, or approximately 200,000 students, are *not* obtaining post-secondary accommodation for their LD. By contrast, 35% of students with ASD or traumatic brain injuries receive accommodations and supports.[10] Approximately 92% of students with LD receiving assistance with school work found this assistance to be useful.[9]

The rate of receiving accommodations and supports in postsecondary schools for those who had disclosed a disability ranged from 58 percent at 4-year colleges or universities to 64 percent at vocational, business, or technical schools and 76 percent at 2-year or community colleges.[11] Nearly 80% of support provided consists of additional time for tests. Only 37% of students with LD receive adaptive technology or tutoring.[12]

Only 69 U.S. colleges and universities provide comprehensive support programs for students with LD (Landmark College was the first, and currently one of only two, with dedicated overall program). Most located in 4-year colleges.[13] Such programs often combine academic support with elements such as:

- Weekly workshops on topics such as time management or peer interaction
- Development of individualized learning plans
- Weekly meetings with counselors

The most common tuition model appears to be the assessment of a standard fee per semester or per year, typically in the range of $1,500 to $3,500 per semester.[12] For Landmark College, all support systems and elements are included with the overall tuition and fees (not extra charge).

Are individuals diagnosed with dyslexia given opportunities to succeed? Opportunities available to students with dyslexia today are much more inclusive and expansive than just a decade or even 5 years ago, but more can and needs to be done. Both secondary and postsecondary institutions should consider an across-the-life-span approach to supporting students with LD such as dyslexia. In other

words, transitions from high school to college and from college to the world of work should be deliberately engineered and coordinated between high schools, colleges and industry to ensure maximum success.

In 2012 Landmark College received approval from our accrediting body, NEASC, to offer 4 year degrees to students with LD. We run various summer term short term programs for high school and college students. Also, Landmark College has initiated a program where we provide college courses (engineered for students who learn differently) online to high school students with LD (including dyslexia), for advanced placement credit and with a high school instructor/facilitator on the ground to assist the student.

Are current educational programs adequate to help those with Dyslexia? Programs specifically designed for students described by a diagnostic label can be short-sighted and stigmatizing. Under the current model, college students first have to establish their eligibility as an individual with a disability under the ADA, and then prove their need for specific accommodations and support services. This is a gatekeeper model that unfairly penalizes students who cannot afford expensive diagnostic evaluations and/or are not well-versed in ways of self-advocacy. However, the amendments to the ADA and recent lawsuits (e.g. the LSAC consent decree) have shifted traditional mindsets. Students no longer have the sole responsibility of having to prove their need for accommodations; the college must should the responsibility of proving why a certain accommodation is service is being denied. This is encouraging.

Educational programs guided by the principles of universal design are both non-stigmatizing and effective because they focus on design and the space, and ways to make the environment inclusive from the onset, rather than having to retrofit for accommodations. UD emphasizes solutions rather than focusing on individual deficits to be remediated or accommodated.

Technology is a vehicle for the application of UD principles within instruction. But care must be taken to ensure that the use of technology does not add to the digital divide (reality that not all have access to technology, internet and similar). Educational programs most beneficial for students with dyslexia should be built around ubiquitous, off-the-shelf, low cost-no cost technologies.

III. Landmark College Model for Bright College Students with LD.

Landmark College offers 2- and 4- year degree programs, serves about 500 mostly residential students, and enrolls only neuro-diverse students with an LD such as dyslexia, ADD and/or ASD. Our program is engineered to provide skills and strategies to students who learn differently, and in so doing empower and embolden bright young learners who do not perform well in the mostly one-size-fits-all post-secondary environment. Our graduates (all 2-year; the 4-year BA started two years ago and first graduates will not emerge until 2016) ultimately graduate from baccalaureate programs at a rate higher than all learners (nationally) and well above the graduation rate for college students with LD.

Traditional assessment practices which require diagnostic evaluations can become gate-keepers for students who learn differently. At Landmark College, we take a holistic approach to identification and assessment that seeks learning solutions rather than eligibility and accommodations. While students do need to provide documentation of their disability to enroll at Landmark College, the documentation is one of multiple sources of information that help identify courses that best match students' needs and interests.

In the area of assessment, LCIRT recently hosted a focus group of nationally reputed external evaluators of LD, including diagnosticians from Yale and Harvard University. One of the recommendations of this focus group was to add functional assessments to the traditional portfolio of assessment practices for dyslexia. At Landmark College, our intake process includes many of the recommendations of this focus group.

What is the evidence that our model works? In terms of outcomes and efficacy, our strong retention and graduation data has been mentioned above. In particular, the fact that our graduates demonstrate a higher baccalaureate graduation rate as compared to all (national) learners, let alone those with LD (whom have a low graduation rate), provides empirical proof that our approaches build skills, strategies and confidence that students then employ later in life.

The evidence base for UD in particular, which is our pedagogical under-girding, is quite substantive. References include writings by CAST (Center for Applied Special Technology) David Rose and Anne Meyers. Evidence-based comes in many forms; and testimonials from our students and parents provide yet another form of evidence. Also, recent studies such as one with a Lehigh University collaborator and which looks at archival data from 2006 to 2011 clearly attests to the benefits of our particular brand of student support services (advising and coaching; not yet published).

Landmark College uses a deliberate approach to remediating reading deficits. We provide 1) integrated "assistive" technology that removes reading fluency as the issue, and concentrates on offering active reading, vocabulary development, and visual/auditory interaction to reinforce sound/ symbol relationships, and build comprehension skills. Also, 2) the College offers a Wilson reading program that works with students on phonological awareness, word attack skills, and reading rate and fluency. Finally, 3) the College does not disadvantage students who are poor readers from the opportunity of interacting with college material. Weak readers are not necessarily weak thinkers.

Early intervention with reading is optimal, but schools would do well to approach remediating reading problems by more than skill and drill exercises. Reading in context, providing material appropriate to age level, teaching techniques of skimming, active reading, and monitoring of attention are all important to improving reading ability.

How does Landmark College identify and assess students with dyslexia and other LD? Landmark College requires all students to provide a documented learning disability diagnosis with an updated report written within a three year period. The Academic Affairs Placement Team reads psycho-educational evaluation which includes cognitive scores, achievement testing, diagnostic information and recommendations from a professional clinician.

The diagnosis or learning profile and history of support services (IEP) or accommodations (504). Cognitive ability: IQ is considered as well as processing speed and working memory. Students must have cognitive ability to engage in a college curriculum and work towards the AA or BA/BS degrees. Level of skills: Reading comprehension, fluency, decoding, reading rate, written expression, writing fluency, writing mechanics. The team uses achievement testing and diagnostic criteria to determine placement in one of our three "points of entry" curriculum: Credit, Partial-Credit (hybrid semester) and Language Intensive Curriculum (remedial semester).

The three points of entry. We know that reading issues are not always caused by reading disorders such as dyslexia; attentional learning issues and weak executive functioning can also impact the

efficiency and fluency of reading. For this reason we look first at skill level, testing scores and reports from previous school before looking at the diagnosis. Emphasis is placed on learning needs rather than labels.

Students with most severe forms of dyslexia place in a Language Intensive Curriculum. Interventions include combination of remediation and accommodation. Emphasis is on strategy instruction, use of assistive/adaptive technology and the nationally recognized Wilson Reading System. Goal is to access college level material through active learning and use of technology. Students who read and write moderately below college level are placed in Partial Credit Curriculum. Weak vocabulary, lack of background knowledge and dysfluent reading are characteristics. Interventions include developmental writing, reading lab to learn assistive technology (text reader) and teacher directed strategy instruction/study skills. Students who read and write at upper high school or college level are placed in the Credit curriculum with emphasis on learning efficiency. Decoding for these students is not an issue that impacts learning. Fluency issues may persist and may impact efficiency of learning. Interventions include strategy instruction in active reading for comprehension, use of text readers, and writing process methods for composition and clarity of writing.

IV. Integrated Technologies to Support Learning, and Online Teaching and Learning.

Schools and colleges need to meet today's students where they reside, namely in the digital sphere and the online platform (but also need to be cognizant of any digital divide). We need intervention solutions for the eLearning ecosystem, not simply assistive technologies for those with dyslexia. The research base for online learning and students with LD is lacking. The merits and demerits of social media specifically for students with LD need much more exploration.

Learning Technologies: This current generation of college students is more technologically savvy than any prior generation.[14] Consider: A recent EDUCAUSE (2013) study[15] of 1,082 university students found that 91% of students own smartphones and 37% have tablets; and 82% of tablet owners use these devices for academic purposes. Students use mobile devices, applications *(apps),* and social media as an extension of their identity, and not simply as tools or accessories in everyday life. For college students with LD, technologies, including mobile devices and apps offer tremendous promise.[16]

Every day on college campuses around the country, students with LD are advised and coached on ways to use "assistive technologies" to accommodate and/or compensate for their academic difficulties[17]. Although this term is used, even by us, we recognize that the emotional overlay of "assistive" technology can be both stigmatizing and burdensome. The new genres of innovative technologies could make "assistive" a thing of the past. A review of blogs, posts, and tweets by college students reveals the multitude of ways in which students are designing and using technology for creativity, communication, critical thinking, and collaboration; the very skills identified by the National Education Association as critical for the our global society. Yet, little is known of mobile device and apps use among college students with LD. More research is needed in this area.

Landmark College also recently received funding from LDFA (Learning Disabilities Foundation of America) to sponsor a competition on innovative applications or existing and/or new idea for iPad apps, created in partnership between students and faculty. This project aims to understand the technologies that college students today are using; and develop pedagogical applications to support the learning needs of students with dyslexia. The project capitalizes on college students' knowledge of and familiarity with iPads and apps, and provides a means for bridging the gap between student use and pedagogical practice.

Finally, **online learning is here to stay, and students with LD are disadvantaged**. Landmark College is developing online teaching and learning platforms that are best engineered to students with LD such as dyslexia. We are collaborating with others on adaptive learning software elements and we are working to build UD into online/blended courses. Through our online efforts we will create an infrastructure that will allow us to develop programs at the post-baccalaureate level which can help us "educate the educators" such as our existing professional certificate program in *Universal Design: Technology Integration*. http://www.landmark.edu/academics/degree-and-credit-options/certificate-program

V. LD and Dyslexia - and Careers/Workforce

Individuals with dyslexia are a huge source of untapped labor in this country. Just to focus on STEM here, there has been a long-standing recognition and support by the US Department of Labor that the U.S. is not training enough STEM workers to fill economic demand. Persons with disabilities, including those with dyslexia, are underrepresented in STEM across educational and workforce settings.[18] [19]

There is a need to improve postsecondary educational opportunities for students with Dyslexia who are interested in STEM careers[19]. According to the United States Government Accountability Office (2009) the number of undergraduate students with disabilities has continued to increase over the past decade reaching a total of 11% of the postsecondary student population. Unfortunately, many qualified college-ready students with LD drop out before completing their college degrees. [20]

Special skills and talents that Dyslexics can bring to the work force. An area where individuals with dyslexia often excel is *entrepreneurship*. Famous examples include: Richard Branson, Whoopi Goldberg, Charles Schwab. These are just the most recognizable names; there are many more individuals with dyslexia who bring entrepreneurial initiatives to our economy. However, a large number of entrepreneurial talent goes unnoticed. Entrepreneurship has to be nourished, especially in the early stages through internships, apprenticeships and sponsored opportunities by industry. Unfortunately postsecondary internship opportunities usually go to those who excel on traditional markers of competency, such as grades. Many students with dyslexia may not have the best GPA or academic score card, but given the opportunity to be creative and innovative, can become the next successful entrepeneur.

Workforce training should include instruction in and access to computer skills that augment reading issues and provide compensatory strategies. Instruction that is offered should not rely solely on auditory memory as auditory processing difficulties are often tied to the dyslexic diagnosis.

Internships and other opportunities for applied/experiential learning are important. Not only do these provide students with LD invaluable experience in the actual work environment, but these efforts better expose employers and our citizens to the strengths of people with a "disability" and ipso facto demystify LD and enlighten all involved. Landmark College is actively pursuing internship opportunities with area industry and other colleges. Example: WHEC Internship project at Landmark College which is a collaborative program with 6 higher education institutions in Windham County, VT.

VI. Research and Development in LD/Dyslexia (and NSF Funding to Landmark College)

Organizations such as NSF have been supporting educational research to improve outcomes for students with LD, including dyslexia, for some time now. NSF REAL (Research in Education and Learning) is now part of the broader umbrella funding all diversity grants including women's studies, minorities etc. While

the philosophical intent of including dyslexia under diversity is laudable, funds within this track should be expanded to address this larger agenda.

In addition to the LDFA (and other) funding, LCIRT at Landmark College recently received two NSF grants to address learning needs of students with LD. This is a testament to efforts by the government to support programs that particularly seek to understand students with learning differences. Such effort is to be lauded. NSF should consider working with institutions to support and extend the outcomes of the projects beyond the funding cycle. Recent NSF grant awards to Landmark College:

1. National Science Foundation Research in Education and Learning – (NSF-REAL)

- **Awarded:** Landmark College (LCIRT)
- **Title:** *Social Presence in Instructor Mediated Synchronous Versus Asynchronous On-Line Discussions: A Study of Undergraduate Students with Disabilities Learning Statistics*
- **Award duration:** September 1, 2014 – August 31, 2017 (3 years)
- **Award amount: $486,970**
- **PI:** Dr. Ibrahim Dahlstrom-Hakki **Co-PI:** Dr. Manju Banerjee

Project Summary: We have known for some time now that instructor presence is a critical learning need for students with LD. Online learning is a distraction-rich environment which can be particularly challenging for students with LD and executive function difficulties. This project will investigate a critical question about students with LD in online courses, namely, *the importance of instructor-mediated synchronous discussions within an online platform.* For the purposes of this study, instructor-mediated synchronous discussions will be conducted as live virtual group interactions (instructor and 8-12 students) via Adobe Connects. Each participant will be able to see everyone else, share screens, and talk in real-time about the course topic or class assignments. Synchronous discussions will be compared to asynchronous discussions conducted via VoiceThread, where students will share aloud their thinking via video capture online, though not in real time.

Given the paucity of research on best practices for online innovations, the results of this study from Landmark College will inform teachers/instructor, instructional designers, and institutional perspectives on emerging models of online education for diverse learners.

2. National Science Foundation Data Intensive Research to Improve STEM teaching and Learning

- **Awarded:** Landmark College (LCIRT); MIT, TERC, Inc.
- **Title:** *Revealing the Invisible: Data-Intensive Research Using Cognitive, Psychological, and Physiological Measures to Optimize STEM Learning*
- **Award duration:** August 15, 2014 Start – (2 and 1/2 years)
- **Award amount:** Total: **$1,163,711 million**; Landmark College award **$270,363**
- **PIs:** Dr. Ibrahim Dahlstrom-Hakki (Landmark College); Dr. Jodi Asbell-Clarke (TERC, Inc.); Dr. Micah Altman (MIT)

Project summary: This project brings together expertise in learning sciences, cognitive psychology and data sciences to advance core knowledge about how big data, enhanced with biometric information, can aid in the study of learning. The goals of this exploratory research are to understand how *exhaust data*[21] from digital games can be used to customize optimal learning

experiences; and more broadly, evaluate how exhaust data can reveal basic cognitive activities that are prerequisites for learning. More specifically, the project will study the relationship among constructs of gaming activity such as engagement, attention and memory, by having students play science video games and observing their implicit learning of basic principles of Newtonian physics.

VII. (nota bene) Vice President Nelson Rockefeller

House members likely know the story of one of their own. Nelson Rockefeller served as the 41st Vice-President of the United States from 1974-1976. He was also the 49th Governor of New York and worked in the administrations of Franklin Roosevelt, Harry Truman, and Dwight Eisenhower. Rockefeller also had dyslexia. Nelson Rockefeller almost single-handedly changed how people thought about dyslexia when, in 1976, he "came out" to the public about his own dyslexia. It was perhaps the first time a major public figure, a Vice-President, and someone from such an illustrious and successful family had openly discussed his dyslexia.

In 1976, while serving as Vice-President, Rockefeller discussed his own severe case of dyslexia in a popular magazine article. He noted how dyslexia impacted his performance in school and also how he had to memorize his speeches during his political career because he was afraid of trying to read them. This was an important moment in the American public's recognition that dyslexia was a common learning disability, affecting even the most prominent families. It also helped the public understand that dyslexia did not impact intelligence, motivation, or character – that even those with dyslexia could become highly successful adults, even rising to the ranks of one heartbeat away from the Presidency.

In the magazine interview, Rockefeller recalled, "I was dyslexic… and I still have a hard time reading today. I remember vividly the pain and mortification I felt as a boy of eight when I was assigned to read a short passage of scripture at a community vesper service and did a thoroughly miserable job of it. I know what a dyslexic child goes through… the frustration of not being able to do what other children do easily, the humiliation of being thought not too bright when such is not the case at all. But, after coping with this problem for more than 60 years, I have a message of hope and encouragement for children with learning disabilities and their parents." [22]

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