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Design for All

Guest Editor: Director Lee Christopher

Concluding issue of 'Women Designers year 2014'

Chairman's Desk:

Dr. Sunil Bhatia

One day a child was playing snakes and ladders game and I was curious to know how he reacts as it will be thrilling & exciting to watch because I was aware about the rules and its consequences. He got closer to the box where bottom of ladder was placed that takes the player closer to finish of the game and took care not to go close to the mouth of snakes that gulps and takes the player away from the finishing of the game. He was praying before throwing his dice whenever he was closer to the ladder box so as to reach the finish line and skip the mouth of the snake. He was afraid of throwing the dice and facing the wrath of a snake that gulps its victims and enjoyed when, with no effort, he was pushed upward closer to the finish line when he was gifted with a climb with the help of a ladder.

The fear of sliding down or losing the game or the excitement that comes with the chances of winning was the core design of the game. 'Life has no grammar and who will succeed and who will lose is an individual matter and who will relish the failure or success is also individual character.' Who thought about the design of ladder is an

interesting area of exploration and how it has affected our thought process is yet to be explored. Ladder has played such an interesting role in our lives although I have never given it any thought. The more I think more about it now the more amazed I am of its design.

The existence of ladder is from primitive times and it was their need because nature has given us uneven earth surface as it has lofty mountains as well as deep pit like structure such as ravines and valleys. Hence, in order to overcome or cross such uneven surfaces they were depending on their physical strength like all other animals do. Either they walked or jumped or climbed or lifted themselves to cross that hurdle. Sometime situations were so grave that physical strength was failing and man need some external help. To overcome such difficult situations mankind started thinking of something and later on this proved to be ladder. Mankind started to realize that the eatable fruits or food stored by animal kingdom for their survival were placed and stored at that height of the branch of tree where enemies' physical strength was not enough to take it away. Honey bees are also clever to protect their food from their enemies. They developed honey hives for storing their foods which were difficult to reach. Man was capable to climb the tree by holding different branches of the tree to reach stored food of animals or for plucking fruits. However, some fell into deep pits where another person who wished to rescue him and help him was unable to do so and they devised a method of using the climber plants to take him out. That climber should be strong enough to bear the weight of rescued person and long enough to reach the troubled person. As their knowledge widens about twisting fiber to design rope and art of knotting, mankind started to design the ladder by placing knots at

some distances that prevents slipping and allows the climber to rest his legs on lower knots. It was single rope ladder. Our ancestors were filled with wisdom and they found there are two kinds of grass - one that is hard which is bamboo plant and another is climber plants that is flexible. Hard bamboo was enough to bear the load of an individual and found single when resting on branch of a tree. A person has to climb and do the same exercise what he was doing while climbing any tree. I have witnessed the ancient practice in our time in southern part of India where coconut climber uses the single bamboo pole with side stumps forming a kind of ladder and reaches to possible height after resting one end on trunk. They might have thought to put the two parallel bamboos and it was less strenuous compared to single. Risk was high of falling from height with single bamboo stick and lower when they used two parallel bamboos. It might have generated another problem of sliding from bottom as well as holding both bamboo sticks by climber was difficult proposition. But improved design was less strenuous. Someone might have thought to tie both ends of bamboo to prevent possible movement and to go away separately. Gradually people used the climber plants at some distance to hold the two bamboos and realized holding the preceding rung climber could rest legs on succeeding rung and was more comfortable. Initially it was hard and made of bamboo that can rest on hard wall-like structure and another was flexible made with rope to hang and we still notice its use in helicopters. It saves space by rolling. The initial ladders were designed for fetching the water from water table like ponds, lakes and manmade well or to pluck fruits. By digging the earth they found water and made various holes on circumference of earth well for climbing as well for going down. It was highly risky because

strength of clay was not enough to hold the weight of climber. With the discovery of fire that problem was solve because they found clay bricks becomes stronger after baking and can hold the weight of the climber. They replaced clay circumference with baked bricks. What should be the placement of elevated bricks was biggest dilemma? They found placing vertically after few distance gaps was difficult to use compared to place just like four legs of lizard. It was primitive design of the ladder and they tried their level best to exploit as many ways. They used the extended design of it to cross the river after laying horizontally from one bank to other side of bank. As technologies improved ladder also changed. The journey of ladder started with natural products and as man acquired knowledge of iron as well as aluminum it has drastically changed the face of ladder and the materials used to make them.

Discovery of electricity has added a new dimension in ladder design and what we see as elevators is nothing but extension of primitive design of ladder. As man discovered fire, learnt its management and its various applications but it was inbuilt with various types of fire accidents as modern man thought of designing the residence in stories, forced the fire management people to design various type of ladder to handle different situations at the time of accidents for combating fire.

Their thought process has taken shape from practical experimentation and improved by trial and error method. There were scientific minds but scientific theories were absent. Scientific theories developed by modern person has changed the pace of developments and it is an all-round progress .What we see in our

modern world is outcome of these experiments and later on we developed the theory to make it for more wider applications. They were designed for purpose, designed for certain class users and design to avoid failures.

I visited forts and temples and I was amazed to see their architecture. Pyramids are erected and it is marvelous design that has been associated with many mysteries. One of the theories for taking that heavy stones slab to such height was with the use of step platform. Step platform is nothing but extension of ladder. Indian forts are narrow, broad, without railings, with railings that are unusually steep straight or spiral. I could not figure out why they have designed it in this fashion. I realized stairs are extension of ladder where in place of rung, steps are designed. Narrow stairs are designed for security purpose where enemies travelling in groups were unable to attack and they were left with no option but to attack individually. Killing an individual was easy for defending as opposed to defending against groups of people. Broad designed stairs were made keeping in mind the use by group of peoples and same practice is still visible in modern design of malls, auditoriums where public footfalls are high. They are less steep and height of steps are also low to avoid any untoward accidents. I was thinking about railings and found the purpose without railings was to provide open space because armors and weapons like swords, javelin were heavy ,long and supported with railings which will create hindrance for movement for person carrying it. When I visited residential areas of fort where queens and other family members were living and found steps are narrow, at height usually not seen in modern times and unusually steep. I realized in Indian context that Indian woman

is beautiful who has heavy buttocks and to support her they designed the stairs in such manner. When women climbed she has to exert all force from her hip bone not from her fore leg as men usually do while walking/running. It was a kind of exercise.

Ancient temples in India are generally at height or at the top of mountains and have peculiar nature of steps and found heavy large slabs of length & width with height of 1 to 2 feet and side by side steps that are used by common people. I failed to figure out that abandon by modern people and prefer for using smaller steps for climbing. All of a sudden I realized earlier our warriors where praying for their God/ Goddesses for blessings of unusual power to defeat enemies. That time transportation of these soldiers was done with the help of horses and elephants. They might have designed stairs by using such height of heavy platform that would be compatible with steps of animals as well as it can bear heavy weight. Nature of footfalls decides the design of ladder.

Modern time role of ladder has increased and to cover the height of skyscraper fire brigade has extended ladder to reach that height to combat fire and it should also fit within the size of automobiles for fast transportation. Urban people feel pride in designing skyscraper and give them boost of confidence of knowledge of science and technology. Other departments should have technologies to meet the challenges of untoward incidences associated with skyscraper and local governing bodies approves the design of skyscraper if the fire departments approve by saying we have technologies to meet the challenges. Modern buildings are designed with glass exterior and to clean it modern man has designed pulley with wooden plank

and it is called 'variable ladder'. Bathing stools where person sits while bathing is one kind of ladder where single step is used. Ramps where no steps are designed so as to make the climbing effortless for everyone as it is designed in continuous platform nature and is another kind of ladder. Escalators and elevators are best ladders created by modern people who have designed it and it is in sync with concept of universal design. The problem of inaccessibility is solved with these equipments. Turntable, hook and many other variations are developed as our technologies improve.

This special issue is last in series of our declared 'year 2014 woman designers' and Dr Christopher Lee has honored us by accepting our invitation to conclude our year of woman designer. It was a great challenge and she did complete justice with this concluding issue. Our attempt was to sensitize the minds of modern designers to understand the contribution of women designers in making this world worth living and ignoring their roles may invite imbalance in progress of society.

We do not know how far we succeeded in our 12 issues of 2014 but letters, emails have poured and appreciated by many was our driving force. Bottom of ladder for making better society is instilling values among future citizens. Who can do better justice? None other than Woman! Salute to power of woman.

Merry Christmas! Happy& Prosperous New Year 2015!! Our publication is entering in 10th year without missing an issue!!! Salute to our esteem readers & contributors.

With regards

Dr. Sunil Bhatia

Design For All Institute of India

www.designforall.in

dr_subha@yahoo.com

Tel-91-11-27853470®

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Other Regular features

Forthcoming issues

January 2015 Vol-10 No-1

Stephanie Battista, Senior Design Program Manager .

Stephanie directs medical and wearable technology design programs at Modern Edge. She is responsible for project management, client relationships, business development, sourcing, and studio culture. For over a decade prior to joining Modern Edge, Stephanie was the principal of her own product design and development firm specializing in lifestyle product design, soft goods, and wearables for technology-driven start-ups. Stephanie brings expertise in medical devices, textiles, consumer goods, and wearable technology. She will be the Guest Editor and invite different authors of her choice on concept of universal design and it will be our fifth special issue on different occasions with IDSA, USA. Website: Modernedge.com Email: s.battista@modernedge.com

February 2015 Vol-10 No-2

Prof Mugendi K. M'Rithaa is an industrial designer, educator and researcher at the Cape Peninsula University of Technology. He holds postgraduate qualifications in Industrial Design, Higher Education, and Universal Design. He is passionate about various expressions of socially (responsive and) responsible design, including Participatory Design; Universal Design; and Design for Sustainability. Mugendi has a special interest in the pivotal role of design in advancing the developmental agenda on the

African continent. He is associated with a number of international networks focusing on design within industrially developing/majority world contexts, and is currently the President-Elect of the *International Council of Societies of Industrial Design* (Icsid). He will be the Guest Editor and his passion for universal Design is real driving force for establishing the concept in Africa continent.

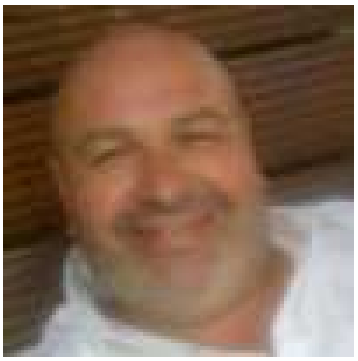
March 2015 Vol-10 No- 3

Paula Sotnik, Institute for Community Inclusion, School for Global Inclusion & Social Development, University of Massachusetts Boston . Paula Sotnik developed and directed 12 federal and state training and technical assistance projects (past and current) supporting individuals from traditionally underrepresented groups, including persons with disabilities. She is a recognized expert consultant, trainer and author on access and accommodations; culture brokering; diversity; outreach and recruitment strategies; team and partnership development; measurable outcome oriented strategic planning; national service, volunteerism and disability legislation, policy knowledge and practice acquired through years of personal, educational and professional life experiences. She serves as a consultant reviewer and trainer for an international fellowship exchange program. She will be Guest Editor of special issue and will focus on Universal design development in USA

April 2015 Vol-10 No-4

Debra Ruh is a Global Disability Inclusion Strategist, ICT Accessibility Training and Social Media Thought Leader on Disabilities. She focuses on Disability Inclusion, EmployAbility, Corporate Social Responsibilities, ICT Accessibility, Corporate Social Responsibility and Social Entrepreneurs. She is also the author of several books including "Uncovering Hidden Human Capital: How Leading Corporations Leverage Multiple Abilities in their Workforce" and "Finding Your Voice by Using Social Media"

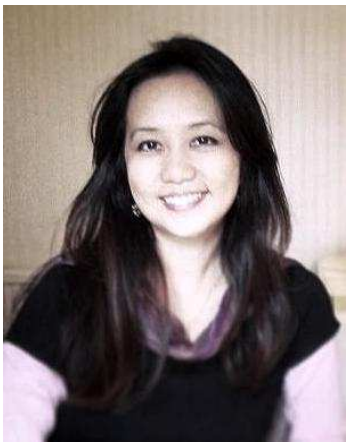
May 2015 Vol-10 No-7



afUD (French Association of Universal Design) President Jean Rene Moussu has accepted our invitation for Guest Editor for our special issue. He is enthusiastic to popularize the concept of Universal Design in his country because he feels it is social responsibility of every citizen of the world to make the world accessible to all. He is inspired by Ron Mace and believes his word his philosophy

***The UD is a collective thought. Think different !UD*think! The UD* is notan evolution, it is a revolution.**

June 2015 Vol-10 No-7



Dr.Antika Sawadsri is a full-time lecturer in the School of Interior-Architecture at King Mongkut's Institute of Technology Ladkrabang (KMITL). She received a PhD from the School of Architecture, Planning and Landscape, Newcastle University, UK. She has qualifications on interior Architecture and Planning and is a specialist in an interrelationship between social construction of 'disability' and the designed environment. Her academic interest focuses on inclusiveness in the process of creating living spaces. Recently, Antika has taken parts in both the State's agencies and non-government's movement in mobilising equal access to the buildings and city of disabled and ageing groups in Thailand.

July 2015 Vol-10 No-7

Humaniteam is a design laboratory which focuses on Health and Disability-related issues. We believe that the practice of a sport is conducive to enhancing the skills of people in disability situation in their everyday life environment.

Design acts as a bridge between each pole of expertise, thereby creating a common language and translating it into objects or services. HUMANITEAM is really passionate by design for All. Many projects of UD are ongoing. Ms Claire Fauchille will be the Guest Editor.

August 2015 Vol-10 No-8

Dr. Bijaya K. Shrestha received Doctoral in Urban Engineering from the University of Tokyo, Japan (1995-'98), Master in Urban Design from the University of Hong Kong, Hong Kong (1993-'95) and Bachelor in Architecture from the University of Roorkee (now Indian Institute of Technology), India (1983-'88). Dr. Shrestha has got working experiences of more than two decades. He had already served to the Department of Housing and Urban Development, Ministry of Housing and Physical Planning, Government of Nepal, United Nations Centre for Regional Development (UNCRD), Japan and various architectural schools in Nepal before taking the present job at Town Development Fund (TDF). He has initiated a new master program in Urban Design and Conservation at Khwopa Engineering College, Purbanchal University, where he served two years as Head of Post-graduate Department of Urban Design and Conservation.

Dr. Shrestha is the recipient of numerous gold medals for his excellent academic performance and decorated by 'Calcutta Convention National Award 2006' by Indian Society for Technical Education for his best paper at the 35th ISTE Annual convention and National Seminar on Disaster – Prediction, Prevention and Management. He is also member of numerous professional bodies and life member of various alumni associations. He has already contributed more than five dozen of papers, published in various forms: book chapter, international journals, conference proceedings, local magazines and journals including in local newspapers. Moreover, he has been invited in numerous international

conferences for presentation of his research findings. Finally, his field of expertise includes sustainable urban development, disaster management, housing, local government capacity building and development control. He will focus on universal design concept on Nepal.

September 2015Vol-10 No-9

Min Wang Dean of School of Design CAFA, Beijing Beijing City, China Design Currently with AGI, China Central Academy of Fine Arts School of Design and previously worked with Square Two Design, ICOGRADA, Beijing 2008 Olympic Committee. His education is from Yale University will be Guest Editor and he will highlight the contribution of China in Universal Design.

October 2015 Vol-10 No-10

Prof Ravi and Dr Ajanta Sen of IIT Mumbai India will be the Guest Editor and theme of the special issue is Design and Children.

November 2015 Vol-10 No-11

Ewa Golebiowska, Poland is the president of EIDD Design For All and she has accepted our invitation of Guest Editor and she will invite the authors from European countries for special issue.

Guest Editor:

Lee Christopher

Lee Christopher** is the Director of eLearning at Arapahoe Community College and also an ACC instructor. Lee has a BA in Philosophy, an M.Ed, and a M.F.A in Writing and Poetics. Lee is currently in the dissertation phase pursuing a Doctorate in Education from Capella University. Her dissertation title is Universal Design for Learning: Implementation and Challenges of Community Colleges. Lee's publications include: "Digital Storytelling" in Handbook of Research on Transformative Online Education and Liberation: Models for Social Equality, Kurubacak and Yuzer, Eds., IGI Global, 2011, "Hype versus Reality on Campus: Why eLearning Isn't Likely to Replace a Professor Any Time Soon" with Brent Wilson, The E-Learning Handbook, Carliner and Shank, eds.Pfeiffer, 2008 , and "What video games have to teach us about learning and, Lee literacy," located at http://edrev.asu.edu/reviews/rev591.htm is on the Colorado Community College System Task Force for Web-IT Accessibility. She has a passion for Universal Design for Learning and will be guest editor for concluding issue of year 2014 Women's Designer.

Universal Design for Learning: A Ladder to Successful Learning

Lee Christopher

The first time I heard the words Universal Design for Learning, I was sitting in a Conference Presentation entitled, "What is UDL?" The presenter told us that UDL stood for Universal Design for Learning and that she would be talking more about what Universal Design was throughout her talk. I didn't know at the time that this presentation would be life-changing for me.

The presenter, Donna Hall, an experienced distance education instructor and instructional designer had us close our eyes as she played part of a video on Quadratic Equations. When she stopped the video, she asked us to open our eyes and explain what the video was about. A math teacher quickly raised her hand. Ms. Hall asked the rest of us in the audience if we understood the video before hearing the math teacher's explanation. There was immediate laughter and someone said, "Are you kidding?" Ms. Hall then told us that what we experienced was how it is for a blind student taking a math course and having only videos presenting math material to him or her. Next, Ms. Hall handed out 3 X 5 index cards and pencils. She asked us to write our names on the cards using our non-dominant hand. If we were right-handed, we should write with our left hand. If we were left-handed, we should write with our right hand. This was almost impossible. Some cards fell to the floor and some people dropped pencils. Ms. Hall pointed out that this was what it is like for someone with mobility issues or suffering with arthritis. The third activity we had to do was to watch a video without any sound. The video was of an art instructor demonstrating how to trim art work down and get it on a board. Once again, no one could figure out what

the lesson was about. Ms. Hall pointed out that we had experienced what it is like for a deaf person trying to learn in this situation. Ms. Hall pointed out that had the instructors used the principles of Universal Design for Learning, there would have been multiple ways the instructor would have used to teach the lessons. She told us that Universal Design for Learning (UDL) represents instructional design that strives to meet the learning needs of the greatest number of students (Center for Applied Special Technology (CAST), 2014; Higbee, 2009). It was after this presentation that I began learning as much as I could about Universal Design for Learning. "Walking in someone else's shoes is a good idea."

As my passion for Universal Design for Learning (UDL) grew, I began wondering if UDL had been implemented in other parts of the world. One day about a year ago, I did a Google search using the terms Universal Design for Learning and India. It is then that I found *Design for All* and the wonderful work of Dr. Sunil Bhatia. It is indeed an honor to be the guest editor for this issue featuring Universal Design for Learning.

Universal Design for Learning and Higher Education

In this 21st century education is no longer confined to space and time. Technology and the Internet have given us online education. Online education connects not only with individual students and teachers, but also with communities and countries. Students in India can become classmates with students in Denver, Colorado. With this ability to obtain an education online, independent of time and location, men and women of all ages, race, and cultures are able to obtain a degree in higher education. In the United States, enrollment of this diverse group of learners in online courses continues to increase (Husser & Baley, 2011; Instructional

Technology Council, 2012; U.S. Department of Education, National Center for Education Statistics, 2011; Sloan Report, 2010;). It is to be noted that for many, community colleges are where these learners begin their journey.

Open-access and inclusiveness are the cornerstones of community colleges (American Association of Community Colleges, 2014; Clay, 2012, p. 38). Open-access is a doorway for all individuals in a community to get an education. Community colleges provide students with the opportunity to earn Associate degrees, certificates, to transfer to 4-year institutions, to obtain workforce trainings and skills development, and community colleges also offer noncredit programs that aim to enhance the knowledge of its learners. In addition, learners can do this online, without leaving their homes.

The expansion of online course offerings in community colleges and the increase in the enrollment of diverse learners provide instructional designers, many of whom are professors, with new challenges and opportunities. Universal Design for Learning is a framework that helps designers and instructors create quality instruction for these ever increasing diverse learners. The Higher Education Opportunity Act (HEOA) defines UDL as "a scientifically valid framework for guiding educational practice that - (A) provides flexibility in the ways information is present, 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, August 14, 2008).

In the United States, Federal legislation not only encourages people to pursue higher education, but federal legislation assures them access. The Individuals with Disabilities Education Act of 1997, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990 encourages people to pursue higher education. In addition, the reauthorization of the Higher Education Act by Congress has placed emphasis on universal access to higher education. When Universal Design for Learning principles are implemented in online course design as well as in traditional course design, all students benefit. Universal Design for Learning (UDL) represents instructional design that strives to meet the learning needs of the greatest number of students (Center for Applied Special Technology, CAST, 2009; Higbee, 2009). Universal Design for Learning offers options rather than limitations (Yager, 2010). Learners in higher education need options today.

Origin of Universal Design for Learning

Universal Design had its beginning in architecture. Ronald Mace, an architect and educator, coined the term Universal Design. Mace (2008) defined Universal Design as "The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Universal Design Center, "About UD," para. 1). Examples of Universal Design seen in everyday life are curb cuts, automatic door openers, and luggage with rollers. Curb cuts help those in wheelchairs, and they also help people with baby strollers. Automatic door openers help people in wheelchairs and walkers, and they help people carrying babies or books or other items. In 2003, Universal Design entered into the world of fashion. Jan Erickson launched her own company called *Janska* making clothing that

featured universal design as the framework. In other words, she designed fashion that was attractive, comfortable, easy to put on and take off, clothing that everyone could wear (Toomy, 2014). The foundation of Universal Design is to create products and environments that can be used by all people. Experience demonstrates that when products and environments are designed with Universal Design as the framework, many people benefit and not only those with disabilities (Burgstahler, 2010).

AUTOMATIC DOORS

CURB CUTS

With the expansion of diversity in schools and with research about how learning occurs, Section 504 of the Rehabilitation Act of 1973 and Section 508 set the stage for Universal Design to expand

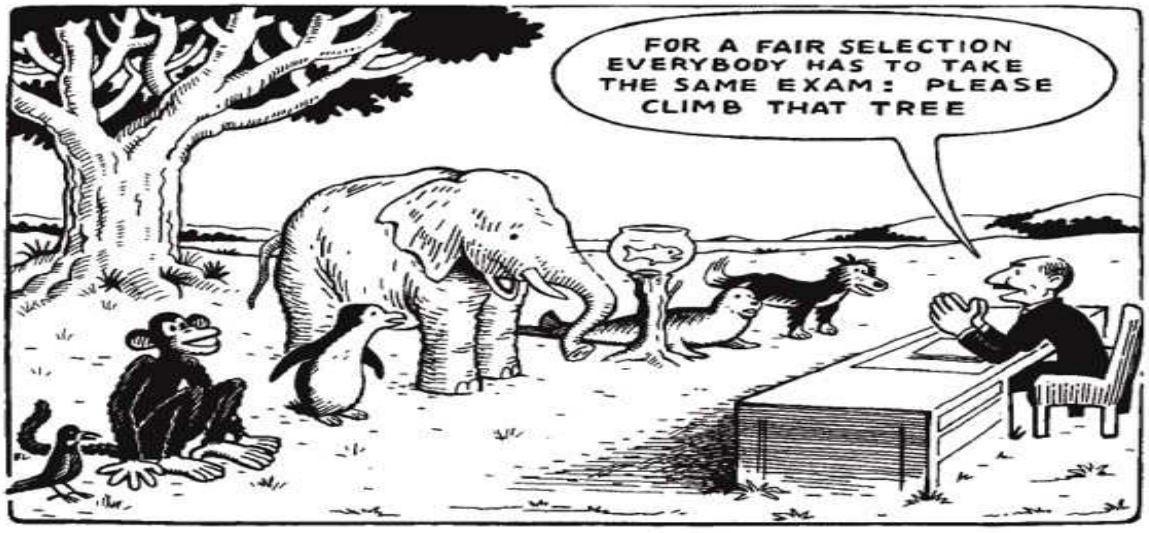
into education. While Universal Design is "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Mace, 2008, para. 1), Universal Design for Learning (UDL) is an instructional design which encompasses a set of principles that provides flexible approaches to instruction so that all individuals have equal opportunities to learn (Center for Applied Special Technology, CAST, (2012).

Universal Design for Learning is not a static design, but one that changes and grows as researchers, educators and learners interact and explore the best ways to learn. Universal Design for Learning provides a theoretical framework for the design of quality instruction that is inclusive and strives to reach the greatest number of learners. The basic principles of UDL are multiple means of representation, multiple means of expression, and multiple means of engagement. These basic principles of UDL are based on brain research findings on how learning occurs. The three broad brain networks that correspond to the basic UDL principles are recognition networks, strategic networks and affective networks (Meyer, Rose, & Gordon (2014). Table 1 shows this correspondence.

TABLE 1. UDL Principles & Corresponding Brain Networks

Universal Design for Learning Principles	Brain Networks
Multiple Means of Representation	Recognition Networks
Multiple Means of Expression	Strategic Networks
Multiple Means of Engagement	Affective Networks

Research has confirmed that we all learn in different ways.



Students in community colleges are a diverse population including single parents, veterans, students from other countries and ethnic backgrounds, students who are the first in their families to attend college and students with disabilities. The characteristics of this diverse population include physical differences, visual differences, hearing differences, learning differences, attention differences and communication differences (Burgstahler, 2010, p. 5). Answering the educational needs of this diverse population calls for an instructional design framework that is inclusive and flexible. Universal Design for Learning provides this framework.

The writers in this issue of *Design for All* provide a wealth of information and insight into Universal Design for Learning. Gail Essmaker writes about Universal Design for Aging e-Learners, Raja Sen reports on a Case Study he did regarding Implementation and Challenges with Universal Design for Learning, Valorie Sundby writes about Universal Design and Alternate Formats, and Cindy Poore-Pariseau writes about Universal Design and Online Learning.

Understanding Universal Design for Learning and implementing Universal Design for Learning in our schools, colleges, and

universities will help create rich learning experiences for instructional designers, professors, and students. Dr. Sunil Bhatia in his editorial pointed out how useful and needed the simple design of a ladder is. Universal Design for Learning can be a ladder for the future of education.

References

American Association of Community colleges (2014). AACCMission: Building a nation of learners by advancing America's community colleges. Retrieved from *http://www.aacc.nche.edu/About/Pages/mission.aspx*

Burgstahler, S. (2010). Universal design in higher education. In S.E. Burgstahler & R.C. Cory (Eds.), Universal design in higher education from principles to practice. (pp. 3-21). Cambridge, MA: Harvard Educational Press.

CAST Center for Applied Special Technology (2012). UDL guidelines version 2.0. Retrieved from http://www.udlcenter.org/aboutudl/udlguidelines

Clay, R.A. (2012). Diversity at community colleges. American Psychological Association. 43(8). p. 38. Retrieved from http://www.apa.org/monitor/2012/diversity.aspx

Higbee, J.L (2009). Implementing universal instructional design in postsecondary courses and curricula. Journal of College Teaching and Learning. 6(8), 65-77.

Hussar, W.J., and Bailey, T.M. (2011). Projections of Education Statistics to 2019 (NCES 2011-017). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

Instructional Technology Council. (2012). Trends in eLearning: Tracking the impact of eLearning at community colleges. 2012 Distance Education Survey Results. Instructional Technology Council. Retrieved from *http://www.itcnetwork.org*

Mace, R. (2008). About UD. The Center for Universal Design. Retrieved from *http://www.ncsu.edu/ncsu/design/cud/about_ud/about_ud.htm*

Meyer, A., Rose, D., & Gordon, D. (2014). Universal design for learning. Wakenfield, MA: CAST Professional Publishing.

The Center for Universal Design. (2008). About UD. Raleigh: North Carolina State University Retrieved November 30, 2013 from http://www.ncsu.edu/ncsu/design/cud/about_ud/about_ud.htm

The Sloan Consortium Report. (2010). Class differences. Online education in the United States, 2010. Retrieved from http://www.sloanconsortium.org

Toomy, Conner (2014). Reinvention: Always in fashion. AARP. Retrieved July 19, 2014 from http://www.aarp.org/work/working-after-retirement/info-06-2012/reinvention-always-in-fashion.html

U.S. Department of Education, National Center for Education Statistics (2011). Enrollment in postsecondary institutions. Fall 2009; graduation rates, 2003 & 2006 cohorts; and financial statistics, fiscal year 2009. (NCES Publication No. 2011-230). Retrieved from http://nces.ed.gov

U. S. Department of Education. (2008). Higher Education Opportunity Act 2008 (HEOA) P.L. 110-315. Retrieved from http://www2.ed.gov/policy/highered/leg/hea08/index.html

U.S. Department of Justice (2009) Americans with disabilities act of 1990, as amended. Retrieved from http://www.ada.gov/pubs/ada.htm

U.S. Department of Health and Human Services, the Office for Civil Rights. Your Rights Under Section 504 of the Rehabilitation Act. Revised June 2006. Retrieved from http://www.hhs.gov/ocr/civilrights/resources/factsheets/504.pdf

Yager, S. (2010). Small victories. Faculty development and universal design. In Sheryl E. Burgstahler and Rebecca C. Cory (Eds.). Universal design in higher education from principles to practice. Cambridge, Massachusetts: Harvard Education Press.

Lee Christopher, M.Ed., M.F.A.

Cindy Poore-Pariseau, Ph.D.

Cindy Poore-Pariseau graduated from the University of Michigan with an M.A. in Higher and Adult Continuing Education and a Ph.D. in Instructional Design for Online Learning from Capella University. Cindy has worked in the field of Higher Education for over 20 years and has specialized in Disability Services and Universal Design over the past 10 years. Currently Cindy is Coordinator of Disability Services for a community college is southeastern, MA and she teaches online courses for the college as well as for Kaplan University. Cindy provides regular faculty development face to face and online on the topic of accessibility and universal design.

Universal Design for Online Learning

Cindy Poore-Pariseau, Ph.D.

Online education, also known as eLearning or distance learning, may be defined in a number of ways. For some, learning must occur 100% of the time over the Internet. For others, even 1% of the time spent on the Internet for educational purposes is considered online learning. To whatever school of thought one subscribes, the common factors are a) education is occurring and b) the Internet is involved.

When considerations are made for preparing lessons of any type for the online environment, many issues must be considered. For example:

- ***Will the student have reliable and frequent Internet access?***
- ***What time of connection will student have? Dial-up? Wireless? Broadband? Mobile?***
- ***How much bandwidth will be available?***
- ***Will disability-related applications such as Job Access with Speech (JAWS) or keyboard only access be utilized?***
- ***Is the student a non-native language learner?***
- ***Is the student be colorblind?***
- ***Are captioned videos essential for learning to occur or will the learner benefit from captioning?***

There are many considerations to be made in the design of distance or online learning. However, given the anonymity of students who take classes from a distance, how is one to know what eventuality they should plan for? How does one "design for all"?

According to Poore-Pariseau, (2010, 2011), one way to plan in advance for a broad variety of needs is by utilizing the concept of Universal Design. **Universal design is a term developed by architect Ron Mace in the 1970s to describe "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Center for Applied Special Technologies, 2008, para. 2). An example of the universal design concept is curb cuts (Figure 1), which were initially designed to allow complete street and sidewalk access to people using wheel chairs. Today, however, curb cuts are used to allow the same access to those who use bicycles, strollers, roller blades, and other equipment that make full curbing difficult to negotiate.**

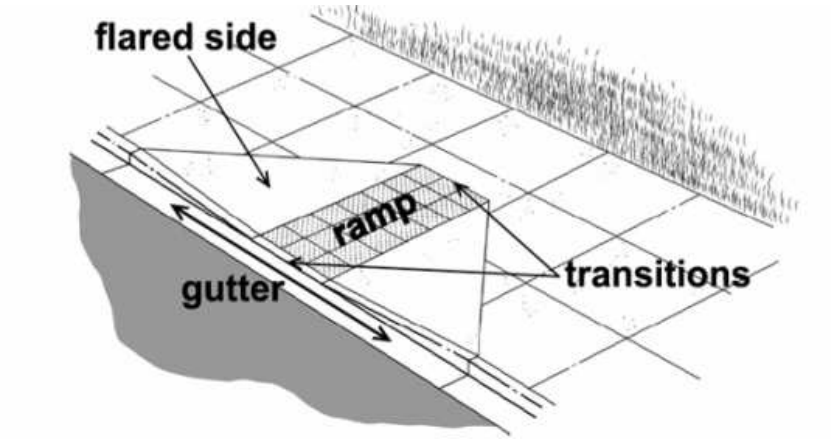


Figure 1. Curb Cuts. U.S. Department of Justice. (2010). Images. In *Flared ramp.* Retrieved from www.ada.gov/images/flaredramp1.jpg

The concept of universal design was then extended to the educational environment and the term "learning" was added, transforming universal design to universal design for learning (Center for Applied Special Technology, 2008). According to the Center for Applied Special Technology, universal design for learning is a system for providing a variety of means for students to access and engage with course material and demonstrate their knowledge of the curriculum (see Figure 2). This approach to teaching and learning allows individuals to draw upon and utilize their particular learning strengths, while acknowledging that not all students learn in the same manner.

This makes universal design an approach to learning that can benefit many populations. For example, Sapp (2009) noted that universal design for learning has been shown to benefit English language learners; Moore (2004) gave those with different learning preferences and strengths as examples. In addition, Hichcock, Meyer, Rose, and Jackson (2002) discussed learners who benefit from gaining information through a variety of modalities as additional examples of nondisabled populations who benefit from universal design for learning. The following statement from the Learning Opportunities Task Force (2003) emphasizes the wide-ranging benefit of universal design for learning:

> ***A core concept of Universal Design is that by anticipating and planning for the diverse needs of potential users during the design process, the resulting product or outcome will better suit the needs of all users….When applying the concept of Universal Design to instruction, the benefits are much the same. Anticipating and planning for the diverse needs of***

students, including but not limited to students with disabilities, results in a better learning experience for all students. (p. 1)

Principle 1. Multiple means of representation, to give students various ways of acquiring information and knowledge (the "what" of learning)

Principle 2: Multiple means of expression, to provide students alternatives for demonstrating what they know (the "how" of learning)

Principle 3. Multiple means of engagement, to tap into students' interests, offer appropriate challenges, and increase motivation (the "why" of learning)

Figure 2. Universal Design for Learning. Text from Center for Applied Special Technology (2008).

Because this author is most familiar with educational systems in the United States -community colleges in particular- references to education, from this point forward, will be focused on these US community colleges; however, because of the diverse make up of US community colleges, many of the educational and access-related concerns and potential solutions that can be attributed to and/or applied to community colleges may be extrapolated to other countries and types of intuitions. From a worldwide perspective, the information about community colleges and their students is relevant as these populations must often cross the digital divide in much the same way as those from developing nations. These populations encounter connectivity issues, diverse economic conditions and varying physical and other access needs, issues and concerns.

Online learning issues, including those of accessibility, are of particular importance to community colleges, not only because they enroll over half of the total online students in the United States (Allen & Seaman, 2008), but also because of the diverse student population they serve. Schuck and Larson (2003) discussed the community college population and the need for a universally designed curriculum:

> ***This mission [of the community college] is characterized by a commitment to serving all segments of society through an open-access admissions policy . . . . students who attend community colleges are seeking an environment that has been designed to accommodate them. Such an environment calls for a flexible and inclusive model of delivering education and makes UD's [universal design] "one size does not fit all" approach particularly compelling. (pp. 59-60)***

Extending the relationship between community colleges and online learning is a relatively new move by the State of California. According to the Chronicle of Higher Education (2010), California's 110 community colleges have recently worked out an agreement with Kaplan University to allow students to take single, online courses through Kaplan University as a means to earn credit towards their California Community College Associate's degree. This agreement was put in place due to a combination of factors, including increasing enrollments resulting from economic conditions and decreasing state funds. If this becomes a world-wide trend, the percentage of college students enrolled in online courses, including those with disabilities and other access related issues, will continue to grow.

In addition to enrolling a large percentage of online students, community colleges also enroll a larger percentage of disabled students than any other category of postsecondary institution (Frieden, 2003; McCleary-Jones, 2008; Schuck & Larson, 2003). Because the number of online students as well as the number of disabled students is greater in community colleges, their faculty members have both great opportunities and great needs to design for accessibility. For this reason, the following discussion will focus on how to best prepare online learning opportunities in a way that will benefit very diverse populations using the concept of Universal Design.

Many aspects of teaching and learning are impacted when one moves from a face to face environment to an online environment, even if the courses are online only a part of the time. For example, if I am taking a class face to face and the teacher is talking too fast, I can raise my hand and ask the teacher to slow down or repeat what was said. However, if the "lecture" is given in the form of a podcast, for example, several issues may arise if diverse needs are not planned for in advance. For example:

- ***Can the controls of the podcast be accessed by a student who can only use a keyboard? This may apply to students who are blind or for other reasons cannot use a mouse.***
- ***Are there captions for those enrolled in the course who is deaf or hard of hearing?***
- ***Are there captions for those who are not native speakers of the language being used? Other types of issues that may come into play are the use of colors (keeping in mind that some may be colorblind) or***

- ***the use of on screen movements or screen flickering that may cause seizures.***

While it is nearly impossible to preplan for all situations, developing curricula in a Universal Design manner will minimize the need for retrofitting and can minimize accommodations that need to made for people with disabilities or others who cannot access lessons for a variety of reason. While retrofitting a lesson and/or accommodating a disability may be quick, easy and inexpensive in a face to face setting, this is often not the case in an online environment.

Universal Design for Learning

As noted previously, universal design for learning is an approach to instructional design that calls for giving students choices from the outset (rather than retrofitting options) with regard to how they (a) access information, (b) engage with course material, and (c) express what they have learned (Center for Applied Special Technology, 2008). Said another way, universal design for learning is an "educational approach for instructing all students through developing flexible classroom materials, using various technology tools, and varying the delivery of information or instruction" (Finn & Thomas, 2006).

Providing options for how students access information, engage with course material and express what they have learned allows for a learning format that is flexible, but maintains the overarching integrity in all aspects of the course (Hichcock et al., 2002). When designing from a universal perspective, the designer is able to insert various options from which students can become engaged with the material and show the knowledge they have gained. In a lesson about the Civil Rights Movement, for example, students would be

given specific elements from which to choose (Center for Applied Special Technology, 2008). Students might have the option to click on a captioned YouTube video, a podcast, a transcript, and so forth in order to access course material; in other words, options from which the learner could choose to access course material would be readily available.

Three Principles of Universal Design for Learning. There are many ways in which universal design for learning can be implemented. General examples for utilizing the three principles of universal design for learning (access, engagement, and expression) include:

1. **Principle I:** ***Provide Multiple Means of Representation (the what of learning). Students differ in the ways they perceive and comprehend the information presented to them. For example, those with sensory disabilities (e.g., blindness or deafness), learning disabilities (e.g., dyslexia), language or cultural differences, and so forth may all require a different means to approach content. Some may simply grasp information better through visual or auditory means than through printed text. In reality, no one type of representation will be optimal for all students, so providing options in representation is essential.***
2. **Principle II:** ***Provide Multiple Means of Expression (the how of learning). Students differ in the ways they are able to navigate a learning environment and express what they know. For example, individuals with significant motor disabilities (e.g., cerebral palsy), those who struggle with strategic and organizational abilities (e.g., executive function disorders,***

ADHD), those who have language barriers, and so forth approach learning tasks very differently and also demonstrate their mastery of tasks differently. Some may be able to express themselves well in writing but not orally, and vice versa.

3. **Principle III:** ***Provide Multiple Means of Engagement (the why of learning). Students differ markedly in the ways they can be engaged or are motivated to learn. Some students are highly engaged by spontaneity and novelty, while others will be disengaged or even frightened by those approaches and prefer a strict routine. (The National Center on Universal Design Center, 2010, para 5)***

General Universal Design for Learning Examples. Sheryl Burgstahler (2008), founder of Disabilities, Opportunities, Internetworking, and Technology (DO-IT) and Accessible Technology provides several general universal design for learning examples. Multiple delivery methods of learning material, for example, can be used to motivate and engage all learners. Class outlines and notes on an accessible website can provide a flexible means for students to access classroom information. Giving students options with regard to how they express what they know also increases access to curriculum for students.

Specific Universal Design for Learning Examples. From the more general examples listed above, a faculty member or instructional designer can utilize course specific methods to design their courses in a universal manner; Table 2 gives examples from Ensuring Access through Collaboration and Technology (ENACT), (n.d.)

Table 2. Examples: Universal Design for Learning Principles in the Classroom

Principle 1: Multiple Means of Representation	Principle 2: Multiple Means of Expression	Principle 3 Multiple Means of Engagement
A math/statistics faculty member began providing handouts of overheads to the entire class so that students could use them for reference and review.	A sociology professor revised her assessments by adding a research project in addition to the midterm and final exam in order to diversify the types of work that affected the final grade in the course.	A foreign language professor used puppet shows, role plays, velcro cards, and searches of computer web sites in the second language to make the instruction as multi-modal as possible.
Professor provides information in class, and also makes the information available out of class.	An introductory physics course administers the midterm exams in the evening, allowing all students up to two hours for a one-hour exam.	A geology professor developed computer animation modules to illustrate some of the key concepts in a course on physical hydrology.
A biology professor began using two overhead projectors in his lectures so he can leave the old slide on the screen longer.		

Once difficult piece in the universal design for learning model is how to offer alternatives that will support the learning needs of every student. Sims and Stork (2007) argued against this because of the difficulty of knowing the particulars of every student, especially in a distance-learning environment. For this reason, when

using a universal design for learning model as a proactive way of providing accessibility to students, occasional accommodations may still need to be inserted in order for full accessibility to be obtained (Burgstahler, 2007).

Despite these criticisms, universal design for learning was never meant to solve all accessibility issues. According to Center for Applied Special Technology (2008), universal design for learning:

> ***Provides a blueprint for creating flexible goals, methods, materials, and assessments that accommodate learner differences. ...Universal does not imply a single optimal solution for everyone. Instead, it is meant to underscore the need for multiple approaches to meet the learning needs of diverse students. ...UDL uses technology's power and flexibility to make education more inclusive and effective for all. (p. 25)***

This proactive use of universal design for learning can alleviate some practical and legal accessibility-related concerns, but not all, thus necessitating occasional accommodations (Rose & Meyer, 2002).

Although it cannot make all learning accessible at every turn, universal design for learning can be a means to change the approach for giving students access to the curriculum, from reactive only (i.e., accommodations) to a proactive universal design for learning approach, adding accommodations when necessary (Burgstahler, 2007). For example, in a universally designed online learning environment, reading material may be made available for students to

- ***read from their computer screen, either by the students or by assistive technology;***
- ***be download when they wish to print the material; and/or***

- ***listen to via audio for those whose learning is enhanced when they can hear text. Although audio may not be practical in some cases, technology exists that can make the process manageable, when the designer deems this step practical and, of course, not in violation of copyright laws.***

This redundancy approach makes content readily available, accessible, and usable for most students, including those who are blind and can hear, but not for those who rely on Braille as their primary means of gathering information. Turning material into Braille is an extensive and expensive process; the cost to turn text into Braille can range from three dollars per page (for words) to 17 dollars per page for music (Braille Inc., 2008). However, there are some instances, such as in the case of math and music, when Braille may be necessary for access. Therefore, Brailed material is an example of an instance in which the accommodation may be best produced as a retrofit, on a case-by-case basis, rather than as a universal design for learning option or process.

Research. In a study composed of three California State University campuses, 15 faculties participated in a universal design for learning awareness project called Access by Design (AxD). During this project, faculty members were asked to participate in a workshop designed to teach them about the principles of universal design for learning; the participants were then given an opportunity to look at various course designs and implement changes that were in line with universal design for learning (Ayala & Christie, 2009). The reported outcome of the study was that

UDL helped begin a conceptual shift with respect to how they viewed their learning relationship with all students, including

> ***disabled students. …when faculty members consider the principles of UDL, a shift occurs in educational responsibility. Instead of blaming the individual with a disability for their learning challenges, perhaps faculty should first consider the extent to which their learning environment is welcoming to a community of diverse learners. (p. 4)***

Similarly, Poore-Pariseau (2011) found that when faculty members who design their own instruction participated in training about UDL, they were more likely to proactively design their future courses with accessibility-related needs in mind. These studies substantiate the idea that knowledge about the principles of universal design for learning is important not only in terms of designing instruction that is accessible, but also in terms of how disabled students are perceived.

According to Roh and So (2005), the research available about universal design for learning and Web accessibility has been more focused on the technical aspects of designing, rather than on instructional or learning perspectives. Hutchins (2003) also indicated that there has not been enough attention paid to "how an instructor can best direct, facilitate, and support students toward certain academic ends (i.e., student achievement, student satisfaction) in Web-based classes" (p. 1). Because the research about universal design for learning and Web accessibility has not focused to a large extent on pedagogy and because of the growing number of disabled students entering the higher education sector, Roh and So (2005) conducted a study that had a two-fold purpose. The first was to gather information about the perceptions disabled students and postsecondary personnel have about universal design

for learning and Web accessibility. The second purpose of the study was to discover the effective strategies personnel were using to design accessible courses.

Rho and So (2005) concluded that all parties had little knowledge of universal design for learning and Web accessibility. The participants of the study agreed that "WBI [Web based instruction] personnel should have knowledge and skills for making their WBI more accessible to all students" (Roh & So, 2005, p. 4). Kochhar-Bryant, Basset, and Webb (2009) concurred with this finding and discussed a need to provide training for faculty members (and other campus personnel) in order to design accessible course content

Designing Effective Online Instruction

Designing courses for online learning takes a specialized set of skills that are different, in many ways, from those skills necessary for designing on-ground courses (Yang & Cornelious, 2005). For example, traditional face-to-face education is often designed in a teacher-centered model, whereas the format for online learning lends itself more towards student-centered learning (Yang & Cornelious, 2005). The necessary perspective in this instance is for the designer (who, in this case, may also be the instructor) to take the focus off of himself as the authority who imparts knowledge and to place the focus on the students, while acting as a guide for the students as they move through the process of meeting the course goals through the use of technology.

In the traditional, face-to-face role, Yang and Cornelious (2005) observed that faculty members are often lecturers who disseminate information for students to reflect upon whereas online instruction often involves allowing, if not encouraging, students to

become a community of learners who "collaborate with each other in order to develop personal understanding of course content" (p. 4). If collaboration is important to the learning process, then designers must know how to effectively set up their courses in a way that encourages this process among a diverse group of students. Additional challenges faced when designing online instruction are that of understanding how to effectively utilize appropriate technology and to be able to guide students through the process of learning to utilize the technology in a way that promotes learning (or have access to resources that can provide students with such assistance).

Changing from synchronous to asynchronous classroom discussions is one significant difference between online and face-to-face learning. In their study of 116 students enrolled in hybrid courses (those courses that are partially face to face and partially online), Wu and Hiltz (2004) found that online discussions improved perceived student learning outcomes. However, as noted by Yang and Cornelius (2005), facilitating discussion in face-to-face classrooms is different from doing so online. Online environments allow all students to participate in discussions, whereas student discussions in a face-to-face setting may be limited by factors such as time constraints and students who monopolize discussion.

However, an abundance of information, as well as the change of format from synchronous to asynchronous, may lead to information overload for students. The overwhelming nature of information conveyed in this process may necessitate assistance from the online instructor in discovering what is important as well as how to navigate this new mode of learning. Students may also need assistance from their instructors in discovering how to move an

asynchronous discussion forward in a scholarly fashion, and overall assistance with regard to how to adjust to the technology and a new mode (and model) of learning.

In a study conducted by Cleveland-Innes, Garrison, and Kinsel (2007) about the adjustments online learners must make from the traditional on-ground classroom learning model, the researchers noted that the adjustments are not merely a matter of students feeling comfortable in the new environment. Online learning has "significant learning implications as well" (p. 12) that require competence from instructors that extend beyond the subject area in which they are instructing. Students no longer have a passive role in learning and must receive guidance from their instructors regarding how to make this adjustment in a way that will move their learning processes forward and will keep students motivated to continue to make necessary adjustments to their new roles (Yang & Cornelious, 2005).

Muilenburg and Berge (2005) conducted an exploratory factor analysis study to learn about student barriers to online learning. They found eight factors to be significant, which included, "(a) administrative issues, (b) social interaction, (c) academic skills, d) technical skills, (e) learner motivation, (f) time and support for studies, (g) cost and access to the Internet, and (h) technical problems" (p. 29). Each of these issues may be exacerbated by the presence of a learning or physical difference that influences or impacts learning. Therefore, those who design instruction for the online environment must be aware of these issues as well as their impact on accessibility and must be prepared to work through the issues in order to provide students with positive and effective online learning experiences.

In considering how to design instruction in a way that accounts for important factors such as accessibility, one can look to Sims' (2009) Proactive Design for Learning and Sprenger's (2008) discussion about student choice and universal design for learning (Center for Applied Special Technology, 2008), each of which view instruction from the standpoint that students are a heterogeneous group that have individual learning needs that cannot be met with a one size fits all model. Thus, those charged with teaching as well as designing online instruction have an enormous task before them. Not only must they have a mastery of their subject matter, they must also understand the legal and technical issues involved in designing accessible courses, which may involve developing knowledge about learning theories as well as instructional design theories and processes.

According to Poore-Pariseau (2011) online instructors are being asked to make the shift from the instructor-centered teaching model often used in the traditional face-to-face setting to a student centered-model, where they are now facilitators, rather than disseminators, of knowledge. In order to design effective, accessible online instruction, instructors must accomplish what is nearly impossible in online learning environments: to "discover students' learning preferences, integrate technology tools, apply appropriate instructional techniques, put them all into practice and generate the most suitable method [of learning] for individuals" (Yang & Cornelious, 2005, p. 6). One approach that has been proposed to accomplish the above cited challenges is the implementation of the principles of universal design for learning (Center for Special Technology, 2008). Poore-Pariseau's (2011) study investigated the effectiveness of this approach in regard to the

impact knowledge of universal design for learning principles had on the importance faculty members placed on designing accessible course materials. As previously mentioned, this study found that those who participated in a training of about the concept of UDL were positively impacted in terms of be more prepared to proactively design their courses to meet the needs of students from a variety of backgrounds with varying needs.

For more information about Universal Design and/or to learn about ways to teach faculty about the concept of Universal Design for education, go to:

http://www.washington.edu/doit/Resources/udesign.html

http://www.cast.org/udl/

http://elixr.merlot.org/case-stories/understanding--meeting-students-needs/universal-design-for-learning-udl

http://www.udlcenter.org/implementation/planningtemplates/school

http://udeworld.com/training.html

http://www.unco.edu/cetl/UDL/

http://www.ncsu.edu/ncsu/design/cud/edutrain_et/edutrain_et.htm

References

Allen, I. E., & Seaman, J. (2008). Staying the course: Online education in the United States, 2008. Needham, MA: The Sloan Consortium. Retrieved from http://sloanconsortium.org/sites/default/files/staying_the_course-2.pdf

Ayala, E. & Christie, B. (2009, Spring). Universal design for learning: A proactive pedagogical approach. Senate Forum, 24(2), 2-3. Retrieved from http://www.fullerton.edu/senate/forum/spring09/ Universal_Design_For_Learning.pdf

Braille Inc. (2008). Price List. In Placing Brailled materials into database. Retrieved from http://home.capecod.net/~braillinc/

Burgstahler, S. (2008). Universal design in higher education: From principles to practice. Cambridge: Harvard Press.

Burgstahler, S. (2007). Accessibility training for distance learning personnel. In Postsecondary education and disabled students. Retrieved from http://www.athenpro.org/node/56

Center for Applied Special Technology (2008). Research and development. In UDL guidelines. Retrieved from http://www.CAST.org/research/index.html

Cleveland-Innes, M., Garrison, D.R. & Kinsel, E. (2007). Role adjustment for learners in an online community of inquiry: Identifying the challenges of incoming online learners. International Journal of Web-Based Learning and Teaching Technologies, 2(1), 1-16. doi: 10.4018/jwltt.2007010101

Chronicle of Higher Education. (2010, February 8). California community-college students may take online kaplan courses for credit. Retrieved from http://chronicle.com/blogPost/ California-Community-College/21134/

ENACT:Ensuring Access through collaboration and technology. (n.d.). Postsecondary Examples of Universal Design for Learning (UDL). Retrieved from http://www.inclusion.msu.edu /files/ UDL_Postsecondary_Examples_and_Resources.pdf

Finn, D. E., & Thoma, C. A. (2006, Spring).What is a universal design approach to learning? The professor's assistant: An informational publication of the VCU Professional Development Academy, (pp. 1–4). Richmond, VA: Virginia Commonwealth University, Rehabilitation Research & Training Center.

Frieden, L. (2003). People with Disabilities and Postsecondary Education (Position Paper). Retrieved from http://www.ncd.gov/newsroom/ publications/ 2003/education.htm

Hichcock, C., Meyer, A., Rose, D., & Jackson, R. (2002). Providing new access to the general curriculum: Universal design for learning. Teaching Exceptional Children, 35(2), 8-17. Retrieve April, 2008 from http://www.cec.sped.org/content/navigationmenu/ aboutcec/international/stepbystep/providing%20new%20access%20-%20vol.35no.2novdec2002%20tec.pdf

Hutchins, H. M. (2003). Instructional immediacy and the seven principles: Strategies for facilitating online courses. Online Journal of Distance Learning Administration, 6(3), 1-13.

Retrieved from http://www.westga.edu/~distance/ ojdla/ fall63/hutchings63.html

Kochhar-Bryant, Bassett, D., & Webb (2009). Transition to postsecondary education for disabled students. CA:Corwin Press.

Learning Opportunities Task Force. (2003). Universal Instructional Design (UID): A FacultyWorkbook. Ministry of Training, Colleges and Universities, Government of Ontario, 2002-03. Retrieved from http://www.uoguelph.ca/tss/uid/uid-workbook-FTF.pdf

McCleary-Jones, V. (2008). Students with learning disabilities in the community college: Their goals, issues, challenges and successes. ABNF Journal, 19(1), 14-21. Retrieved from http://www.jsr.vccs.edu/jsr_sds/pave/documents/Studentwith DisabilitieinCommunityCollege.pdf

Moore, M. (2004, March). Disabilities and Other Learner Characteristics. American Journal of Distance Education, 1-3. Retrieved from Academic Search Premier database.

National Center on Universal Design for Learning. About UDL:Learn the basics. In UDL Guidelines. Retrieved from http://www.universal design for learningcenter.org/ aboutuniversal design for learning/universal design for learningguidelines/introduction

Poore-Pariseu, C. (2011) Principles of universal design for learning: What is the value of UDL training on accessible pedagogy? Capella University, 139 pages.

Poore-Pariseau, C (2010). Online Learning: Designing for All Users. Journal of Usability Studies, 5 (4), pp. 147-156.

Roh, S.Z., & So, H. J. (2005). Designing accessible Web based instruction for all students. 19th Annual conference on Distance Teaching and Learning, 1-6.

Rose, D. & Meyer. M. (2002). Teaching every child in the digital age. Alexandria, VA: Association for Supervision & Curriculum Development.

Sapp, W. (2009). Universal Design: Online educational media for disabled students. Journal of Visual Impairment & Blindness, 103(8), 495-500. Retrieved from Academic Search Premier database.

Schuck, J. & Larson, J. (2003). Community colleges and universal design. In J. L. Higbee (Ed.), Curriculum transformation and disability: Implementing universal design in higher education (pp. 59-70). University of Minnesota, Minneapolis: Center for Research on Developmental Education and Urban Literacy, General College.

Sims, R. (2009). From three phase design to learning design: Creating effective teaching and learning environments. In J.W. Willis (Ed.), Constructivist instructional design (C-ID): Foundations, models, and examples (pp. 379-392). North Carolina: Information Age.

Sims, R., & Stork, E. (2007). Design for contextual learning: Web-based environments that engage diverse students. AusWeb: The thirteenth Australasian World Wide Web Conference. Retrieved from http://ausweb.scu.edu.au/aw07/papers/refereed/ sims/paper.html

Sprenger, M. (2008). Differentiation through learning styles and memory. Thousand Oaks, CA: Corwin.

U. S. Department of Justice. (2010). Images. In Flared ramp. Retrieved from www.ada.gov /images/flaredramp1.jpg

Wu, D., & Hiltz, S. R. (2004). Predicting learning from asynchronous online discussions. Journal of Asynchronous Learning Networks, 8(2), 139-152.

Yang, Y. & Cornelious, L. (2005, Spring). Preparing instructors for quality online instruction. Online Journal of distance Learning Administration, 8(1), 1-17. Retrieved from http://www.westga.edu/~distance/ojdla/spring81/yang81.htm

Cindy Poore-Pariseau, Ph.D.

Valorie Sundby

Valorie Sundby graduated from the University of Arizona with a Bachelor of Science in Business Administration with a major in Management Information Systems. Valorie was introduced to Web Accessibility in 2009 and became a contractor performing Web Accessibility Audits. She now works as a Disability Services Specialist at Arapahoe Community College in Colorado, USA. Valorie recently received her Professional Certification in Web Accessibility Compliance from the University of South Australia.

Alternate Formats: Unequal to be Fair

Valorie Sundby

Introduction

I was working as a tester in a startup software company when the lead developer walked into my office and threw a large book on my desk. "Learn this." he said, as he turned and walked out. The book, Web Accessibility: Web Standards and Regulatory Compliance, lists Jim Thatcher at the top of a long list of contributors. That single moment was the turning point in my career and life. Web Accessibility has brought awareness of the great effort made by persons with disabilities to gain the same information, interaction and achievement as people who are fully abled.

It took me a couple of years to fully grasp Web Accessibility and the guidelines spelled out in Section 508 of the Rehabilitation Act in the United States. This year, I earned my Professional Certification in Web Accessibility Compliance from the University of South Australia. The certification focused primarily on the Web Content Accessibility Guidelines 2.0 (WCAG 2.0) which are maintained by the World Wide Web Consortium (W3C). What I learned most from the course was how much more I need to learn in a field constantly changing at the speed of learning.

For several years now, I have been a Web Accessibility Auditor: I check web pages for conformance to accessibility guidelines, write reports on my findings and suggest ways to correct the issues. Last year, I called the Disability Services Department at my local

community college to see if I could volunteer because I wanted to see the impact of accessibility on people as they work to earn college degrees. I pictured working with students with disabilities, learning how they use assistive technology and seeing how accessibility makes a difference. I was hired full-time in February of 2014 as a Disability Services Specialist and now find myself helping the college map its own path to accessibility to improve the students', employees' and the communities' experience within the college.

One thing this past year has taught me is creating an accessible document or web content is just the beginning of the process. People with disabilities rely heavily on the use of alternate formats - changing the content into a form which can be accessed either by the person or their assistive technology (AT). Examples of alternate formats include Braille, large text, sign language or captions, descriptive captioning, inverse contrast or accessible electronic format.

Alternate Formats are Different

Aristotle is credited with saying, "The worst form of inequality is to try to make unequal things equal." Students are unequal: unique individuals with unique perspectives, life experiences and learning styles. Even genetically identical twins have many subtle differences as the environment "talks" to the genome to which make them unique.[1] One identical twin is different from the other as even in the womb one is positioned left of the other, one is born first, the other second. Each identical twin is unique. Students with disabilities are not the same as students without disabilities. The learning environment for students with disabilities cannot be equal to that of

students without disabilities in order for the students with disabilities to be treated fairly.[2]

Students with the same disability have unique learning experiences. The impact of the disability on learning will be different for each student with color blindness though they are categorized as having the same disability. One student may not be able to perceive blue while another may not be able to perceive red. Treating these two students the same is not fair. The student who cannot perceive red text will not understand the instructions, "Correct the phrases in red." when all the content looks black. The student who cannot see blue will likely be able to complete the assignment. Following Universal Design for Learning (UDL) and accessibility practices by indicating with color and a second non-color indicator such as an underline will allow the student to independently participate in the assignment. Instructions would then read, "Correct the phrases which are underlined and in red."

To make the learning environment fair, content must be provided to the students with disabilities in a format they can access. Alternate formats are used so the student can access the content directly or through the use of assistive technology (AT), like screen readers. The student who is blind cannot see text, diagrams, charts and videos with their eyes. If Disability Services (DS) provides text in Braille, diagrams as tactile or 3D images, charts as raw data in well-formed tables and videos as descriptive text, the student who could not access the content in its original form is now able to participate in discussions, write papers and can be assessed based on their knowledge. Conforming content to Universal Design for Learning (UDL) and accessibility guidelines makes it easier for instructors,

students and Disability Services (DS) to tailor the format for students' unique needs.

Alternate formats, however, do not make the learning experience equal. The student who digests the raw data without the benefit of colorful graphs will learn the material differently than the student who can visualize the graphic presentation. Assistive technology (AT) users often require additional time to access content. Challenges of learning and cognitive disorders cannot be completely overcome by alternate format and assistive technology (AT) use, but the disadvantages of the disability can be minimized.

Case #1: Formatting for Screen Readers

A student with severe low vision finds much of the content provided in education not accessible to screen readers. Rather than waiting for Disability Services (DS) to create accessible content, the student chooses to use a magnification program. Magnification of content to 800% on a computer screen requires the user to scroll the content back and forth many times. This same student with low vision explained how reading magnified content causes her to experience dizziness and headaches. Imagine the frustration experienced by the student who requires over twice the time to read assignments and is rewarded with a headache for the effort.

Providing content which complies with Universal Design for Learning (UDL) and accessibility guidelines like Web Content Accessibility Guidelines 2.0 (WCAG 2.0) would greatly improve the quality of the student's learning experience. Accessible content can be read using a screen reader. Proficient screen reader users can read as fast as sighted adult readers.[3] Implementing Universal Design for Learning (UDL) and accessibility when creating course content increases the

speed with which students can get access to information and avoids the uncomfortable consequences of lesser alternatives.

Disability Services departments spend hundreds of hours reformatting books, handouts, tests, and resources to alternate format. The quality of the content delivered has a direct impact on the number of hours spent in remediation. A trained, experienced remediator using the latest conversion software cannot make up for poor quality. Veteran instructors pulling handouts from a repository of materials collected over decades of teaching may not be cognizant of the impact to students and Disability Services (DS). Disability Services (DS) recently received a mimeograph from one such archive. The quality was so poor and the text so faded that OCR did not recognize a single letter. The document had to be retyped. Disability Services (DS) can take advantage of a teaching opportunity on accessibility and Universal Design for Learning (UDL) and do the instructor a favor by returning the new electronic version to the instructor and point out the advantages of the improvements to all students.

Remediation services and software can be a significant cost center for Disability Services (DS). A typical process to convert a hard document into a screen reader ready Word document includes:

1. ***Scan document to pdf.***
2. ***Optimize scan and save in Word format.***
3. ***Proofread the Word document: correct OCR errors, add headings, list and table structure.***
4. ***Documents with images:***
    a. ***Cut and copy images and diagrams from the original document.***

b. ***Consult with instructor or other Subject Matter Expert (SME) on correct alternative text for images and diagrams. This is especially important for Science, Technology, Engineering and Math (STEM) courses.***
c. ***Add alternative text to images. Science, Technology, Engineering and Math (STEM) content ought to follow Guidelines for Describing STEM Images.***

5. ***Test the document with a screen reader.***

The ideal content for translation to alternate formats is an accessible electronic document. Conscious consideration of Universal Design for Learning (UDL) in the production of content can save Disability Services (DS) time and money and greatly improve the learning experience for all students.

Case #2: Formatting for Consistency

Content presented in an inconsistent manner can negatively impacts all students. For the student with a disability, this negative impact is often amplified. The student who is blind and uses a screen reader benefits from consistent presentation throughout the semester. Consider hearing four different handouts each with a different sequence of information at the top of the page:

- ***Class, instructor, assignment name, due date.***
- ***Assignment name, due date, class, instructor***
- ***Instructor, assignment name, due date, class***

The student who is blind using a screen reader has the added burden of deciphering inconsistent presentation. The student using a screen reader must take more time to get through assignments. Students with learning or cognitive disabilities may not be able to overcome

this burden on their own. Students may need to meet more often with instructors, require additional academic assistant accommodation, and/or use additional tutoring services.

Recently a student with multiple cognitive and vision disabilities was failing a class and was very confused about the situation. The student was not able to correctly state the class he was in because content was delivered with a variety of class names and variations on assignment titles. Instructors using content in more than one class and listing all classes in the header can inadvertently cause confusion. Additionally, the student was confused about which assignment to do, when to hand it in and how to look up the grade because of the title variations. Disability Services (DS) was not made aware of the problem until several weeks into the semester. Disability Services (DS) was only seeing the handouts, and the student was getting content in class lectures, white board, handouts and Learning Management System (LMS). Following Universal Design for Learning (UDL) in each content delivery system could have prevented the confusion.

Course content presented in a predictable format throughout the semester allows the student to anticipate the structure. Content delivered with consistent headings, organizational structure and pattern of delivery saves precious time and allows for deeper learning. For content presented within an LMS, Web Content Accessibility Guidelines 2.0 (WCAG 2.0) provides guidelines for Meaningful Sequence (1.3.2), Consistent Navigation (3.2.3) and Consistent Identification (3.2.4). Providing these elements does not provide an advantage to the disabled student. Providing these elements makes it easier for every student to navigate and allows

assistive technology (AT) to deliver content to users more efficiently.

Conclusion

Students with disabilities are becoming uniquely independent as assistive technology (AT) advances and LMS are more widely used because they can manipulate the learning environment to meet their unique needs. Many students at the college level choose to not disclose their disability and are not seen by Disability Services (DS). Operating systems on computers are including free accessibility features such as magnification and text-to-speech software. Speech-to-text is improving and enabling students and instructors to compose documents without touching a keyboard. Braille keyboards with refreshable Braille displays make research on the internet more effective when the content is accessible. Transforming the learning environment is made easier with consistent and conscientious Universal Design for Learning (UDL) practices. Universal Design for Learning (UDL) is opening quality learning experiences to many students with and without disabilities. It is fair to be unequal when a student can create a learning environment to meet unique needs and level out barriers of disability.

Citations

[1]Weiss, Rick. "Twin Data Highlight Genetic Changes." Washington Post. The Washington Post, 05 July 2005. Web. 12 Nov. 2014.

[2]Rafferty, Maureen, M.A. (2014, August 27) Interview by Valorie Sundby. Arapahoe Community College. Disability Services Department, Littleton, CO, USA.

[3]Nelson, Brett. "Do You Read Fast Enough To Be Successful?" Forbes. Forbes Magazine, 12 June 2012. Web. 12 Nov. 2014.

Resources

http://ncam.wgbh.org/experience_learn/educational_media/stemdx/guidelines
http://www.w3.org/TR/UNDERSTANDING-WCAG20/content-structure-separation-sequence.html
http://www.w3.org/TR/UNDERSTANDING-WCAG20/consistent-behavior-consistent-locations.html
http://www.w3.org/TR/UNDERSTANDING-WCAG20/consistent-behavior-consistent-functionality.html

Valorie Sundby

Gail Essmaker, Ph.D.

Gail Essmaker is the Instructional Technologist at Lake Superior State University in Michigan, where she oversees diverse student and faculty e-training programs. She has a Master's degree in English and has taught and worked in online instruction for more than ten years. In 2012 she received her doctorate in Instructional Design for Online Learning from Capella University, with a research focus on universal design for online learning and its applicability for aging online learners. This continues to be her ongoing and current research focus.

Universal Design for Aging e-Learners: Accommodating Age-Related Functional Declines Lake Superior State University

Gail Essmaker, Ph.D.

Author Note

Gail M. Essmaker, Instructional Technology, Lake Superior State University, Sault Sainte Marie, Michigan, United States. This article is based upon the author's dissertation research completed in 2012 for Capella University, Minneapolis, Minnesota, United States, and entitled "How Designers-by-Assignment in Community Colleges Apply Universal Design Principles to Online Course Designs to Accommodate Aging Learners."

Abstract

This article offers a literature review to support the assertion that changing global demographics and a shifting global economic focus mandate a change in how online and technology-based learning environments should use Universal Design to accommodate the learning needs of aging learners. The literature review offers evidence from research in the fields of health and physiology, of human-computer interface development, and of education. The literature shows that the growing number of e-learners between the ages of 40 and 65 typically experience age-related declines in functionality that impact their abilities to succeed in the technology-based teaching settings of the workplace or tertiary education. Application of Universal Design (UD) principles, as defined in this article, could accommodate most of the age-related needs experienced by this large group of learners.

Universal Design for e-Learners: Accommodating Age-Related Functional Declines

Increasing numbers of learners are enrolling in e-learning courses for tertiary education as well as for professional development and training. This expansive trend necessitates instructional design for e-learning that meets the learning needs of an aging population. While many studies have emphasized the importance of using Universal Design for e-learning in order to accommodate the broadest range of learner needs within technology-based environments, research about the specific needs of this large group of learners is lacking. This article primarily serves as a literature review presenting research evidence from the fields of education, health and medicine, and human-computer interface to demonstrate there is an acute need for more research in this area. It is important for those designing online or technology-based learning environments to understand and address the age-related declining functionality faced by so many of the learners who will be enrolled in those courses, in order to ensure the successfulness of course enrollees and the achievement of actual instructional objectives.

The World Health Organization (2014) states the average life expectancy of the global population at birth in the year 2012 was 70 years, and "the global population aged 60 years could expect to live another 20 years on average in 2012." In conjunction with increased life expectancy, Stanford University's report on global demographics projects that "by 2050, the worldwide working-age population is projected to be 1.3 times the 2010 level, an increase from 4.5 billion to 5.9 billion" (Hayutin, A., 2010). People will remain longer in the workforce longer as well, requiring continuous

and ongoing education and training to keep their skills updated in an ever-changing global marketplace. What do these expected changes mean to educators and employers entrusted with the education and training of this vast and aging global workforce?

As noted in a recent OECD report, economies "depend upon a sufficient supply of high-skilled workers" and "rapid technological advances have been transforming the needs of the global labour market" (p. 74, Education at a Glance, 2013: …). Equipping workers for a more technologically advanced labor market requires equally advanced methods in training and education for those workers. The OECD charges, "The fundamental challenge is to understand how the nature of work is changing and to prepare as many workers as possible for the jobs of the future" (para. 8). In recognition of this change in the global marketplace, McKinsey and Company's research division points to how many organizations of every type are already delivering training and education over the Internet or via technology specific tools (Manyika, Lund, Auguste & Ramaswamy, 2012). Capper (2010) explains, "In addition to college and university courses and degree programs, some e-learning companies or institutions offer . . . courses only for corporations; some offer courses for individuals in career development and/or personal development; and many offer training in various management, finance and IT-related skills" (e-learning, p. 1). Capper references the Gartner Research Group's analysis of numerous Internet usage reports, the findings of which highlight expanding and "specific initiatives focused on distance learning and Internet-based education in all 25 of the world's most populous countries, and interest . . . growing in government, educational and commercial organizations worldwide." This report also remarks upon the

increasing number of governments now allocating resources and establishing standardized policies "to promote the use of e-learning for a variety of constituencies and purposes (Capper, p. 13). Many of these programs are aimed at the promotion of lifelong learning, knowing that lengthening lifespans will require ongoing education throughout the extended aging process (Capper, p. 13).

Pratap (2014) of CommLab India for Effective e-Learning cites the following sources in support of this same trend in a more global e-Learning focus:

- ***Global Industry Analysts, Inc., (GIA) says that corporate training is a $200 billion industry, where eLearning alone represents $56.2 billion, and this will grow to $107 billion by 2015.***
- ***Docebo reported that the worldwide market for self-paced eLearning reached $35.6 billion, in 2011. The five-year compound annual growth rate is estimated at around 7.6%. So, revenues in eLearning should reach around $51.5 billion by 2016.***
- ***The European Survey 2011 has released a statement, saying 51% of companies delivered at least one training session via eLearning to over 50% of their employees.***
- ***Enterprise Survey Results 2013 state that over 41.7% percent of global Fortune 500 companies now use some form of educational technology to instruct employees during formal learning hours, and that figure is only going to steadily increase in future years.***

What Does Universal Design Accomplish?

In designing instruction and training for online or technology-based environments, it is necessary to consider the functional needs

of all the prospective end-users. Universal Design for online learning is an approach to instructional design that empowers and enables all learners to participate and compete on a fair and level playing field. It is broadly defined as the structuring of design elements to accommodate the greatest number of users (Center for Universal Design, 2008). The endorsed definition of Universal Design (UD) is the "design of products and environments to be usable by all people to the greatest extent possible, without adaptation or specialized design" (Universal Design Alliance, 2011, "What is UD," para. 2). UD is applied in many fields, including architecture, product design and development, or technology, and it guides the development of spaces, tools, and products for equal and fair ease-of-use and accessibility for all people, regardless of disabilities or life conditions. As related specifically to instruction, there are two specific foci for UD:

> ***UDI / UID. Universal instructional design. Elias (2010) proposed eight UID principles for use in distance education. Six of those principles are especially applicable to this study, and are connected to UD principles that accommodate age-related needs in online course designs: equitable use, flexible use, simple and intuitive design, design using perceptible information, tolerance for error, and low physical and technical effort ("Eight UID principles").***
>
> ***UDL. Universal design for learning. Universal design of instruction that supports learning through the creation of "instructional goals, methods, materials, and assessments that work for everyone – not a single, one-size-fits-all solution but rather flexible approaches that can be***

customized and adjusted for individual needs" (Center for Applied Special Technology – CAST, 2011, "About UDL").

In the field of education, McGuire, Scott, and Shaw (2006) argue that it is more effective, as well as beneficial to learners, when designers and instructors proactively plan instruction that will accommodate the widely diverse needs of postsecondary learners, rather than providing accommodative tools to learners only after they have self-identified with specific needs (p. 125). Chaturvedi (2010) agrees, and also points out that "the goal of universal design is to remove obstacles through initial designs that take into consideration the diverse needs of individuals, instead of removing those obstacles and challenges at a later stage by individual adaptation" (pp. 4-5). Universal Design at its best, then, is intended to "meet the needs" of all users who might otherwise have some level of difficulty using that product or service (Weber, 2006).

In the field of educational technology, online training and instruction are most often delivered through a Course Management System (CMS), which comes 'packaged' with general accessibility features. However, many end-users and learners working within those CMS tools need additional support for optimal use of the system. Most CMS products provide options which can be activated to integrate with assistive technologies for users with disabilities, but it remains in the hands of course developers or instructor/designers to implement many of the design accommodations that would equalize the online learning environment and CMS instructional content deliveries for users faced with physiological or cognitive challenges. In addition, accessible or adaptable design differs from UD, in that the goal of UD is not specifically to meet the needs of users with disabilities, but rather to

design products that can be used easily by everyone to the greatest degree that is possible (Center for Universal Design, 2008). Any CMS course content using optimal UD should be flexible enough to allow users to function efficiently and effectively, regardless of assistive technologies; UD provides greater ease of use and accessibility for learners of all types and learners with widely diverse learning needs as well. Other "diverse" functional concerns are "accommodated," such as normal declines associated with aging. Universal Design of Instruction and Universal Instructional Design: UDI and UID

More specifically, Universal Design of Instruction (UDI) and Universal Instructional Design (UID) ensure that all elements of the instructional design are accessible and optimally usable by all students without accommodative measures being required for any students, but with no reduction in the academic rigor; thus, the design emphasis maximizes every student's ability to learn successfully. In comparison, Universal Design for Learning (UDL) clearly articulates the goal of achieving design that can be individually customized by the actual end-users to fit their own needs or preferences. Educators and instructional designers using all or any of these Universal Design approaches are agreed that the design of instruction should be optimally understandable to learners and fundamentally user-friendly for all learners.

In the first decade of the twenty-first century, educational researchers observed that postsecondary institutions were having problems "keeping pace" with the rapidly expanding diversity of learners (Berger & Van Thanh, 2004; Rose & Meyer, 2002). The initiative for universal instructional design (UID) and/or universal design for instruction (UDI) has increased in momentum as a means

to address this diversity among postsecondary learners, and it was recognized that early adopters of universal design could not only meet the needs of learners with disabilities, but also provide "an effective means for promoting better learning environments for all people, regardless of . . . individual characteristics (Berger & Van Thanh, 2004, p. 124). Elias (2010) recommends that eight of the UID / UDI principles conceived by Connell et al. in 1997 are appropriate for the distance learning environment, and can be tailored to suit the e-environment as follows:

1. **Equitable use:** ***The design is useful and accessible for people with diverse abilities and in diverse locations. The same means of use should be provided for all students, identically whenever possible or in an equivalent form when not.***
2. **Flexible use:** ***The learning design accommodates a wide range of individual abilities, preferences, schedules, and levels of connectivity. Provide the learners with choice in methods of use.***
3. **Simple and intuitive:** ***The course interface design is easy to understand, regardless of the user's experience, knowledge, language skills, technical skills, or current concentration level; it should eliminate unnecessary complexity.***
4. **Perceptible information:** ***The design communicates necessary information effectively to the user, regardless of ambient conditions or students' sensory abilities.***
5. **Tolerance for error:** ***The design minimizes hazards and adverse consequences of accidental or unintended actions.***

6. **Low physical and technical effort***: The design can be used efficiently and comfortably and with minimal physical and mental fatigue.*
7. **Community of learners and support***: The learning environment promotes interaction and communication among students and between students, faculty, and administrative services.*
8. **Instructional climate***: Instructor comments and feedback are welcoming and inclusive. High expectations are espoused for all students.*

Elias (2010) also reminds online course designers that the applications of these UID / UDI principles result in end-products and e-environments for learning that will best "meet the needs of potential users with a wide variety of characteristics" (para. 3). The principles of UID / UDI emphasize equitable design of courses to ensure that every type of learner with every represented level of skill or ability is provided with tools, support, and a learning environment through which they are comfortably capable of achieving success.

Universal Design for Learning: UDL

Closely related to UDI / UID, the focus of UDL specifically emphasizes the design of learning constructs that include curricula, instructional environments, and the use of instructional technologies. As online learning gained acceptance and proliferated in higher education during the early 21st century, educators and instructional designers for online learning strongly championed the concepts for UDL. Bernacchio and Mullen (2007) explain UDL as an overall educational focus "provides guidance for creating flexible curricula and instructional environments, and for using technology

to maximize success for all students, including those with . . . disabilities" (p. 167). The emphases on the importance of instructional technology integration and on the development of productive instructional environments within UDL blend well with the objective of instructional design for online learning to facilitate successful learning. For online instructional designs in particular, UDL includes: simple and straightforward presentation of instructional material and navigations in a CMS that will not overtax the skills of learners; the effective use of ambient learning conditions and modalities within the CMS; a systemic tolerance for error that anticipates the widely varied technology skill levels of the learners; and low levels of requirements for physical effort to ensure that learners can focus attention as much as possible on learning content and performing learning activities rather than on the physical operations within the CMS (p. 168). Hence, for online learning environments UDL is a two-sided task involving not only the equitable design of instruction, but also the equitable design of the CMS tool being used for instructional delivery. Guptill (2011) points out that instructional designers working more specifically to develop equitable UDL for educational deliveries are tasked with:

> ***drawing on the latest brain research, multimedia technology, and assistive technology . . . [to provide learners with] a wide variety of options for accessing, using, and engaging with learning materials to reduce barriers for learners with disabilities but also increase opportunity for all learners based on the individual strengths and needs of every student. (p. 30)***

The myriads of technology tools available for use within a CMS must therefore be selected with close attention to UDL principles, ensuring every learner of barrier-free instruction.

As defined by the Center for Applied Special Technology, CAST, (2011), "UDL provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone – not a single, one-size-fits-all solution but rather flexible approaches that can be customized and adjusted for individual needs" ("What is Universal Design," para. 2). CAST researchers Rose and Meyer (2002) helped lay the foundations in the seminal research for UDL, and they predict:

> ***Tools and media will always be essential for successful implementation of UDL [but] . . . in our view, another approach represents the future of curriculum design. This is generating curricula with built-in flexibility that inherently accommodates diverse learners. Such curricula require designers to consider from the outset the varied learners that might use it and the potential instructional approaches that teachers might take. (Chapter 6, "Glimpsing the future," para. 2)***

In the promotion and implementation of UDL, Rose and Meyer argue that "to be practical on a larger scale, UDL requires systemic changes in the following key arenas: policy, curriculum design, teacher training and preparation, [and] consensus building" (Chapter 8, "Key ideas").In advocating for change, these authors challenge course developers and designers to specify UDL requirements for greater flexibility in learning materials and tools in support of efforts to "reduce or eliminate many barriers to learning," and in doing so, to "provide all students with opportunities for success" (Chapter 8, "Working for large scale change," paras. 13, 16). While a central aim of CAST is to eliminate learning barriers for the disabled, it is also expected that achieving that goal will be in the best interest of all diverse types of learners. Indeed,

purposefully designing instruction in advance to accommodate greatly diverse learning needs not only ensures equity for learners with disabilities, but also for *all* learners, including those over the age of 40 confronted with challenges in the online learning environment stemming from normal declines of aging, which are discussed in more detail in the next section of this article.

Looking specifically at aging as an issue of concern for instructional design, Rivera Nivar (2009) attempted to identify e-learning guidelines for the use of UD principles that accommodate age-related needs, pointing to "an imminent necessity to understand the influencing factors of aging in relation to the design of learning interfaces" (p. 5). The experimental study's participants were younger learners aged 25-35 and older learners aged 55-65, and sought information to determine UD guidelines that would be suitable for both age extremes of learners. The findings of this specific study indicate that multi-age and user-friendly online learning designs would be difficult to construct, due to the wide variations in learning needs (p. 103). However, these findings do not negate the ethical and professional responsibility of instructional designers in online learning to devise and design instruction that reduces or removes barriers to learning for online learners over the age of 40.

Age-Related Changes and Age-Related Learning Needs

The age-related physiological and cognitive challenges faced by learners over the age of 40 are a salient concern for instructional designers in online learning environments. The age-specific needs of this large learner population present a challenge for content and course designers; however, application of Universal Design (UD) principles, which should be "usable by all people, to the greatest

extent possible, without adaptation or specialized design" (Universal Design Alliance, 2011, "What is universal design," para. 2), could accommodate most of the age-related needs of this large group of learners.

Age-related declines often occur in adults progressively over time, at varying rates, and frequently on multiple fronts at the same time. The recognition of those declines may even be unrealized or unacknowledged by the learners themselves. Yet for many learners over the age of 40, declining physiological and cognitive abilities affect their vision and resultant reading speed (Humes et al., 2007), their mouse-movement speed and accuracy (Bellis & Wilber, 2001; Oetjen & Ziefle, 2007), and their cognitive speed for processing information (Light et al., 2006; Luo & Craik, 2008). Designing CMS-delivered online courses to accommodate gradually diminishing visual or auditory acuity, gradual reductions in cognitive processing speed, or gradual slow-downs of task-switching speed with a mouse requires awareness on the part of instructional designers or other course developers that may precede the awareness of the learner for whom it is being designed. Nevertheless, this problem presents a disadvantage to online learners over the age of 40 when their coursework and participation are measured alongside that of learners under the age of 40.

A large body of evidence in the literature from the physiological sciences and HCI reveals just how widely varied the physiological and cognitive declines that begin around the age of 40 can be (Bellis & Wilber, 2001; A. Crow, 2000; Fridriksson, Morrow, Moser, & Baylis, 2006; Helmuth, 2002; Mallo, Nordstrom, Bartels, & Traxler, 2007; Oetjen& Ziefle, 2007; Kray & Lindenberger, 2000; Parkin, Walter, & Hunkin, 1995; Salthouse & Somberg, 1982; Schaie, 1996; Souza &

Boike, 2006; Vaughan & Letowski, 1997). For learners over the age of 40 working within the online or technology-based learning environment, the application of UD principles to online courses would have to include design adjustments in consideration of age-related challenges like declining visual acuity (Humes et al., 2007), decreased speed in navigation and typing (McMahan & Sturz, 2006; Smith et al., 1999), and slower cognitive processing speed (Buchler et al., 2008; Kray & Lindenberger, 2000; Mallo et al., 2007). As applied in this article, the relevant terms connected to typical age-related declines are defined as:

Age-related cognitive declines. **This study defines age-related cognitive declines as those normal slow-downs in cognitive processing speed that would affect learners' functioning in an online course. Such declines are identified in this study as those that occur gradually over time and typically begin around the age of 40. Luo and Craik (2008) explain that the normal process of aging "is accompanied by a general reduction in [cognitive] processing speed that in turn leads to declines in a broad range of cognitive functions" after the age of 40 (p. 347). The specific cognitive declines related to this study impact learners' function for reading and understanding the highly text-based content in online courses (Fridriksson et al., 2006; Humes et al., 2007; Oetjen & Ziefle, 2007).**

Age-related physiological declines. **This study defines age-related physiological declines as those slow-downs occurring slowly over time and beginning around age 40 that affect visual acuity, auditory acuity, and motor skill speed. Specifically, visual and auditory acuity is necessary to function in online courses for working with text-based content, audio files, and audio- and audio-visual materials, but these senses both begin to decline around age**

40 (Charness & Dijkstra, 1999; Humes et al., 2007; Vaughan & Letowski, 1997). Motor skill speed also begins to decline around 40 and can affect online learners' ability to use a mouse accurately or move through timed tasks efficiently (Kray & Lindenberger, 2000; Light et al., 2006; Smith et al., 1999).

Cognitive aging. **This study uses the term cognitive aging to describe the predictable and expected decline in abilities to perform cognitive tasks that require effortful processing and occur slowly over time as a part of the natural aging process. In the simplest models of cognitive aging, "aging is assumed to affect structures and processes both in the brain and regarding cognition" (Cabeza, Nyberg, & Park, 2005, p. 3).**

Visuomotor functioning. **This term as used in this study refers to coordination of physical motor activity that is dependent on visual input (Bellis & Wilber, 2001). For online learners, visuomotor functioning is required for any learning activity that requires hand-eye coordination, such as scrolling through text, opening files, or any tasks involving mouse movements. The cognitive processes required for visuomotor functioning are specifically known to begin to be in decline "between the ages of 40 and 55 years" (Bellis & Wilber, 2001, p. 260), and that is the age of concern for this study, specifically in regard to that age group of learners community college online learning environment.**

As a general practice, many course designers do not typically consider age-related needs when developing course content or structure. Schaie (2008) specifically charges that age-related declines not are not yet recognized as legitimate needs, and argues that "normative age-related declines in aspects of perception, cognition, and psychomotor ability. . . [and] appropriate sensitivity

to those changes should lead people to design technology artifacts that can be used effectively and comfortably by older users," but this has not yet been the case (pp. 183-184). Other researchers argue that UD or universal usability is not achievable at present because designers do not as yet have a means for addressing the "wide variances" of physiological, visual, and cognitive levels, as well as of user knowledge, among users of technology (Vanderheiden, 2000, p. 32). While UD is reported to be followed by many producers and purchasers of CMS environments, Schaie (2008) notes that "adoption of best practices still appears to have a significant lag," especially in designs to address usability factors stemming from normal age-related declines (p. 183).

It is all the more important, then, for instructional designers to understand more fully that the physiological challenges faced by this cohort of adult learners can affect their ability to interact effectively with any online design element requiring visual or fine-motor interaction (Bellis & Wilber, 2001; Humes et al., 2007). For example, a default setting for text-based content in a timed test in a CMS typically appears in a size 12 font, which does not facilitate easy reading for learners over the age of 40. In addition, cognitive processing speeds are slower for learners over age 40, and this slower processing speed is further complicated by the effort needed to focus on the smaller font of the text. Yet the time restrictions for online tests are not usually adjusted for learners over age 40 to provide longer time for reading that text or for processing the information presented in the text. As yet another example, at age 50, people are generally "1.5 times slower [when responding to stimuli] . . . than at the age of twenty" (A. Crow, 2000, "What's older," para. 1); therefore, the speed with which the 40-and-older

learner processes information is slower than younger students, which may have a significant impact on this older cohort's information processing capabilities and subsequent learning performances in online classes (A. Crow, 2000; Schaie, 1996, pp. 271-272). Moreover, because many online learners over the age of 40 are less familiar than younger learners with CMS-delivered instruction (A. Crow, 2000; Keller, 2006; Tyler-Smith, 2006), they face an increased external cognitive load effect created by the necessity to focus their attention on their own sensory, motor, or cognitive processes while working in online courses (Brünken, Plass, & Leutner, 2003). For online learners over the age of 40, unfamiliarity with online CMS-delivered learning can increase learners' cognitive load. Subsequently, increased cognitive load created by the inherent navigational demands in an online CMS-delivered learning environment can therefore add to the known challenges to effective learning caused by age-related physiological and cognitive declines.

Online learners over the age of 40 often contend with a wide variety of specific physiological age-related changes that challenge their abilities to function in an online learning environment, only one of which includes unfamiliarity with the CMS environment. Kalyuga (2006) notes that in e-learning settings, "learner physical activity within interactive settings may not necessarily translate into required cognitive processes. Instead, it may impose additional processing demands on learner cognitive resources," including those required for sensory and motor focus (p. 387). For online learners over the age of 40, this risk is greater than it is for younger learners, because their visual acuity is declining (Oetjen & Ziefle, 2007) and their responses to visual stimuli and task-switching demands are

typically slowing down (Kray & Lindenberger, 2000; Parkin et al., 1995; Salthouse & Somberg, 1982).

In summary, those who design online courses for adult learners have a demographic imperative to address the learning needs resulting from the physiological and cognitive declines known to begin affecting individuals once they reach the age of 40. These include sensory declines, most notably in vision and hearing; motor declines, particularly in response time to stimuli; cognitive declines, which typically affect the speed with which information is learned or communicated. Each of these areas is further explained in the next sections of this article.

Sensory Declines

Normal visual declines caused by aging are known to affect users' interactions with information delivered via computer screens, and the response speed and accuracy of people in their 40's and 50's is less than that of people in their 20's (Oetjen & Ziefle, 2007). Research by Bellis and Wilber (2001) demonstrates that age-related declines in responses to visual prompts typically begin at age 40, and these sensory declines will in turn impact response times to interactive navigations within a CMS-delivered online course. Fridriksson et al. (2006) report that additional functional declines related to changes in vision have been found to begin around the age of 40; these declines affect working memory, selective responses to stimuli, and task switching (Kray & Lindenberger, 2000; Parkin et al., 1995; Salthouse & Somberg, 1982). As explained by Fridriksson et al., these declining abilities may have a directly negative effect upon any tasks related to language processing, which includes text-based or audio deliveries of content

in online courses. When learners over the age of 40 expend attentional visual focus in the working memory to process the *design* elements within their online courses, extraneous cognitive load is increased and they are less able to focus working memory capacity on the *content*, which is connected to intrinsic cognitive load and learning.

The declines in vision that begin around the age of 40 have a marked effect on task performances in online environments. Research by Bellis and Wilber (2001) investigated the effects of age and gender on visuomotor functioning across the lifespan. Their findings show that "visuomotor interhemispheric transfer time tasks, decrease relatively early in the adult life span (i.e., between the ages of 40 and 55 years) and show no further decrease thereafter" (Abstract). Visual declines can also directly affect cognitive processing speeds, as shown by Fridriksson et al. (2006). When studying response times to visual stimuli presented via computer screens among people ranging in age from 20 to 82, these researchers found that the simple language-based task of assigning a word-name to an image required more focused cortical activity among older participants than younger participants (Abstract). Precise age groupings for effects were not cited by the authors. In a study that does break down effects by age groupings, research by Oetjen and Ziefle (2007) for age effects on electronic reading tasks shows that middle aged LCD text readers were more negatively affected than younger adults by the viewing angle of the screen, resulting in "a larger decrease in discrimination time" for those over 40 compared to younger participants (p. 623). Based on this evidence, online learners over the age of 40 will typically experience slowdowns when translating what is visually seen on the screen into

the performative actions required for navigation within their online courses.

The growth of the e-learning industry is paralleled by increased developments of multimedia applications that are quickly adopted for use in online course designs. Calandra, Barron, and Thompson-Sellers (2008) remark that as increased bandwidth options and streaming media become more user-friendly for online learning environments, the inclusion of audio content is also increasing. This outgrowth is supported by Mayer's theory of multimedia learning (2001), which suggests that well-structured content combining both video and audio can enhance learners' focus in the working memory. Calandra et al. investigated current uses of audio in online instruction, finding that its most frequent uses include narration, music, and sound effects; in addition, it was found that full or partial audio narrative is commonly used in support of text presentation (p. 595). This expanding use of audio content in online course design may present problems to those learners over the age of 40, who may be experiencing declines in hearing or in auditory processing abilities.

Multimedia and Web-based conferencing tools are also being used more frequently as a proactive means for facilitating learners' perceptions of immediacy and accessibility within the online environment, and these may also be problematic for learners with age-related declines in hearing. Student satisfaction and performance in online courses is typically increased when students perceive their instructors as more accessible. According to Schutt, Allen, and Laumakis (2009), verbal immediacy and social presence can be enhanced in online courses through the use of video and audio conferencing tools, which "allow . . . distance education

instructors to employ many of the verbal immediacy behaviors that previously cited research has found to be positively correlated with cognitive and affective learning outcomes" (p. 137). However, those positive impacts would be reduced for online learners with hearing problems.

Age-related hearing declines can begin any time after the age of twenty. Researchers Souza and Boike (2006) investigated the variable of age in relation to hearing-based performance, and discovered that "the age difference was apparent even for listeners in their 40s and 50s, relative to listeners in their 20s and 30s" (p. 146). They go on to explain that "age was a significant predictor of performance with a decrease in performance of about 2.5% per decade of age . . . [and] the ability to obtain voicing information decreased with increasing age" (p. 146). Therefore, even though online learners over the age of 40 may not be aware their hearing is less precise than the hearing of their younger classmates, the age-related declines they experience may still have an impact upon any learning performance connected to course content with audio elements. The age-related declines may be generally unnoticed by learners over the age of 40, but still affect learning effectiveness if the instructional design for the audio content deliveries is not appropriately age-sensitive.

While some learners may be aware of various physiological declines as they reach the age of 40 and above, fewer are likely to be aware of the changes occurring slowly over time to their hearing. It is needful that course designers use age-sensitive design for audio components of online courses, even if the learners themselves are unaware of the need for those age-sensitive accommodations.

Motor Declines

Motor declines associated with normal aging can be significant for non-traditional learners over the age of 40 working on an online learning environment, as any declines will impact their ability to use a mouse and keyboard and affect their response times. Workplace studies have determined that normal aging processes affect the performances of workers on computer-based tasks. Workers in their 40's perform more slowly on a broad range of computer tasks, and "made more errors and took longer to respond to computer interactive tasks than did younger participants" in workplace studies (Mallo et al., 2007, para. 3). Computer-based task difficulty level also impacts people in their 40's more than it does for people in their 20's. Specifically, performance studies investigating mouse movements among computer users indicate "age-related declines in motor control are related to age differences in mouse performance," especially evident in "clicking and double-clicking tasks, as evidenced by longer movement times, more submovements, and more errors" as the ages of the study participants increased (Smith et al., 1999, Discussion section). It is indicated that as motor skill declines in this age cohort, the increased extraneous cognitive load effects will result in slower response times and/or incorrect responses in online tasks.

Cognitive Declines

Added to the difficulties caused by physiological declines associated with normal aging, many learners in the 40-55 age cohort also begin to experience cognitive slowdowns that may impact their performances on online tasks. In computer-based tasks, adults in their late teens through their early thirties "experienced a 26% decline in performance from single- to dual-task processing. Older adults [over the age of 65] . . . experienced a 55% decline in

performance" (Batsakes & Fisk, 2000, "Summary of dual-task," para. 1). Therefore, at some point between their 20's and 60's, a decline of about 29% is progressively taking place in task processing and performance. This conclusion is supported by additional evidence from the field of brain research, as cited by Helmuth (2002):

> ***The dorsolateral prefrontal cortex shrinks by about 5% per decade between the ages of 20 and 80. The hippocampus, a part of the brain crucial for memory, holds its own until middle age. But after age 45 or so, it loses about 7% of its volume per decade. ("March of time," para. 2)***

These findings suggest that declines in cognitive task processing abilities are occurring in adults over time between their mid-thirties and mid-sixties. While much research demonstrates that age-related effects in cognitive function exist and cognitive processing abilities are significantly slower for adults over 60 compared to adults under 40 (Bopp & Verhaeghen, 2007; Buchler et al., 2008; J. E. Fisk & Warr, 1998; Light et al., 2006; Luo & Craik, 2008; Salthouse & Meinz, 1995), little research has been done to specifically test the age group between 40 and 65 – the cohort in which these gradual declines are occurring. Further research is needed within the field of education to determine how much impact normal aging declines may have upon the cognitive functionality of adult online learners over the age of 40.

Although educational research is lacking in this area, in the broader field of human-computer interaction (HCI), a great many studies have focused on age as a dichotomous concept of comparison: participants in these studies are typically the very young and the very old (Hickman, Rogers, & Fisk, 2007; Jamieson & Rogers, 2000; Pak, Rogers, & Fisk, 2006; Stronge, Rogers, & Fisk,

2006). The Center for Research and Education on Aging and Technology Enhancement (CREATE, 2010a) is actively engaged in ongoing research aimed at measuring and assessing aging effects that impact user performance in Web-based settings, but the majority of that research is explicitly directed at so-called elderly users over the age of sixty-five. The specific partitioning of young and old subjects has allowed researchers to compare one group to another very clearly, thus providing a measure for effects that are evidenced by older persons; however, there is less research related to transitional aging processes that affect technology users as they are passing between the lifespan stages of youth and old age. Researchers are only beginning to investigate relevant issues of design for users who are between the ages of 40 and 65.

In addition to the elements of design that impact elderly end-users of technology, another area of interest to HCI researchers is multimedia-based instructional environments, which are also frequently "multimodal" environments. Multimedia refers to the various media-based tools within the Web-based environment, while multimodal refers to the simultaneous verbal and visuospatial processing of information and content by humans that occurs during their interactions with the media or content. The multimedia tools may require interactions in visual modes, auditory modes, motor-skill modes, or perceptual and cognitive modes, and more often than not they demand interactions in multiple modes at one time.

Obrenovic, Abascal, and Starcevic (2007) define multimodal interaction as "a characteristic of everyday human discourse, in which we speak, shift eye gaze, gesture, and move in an effective flow of communication," and explain that incorporating these natural human behaviors into the design for a Web-based

environment "is the primary task of [effective design for] multimodal user interfaces" (p. 1). In a CMS delivered course, those who develop and design the online courses are tasked with providing effective applications of the media-based tools of the environment, as well as with ensuring optimal usability for all users in every required physiological and cognitive interaction. Obrenovic et al. argue that clearer design focus on anticipated multimodal interfaces will result in more accessible UD. Designing in advance for all expected user needs, including age-specific needs, is a challenge for all those who develop and design online courses. Anticipated difficulties among diverse learners include their physiological, cognitive, and social abilities. Multimedia content in online courses can present accessibility issues on many levels for learners over the age of 40. As explained by Obrenovic et al., any "limited abilities of a user can be viewed as a break or decrease" in the effectiveness of the human-computer interaction (p. 2). The type of multimedia in use establishes the various demands of modalities for interactions, most of which are impacted by age-related declines, as shown in Table 2.

Table 2. ***Age-Related Multimedia Modality Issues for Online Learners Over 40***

Type of Multimedia	Modalities Affected by Age-Related Declines
Instructional design using text only	• Vision • Motor (scrolling) • Perception • Cognition
Instructional design using text with audio	• Vision • Auditory

	• **Motor (scrolling)** • **Perception** • **Cognition**
Instructional design using video with audio	• **Vision** • **Auditory** • **Perception** • **Cognition**
Instructional design using text and requiring interactive mouse movement	• **Vision** • **Motor** • **Perception** • **Cognition**
Instructional design using advanced simulations for active learning	• **Vision** • **Auditory** • **Motor (scrolling)** • **Perception** • **Cognition**

Note. **Adapted from "Universal Accessibility as a Multimodal Design Issue," by Z. Obrenovic, J. Abascal, and D. Starcevic, 2007, *Communications of the ACM, 50*(5), p. 2.**

Obrenovic et al. (2007) observe that it is now more important than ever to design highly "flexible and reusable solutions" to address a wider range of settings and needs, and to "provide solutions for different levels of availability of specific effects. In this way it is possible to create adaptable solutions which adjust to user features, states, preferences, and environmental characteristics" (p. 9). Before that goal can be reached, however, more research is needed to determine how course designers can use Universal Design principles to accommodate factors that affect success within the online learning environment, such as age-related declines.

Conclusion

Additional research is needed to investigate more fully the needs of the so-called middle-aged end-users and how they can work most successfully in online or technology-based learning environments. Research thus far has predominantly focused on age-effects and technology usability has already focused much attention on how graphic design in computer interfaces specifically impacts the self-efficacy and extraneous cognitive load for those over the age of 65 (Curran & Robinson, 2007; Humes et al., 2007; Strickler & Neafsey, 2002). The CREATE institute was established "to ensure that the benefits of technology can be realized by older adults to support and enhance the independence, productivity, health, safety, social connectedness and quality of life of older people" (2010a, "CREATE Overview," para. 1). Research performed by CREATE team members has brought to light numerous issues affecting older people's use of computer-based technologies. However, research continues to be lacking on the usability factors for people between the ages of 40 and 65 who are not considered to be members of the "elderly" culture. This important group is still actively participating in the global marketplace, and are participating in lifelong learning as a part of workplace training, tertiary education for advanced degrees, and skill sets needed to function in a strongly technology-based global economy.

Governments are aware that with increased life expectancy, people will remain longer in the workforce longer and will need continuous and ongoing education and training to keep their skills updated. Equipping workers for a more technologically advanced labor market requires equally advanced methods in training and education for those workers, and Universal Design for e-learning

that accommodates age-related learning needs must become a part of that process.

References

Batsakes, P. J., & Fisk, A. D. (2000). Age-related differences in dual-task visual search: Are performance gains retained? The Journals of Gerontology, 55B(6), 332-342. doi:10.1093/geronb/55.6.P332

Bellis, T. J., & Wilber, L. A. (2001). Effects of aging and gender on interhemispheric function. Journal of Speech, Language, and Hearing Research, 44(2), 246-263. doi:10.1044/1092-4388(2001/021)

Berger, J. B., & van Thanh, D. (2004). Leading organizations for universal design. Equity & Excellence in Education, 37(2), 124-134. doi:10.1080/10665680490453959

Bernacchio, C., & Mullen, M. (2007). Universal design for learning. Psychiatric Rehabilitation Journal, 31(2), 167-169. doi:10.2975/31.2.2007.167.169

Bopp, K. L., & Verhaeghen, P. (2007). Age-related differences in control processes in verbal and visuospatial working memory: Storage, transformation, supervision, and coordination. The Journals of Gerontology, 62B(5), 239-246. Retrieved from http://psychsocgerontology.oxfordjournals.org/

Brünken, R., Plass, J. L., & Leutner, D. (2003). Direct measurement of cognitive load in multimedia learning. Educational Psychologist, 38(1), 53-61. doi:10.1207/S15326985EP3801_7

Buchler, N. G., Hoyer, W. J., & Cerella, J. (2008). Rules and more rules: The effects of multiple tasks, extensive training, and aging on task-switching performance.

Memory & Cognition, 36(4), 735-748. doi:10.3758/MC.36.4.735

Cabeza, R., Nyberg, L., & Park, D. C. (2005). Cognitive neuroscience of aging: Emergence of a new discipline. In R. Cabeza, L. Nyberg, & D. C. Park (Eds.), Cognitive neuroscience of aging: Linking cognitive and cerebral aging (pp. 3-15). New York, NY: Oxford University Press.

Calandra, B., Barron, A. E., & Thompson-Sellers, I. (2008). Audio use in e-learning: What, why, when, and how? International Journal on ELearning, 7(4), 589-601. Retrieved from http://www.aace.org/pubs/ijel/

Capper J. (2010). E-learning growth and promise for the developing world. Retrieved from http:/ /www.techknowlogia.org.

Charness, N., & Dijkstra, K. (1999). Age, luminance, and print legibility in homes, offices, and public places. Human Factors, 41(2), 173-173. doi:10.1518/001872099779591204

Center for Applied Special Technology. (2011). What is universal design for learning (UDL)? Retrieved from http://www.cast.org/

Center for Universal Design. (2008). Federal legislation. Retrieved from http://www.ncsu.edu/ www/ncsu/design/sod5/cud/about_ud/about_ud.htm

Chaturvedi, A. (2010). Universal design for instruction for students with disabilities at the postsecondary level. (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (3421028)

Connell, B., Jones, M., Mace, R., Mueller, J., Mullick, A., & Ostroff, E. (1997). The principles of universal design. Retrieved from http://www.ncsu.edu/project/ design-projects/udi/

Crow, A. (2000).What's age got to do with it? Teaching older students in computer-aided classrooms. Teaching English in the Two Year College, 27(4), 400. Retrieved from http://www.ncte.org/journals/tetyc/issues

Curran, C., & Robinson, D. (2007). An investigation into Web content accessibility guideline conformance for an aging population. International Journal on ELearning, 6(3), 333-349. Retrieved from http://www.aace.org/pubs/ijel/

Elias, T. (2010). Universal design principles for Moodle. The International Review of Research in Open and Distance Learning, 11(2). Retrieved from http://www.irrodl.org/index.php/ irrodl/article/view/869/1575

Fisk, J. E., & Warr, P. B. (1998). Associative learning and short-term forgetting as a function of age, perceptual speed, and central executive functioning. The Journals of Gerontology, 53B(2), 112-121. doi:10.1093/geronb/53B.2.P112

Fridriksson, J., Morrow, K. L., Moser, D., & Baylis, G. C. (2006). Age-related variability in cortical activity during language processing. Journal of Speech, Language, and Hearing Research, 49(4), 690-697. doi:10.1044/1092-4388(2006/050)

Guptill, A. (2011). Universal design for online learning: A conceptual model. (Doctoral Dissertation). Retrieved from ProQuest Dissertations and Theses. (3443809)

Hayutin, A. (2010). Population age shifts will reshape global workforce. Retrieved from http://longevity3.stanford.edu/global-demographics/

Helmuth, L. (2002). A generation gap in brain activity. Science, 296(5576), 2131-2133. doi:10.1126/science.296.5576.2131

Hickman, J. M., Rogers, W. A., & Fisk, A. D. (2007). Training older adults to use new technology. The Journals of Gerontology, 62B(10795014), 77-84. Retrieved from http://psychsocgerontology.oxfordjournals.org/

Humes, L. E., Burk, M. H., Coughlin, M. P., Busey, T. A., & Strauser, L. E. (2007). Auditory speech recognition and visual text recognition in younger and older adults: Similarities and differences between modalities and the effects of presentation rate. Journal of Speech, Language, and Hearing Research, 50(2), 283-303. doi:10.1044/1092-4388(2007/021)

Jamieson, B. A., & Rogers, W. A. (2000). Age-related effects of blocked and random practice schedules on learning a new technology. The Journals of Gerontology, 55B(6), 343-353. doi:10.1093/geronb/55.6.P343

Kalyuga, S. (2006). Instructing and testing advanced learners: A cognitive load approach. Commack, NY: Nova Science.

Keller, C. A. (2006). Baby boomers as adult learners of computer applications in higher education: A case

study. (Doctoral Dissertation). Retrieved from ProQuest Dissertations and Theses. (3216201)

Kray, J., & Lindenberger, U. (2000). Adult age differences in task switching.

Psychology and Aging, 15(1), 126-147. doi:10.1037/0882-

7974.15.1.126

Light, L. L., Chung, C., Pendergrass, R., & Van Ocker, J. C. (2006). Effects of repetition and response deadline on item recognition in young and older adults. Memory & Cognition, 34(2), 335-343. doi:10.3758/BF03193411

Luo, L., & Craik, F. (2008). Aging and memory: A cognitive approach. Canadian Journal of Psychiatry, 53(6), 346-353. Retrieved from http://publications.cpa-apc.org/browse/sections/0

Mallo, J., Nordstrom, C., Bartels, L., & Traxler, A. (2007). Electronic performance monitoring: The effect of age and task difficulty. Performance Improvement Quarterly, 20(1), 49-63. doi:10.1111/j.1937-8327.2007.tb00431.x

Manyika, J., Lund, S., Auguste, B., & Ramaswamy, S. (2012). Help wanted: The future of work in advanced economies. Retrieved from http://www.mckinsey.com/insights/employment_and_growth/future_of_work_in_advanced_economies

Mayer, R. E. (2001). Multimedia learning. New York, NY: Cambridge University Press.

McMahan, S., & Sturz, D. (2006). Implications for an aging workforce. Journal of Education for Business, 82(1), 50-55. doi:10.3200/JOEB.82.1.50-55

McGuire, J. M., Scott, S. S., & Shaw, S. F. (2006). Universal design and its application in educational environments. Remedial and Special Education, 27, 166-175. doi:10.1177/07419325060270030501

Obrenovic, Z., Abascal, J., & Starcevic, D. (May, 2007). Universal accessibility as a multimodal design issue. Communications of the ACM, 50(5), 83-88. doi:10.1145/1230819.1241668

OECD (2013), Education at a Glance 2013: OECD Indicators, OECD Publishing. http://dx.doi.org/10.1787/eag-2013-en

Oetjen, S., & Ziefle, M. (2007). The effects of LCD anisotropy on the visual performance of users of different ages. Human Factors, 49(4), 619-627. doi:10.1518/001872007X215692

Pak, R., Rogers, W. A., & Fisk, A. D. (2006). Spatial ability subfactors and their influences on a computer-based information search task. Human Factors, 48(1), 154-165. doi:10.1518/001872006776412180

Parkin, A. J., Walter, B. M., & Hunkin, N. M. (1995). Relationships between normal aging, frontal lobe function, and memory for temporal and spatial information. Neuropsychology, 9(3). 304-312. doi:10.1037/0894-4105.9.3.304

Pratap, D. (2014). Ten surprising statistics about e-learning. Retrieved from http://blog.commlabindia.com/elearning-design/statistics-about-elearning

Rivera Nivar, M. (2009). Development of universal design guidelines for e-learning and e-training. (Master's Thesis). Retrieved from ProQuest Dissertations (1468700)

Rose, D. H., & Meyer, A. (2002). Teaching every student in the digital age: Universal design for learning. Alexandria, VA: ASCD. Retrieved from http://www.cast.org/teachingeverystudent/ideas/tes/

Salthouse, T. A., & Meinz, E. J. (1995). Aging, inhibition, working memory, and speed. The Journals of Gerontology, 50(10795014), 297-306. doi:10.1093/geronb/50B.6.P297

Salthouse, T. A., & Somberg, B. L. (1982). Time-accuracy relationships in young and old adults. Journal of Gerontology, 37(3). 349-353. Retrieved from http://geronj. oxfordjournals.org/content/37/3/349.full.pdf+html

Schaie, K. W. (1996). Intellectual development in adulthood. In J. E. Birren and K. Warner (Eds.), Handbook of the psychology of aging (pp. 266-286). San Diego, CA: Academic.

Schaie, K. W. (2008). Social structures and aging individuals. New York, NY: Springer.

Schutt, M., Allen, B. S., & Laumakis, M. A. (2009). The effects of instructor immediacy behaviors in online learning environments. Quarterly Review of Distance Education, 10(2), 135-148, 249, 251. Retrieved from http://www.eric.ed.gov/ERICWebPortal/search/detailmi

ni.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=EJ864049&ERICExtSearch_SearchType_0=no&accno=EJ864049

Souza, P. E., & Boike, K. T. (2006). Combining temporal-envelope cues across channels: Effects of age and hearing loss. Journal of Speech, Language, and Hearing Research, 49(1), 138-49. Retrieved from http://jslhr.asha.org/

Strickler, Z., & Neafsey, P. (2002). Visual design of interactive software for older adults: Preventing drug interactions in older adults. Visible Language, 36(1), 4-4-28. Retrieved from http://visiblelanguagejournal.com/

Stronge, A. J., Rogers, W. A. & Fisk, A. D. (2006). Web-based information search and retrieval: Effects of strategy use and age on search success. Human Factors, 48(3), 434-446. doi:10.1518/001872006778606804

Tyler-Smith, K. (2006). Early attrition among first time e-learners: A review of factors that contribute to drop-out, withdrawal, and non-completion rates of adult learners undertaking e-learning programmes. Journal of Online Learning and Teaching, 2(2). Retrieved from http://jolt.merlot.org/vol2no2/tyler-smith.htm

Universal Design Alliance. (2011). What is universal design? Retrieved from http://www.universaldesign.org/universaldesign1.htm

Vanderheiden, G. (2000). Fundamental principles and priority setting for universal usability. Proceedings on the ACM 2000 Conference on Universal Usability, USA. 32-37. doi:10.1145/355460.355469

Vaughan, N. E., & Letowski, T. (1997). Effects of age, speech rate, and type of test on temporal auditory processing. Journal of Speech, Language, and Hearing Research, 40(5), 1192-1200. Retrieved from http://jslhr.asha.org/

Weber, H. (2006). Providing access to the internet for people with disabilities: Short and medium term research demands. Theoretical Issues in Ergonomics Science, 7(5), 491-498. doi: 10.1080/14639220500077387

World Health Organization. (2014). Global Health Observatory: Life expectancy. Retrieved from http://www.who.int/gho/mortality_burden_disease/life_tables/en/

Gail Essmaker, Ph.D.

Raja Sen (Raj) MEd, BS, AAS, MCSE

After graduating with a Bachelor's in Science (B.S.) from the University of Calcutta, Raj attended Arapahoe Community College in Littleton, Colorado to obtain an Associates of Applied Science (A.A.S) in Computer Networking. Raj also has Master's Degree in Education (M.Ed.) specializing Instructional Design. Apart from the above degrees, he is a Microsoft Certified System Engineer and Administrator. Raj is currently working as an Instructional Designer for eLearning at Arapahoe Community College and has profound knowledge on Universal Design for Learning and its applications in higher education. He has recently become a Quality Matters (QM) reviewer for online courses. Outside of professional interests, he likes to travel, weight train and spend time learning about new innovations in technology.

Universal Design for Learning: Implementation and Challenges at Community Colleges

Raja Sen (Raj) MEd, BS, AAS, MCSE

One of the biggest problems in instruction today is the lack of Universal Design for Learning (UDL) in online courses (Simoncelli & Hinson, 2008). UDL is an approach to instruction and curriculum development to accommodate all learners, including students with disabilities (Strobel, Arthanat, Bauer, & Flagg, 2007). Applying Universal Design for Learning principles in distance educational courses is nothing but employing better teaching principles. It is another way to adjust the course curriculum to meet students' needs instead of having students adjust to the curriculum. Not only does this increase student motivation, but also the probability for them to succeed. It is a significant consideration when designing online courses where students are not confined to a specific geographical area. Lessons should be created irrespective of cultural or physical differences amongst individuals. Multicultural education is a philosophy for the 21st century that will provide instruction irrespective of cultural or physical differences making it more inclusive for all. Multicultural education is a way of thinking, a philosophy (Banks, 1993). While enrollment in online courses continues to increase, student retention and graduation rates are a major concern for community college leaders (American Association of Community Colleges, 2012). This can improve by offering more effective and inclusive instruction for the ever

increasing diverse student population. King, Williams & Warren (2010) believe that 21st century goals in teacher education requires attention to diversity, technology and instructional support of how materials are presented to students, how they get engaged and how learning occurs. Barriers such as differences in background, access, experience or prior knowledge present some unique challenges that educators face to meet the diversity needs of students. One approach to meet those needs is the integration of Universal Design for Learning (UDL) principles with instructional planning.

Applying the basic principles of UDL in online instruction can help reach out to a much more diverse population of students, which in turn would make the instruction more inclusive and effective. In an article about creating access for students with disabilities, Michael and Trezek (2006) emphasize universal design to be the application of an architectural concept in which designers create their products with all persons in mind rather than adapting to personal needs and strengths after the fact. They believe that the principles of universal design not only add to the richness and effectiveness of teaching critical and complex content, but also provide the students with choices on how they learn, share and get assessed. In another article about the need of universal design in online learning environments, Roberts (2004, pp. 188-197) discusses that the ability of over 30 million people in the United States is compromised due to inaccessible computer design. This includes distance education courses offered through Online Learning Environments (OLEs). When developing

distance education courses, it is important to address the need of people with disabilities in addition to sound pedagogical strategies. Too many current courses require the exclusive use of visual and high degrees of manual dexterity which can prevent student with disabilities from being able to participate and hence, lose out on learning opportunities. It is the responsibility of the course designer (mostly the instructor at community colleges) to realize these deficiencies and make suitable adjustments. McGuire, Scott & Shaw (2006, pp. 166-175) point out that the lack of Universal Design for Learning (UDL) in distance education courses results in problems like low academic performance and higher dropout rates among students with disabilities. The No Child Left behind Act (2001) reported disappointing educational outcomes for many students with disabilities. Low motivation lowers academic success rates. Students with disabilities feel excluded from the course curriculum and in most cases end up dropping out.

It is important to recognize that accessibility is not just an enhancement. It is a requirement by U.S. laws that state, "No qualified individual with a disability in the United States shall be excluded from, denied the benefits of, or be subjected to discrimination under" (Section 504 of the Rehabilitation Act, 2005). Federal electronic and information technology must be accessible to people with disabilities, including employees and members of the public (Section 508 of the Rehabilitation Act, 2005). Over 95% of students with diagnosed disabilities participate in the general education classroom alongside their peers (U.S. Department of Education, 2001). The lack of UDL

implementation is particularly applicable to community colleges where the online instructor is often the course designer. At these colleges, the application of principles of universal design is the responsibility of instructors who are designers-by-assignment (Chodock & Dolinger, 2009; Merrill, 2007). Merrill (2007) agrees that at community colleges, instructional designers are faculty, who are designers-by-assignment and are probably less familiar with the application of universal design principles than instructional designers. Both sources advocate that the lack of UDL implementation at community colleges is probably due to the lack of knowledge of subject matter experts (SME), who are have been assigned to design their own courses.

CASE STUDY:

A qualitative study was conducted to investigate the lack of UDL implementation in online courses and find the major causes for this deficiency. A case study methodology was used which is an all-encompassing method covering design, data collection techniques, and specific approaches to data analysis (Gay, Mills & Airasian, 2009). It is a research strategy which focuses on understanding the dynamics present within single settings, can employ multiple levels of analysis and combine data collection methods (de Weerd-Nederhof, 2001). Case studies can be used to provide description, test theory or generate theory, both exploratory and explanatory. The study was conducted at a community college in Colorado. The overall objective of this study was to add to the field of research so that stakeholders and administrators can develop reasonable

remedial action plans to help resolve this problem in higher education. The study would help determine whether there was indeed a lack of UDL implementation in online course offerings at the community college. The study would also help determine the major causes that lead to such a lack of UDL implementation in online courses.

SAMPLING:

An email was sent out to all online instructors at the college inviting them to participate in the study. The pool of online instructors consisted of both full-time (permanently hired by the college) and part-time (temporarily hired to teach one or more courses each semester) faculty. This population of both full and part-time faculty was diverse, both culturally and ethnically. With the physical location of a distance education course not providing a barrier, some adjuncts were located out of state or even out of the country. The email clearly stated the purpose of the study, role and expectations of the participants and the researcher in the study, limitations of the study and how the results would add to the field of research. An informed consent form was also attached to the email. It is one of the most vital parts of a research process and more than just obtaining a signature on a form. It ensures that the participants are fully educated and informed about their role and expectations in the study and what it involves. A total of 10 participants were obtained through random sampling (first ten respondents).

METHODOLOGY:

Passive observation techniques were used to observe online courses taught by the participants. The courses were observed against a rubric designed by the author to measure the level of Universal Design for Learning (UDL) implementation in the course. Non-participant observation was used due to its non-involved nature which in turn reduced the probability of personal bias and any emotional involvement with participants. A survey was also designed and administered to the online instructors who were participating in the study. The link to the survey was emailed and the responses were collected on the website that hosted the survey. The purpose of using this method was to learn about the possible causes that might have led to UDL deficiency in online courses. Some questions were asked to learn how much knowledge participants had about the significance and use of UDL in distance education. Other questions asked their opinion about the causes that, they believe, led to this lack of UDL implementation and their recommendations that might help solve the problem. Both instruments used for data collection above were qualitative in nature.

INSTRUMENTS FOR DATA COLLECTION:

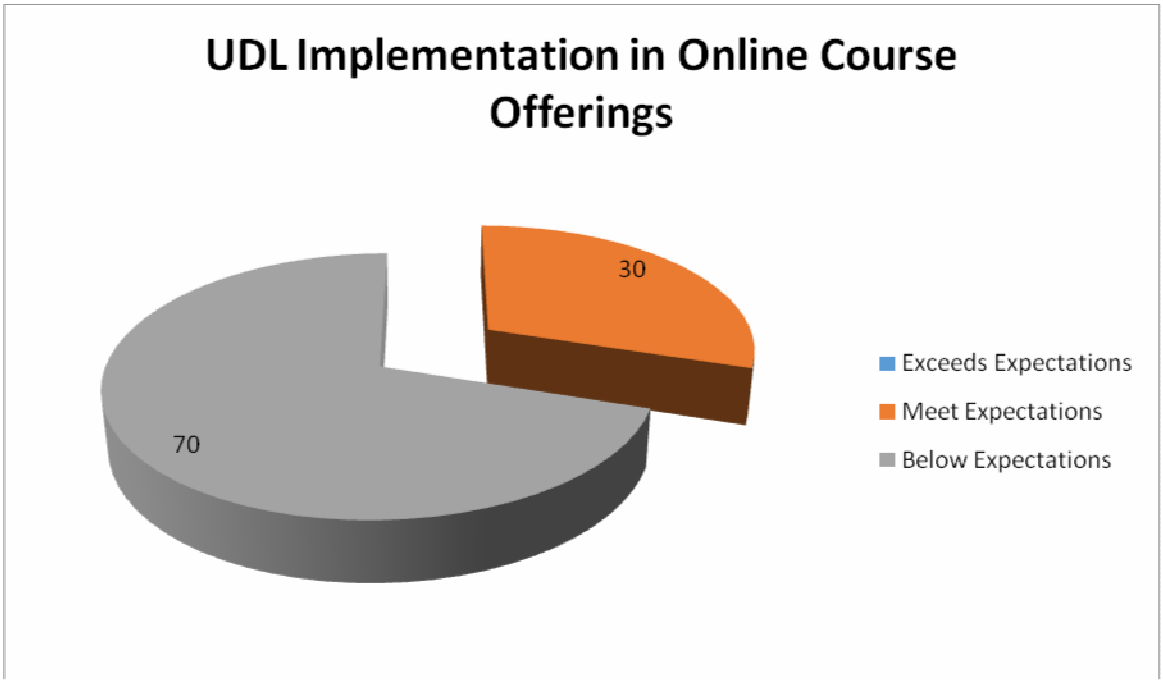
The first instrument was a rubric that had six different criteria against which each online course was evaluated. Each criterion had 3 levels: exceeds, meets and below expectations. Each level had a unique rating where 3 (exceeds expectations) was the highest and 1 (below expectations) was the lowest. If all the stated conditions were met for a criterion, it would

receive the highest rating of 3. In an event where fewer conditions would be met, the criterion would receive a lower rating. The overall rating of a course was the cumulative score of all the six different criteria. The rubric was designed by the author who was also the researcher (and an instructional designer at the college where the study was conducted). The rubric helped reduce personal bias by promoting a consistent data collection process. The data that was collected by observing each online course was maintained on a separate rubric form. The form did not collect any confidential information like course details or the name of the instructor. This maintained confidentiality of the data. The second data collecting instrument used in the study was an online survey which consisted of open-ended questions and was hosted on a popular surveying website. The link to the survey was emailed to the participants and the collected data was stored on the hosting site. The online survey maintained both anonymity and confidentiality of the information collected. The survey was carefully designed to ensure that no personal information was either asked or tracked (such as cache, ip address, et cetera). The results were stored on the survey hosting website and were available to the researcher through a password protected account only. This helped maintain the integrity and confidentiality of the data.

RESULTS:

The results obtained from the observation of courses showed that most online courses received a low rating for the level of UDL implementation. The data analysis concluded that there was a lack of UDL implementation at the community college where the study was conducted. All of the observed courses were live online offerings from the spring of 2013. A single course obtained a rating of 14 while two other courses were rated at 12 each. All the other seven courses obtained a rating of 10 or below. The overall rating scale for courses were as follows: exceeds expectations (15-18), meets expectations (11-14) and below expectations (10 and below). None of the observed courses were rated between 15 and 18. Only 3 out of the 10 (30%) attained ratings between 11 and 14, while the rest 7 (70%) attained ratings of 10 and below. Although 30% of the observed courses met expectations for UDL implementation, none of the observed courses exceeded expectations and the rest 70% fell below expectations. The results were conclusive: there was a lack of UDL implementation in online course offerings at the community college. The chart below shows a pie chart representation of the observed online courses that exceeded, met or fell below UDL expectations.

UDL Implementation in Online Course Offerings



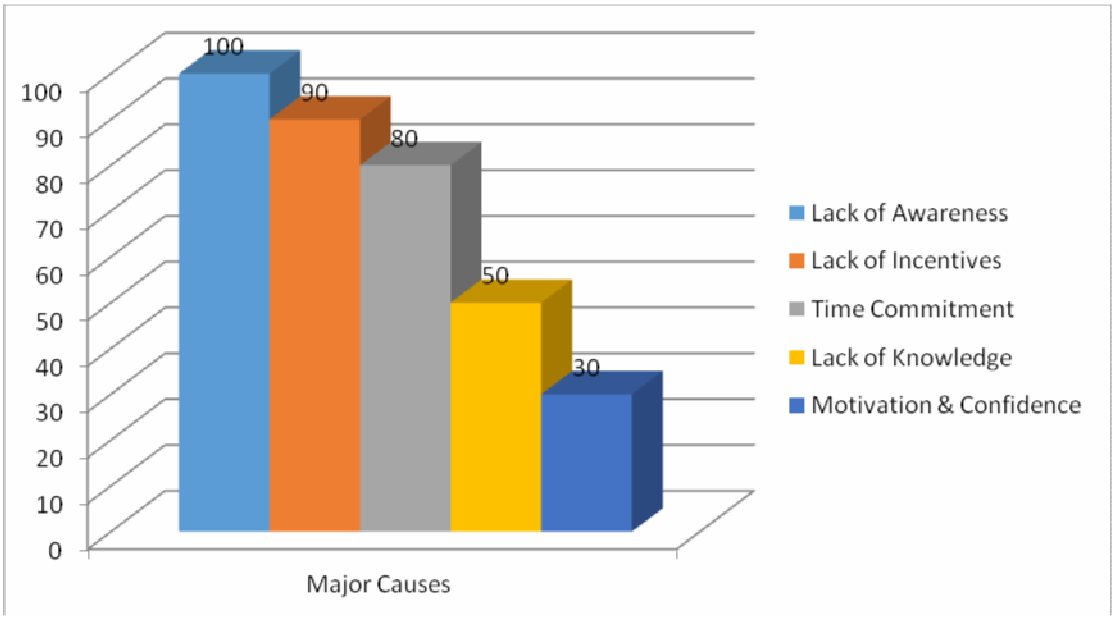
The data collected from the online survey was categorized into major causes and possible solutions. Participants suggested the major causes of the lack of UDL implementation to be:

- ***Lack of Awareness (100% response rate)***
- ***Lack of Incentives (90% response rate)***
- ***Required Time Commitment (80% response rate)***

Other possible causes were the lack of knowledge (50%). Some (30%) of the participants also believed that instructors teaching online courses lacked the motivation and confidence of success.

The chart below shows a bar graph representation of the major causes that online instructors (participants in the study) believe have led to the lack of UDL implementation in online courses. Each color in the chart represents a theme with a significant percentage (30 or above).

Major Causes that Lead to the Lack of UDL Implementation



Possible solutions and recommendations to remediate the lack of UDL implementation were attributed to training and professional developmental sessions, administrator buy-in and extending support staff (instructional designers and eLearning support staff) to help in the implementation process.

IMPLICATIONS AND FURTHER DISCUSSION:

There are a number of implications from the study. The scope and efficacy of the study should be considered for future studies in the same or comparable area. The findings from this study imply that online course offerings in higher education lack the implementation of universal design principles. Although this study was a case study confined to a single community college, the results are believed to be generalizable to a much larger scale in higher education. The problem is believed to exist at colleges where there are no specialized

instructional or course designers and online instructors have to design their own courses. If this problem persists, online courses will not be inclusive. With the growth of online education across the globe, multicultural education has become a necessity. There is an added need to design curriculum that facilitates various learning styles and a diverse group of learners with a wide range of abilities and disabilities. If online courses in the near future are not developed on principles of universal design, distance education will miss out on the opportunity to reach out to learners across the globe. Other implications include legal consequences as a result of inaccessible course design and content, particularly to special needs students. ADA (Americans with Disabilities Act) compliance is a major part of Universal Design for Learning (UDL) and is also required by the law. Sections 504 and 508 of the Rehabilitation Act clearly state the need for digital content to be accessible to people with disabilities. The scope for further investigation of this problem lies with K-12 online courses. Does this problem exist in higher education online courses only, or is it also affecting K-12 students? Over 95% of students with diagnosed disabilities participate in the general education classroom alongside their peers (U.S. Department of Education, 2001). It would be good to explore and investigate why many special needs students do not make it to college. Are K-12 courses that are offered online not fully accessible and are these possible factors that decrease student confidence and motivation to succeed at higher level college courses?

References

American Association of Community Colleges (2012). AACCMission: Building a nation of learners by advancing America's Community Colleges. Retrieved from http://www.aacc.nche.edu/About/Pages/mission.aspx.

Banks, J., & Mcgee-Banks, C. A. (1993). Multicultural education: Issues and perspectives. Hoboken, NJ: Wiley Publishing, Inc.

Chodock, T. & Dolinger, E. (2009). Applying universal design to information literacy. Reference & User Services Quarterly, 49(1). 24-32.

de Weerd-Nederhof, P.,C. (2001). Qualitative case study research. the case of a PhD research project on organising and managing new product development systems. Management Decision, 39(7), 513-538. Retrieved from http://search.proquest.com/docview/212060813?accountid=42542

Gay, L. R., Mills, G. E., & Airasian, P. W. (9th Ed). (2009). Educational Research: Competencies for Analysis and Applications. Upper Saddle River, NJ: Prentice Hall.

King, L. H., Williams, J. B., & Warren, S. H. (2010). Preparing and Supporting Teachers for 21st Century Expectations through Universal Design for Learning. Delta Kappa Gamma Bulletin, 77(2), 51.

McGuire, J. M., Scott, S. S., & Shaw, S. F. (2006). Universal Design and Its Applications in Educational Environments. Remedial and Special Education, 27(3), 166-175.

Merrill, D. M. (2007). The proper study of instructional design. In Robert A. Reiser and John V. Dempsey (Eds.). Trends and Issues in Instructional Design and Technology. 2nd Ed. New York: Pearson Prentice Hall, 2007, 336-341.

Michael, M. G., & Trezek, B. J. (2006). Universal Design and Multiple Literacies: Creating Access and Ownership for Students With Disabilities. Theory Into Practice, 45(4), 1.

Roberts, K. (2004). The need for universal design in online learning environments. AACE Journal, 12(2), 188-197.

Simoncelli, A. M. & Hinson, J. M. (2008). College Students' With Learning Disabilities Personal Reactions to Online Learning. Journal Of College Reading And Learning, 38(2), 49-62.

Strobel, W., Arthanat, S., Bauer, S., & Flagg, J. (2007). Universal Design for Learning: Critical Need Areas for People with Learning disabilities. Assistive Technology Outcomes and Benefits, 4(1), 81-98.

U.S. Department of Justice. (2005). A Guide to Disability Rights Laws, September 2005. Retrieved November 7, 2011 from http://www.ada.gov/cguide.htm

U.S. Department of Education. (2001). The condition of education. Retrieved from http://nces.ed.gov/pubs2001/2001072.pdf

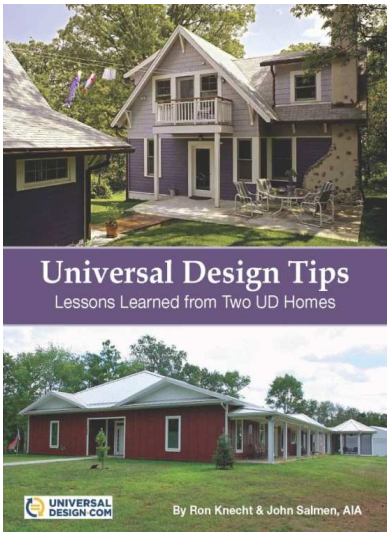
Raja Sen (Raj) MEd, BS, AAS, MCSE

BOOK RECEIVED:

1.A New eBook from UniversalDesign.com

Universal Design Tips: Lessons Learned from Two UD homes

This new electronic book from UniversalDesign.com is filled with tips and ideas that will help guide anyone through the process of designing and constructing their own Universally Designed home. The book was co-authored by John Salmen, AIA, the publisher of *Universal Design News* and founder of UniversalDesign.com, and Ron Knecht, whose durable, energy efficient Universally Designed house was featured in the January 2012 issueof *Universal Design News.*



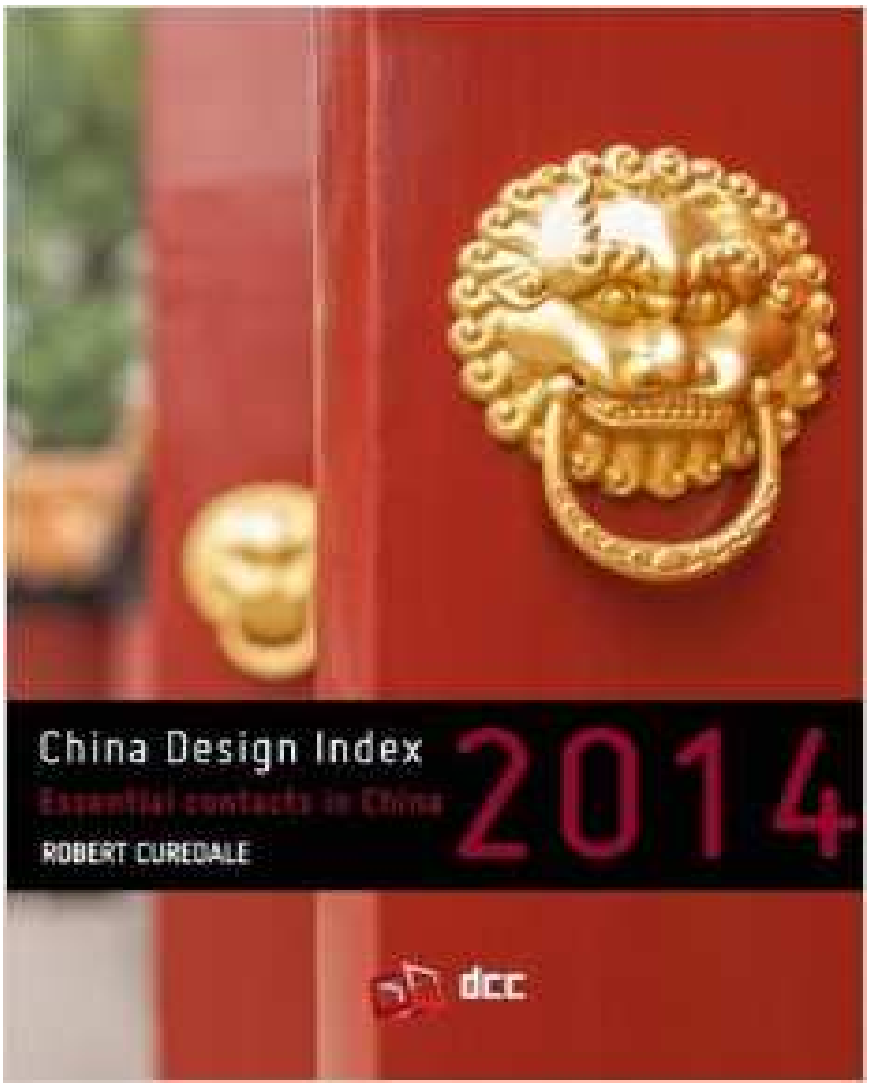
The first section of the book deals with the planning process, providing insight on how to choose a location for the house, consider activities of daily living during planning, best use various types of design professionals, finalize a floor plan and develop a building schedule.

The rest of the book is organized according to different areas or elements of the home (i.e. exterior doors, bathing, and kitchen counters, just to name a few.) Whether designing a whole house or simply remodeling one area, *Universal Design Tips* makes it easy to quickly refer to the relevant section and find valuable tips that ensure success. Each of these sections includes design tips, photos and important lessons that the two authors learned through their personal projects.

John Salmen has been working in the field of accessible architecture and Universal Design for over 30 years, and he put this expertise to good use when remodeling a historic property to create the Universally Designed house he and his wife hope to live in for many years. Salmen's "Home for the Next 50 Years" has been featured in various media outlets: including *The Washington Post*, *Fine Homebuilding*, AARP's television show *Inside E Street* and the book *The Accessible Home: Designing for All Ages and Abilities*. Now, readers will be able to explore Salmen's home in even greater detail and apply his experience to their own Universally Designed home projects.

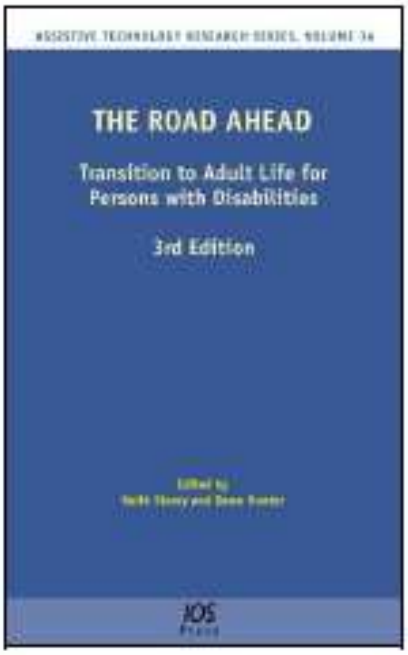
Ron Knecht's experience with Universal Design started after his wife of 46 years became ill with cancer. As her health worsened, Knecht learned first-hand the importance of accessibility for maintaining independence, safety and one's quality of life. Before Knecht's wife passed away, she extracted a promise from him that he would move to a Universally Designed house located closer to their daughter. Knecht was underwhelmed by both the houses that he saw on the market and the UD house plans that he found online; he realized that he would have to plan and build a custom house in order to fulfill his promise.

2.



China Design Index 2014: The essential directory of contacts for designers Paperback – February 1, 2014 by Robert A. Curedale (Author)

3.



The Road Ahead

Transition to Adult Life for Persons with Disabilities

Volume 34 Assistive Technology Research Series
Editors: Storey, K., Hunter, D.
December 2013, 318 pp., hardcover (revised 3rd edition)
ISBN 978-1-61499-312-4 (print)
ISBN 978-1-61499-313-1 (online)
Price: €69 / US$100 / £59

Successful transition from school to adult life has always been difficult for people with disabilities, especially in the area of employment. The vast majority of people with disabilities are either unemployed or underemployed with low wages and few benefits, and many governments are struggling to find a way of providing employment and benefits to people with disabilities without creating disincentives to work.

This book provides strategies and ideas for improving the lives of people with disabilities, exploring new ways of enabling a successful transition to an integrated adult working life by providing effective instruction and support. Following an introduction which outlines the importance of transition services and meaningful outcomes, topics covered in the remaining chapters include: person centered transition planning; enhancing competence and independence; employment assessment and career development; collaboration between agencies for a seamless transition; independent living and supported living; and community functioning skills.

The book will be of interest to all those who work with transition age students as well as those who work with adults with disabilities and want to enable them to have the best life possible. To paraphrase Helen Keller: "People with disabilities not only need to be given lives, they need to be given lives worth living."

4.

Luigi Bandini Buti
DESIGN FOR ALL | AREE DI RISTORO | il caso Autogrill |
Maggioli Editore, 2013
http://shop.wki.it/risultatoricerca.aspx?indizioricerca=luigi+bandini+buti

This book has been born following the collaboration with Autogrill that, for its new facilities "Villoresi Est", has developed an innovative, Design for All oriented project. We then realized that the cares foreseen for "all" would not be noted by "the majority".
If you are not on a wheel-chair, or blind, or you are not travelling with a large family or you don't have to look after your old grand-father, you will not be able to appreciate many of the attentions included into the project. It was therefore necessary to make more visible the virtuosity of the planning process and its results, which may not appear obvious to many people.

This publication is not meant to be a mere description, it is rather a critical analysis of the Villoresi Est rest area, included in a context that wants to examine in depth the methods and the means of Design for All.
Its main objective is therefore to use the "Autogrill case" to investigate the necessary steps to develop projects Design for all oriented, hopefully in an authoritative way.

Edmonton Architect publishes - Adult Children's Book—Accessible Architecture: A Visit From Pops.

Edmonton Architect Ron Wickman launches his first book titled: ***Accessible Architecture: A Visit From Pops*** at the City Room in City Hall, Tuesday, March 18 at 6 p.m. Ron, son of the late Percy Wickman, MLA Edmonton-Rutherford 1989-2001, is a story written on the focus of Percy and his 3 grandchildren. Ron is best known for his accessible design. His most recent endeavor published by Gemma B. Publishing draws on this knowledge. Edmonton draughtsman Jared Schmidts illustrates with wit and precision the need for a house to be visitable by everyone.

As a child, Ron Wickman learned firsthand about the need for accessibility. His father became paraplegic after being injured by an industrial accident. Ron wheeled his father into many inaccessible places. A longtime Edmonton City Councilor Percy Wickman advocated for people with disabilities throughout his life.

Ron Wickman studied architecture in Edmonton and in Halifax, Nova Scotia, specializing in barrier-free design, designing houses and public spaces that were both beautiful and accessible.

Accessible Architecture: A Visit From Pops—is an adult children's book, which demonstrates the three principles for ensuring a house can be visited and enjoyed by everyone equally, including those with a disability. Following Wickman's design and renovation also enables homeowners to age in place.

Visitability principles include

- the front entrance must have no steps;
- all main floor doors must be at least 36" wide
- an accessible washroom must be on the entrance floor.

Accessible Architecture: A Visit From Pops, by Ron Wickman, illustrated by Jared Schmidts and edited by Sarah Yates, is published by Gemma B. Publishing, a Winnipeg-based publisher. Gemma B. Publishing creates heroes and heroines living with a disability, in both fiction and non-fiction. The book will be launched at Edmonton City Hall, March 18 at 6 p.m. and available later at Audrey's Books in Edmonton.

Ron Wickman will be available for interviews after the press conference at City Hall. His lecture at the Buildex Conference, Edmonton Expo Centre, Northlands will be held Wednesday, March 19 at 2:30 p.m.

Accessible Architecture: A Visit From Pops ISBN978-0-991697-0-8 sells for $20.

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For additional information, contact:
Ron Wickman
Architect
780-430-9935
E-mail: rwickman@shaw.ca

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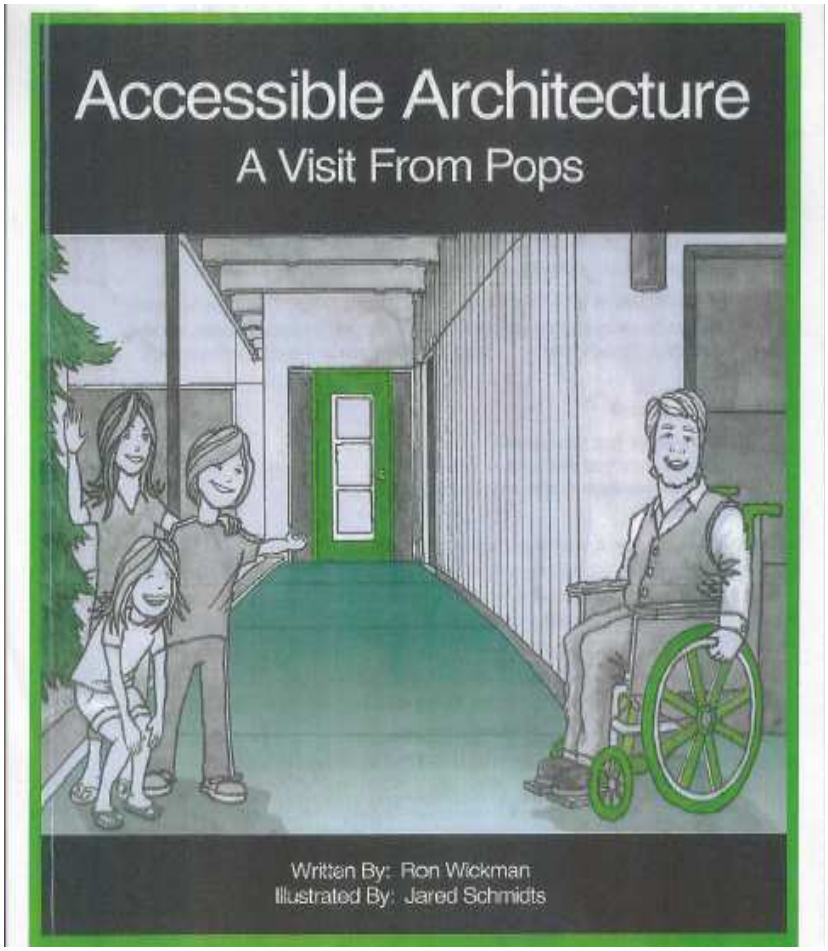

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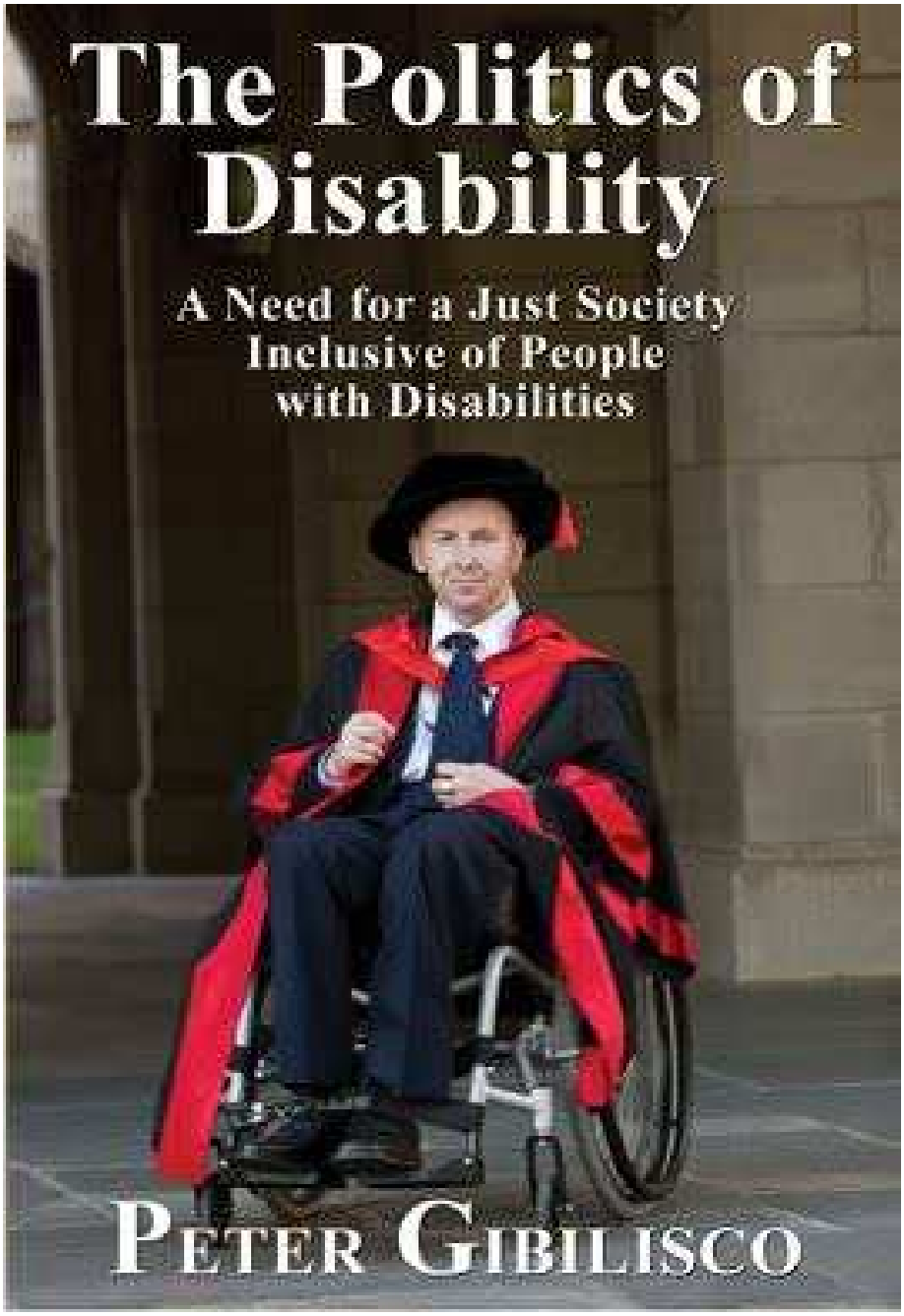
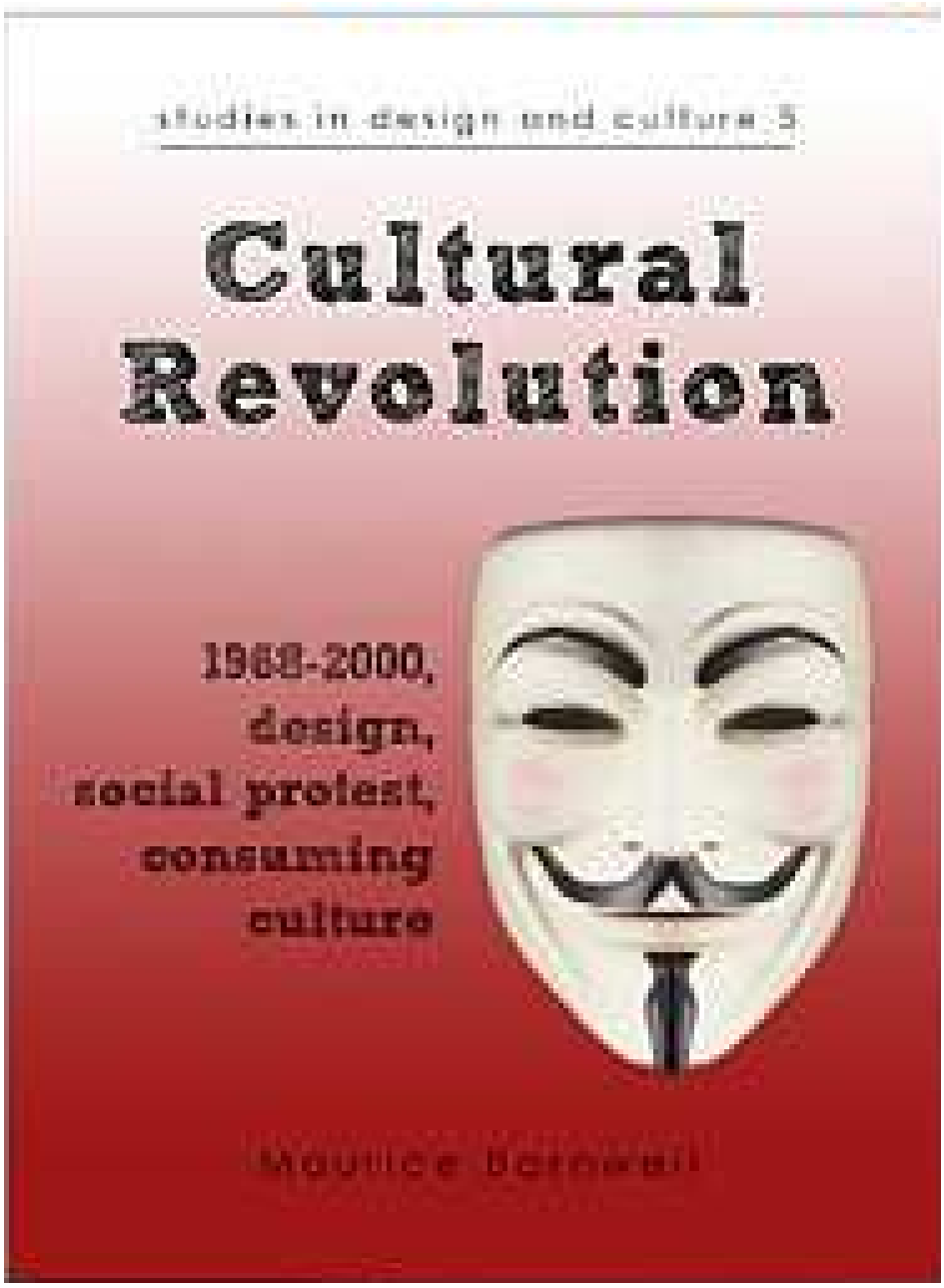


This book will retail for a recommended price of $19.95 USD ISBN 978-1-77143-155-2, with an ebook version also available at a recommended price of $7.95 USD ISBN 978-1-77143-156-9. You'll be able to buy it from all the usual places - Angus & Robertson, Bookworld, Fishpond, Amazon, Kobo, iBookStore, and Google's Play Store, amongst others.

7.

Maurice Barnwell (Author)



8.

Design for All — the project for everyone. Methods, tools, applications.
Volume 1- 2 (Steffan, 2012)

The publication highlights the multidisciplinarity and cross-disciplinarity of the Design for All approach, both in terms of issues addressed and of field of application. The accessibility of places and objects is nowadays a minimum requirement: it is only the starting point to allow their use by the widest range of people possible. Through professional experience and research, the paper tackles problems, methodologies and working tools, benchmarks.
The first volume covers the main areas of research and presents some examples at urban scale; the second volume illustrates examples of architectural design, products, services, university education.
The lack of compliance of the built environment and of the products, with needs that can be very different, causes a state of handicap. The lack of ability is a handicap only if the project has not taken it into account.
With these books we intend to stimulate debate, in-depth research, specialized studies, so that Design for All can be increasingly known and applied in more and more research and professional areas.

Published in Italian in December 2012 by Maggioli Editore (Santarcangelo di Romagna RN, Italy).
http://ordini.maggioli.it/clienti/product_info.php?products_id=8832 Volume 1
http://ordini.maggioli.it/clienti/product_info.php?products_id=8831 Volume 2
The on-line English version is also available since October 2014:
http://www.maggioli-editore.it/ebook/tecnica/design-for-all-the-project-for-everyone-first-part.html
http://www.maggioli-editore.it/ebook/tecnica/design-for-all-the-project-for-everyone-second-part.html

"Ideas, even good ideas, flourish only when practitioners commit to sharing their experiences, perspectives and aspirations. By organizing this publication and convening a distinguished international group of contributors, Editor Isabella Tiziana Steffan helps to establish the current state-of-the-art and affirms the significant potential of Design-for-All. She also delivers fresh inspiration to an expanded audience critically important to engage if Design-for-All/Universal Design is to realize its promise in the coming years.(...)We salute Editor Steffan for her passion, focus and hard work to bring this valuable contribution to fruition." (Valerie Fletcher)

APPEAL:

Srishti Labs is pleased to announce a workshop around "Dynamic Value Modeling" by Nathan Shedroff (CCA - DMBA Program Chair) on 19th-20th December at ITC MyFortune, Bangalore.

Nathan Shedroff is the chair of a unique, unprecedented Design MBA program and a celebrated author of such books as Make It So: Interface Design Lessons from Science Fiction; Design is the Problem: The Future of Design Must Be Sustainable; Making Meaning: How Successful Businesses Deliver Meaningful Customer Experiences; Experience Design 1.1.

The event will take place in ITC MyFortune:
19th of December: 2.00pm – 5.30 pm (followed by a networking dinner)
20th of December: 9.00am – 5.00 pm

Details and Registration for this event on Srishti website at http://srishti.ac.in/dvm/

For additional clarifications, contact Ms. Ksenia Pukhalskaya at ksenia@srishti.ac.in

"Dynamic Value Model" focuses on the development of a balanced combination of quantitative and qualitative value, an aspect which companies struggle to achieve in the present competitive business world. It has been successfully run in many countries with various corporate cultures.

Hands-on, practice-oriented and adapted to the Indian context this workshop will be especially (but not exclusively) beneficial for Designers (both senior and junior), Business Designers, Product Managers, Project Managers, Customer Service Managers, Account Managers, Business Development Managers, Design Researchers, Business Strategists & Marketing Managers.

Enclosed find the flyer. More details and registration available at the official Srishti website http://srishti.ac.in/dvm/.

The number of participants is limited.

Please pass this information to anybody you think would benefit from this workshop.

Girish Prabhu, Ph.D
Founder & Executive Director,
pepperSlate Innovation & Design

Director - Innovation
Srishti Labs
Srishti School of Art, Design & Technology

NEWS:

1.

12 things you need to install a safe shower

The idea of universal design is all about offering quick and easy access to every part of your home. It builds in the flexibility to accommodate users in any state of health or physical mobility. Whatever the current age and level of ability of your household members may be, a shower designed for safety and comfort, as well as style, is sure to be appreciated. And if you already have mobility issues, or if you plan on aging in place, a safe universal shower installation is an absolute necessity. Here are 12 shower safety features to consider.

1. Curbless
Your shower stall should have a very low to non-existent ("dam-free") threshold for convenient roll-in access with a wheelchair or walker. The floor ought to slope down toward the drain; installing tiles on a one-way slope makes for steadier shower chair placement. This type of shower unit may be custom-built or prefabricated. Choose a trackless door with a rubber flange or a weighted shower curtain to restrict the flow of water.

2. Wet room

An alternative to the stall shower, the wet room is built with a waterproof floor so no shower door or curtain is required.

3. Grab bar
At least two grab bars should be securely mounted in the shower area, one horizontal and one vertical of at least 18 inches. The placement depends on individual health or mobility issues. Leave 1.5 inches between the bar and the wall.

4. Shower seat
A shower seat can be freestanding or wall-mounted. The latter tends to be more stable but it requires reinforcement of the entire supporting wall, especially if the bathroom will be used by obese individuals. To save space, consider having a fold-down seat or recessed tiled bench built.

5. Overhead showers
Several overhead showerheads of different heights will provide ease of use to people of all sizes and abilities.

6. Handheld shower
A handheld shower device has a flexible hose, which should be slide mounted to make it adjustable for different heights and either sitting or standing position.

7. Controls
The controls need to be accessible from the shower seat and easy to maneuver using less than 5 pounds of pressure. Single lever valves, which don't require grasping, are easiest. Place controls near the entrance -- or even outside, so that you can turn on the shower and let it warm to the selected temperature.

8. Ledges
Built-in tile ledges make supplies such as soap and shampoo accessible, without blocking the grab bars.

9. Floor
The floor can be protected via non-slip strips. Better still, replace the existing shower floor altogether with small-style, non-skid tile flooring. Avoid glossy surfaces and opt for non-slip treated matt tile installation instead. The grout lines between tiny 1-inch square mosaic tiles offer a lot of traction.

10. Valve
A thermostatic or pressure balancing valve will help prevent scalding. Set the thermostat at a safe temperature of 120 degrees. This is particularly important for someone is unable to feel the water temperature or quickly get out of the way of a scalding spray.

11. Dimensions
The shower dimensions should be at least 3 by 5 feet to allow room not only for a device to assist mobility but also for an attendant to assist the person showering. The door to the bathroom itself should be wide enough for a wheelchair to enter (minimum 32 inches). Inside the bathroom, enough space should be provided to turn around easily, or about 5 feet by 5.

12. Lighting
Bathroom lighting should be adequate for people to maneuver easily while entering, leaving, and using the shower facility.

Read more: http://www.mnn.com/family/protection-safety/stories/12-things-you-need-to-install-a-safe-shower#ixzz3L4fhpuhZ
(Source: NewsTex.com)

2.

India to launch awareness campaign on disabilities issues

NEW DELHI: Centre is contemplating to launch a massive campaign to sensitize people on accessibility issues concerning persons with disabilities, besides creating an awareness on improving facilities for them.
'Sugamya Bharat' (Accessibility India), to be carried out by the Ministry of Social Justice and Empowerment, would highlight accessibility issues of persons with disabilities such as difficulty to access public transport and buildings.
"We would be using platforms like television and social media. We may even have a brand ambassador for the campaign," Awanish Kumar Awasthi, Joint Secretary, Department of Disability Affairs, Ministry of Social Justice and Empowerment, told.

Schools and higher educational institutions would be the main focus of the campaign, he said, adding that campaigns would also be carried out at block and taluk levels.
Official sources said attention to minor details can prevent accidents causing disability, citing the difference in levels between train doors and platforms at railway stations which leads to accidents on quite a few occasions.
Also, accessible ramps and toilets are mandatory in schools for the benefit of students with disabilities and schools should adhere to it. "But in some educational institutions ramps are not accessible for persons with disabilities," the sources said.
Tactile paving – a system of textured ground surface indicators found on footpaths to assist pedestrians who are blind or have low vision- is not serving its purpose in several places, they said.
Against this backdrop, the sources said the ministry has conceived the campaign.
(Source: Economic Times)
3.

December 3: International Day of Persons with Disabilities

The UN's International Day of Persons with Disabilities (IDPD) comes as over a billion people live with some form of disability. This year's theme, 'Sustainable Development: The promise of technology' seeks to harness technology to promote inclusion and accessibility to help realize the full and equal participation of persons with disabilities in society. The promise of technology" is timely, the UN says, as it marks the conclusion of the period of the Millennium Development Goals (MDGS) in 2015 and the launch of a new development framework of sustainable development goals (SDGs).

The 2014 commemoration of IDPD will work to harness the power of technology to promote inclusion and accessibility to help realize the full and equal participation of persons with disabilities in society and shape the future of sustainable

development for all. Three sub-themes chosen will focus on the promise of technology in: Disability-Inclusive Sustainable Development Goals; Disaster Risk Reduction and Emergency Responses; and Creating Enabling Work Environments.

A series of commemorative events will be held to commemorate the Day at UN Headquarters, www.un.org/disabilities/default.asp?id=1620

PROGRAM & EVENTS:

1.

2.

3.

Transportation connects us all.

Whether it's simply getting from home to work or using products shipped over distances near and far, in every region of the world transportation impacts our daily lives.

At first glance, transportation may simply appear to be about the movement of people and goods. But looking deeper, it's also closely linked to equality, access to healthy food and good schools, and wildlife impacts, for example.

As the mobility demands of people and freight have grown, so too has the need for products, systems, and services that will make the transportation sector more life-friendly, for both people and the planet.

Registration is now open

Learn biomimicry and how to apply it while competing for cash prizes with students from around the world.

Register your team for immediate access to the biomimicry design resources and start developing your design solution today!

4.

India HCI

7 - 9 December 2014, IIT Delhi

http://indiahci2014.in/

5.

6.

UnBox Festival - festival to celebrate interdisciplinary collaborations
December 12-14, 2014, New Delhi
http://www.unboxfestival.com/

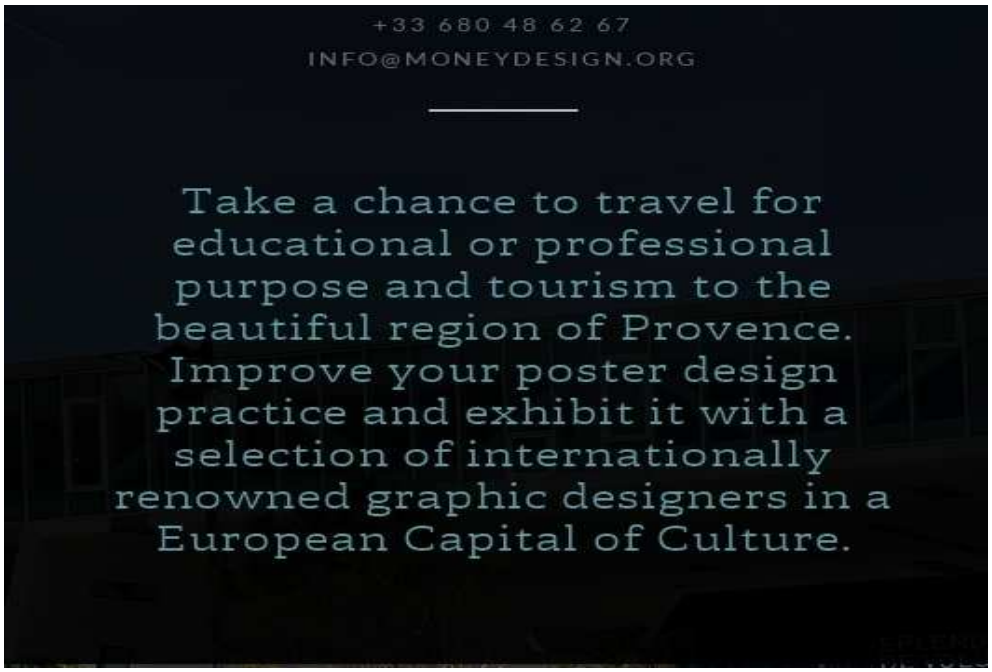
7.

8.

The Biennale Internationale Design SaintÉtienne 2015

9.

10.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11.


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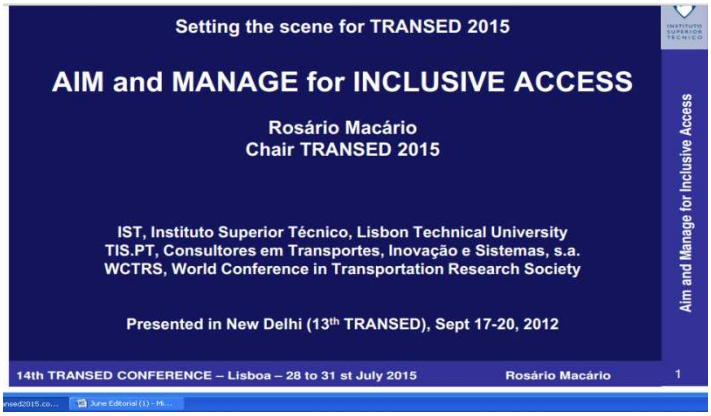
associazione italiana design
della comunicazione visiva
SUMMER SCHOOL
GENOVA
27-30 GIUGNO 2014
ACCADEMIA LIGUSTICA
DI BELLE ARTI
aiap
IIID
Aiap Summer School con Martin Foessleitner
Emergency / Emergenza
Da venerdì 27 a lunedì 30 giugno 2014
dalle ore 10.00 alle 17.30
Accoglienza summer school venerdì 27 alle ore 9.45
Accademia di Belle Arti di Genova,
via Agostino Bertani, 5 - 16125 Genova
Sono aperte le iscrizioni con sconti per tutti gli iscritti entro il 5 giugno!
Potete leggere e scaricare il modulo a questo link.

12.

13.



14.

Welcome to the

Faith & Form/IFRAA International Awards Program for Religious Art & Architecture

The Annual Religious Art and Architecture Design Awards program is co-sponsored by *Faith & Form* Magazine and the Interfaith Forum on Religion, Art and Architecture (IFRAA), a knowledge community of the American Institute of Architects. The awards program was founded in 1978 with the goal of honoring the best in architecture, liturgical design and art for religious spaces. The program offers five primary categories for awards: Religious Architecture, Liturgical/Interior Design, Sacred Landscape, Religious Arts, and Unbuilt Work.

Awards and Recognition

Award recipients receive significant recognition including printed and framed citations, recognition at an IFRAA awards presentation, full-page coverage in *Faith & Form*'s Annual Awards Issue and project board exhibition at the AIA National Convention.

Award Categories

Entries are welcomed and encouraged from architects, landscape architects, designers, artists, students, and consultants. Our entry categories and entry requirements are detailed below.

The 2014 Jury Panel

Chair/Liturgical Designer: Terry Byrd Eason
Terry Byrd Eason Design / Chapel Hill, NC

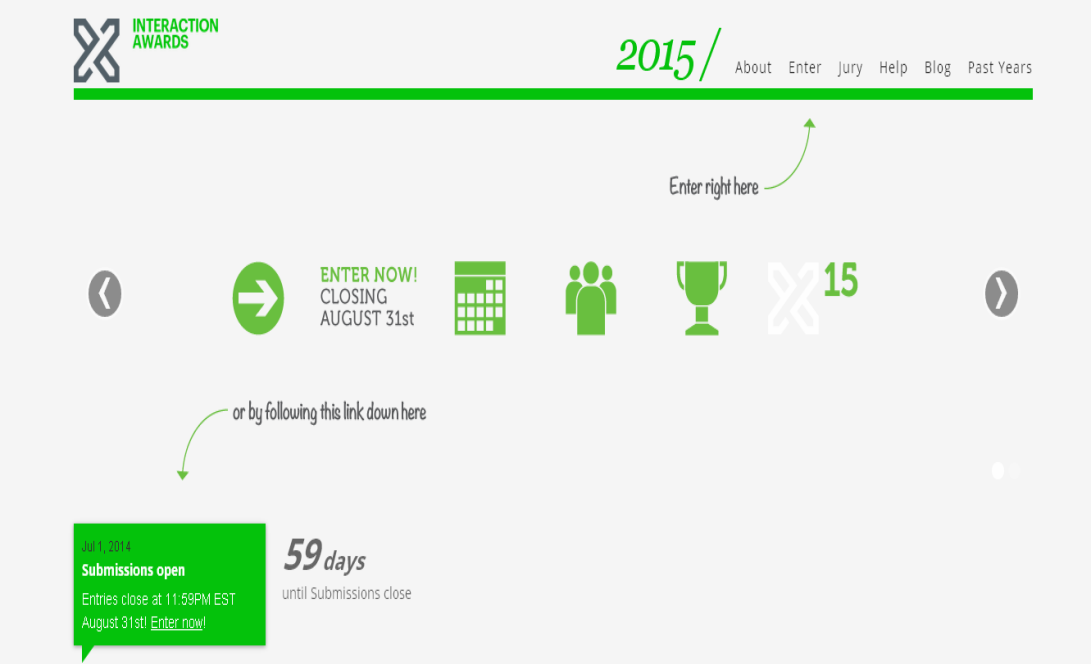
Architect: Craig Rafferty
Rafferty Rafferty Tollefson Lindke Architects / St. Paul, MN

Architect: Douglas Johnston
William Rawn Associates / Boston, MA

Artist: Michael Berkowicz
Presentations Gallery / Mount Vernon, NY

Clergy: Robb Webb
The Duke Endowment / Charlotte, NC

15.



16.

Typography Day 2015

7th - 9th March 2015,

Organized at IDC, IIT Bombay with support from InDeAs and Aksharaya

http://www.typoday.in

Theme:

Focus on 'Typography, Sensitivity and Fineness'

Introduction

Typography Day will be organized for the eight time from 7th to 9th March 2015 at the Industrial Design Centre (IDC), Indian Institute of Technology Bombay (IIT Bombay) with support from India Design Association (InDeAs) and Aksharaya.

The theme for this year's event is 'Typography, Sensitivity and Fineness'.

17.

The voice of blind and partially sighted people in Europe

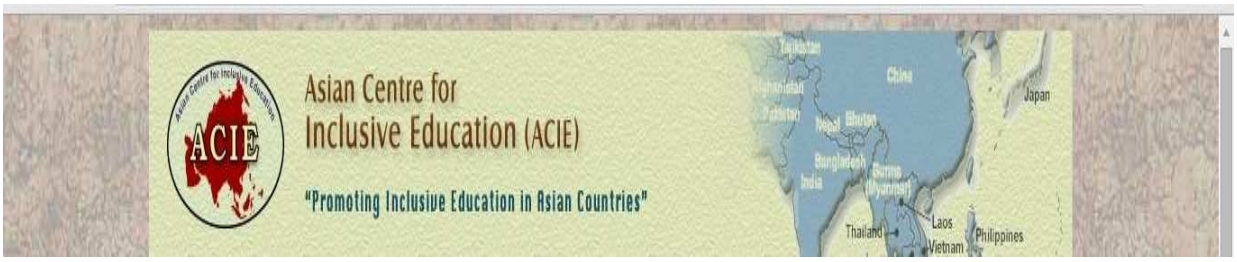
The Vision for Equality Award

The EBU Vision for Equality Award is given to European organisations, institutions, policy makers, enterprises or individuals in recognition of their commitment to protect and promote the rights of blind and partially sighted people and to improve their living conditions. The Award, which consists of a certificate and a piece of art by a visually impaired artist, is presented every four years on the occasion of EBU general assemblies.

Nominations may be put forward by EBU national members and are processed by the EBU Awards Working Group.

CALL FOR NOMINATIONS FOR THE 2015 EBU "VISION FOR EQUALITY" AWARD

18.



2nd International Conference on Inclusive Education

9 - 11 January, 2015

Venue: Institution of Diploma Engineers, Kakrail, Dhaka, Bangladesh

Conference Theme: Achieving Inclusive Education through Post EFA Goals 2015--How Far are We?

19.

5th International Conference on Accessible Tourism (ICAT) 2014 organized by Beautiful Gate Foundation for the Disabled, will be held on December 4-7, 2014, at MBPJ Civic Hall, Petaling Jaya, Selangor, Malaysia.

20.

21.

[2 Day Course and Workshop:
'Innovation & Design Process Management'] - 8th, 9th January 2015 at IDC IIT, Bombay

22.

'Insight 2015'

Design Research Seminar
24 and 25th January 2015, NID, Bangalore
http://www.nid.edu/ insight2015/

23.

5th International Conference on Research into Design
ICoRD '15

...Design across boundaries.....

Indian Institute of Science | Bangalore | 7-9 January 2015

5th International Conference on Research into Design - ICoRD '15
7-9 January, 2015, CEPD, IISc, Bangalore
http://www.cpdm.iisc.ernet.in/ icord15/

25.

13th Pune International Film Festival
8-15, January 2015, Pune

http://www.piffindia.com

26.

National Social Innovation Seminar
17th of November 2014, Pune

27.

28.

National Social Innovation Seminar
17th of November 2014, Pune

29.

Beautiful Gate Foundation For The Disabled

E-Newsletter

Upcoming Events

Tourism For All

THE 5th INTERNATIONAL CONFERENCE ON ACCESSIBLE TOURISM (ICAT 2014)
4th – 7th December 2014
View More...

IN AID OF BEAUTIFUL GATE FOUNDATION FOR THE DISABLED'S TRAINING FUND (SPONSORSHIP)

We are seeking for your kind generosity to contribute to Beautiful Gate Performing Arts Troupe, for its 'Embrace The Diversity', Dance Festival Concert, to be held at the following:

Date: 4 December 2014
Time: 7:30pm (sharp)
Venue: Auditorium, MBPJ Civic Hall, Petaling Jaya.

Beautiful Gate Performing Arts Troupe was officially launched on 13 August 2003. It aims to promote a spirit of work, passion for arts, demonstrate determination of learning and self-development, as well as, to reveal the potential of people with disabilities.

'Embrace The Diversity' Dance Festival Concert celebrates and embraces us as individuals, despite the differences in race, religion, gender, nationality, or disability. Diversity will continue to grow as a one of the greatest challenges and we hope to create more opportunities for the disabled and to cultivate a strong integrated society through the shared love and passion of performing arts. This Dance Festival Concert aims to raise funds for Beautiful Gate's Training Fund for Year 2015 which channels towards:

- Employment Skills and Education training.
- Job placement and services for the disabled.
- Welfare, Care and Outdoor Activities.
- Awareness Workshops and Campaigns.

A Reply Slip is attached at the back of this page. Please log on to our website on http://www.beautifulgate.org.my. For enquiries, please contact Shamyn Lian (Tel:+603 78733933, Fax:+603 78782888, E-mail: shamyn@beautifulgate.org.my or info@beautifulgate.org.my)
In whichever way you elect to support us on this event, we appreciate your consideration of our request. Thanking you in anticipation, and looking forward to a favorable reply.

With Best Wishes,
Sia Siew Chin
Executive Director, Beautiful Gate Foundation For The Disabled.

All rights reserved.

30.

India HCI

7 - 9 December 2014, IIT Delhi

http://indiahci2014.in/

31.

32.

JOB OPENINGS:

1.

We're Hiring 1 UX designer and 1 Graphic Designer for Delhivery, a Gurgaon based Startup working on end to end e commerce fulfillment. Job descriptions below

Job Title-Senior Graphic Designer
Function- User Experience (Technology)
Work Experience - 3+ Years
Location-Gurgaon
Skills/Background Required:

Our team is a diverse mix of inter-disciplinary experts from backgrounds like : Graphic Design, User Experience, User Interface development, Interaction Design and Design Thinking. We are extremely passionate about crafting seamless, delightful end to end experiences across various devices. We are looking for a Senior Graphic Designer with a strong background in Typography, Color theory, Product Aesthetics and Branding. Candidates must have experience in creating logos, mood-boards, color palettes, visually rendered screens, style guide for desktop and mobile form factors and are aware of the
design language followed by popular platforms such as Android, Windows and iOs. Additional requirements for creating branding guidelines, publicity material and visual merchandise would be entrusted with the candidate.

Candidates should have 3+ years of strong experience in applying graphic design principles to projects involving diverse stakeholders. Good theoretical knowledge of typography and aesthetics, and great attention to detail are a must. Any exposure to UX and UI prototyping would be a huge advantage.

- **Strong print,web and mobile design skills in Adobe Photoshop, Illustrator and InDesign .**
- **Experience in Creating visual language and style guidelines.**
- **Strong theoretical background in typography, form, color and product aesthetics**
- **Must be able to adapt to a fast changing environment.**
- **Ability to work independently as well as collaboratively within a team.**

Professional Skills:

1. B.Des/BFA /MDes/ MFA in Visual Communication or Applied arts from IITs, NID or prestigious Art Schools.

2. Strong aesthetic skills.

3. Ability to defend aesthetic decisions with theory/best practices.

Job Title-UX Designer

Function- User Experience (Technology)

Work Experience - 2-3 Years

Location-Gurgaon
Skills/Background Required:

Our team is a diverse mix of inter-disciplinary experts from backgrounds like : Graphic Design, User Experience, User Interface development, Interaction Design and Design Thinking. We are extremely passionate about crafting seamless, delightful end to end experiences across various devices.

We are looking for a User Experience Designer with a strong background in User research methodologies, Usability reviews and heuristic studies, and hands-on experience in conducting Usability testing. Candidates must have experience in creating low and high fidelity wire-frames for desktop and mobile form factors and are aware of the design language followed by popular platforms such as Android, Windows and iOs.

Candidates should have 2-3 years of strong experience in applying user centered design methodologies to projects involving diverse stakeholders. Good theoretical knowledge of Usability principles, and great attention to detail are a must. Any experience in Graphic Design or UI programming would be a major advantage.

- **Strong prototyping skills in Paper and Balsamiq/ Axure/iRise etc.**
- **Experience in doing lean usability tests on site/ remotely.**
- **Strong theoretical background in usability and user centered design.**
- **Must be able to adapt to a fast changing environment.**
- **Ability to work independently as well as collaboratively within a team.**

Professional Skills:

1. B.Des/MDes/M.S in User Experience, Interaction Design, Industrial Design or related disciplines from IITs or NID.

2. Strong analytical and problem solving capabilities.

3. Ability to defend design decisions with theory/best practices.

Company profile:

Delhivery helps merchants and brands create successful online businesses through modular E-Commerce services and core logistics. Our operational capabilities are designed to meet the needs of any business looking to go

online. We provide sellers a modular suite of e-commerce technologies coupled with pan-India logistics operations, helping them achieve fast, reliable and flexible customer fulfillment. Our proprietary commerce technologies toolkit provides sellers a way to develop and manage their entire online channel - including setting up a web-store, catalogue management, studio services, and integration with marketplaces, payments, SEO/SEM, customer analytics and inventory management. All our IT is built in-house and is completely customized to the unique needs of each of our clients.
Delhivery also owns and operates over 60000 sqft of fulfilment space across 3 cities with a dedicated call center, along with an in-house express shipping network across 60 cities with over 85 distribution stations. By Oct 2014, we will have over 250000 sqft of fulfilment space across 10 cities with express shipping in over 125 cities. Our fulfilment and logistics solutions can be provided on a stand-alone basis or bundled together as part of a larger engagement.

Delhivery was founded in June 2011 by alumni of IIM Bangalore, IIT Bombay, IIT Kanpur, IIM Calcutta and IIT Delhi. We currently work with over 700 E-commerce players across 150 cities and are the fastest growing startup in the Indian ecommerce landscape. As we grow the Delhivery team, we are looking for individuals from all kinds of backgrounds who have a passion for hands-on work, tremendous drive and the ability to work in diverse groups.
2.
Baaya Requires Junior Designer
Where: Baaya Design store and studio, Raghuvanshi Mills, Mumbai.

If you have a passion for Indian arts and Crafts, and love learning new things, then we are looking for you! Come and create the most stunning and original interior applications with Baaya Design. You need to be really creative, with a portfolio that is relevant (arts and crafts/hard materials/ furniture/interiors), you need to be savvy on imaging software and a good communicator.

Qualification: Degree/Diploma in Design/Hard Materials/Interiors from a reputed institute. No experience required.
Salary will be as per market norms.

Write to us at baayadesign@gmail.com or call at 022 24979463
3.

LeadSquared is looking for Lead User Interface and Experience Designer in Bangalore.

What we do?

We build software for marketers and sales professionals in SMBs to help them acquire more customers.

Why we exist?

With most purchase decisions of services and products influenced or made online, marketers and sales pros cannot do their jobs without technology and tools. Naturally, there are dozens of business ventures trying to address these needs. Most of them are taking an approach of solving one or two problems at a time. That still leaves a big challenge for the marketers to integrate them and get the analytics right. This is neither easy nor affordable for most of them. LeadSquared tries to integrate all critical marketing and sales processes in one system so they don't have to spend money and time in integrating myriad systems.

Why should I consider this role?

We are a well-funded startup with a very ambitious goal of becoming a globally successful marketing and sales automation platform. The opportunity is immense and this role directly impacts the growth and adoption of the software. The opportunity is to be part of a venture that brings difference to millions of users worldwide.

What you will be doing?

The key role is to design user interface and experience for new features, and improve user interface of existing features. The goal is to:

Design very clean, consistent and visually appealing user interfaces

Build features in a way that users are able to discover and use features on their own.

There are five key elements in the role:

a) Understanding what the customers want in terms of the final outcome and how they would like to achieve the outcome

b) Prototype the interface as appropriate to exhibit user experience

c) Designing the exact visual interface either independently or with assistance of graphic designer

d) Iterate through this process by seeking feedback from stakeholders

e) Work very closely with the development team and take ownership of the UI deliverables

It would be very important for the individual to keep abreast of interaction design trends globally and what the competition is up to.

Ideal background for the role

We would be designing both web and mobile interfaces. So it is important for the individual to have experience of designing interfaces of web and mobile applications. We will pick an individual who has seen the entire lifecycle of an app – not just conceptualization to design, development and release, but also user feedback, improvement iterations and some success in user adoption.

Another key aspect of this role is to take full responsibility of visual design and not just interaction design. Either the individual should be able to do the visual design or be able to work with Graphic Designer to develop mock-ups which development team needs.

The ideal candidate would have worked in a SaaS startup designing web and mobile applications. We are also open to considering professionals working in Outsourced Product Engineering services companies with experience in designing SaaS apps.

If this opportunity interests you, let us talk! Send me your updated portfolio along with your resume to sridharan@leadsquared.com and I look forward to talking to you.

Quick Facts about LeadSquared:

Has been recognized as the No.1 Marketing Automation Software in India by NASSCOM.

Featured in Deloitte's Technology Fast 50 India 2014

We are in Red Herring Asia's Top 100 Finalists - 2014

Has been ranked as one of the Top 20 Most Popular Marketing Automation Software Solutions by CAPTERRA

2 Crowd Grid has recognized us as one of the top performers in Marketing Automation software.

Featured in India's Most Promising Startups in NextBigWhat List 2013 100+ Indian Startups

4.
TI Cycles of India (TICI) has been at the forefront of personal mobility solutions for over 6 decades and has gone from being a pioneer in bicycle manufacture and design to a complete mobility and well-being expert. Standing for the core promise of fun, fitness and freedom, TI Cycles offers consumers a range of bicycles, fitness equipment and infant mobility solutions. TICI is known best for its flagship bicycle brands, BSA, HERCULES and MONTRA.

TI Cycles of India (TICI) is looking forward to expand its design team by adding skills in the area of Experience Design, Graphics/CFM (Color, Finish & Material), Storytelling & Industrial Design. We have following 5 open

positions;

1. Experience Design Head.
2. Designer CMF
3. Designer & Story teller – Animation/Toy Designer/VC
4. Industrial Designer – Advanced Design
5. Industrial Designer on 1 year Contract

All the positions would be based out of our headquarter in Chennai. Details of the open positions are mentioned in the mail below. In order to apply for the position please send an email with your resume and portfolio ONLY to the email address mentioned below. Please do mention the post being applied for in the subject box of the email.

Contact person: Vinodh T /Suman Louis
Email: Careerticycles@tii.murugappa.com

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Special Correspondent:
Ms.Nemisha Sharma ,Mumbai, India
Nemisha98@gmail.com

Address for Correspondence:
13, Lodhi Institutional Area,
Lodhi Road, New Delhi-110 003India.

This Newsletter is published monthly, by
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