Current Issues in Emerging eLearning

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FOREWORD

This first publication of *Current Issues in Emerging eLearning* (*CIEE*) opens and closes with research studies on eLearning practice. The studies frame three theoretical discussions regarding the judicious adoption of eLearning technologies and one extended narrative regarding the various factors behind innovative best practices.

In *Discovering Behavioral Intervention: A Parent's Interactive Guide to ABA*, a team of three scholars from UMass Medical School's EK Shriver Center team up with a collaborator from Praxis, Inc. to provide results of their study of an online course on applied behavior analysis (ABA) offered for and evaluated by the parents of children with autism spectrum disorder. The study evaluates how well the online course helped parents meet the goal of becoming "well informed and knowledgeable about intervention options" available to help meet their child-rearing challenges (Fleming et al), and thus empowers practitioners to develop and apply current, effective, evidence-based practices in teaching, training, and learning. The authors note that "parents seek information on ABA through various media channels, including the Internet. Unfortunately the information they encounter there can be unsupported by scientific evidence, inaccurate, incomplete, or biased toward product promotion" (Fleming et al). The authors describe their implementation of the classic instructional design process used to develop a self-paced online course intended to remedy the prevalence of misinformation on ABA.

The central four theoretical articles in the issue break into two sets of companion pieces. Tara Ashok's *Development of a new mindset for eLearning Pedagogy* provides a researched narrative of the eLearning tool kit adopted by a life-long biology and anthropology instructor who left her native India to teach in the United States, drawn by access to student-centered technologies that supported her teaching goals. Ashok's article in complimented by Dennis Maxey's *Dewey, Desi, and DEC: Exploring the educational philosophy of Indian open, online, and distance education*. Maxey looks not at the sparse eLearning landscape from which Ashok emigrated in 1993, but at the India of today, where the constructivist narratives regarding diverse online learning practices align with the principles espoused by John Dewey but often expose behaviorist underpinnings.

This issue of *CIEE* pairs the work of our Founding Editorial Board Member, Edna Pressler, with a piece by our journal's Editor-in-Chief, Apostolos Koutropoulos. Each explores an application of data analytics which has the potential to enable academic programs to design and deploy technology to optimize learning, teaching, and training. Pressler's *Logging in to Learning Analytics* responds to the growing international learning analytics agenda. Trained in organizational change theory, Pressler applies the McKenzie 7S model to identify seven areas of an organization that require specific attention to adopt a big data eLearning initiative. Koutropoulos proposes a new approach to the portal systems of academic libraries, identifying both opportunities and missteps in

the current Library 2.0 movement. He proposes a new application that leverages analytics, naming this tool the *Library Portal 2.0: The Social Research Management System*. Pressler and Koutropoulos write separately but connectively about changes in the academy that could have transformative power, changes that frighten us in terms of the potential for breaches of user privacy but which could revolutionize teaching, learning, and researching.

Storey Mecoli's closes this issue with *Beyond Assumptions: How Urban Students View and Practice Digital Literacies In and Out of School.* Fittingly she returns us to a research study on eLearning practice, the very genre with which Fleming et al. open this inaugural issue of journal. Mecoli provides a qualitative, ethnographic case study of digital literacy practices and the perceptions of students from an urban metropolitan high school. She finds a disjuncture between students' in and out of school practices. We welcome Mecoli as a graduate student researcher representing this special category of submission to this journal. And we thank her, and all the contributors, to this first issue for their thought-provoking narrative on the practice and study of eLearning in its many forms.

We hope that you walk away from this issue inspired by the results of practical applications of eLearning. The examples our authors provide serve as a starting place for your own research and practice. We hope that you are energized to gather under the banner of the theoretical work proposed in this inaugural issue and engage more with emerging research and practice in these areas. We are eager to help build a community around the research and scholarly use of eLearning theory and eLearning technologies within and across educational sectors. You as a reader, researcher, and practitioner play a vital role in this emerging community. As you read through the articles, we encourage you to contact the writers with your thoughts, comments, and ideas, *and* be in contact with the *Center for Innovation and Excellence in eLearning*, a center of the College of Advancing and Professional Studies at the University of Massachusetts Boston. In this way we will continue to participate in mindful and active engagement with these intriguing emerging topics, and continue to establish findings on eLearning as a distinct body of knowledge, serving as a connection point for critical thought in the field.

Discovering Behavioral Intervention:
A Parent's Interactive Guide to ABA[i]

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ABSTRACT

Autism spectrum disorders (ASD) affect one in 110 children in the U.S. Parents of children with ASD need clear and accurate information to communicate with professionals as they seek appropriate services, including applied behavior analysis (ABA) based intervention. Behavioral professionals can assist parents in this endeavor by recommending resources, including online courses. This paper describes the development and evaluation of an online course on ABA for parents of children with ASD. Parents completing a summative field test (N=21) made significant gains in knowledge and reported high levels of satisfaction. Implications include the potential for enhanced parent-professional collaboration in treatment decision-making.

KEYWORDS: autism spectrum, eLearning, online courses

INTRODUCTION

The prevalence of Autism Spectrum Disorders (ASD) has skyrocketed in recent years, with current estimates showing that ASD affects one in every 110 children (Centers for Disease Control and Prevention, 2011). ASD represents a class of three related neurodevelopmental disorders, Autistic Disorder, Asperger Syndrome and Pervasive Developmental Disorder: Not Otherwise Specified. Typically diagnosed before the age of three, ASD immediately and profoundly affects the young child's ability to communicate, develop language, form social relationships and respond appropriately to environmental stimuli (U.S. Department of Health and Human Services, 2008).

The diagnosis of ASD often takes parents by surprise. In addition to the need for social support, parents immediately require clear and accurate information so they can communicate effectively with professionals from medical, psychological and education communities, and in turn receive appropriate services (Powers, 2000; Harris & Weiss, 1998). For example, behavioral support planning requires professionals and family members to participate together in activities that involve information sharing, creative problem solving and shared decision making (Marshall and Mirenda, 2002). Only when parents are well informed and knowledgeable about intervention options can they begin to gauge the quality and therapeutic potential of services made available to them, and then proceed with confidence to advocate for the best of these approaches (Levy, Ae-Hwa & Love, 2006; Dawson, 2001). In one study, parents of children with Down

syndrome, ASD and Fragile X syndrome who participated in three separate focus groups were in strong agreement that education on syndromes and services, and parent advocacy, all affected the quality of care their children received (Minnes & Steiner, 2009). Knowledge acquisition may also serve as an interim step in encouraging parents to participate directly in the delivery of interventions with their children, which has the potential to enhance intervention effectiveness (Kobak, Stone, Wallace, Warren, Swanson & Robson, 2011), provided they then receive skills-based training (Crockett, Fleming, Doepke & Stevens, 2007).

Early intervention approaches based on applied behavior analysis (ABA) focus heavily on the development of early communication and social skills, and have the strongest and most consistent scientific support for teaching children with ASD and reducing maladaptive behaviors (Eikeseth, 2009; Howlin, Magiati Charman, 2009; Peters-Scheffer, Didden, Korzilius & Sturmey, 2011; Rogers, Vismara, 2008). However, for parents who have little experience arranging ABA and other disability-related services, understanding this new terrain can be immensely challenging (Hamad, Serna, Morrison & Fleming, 2010). Parents seek information on ABA through various media channels, including the Internet. Unfortunately the information they encounter there can be unsupported by scientific evidence, inaccurate, incomplete, or biased toward product promotion (Kabot et al., 2003). There is a need for online coursework for parents which is objective, accurate and unbiased, and that utilizes media and a family-friendly context to effectively convey information.

What role can behavior analysts and related professionals play to help inform and guide parents in these endeavors? Aside from their role in developing and implementing individualized ABA programs, behavior analysts are in a strong position to provide support to families by pointing them to legitimate educational resources while working collaboratively with them to implement and evaluate interventions (Kabot et al, 2003). Online materials geared for parents that present ABA information in an engaging (e.g., media-based, interactive) and largely jargon-free manner, provide another tool that psychologists can recommend with confidence to parents.

In response to this need we developed and field-tested an introductory course entitled *Discovering Behavioral Intervention: A Parent's Interactive Guide to ABA* (hereafter, *DBI*). We describe each of the steps we took in developing and evaluating this course, including: 1) formative evaluation, using parent and professional focus groups; 2) course design and development; and 3) summative evaluation, in which we field tested the course with parents as participants. We end by discussing strengths and limitations of the project and suggesting some next steps for research and practice.

FORMATIVE EVALUATION

Approval to conduct all aspects of this study was provided by the University of Massachusetts Medical School's Institutional Review Board. We began with a formative evaluation, in which we held three 1½-hour focus groups, two with parents of children with ASD, and one with board certified behavior analysts who provide ABA services. Participants were recruited from regional ASD support groups and organizations (parents), and through a local behavior analysis organization. Extensive notes were taken during the focus groups and later analyzed for thematic content.

PARENT GROUPS

Sixteen (16) parents participated in two groups (8 per group). All had children who had been diagnosed with an ASD in the first 3-4 years of their lives. Parents were asked how they first learned about ABA, how easy or difficult it was for them to understand the different types of services made available to them, what they felt was important to know about ABA, how parents judged therapist-child and therapist-family fit, and any advice they would give to other parents. The facilitators (first two authors) presented sample text and pilot video clips of a mother implementing ABA procedures with her son with ASD at home. Participants provided feedback on the coherence and "look and feel" of this content. Parents in both groups were remarkably similar in identifying elements they felt should be included in *DBI*. They emphasized the need to present valid background information on ASD, including possible causes, diagnostic classification, information on the range of emotions and "grieving" that often occurs after receiving the autism diagnosis, and the ways in which ABA could help their child. Parents said it was important to describe the full range of evidence-based ABA approaches, "not *just* Lovaas therapy," saying that this information had rarely been presented to them. They recommended that we show some simple ABA procedures (e.g., basic positive reinforcement procedures) they could use at home, and discuss how ABA could be incorporated into a family's life while preserving a sense of family "identity." Parents reported that ABA was most helpful in teaching their children to communicate, which they initially thought was restricted to the realm of speech and language pathology. They added that communication training had helped to reduce their child's challenging behavior, another area that they asked be addressed. Upon viewing the video clips, parents were roundly enthusiastic about including video in the course, but suggested that the clips be presented in shorter, more discrete segments, with clear instructions on what to look for. Finally, parents also wanted to make sure that we provided links to support groups and other credible resources.

PROFESSIONAL BEHAVIOR ANALYST GROUP

Nine behavior analysts participated in a single focus group. All had worked extensively in programs for children with ASD and were board certified by the Behavior Analysis Certification Board (BACB), an international organization. All had several years' experience working with families. They discussed common fears that parents present when considering ABA, for example, that it might involve "men in white coats" who are "sterile, unfeeling technicians," or that they might not be able to do any of the interventions themselves. They recommended that we help parents understand ABA – what it is, why and how it works, and how they might master some simple procedures to use at home. However, they warned that some parents believe firmly that "more ABA is better," and overdo intervention by delivering it almost constantly. They indicated, as had parents in their focus groups, that maintaining family balance is important. They also largely agreed that we should help parents understand that autism is apt to be a lifelong disorder for which there is no present "cure." The professionals indicated that one of their biggest challenges is to help parents to accept their children's disability, while working

with hope and optimism to help children grow and develop as fully as possible. As in the parent groups, the professionals felt that ABA should be demystified, by providing examples, vignettes and video clips of what ABA "looks like."

In summary, parents and professional behavior analysts were enthusiastic about the potential for *DBI* to provide parents with credible, evidence-based information that would enable them to obtain services earlier and to be better informed as consumers and advocates, all of which would contribute to better outcomes for their children.

COURSE DESIGN AND DEVELOPMENT

We combined focus group information with a review of literature on parent experiences in ABA, a prior analysis we had done on ABA concepts and procedures prioritized as critical by behavior analysis experts (Sulzer-Azaroff, Fleming, Hamad & Bass, 2008), and our team's behavioral and family-support experiences, to design and develop *DBI*. The resulting course addressed the following topics: receiving the autism diagnosis; scientific information on the nature and causes of autism; the meaning of "evidence-based" when evaluating intervention approaches; introduction to the field of ABA; the use of positive reinforcement, prompting and prompt fading in teaching; different ABA approaches (e.g., discrete trial teaching, naturalistic/incidental teaching, picture-assisted methods); positive behavior support (PBS) to support parent-professional partnerships; evaluating research and popular books on ABA.

We designed the course to be *asynchronous*, that is, to be available "any time, anywhere," for use by parents when their hectic schedules permit. We also decided to build *DBI* so that it did not require an instructor. Whereas having an instructor is preferred by most online students, particularly when that instructor is seen as engaging, approachable, patient and passionate about the subject matter (Reupert, Mayberry, Patrick & Chittleborough, 2009), instructors add cost and scheduling constraints that could limit parent participation. Accordingly, we built the course such that it could easily be supplemented by live instruction, but could also be taken without it. This meant that the course content would need to stand on its own. Text and media content would need to be understandable and complete, and it would need to flow in a logical manner as the parent navigated the course. Here is an example of the style and level of language used in the course:

Behavioral intervention relies on the use of a procedure called positive reinforcement. While almost everyone has heard of this procedure, it is often poorly understood...and often used incorrectly. First and foremost, positive reinforcement involves giving immediate rewards to a child following instances of desired behavior. The behavior can be very small at first, an initial step in the right direction!

DBI was developed in Blackboard[©], an eLearning product widely used in higher education. We used this product because it had built-in testing applications that supported our summative evaluation needs, was supported by our university's online learning division, *UMASS Online*, and offered sufficient graphic design capabilities to produce an attractive yet functional course. Figure 1 shows a screen capture of one page in *DBI*, and illustrates how navigation is accomplished and text and video content is delivered.

Figure 1: Screen capture of a course page with instructional text and embedded video. Parents read questions, watch the video (repeatedly if desired), answer questions and receive programmed feedback.

The ultimate value of *DBI* for parents rests in the development and presentation of content they deem directly useful. To that end we wrote text that was clear and concise; used professional filmmakers to produce edited video of a mother using discrete trial and naturalistic teaching procedures with her 5-year old son in their family home; included a 20-minute interview with a mother of a child with ASD who is also an attorney; wrote engaging reviews of well written books on ABA written for parents (e.g., Koegel & LaZebnick, 2004); summarized journal articles in lay language for parents who wanted to "dig deeper;" developed a frequently asked questions section, named "Questions to Consider;" and offered selected links to science-based websites on causes and diagnosis of ASD (e.g., links to the National Institutes of Health and Centers for Disease Control and Prevention). In terms of ABA content, we incorporated these and other features to support a sequence that covered practical concepts in behavior analysis, discrete trial teaching, naturalistic/incidental teaching, augmentative communication, verbal behavior training, and family-systems-based ABA (via Positive Behavior Support).

SUMMATIVE EVALUATION

A convenience sample of 20 parents and one grandparent (N=21) of children with ASD were recruited through ABA service agencies in the greater Boston, MA and Providence, RI areas, and completed the *DBI* course. Data were collected on participant: 1) demographics; 2) knowledge acquisition, via pre- and post-test assessment; and 3) satisfaction, using Likert-style ratings and an open-ended comment section.

DEMOGRAPHIC AND DESCRIPTIVE INFORMATION

Each participant completed a 12-item online survey that asked about their gender, ethnicity, education, relation to child, age of their child a diagnosis, current age of child, time receiving ABA services, goals for taking the course, prior education/training in ABA, and computer/Internet use. Results are presented in Tables 1-3.

Gender	Ethnicity	Education	Relationship to child	Age of child at diagnosis	Current age of child	Time with ABA services
Female (21)	White (17) Asian (1) Hispanic (1) Native American (1) Other (1)	High School (5) Voc/Technical (1) Associates (2) Bachelors (8) Masters (4) Doctorate (1)	Mother (20) Grand-mother (1)	Mean: 33.8 mos. Range: 17-60 mos.	Mean: 4.7 yrs. Range: 2.5-6 yrs.	Mean: 19.7 mos. Range: 0-60 mos.

Table 1: Participant demographics.

Goals for taking DBI (Select all that apply)	Number reporting	Prior training in ABA (select all that apply)	Number reporting
Gain general knowledge in ABA	7	Observed therapist/teacher	13
Increase ABA knowledge beyond introductory level	12	Attended workshops	4
Learn more about teaching my child	19	Attended lectures or talks	12
Learn more about my child's challenging behavior	16	Read books	17
Learn more about evaluating ABA teaching programs	15	Read materials on web sites	16
Learn more about evaluating ABA behavior management	15	Watched videos	4
Determine if I would want more advanced ABA training	11	Learned from a friend	1
Gain information on how better to advocate for my child	17	Taken formal courses	3

Table 2: Participants' goals for taking the course, and their prior training in applied behavior analysis (ABA).

| Frequency of computer and internet use	Number reporting	Type of computer and internet use	Number reporting
Use computer frequently every day	17	Email	21
Use computer about once per day	4	Browse internet for information on ASD	21
Use computer about once per week	0	Take online courses	3
Browse internet frequently every day	8	Participate in online discussion/chat groups	13
Browse internet about once per day	3	Watch online video clips	5
Browse internet about once per week	1		

Table 3: Frequency and type of participants' computer and Internet use.

Participants were mainly mothers (95%) who were white (81%) and female (100%). The group was heterogeneous with respect to participants' levels of education, months of experience receiving ABA services, goals for taking the course and experience learning about ABA. With respect to participant goals, despite the fact that *DBI* was clearly described as introductory in nature, only seven parents had the goal of seeking general knowledge (33%). Most were seeking more advanced knowledge, including skills for more effective advocacy (81%). In order to evaluate whether parents with more experience with ABA services might still benefit from an introductory course, we sought to include parents with a mix of previous ABA exposure levels. We succeeded in recruiting parents who had ≥ 18 months or more experience (N=9), along with our primary target group of parents with ≤ 18 months experience (N=12). This allowed us to compare differential knowledge acquisition between these groups and begin to determine its potential value to parents at varying levels of experience. Finally, our data on computer and Internet use show relatively heavy computer use at least once per day (100%), and moderate daily Internet use (52%). In terms of *type* of computer and Internet use, all participants reported using technology for emailing and Internet browsing for information on ASD. Relatively few had taken courses online (14%) or watched online video (24%), but 62% had participated in discussion/chat groups. All but two participants had sufficient broadband connectivity and experienced no problems viewing videos. One participant supported what has been our plan to offer access to lower-income families via public computers.

KNOWLEDGE ACQUISITION

All 21 participants completed a 20-item pre- and post-test comprised of multiple choice and multiple select items. Pre- and post-tests were identical, so as not to vary in difficulty, delivered online, and scored electronically. Upon completing the pre-test, participants were presented with their overall score, *but they received no feedback on their performance on individual test items*. Therefore while they had a general sense of how they did, post-test contamination was controlled. Figure 2 presents data for participants whose children had received ABA for ≤ 18 months, and Figure 3 shows results for parents whose children had received ABA for ≥ 18 months or more. We divided participants as such to explore the possibility that parents with more exposure to ABA might perform better on the pre- and post-test than those with less exposure. However, all participants demonstrated similar post-test gains. For the entire group (N=21), the mean pre-test score was 56.2%; the mean post-test score was 85.2%. We determined that the data did not closely approximate a normal distribution, so we performed a nonparametric test, the Wilcoxon signed rank test.

The Signed Rank for this treatment effect was S=155.5, which was highly significant (p < .0001, two-tailed). In sum, parents began their participation in *DBI* with some knowledge, as would be expected by their prior experience (average 19.7 months), but they had room to learn much more, as suggested by the group post-test mean of 85.2%.
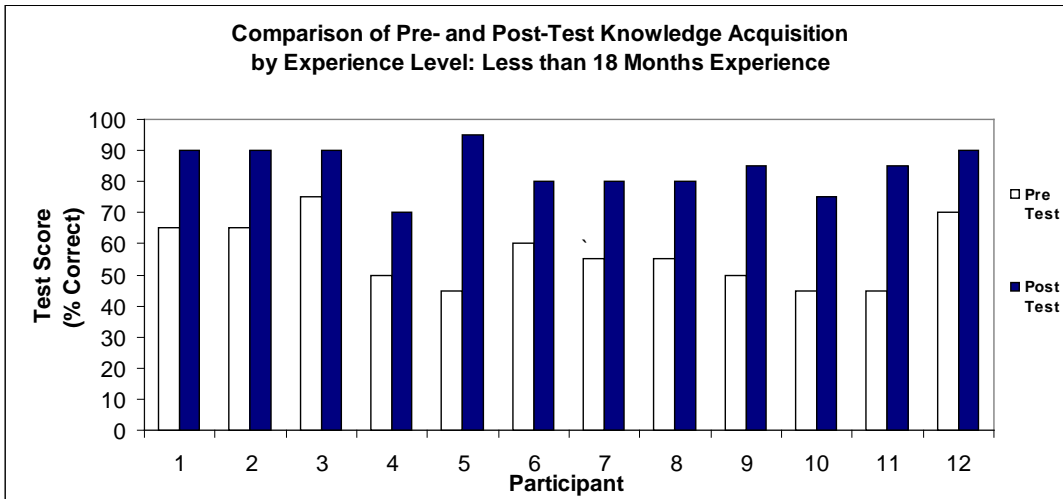
Figure 2: Knowledge acquisition by 12 participants whose children had received ABA for ≤ 18 months.
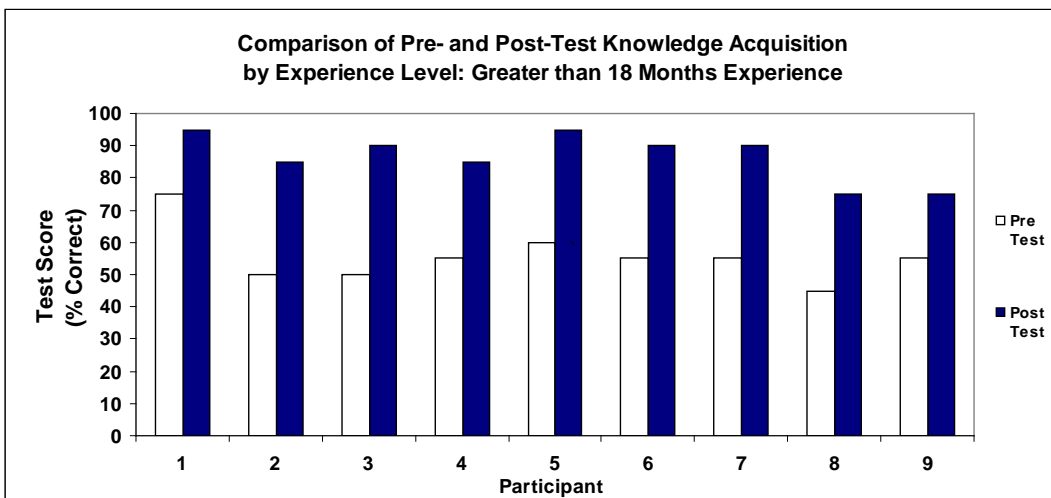
Figure 3: Knowledge acquisition by 9 participants whose children had received ABA for ≥ 18 months

SATISFACTION

Upon finishing the course in its entirety, participants completed a 21-item satisfaction survey and were invited to offer open-ended feedback. Table 4 presents satisfaction data. In general, participants viewed *DBI* in a positive light. They found it relatively easy to navigate (Q. 1-2). In addition, they were moderately to extremely satisfied with the

selection, amount, quality and sequencing of the content (Q. 3-5); very to extremely satisfied with the page design and images ("look and feel") (Q. 7-8); moderately to extremely satisfied with the clarity of the written content (Q. 9-11); very to extremely satisfied with the two types of video presentation (Q. 12-13); and moderately to extremely satisfied with the links, book reviews and journal summaries (Q. 14-16). Concerning the practicality of taking an online course, given the demands facing a parent of a child with ASD, participants reported being extremely satisfied that they could to complete the course and do so at their own pace (Q. 17). Further, 58% were extremely satisfied that the module was easy to fit in their schedule (Q. 18). Finally, participants were moderately to extremely satisfied that they were better prepared to work with their child's team, teach their child, and understand if not manage their child's challenging behavior (Q. 19-21).

Question	Un-satisfied	Somewhat satisfied	Moderately satisfied	Very satisfied	Extremely satisfied
1. Was module easy to navigate?	0	10	16	32	42
2. Was module always available?	0	5	0	32	63
3. Did content meet your needs?	0	5	37	37	21
4. Was information adequate?	0	0	21	47	32
5. How was quality of information?	0	5	5	64	26
6. Was information logical, orderly?	0	5	11	42	42
7. Was page design appealing?	0	5	11	37	47
8. Did images enhance content?	0	0	16	47	37
9. Was language understandable?	0	0	21	37	42
10. Was written content useful in helping you to understand ABA?	0	5	5	58	32
11. Did "questions to consider" help you learn more?	0	5	42	11	42
12. How useful were the teaching video clips of "Kim and Ryan?"	0	10	11	37	42
13. How useful was the video interview with the mother?	0	0	5	84	11
14. Did links to web sites increase your understanding of ASD, ABA?	0	0	10	58	32
15. Were the book reviews useful?	0	0	21	16	63
16. Did journal summaries help you to learn about current research?	0	0	21	16	63
17. Was it helpful to go at your own pace?	0	0	5	11	84
18. Was this easy to fit into your schedule?	0	5	16	21	58
19. Do you feel better prepared to meet with your IFSP/IEP team?	0	15	37	37	11
20. Are you better prepared to teach your child new skills?	5	0	32	37	26
21. Are you better prepared to respond to challenging behavior?	0	1	32	32	21

Table 4: Percent of participants satisfied with course design and content at each of five satisfaction levels.

When asked how long it took them to complete the course, 74% of participants reported that it took 6 hours or less, 11% reported 7-9 hours, 11% reported 10-12 hours and 5% reported more than 12 hours. Finally, participants responded to the open-ended queries, "What advice do you have for the course developers? How could the course be improved? Feel free to comment on any aspect: technology, content, instructional features, etc." Here is a set of representative verbatim comments:

"I have read much information on behavioral interventions, but I have to say that this is the best course that has helped me to understand the different options for my child. I thank you for allowing me the opportunity to take this course. I hope you know that this course is and will make a difference in my child's future. Thank you."

"So many parents of lower income or single - parent challenges have very little time or energy to physically attend a class, so this [course] *makes it much easier. That said, there is of course a great percentage of parents who do not have access to this type of online wonder for lack of a computer. Would it be possible to make this course available at public libraries where people of limited financial means could use the computers AND consult the materials you sited? I truly believe that would be a major step in the right direction."*

"I wish that I would have had access to this information 18 months ago when I was plunged into the world of ASD and began the frantic effort of becoming an expert on my child…The video clips themselves were very insightful and as the mother of a nearly five-year-old little boy, especially poignant. Your course should be required reading for families immediately after the diagnosis of ASD is received."

"I would have liked to see video for the Pivotal Response Training, examples of normalized teaching when out and about (i.e. at the grocery store, a play date, a birthday party, household teamwork) as a generalization technique, the use of activity schedules, Positive Behavior Support use, functional assessment."

"All outcomes and examples were positive in outcome. There was no advice/support for parents who may have/are trying these techniques and they aren't working. A bit more emphasis/advice for problem solving might be very helpful."

DISCUSSION

This small-scale evaluation suggests that an online introductory course in ABA, designed specifically for parents of children with ASD, and as a "stand-alone" course (i.e., not supported by an online instructor), was practical for parents to complete, resulted in significant knowledge acquisition and met with high levels of satisfaction. The data we collected has guided us to undertake development and evaluation of a more comprehensive 10-course *DBI* curriculum, which is currently underway. Our hope is that this complete curriculum, once tested with a larger and more diverse sample, and modified accordingly based on feedback, such as the feedback reported in this study, will help educate and support parents when they receive the diagnosis of autism and search online for credible, understandable information. We also hope that it will assist personnel who work with parents by providing them with a resource they can recommend to them,

one that will enhance parents' participation in treatment decisions and planning, and help them participate more directly in implementing behavioral interventions.

There are a number of limitations in this evaluation. The demographics of this convenience sample point to the need to more actively involve members of diverse racial and ethnic communities, and fathers, in further testing of *DBI*. African American families tend to access special services and seek professional guidance less frequently than European Americans, instead relying more heavily on family, friends and religious groups (Wilder, Dyches, Obiakor & Algozzine, 2004). A similar pattern has been show to exist with Latinos (Bailey, Skinner, Rodriguez, Gut & Correa, 1999). Aspects of *DBI* as currently designed may need to be modified based on cultural differences, and it may or may not prove to be as popular an approach in general as it was with the participants in this project.

Research with fathers of children with ASD has demonstrated that when they received training in ABA, they learned and effectively implemented child-teaching skills, which in turn increased their children's initiations and vocalizations (Elder, Valcante, Yarandi, White and Elder, 2005). Elder et al (2005) noted both the lack of research on father-child interactions in ASD and the potential for positive paternal influence on child development. In a subsequent retrospective study using their same data set, Seung, Ashwell, Elder and Valcante (2006) further demonstrated the efficacy of selected father-child and mother-child interactions, finding significant post-training differences in the ratio of utterances of parents and children during play.

Regarding parents' goals, 81% of the participants were interested in more advanced information on ABA and related advocacy skills. As noted, we are currently developing and testing more advanced courses in the *DBI* curriculum. Whereas the current introductory module might have been too easy for some participants, given their average 19.7 months of experience with ABA, parents at all experience levels appear to have had much to learn, and they did so, as evidenced by their pre-test versus post-test scores. Still, the group post-test mean of 85.2% suggests that there was room for more knowledge gain. When we reviewed participants' time spent on each page we found that many did not spend what we would consider sufficient time to learn the more complex material. This can be resolved by requiring successive completion of course sections using short, embedded mastery quizzes. The downside to this design choice is that it would restrict flexible movement in and around the course, which is a feature our focus group participants suggested was highly desirable.

It should be emphasized that *DBI* is a knowledge-oriented course; it is not meant to replace hands-on training by a behavior analyst or other skilled ABA provider. Rather, *DBI* is designed to help parents become more knowledgeable about ABA, which in turn might support their participation in decision making and advocacy about their child's programs, and *perhaps* better prepare them to learn from hands-on training and participate effectively in their children's ABA programs. Current work on the full *DBI* curriculum is incorporating even more interactive media exercises that may help move parents further along the continuum from knowledge to application. These include interactive graphic objects (case studies with decision-making branches and feedback, click and drag exercises to teach challenging concepts, etc.) and interactive video in which parents can test skills such as giving positive reinforcement, or using and fading

prompts, by clicking directly on running video and receiving immediate feedback. Advances in affordable media options make such interactivity readily available for online course developers. Research on the extent to which parents are better prepared to transfer these kinds of online experiences to actual face-to-face practice is sorely needed. For example, it would be interesting to know how parents who take a course like *DBI* perform in actual advocacy-related communications with behavior analysts and other professionals, and in IFSP and IEP meetings. Likewise, will completing video simulation exercises on the use of ABA teaching-skills in the home result in some level of skill development and transfer?

In conclusion, the formative evaluation, design and development activities, and summative field evaluation results for *DBI* suggest that online coursework in behavioral intervention for parents of children with autism may prove to be an effective tool for them, and perhaps for early intervention staff charged with providing ABA. Parent-professional collaboration may be enhanced, which may lead to improved child outcomes. Professional use and further research on *DBI* or related online educational products will determine its effectiveness.

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Development of a new mindset for eLearning Pedagogy: for the Teacher and the Learner

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ABSTRACT

Teaching, like learning, involves a personal journey. This researched narrative records the role of technology integration in one instructor's teaching practice, and examines how literature in the field accounts for ways eLearning technologies have kept the author and her students engaged in the process of learning. Dr. Tara Ashok of the University of Massachusetts Boston chronicles the personal eLearning tool kit she has selected for effective delivery of contents in different teaching formats. She posits the importance of developing a new mindset to adapt to emerging technologies and examines the literature and her own experiences suggesting how and why, eLearning pedagogy must include a focus on the development of a flexible / growth mindset.

KEYWORDS: new mindset, eLearning, pedagogy

INTRODUCTION

Today, I go to my class and start plugging different gadgets around the computer before I begin my lecture. I become a person cabled all around. I'm wired with a microphone which provides vocal support to allow me to address my class of 150 students sitting in an auditorium, of course, but this microphone also sends my lecture to a classroom capture system that creates an archived recording my students can reference, after the fact. Further my computer is connected to an external hard drive of terabyte size, so that I can pull up any document or animation as required just-in-time to answer a student's question. My classroom cabling routine also involves connecting an iClicker base so that I can pose a question to my students any time during the lecture to get their feedback on the concepts we are discussing in class.

When I leave the lecture hall after my day's teaching I often move to my office, where I check the status of learning in the online course I teach. My online students listen to lectures I have created as narrated slide presentations; they review videos, TED talks, and participate in synchronous web conferencing sessions and asynchronous threaded discussions. The course contents are delivered on a weekly basis with the help of a Learning Management System (LMS).

When we look at the way eLearning tools are impacting the practice of face-to-face, web enhanced and fully online coursework, it becomes imperative that we reassess the pedagogy and the mindset of teachers and learners in order to enhance students' learning outcomes in this digital era. In this paper I will describe my personal journey of evolving with the digital tools and discuss students' learning outcomes that have resulted from my incorporating eLearning strategies into my teaching practices, keeping in the foreground a review of the literature regarding questions of mindset and eLearning pedagogies.

MINDSETS

The word "mindset" has been brought to focus by Carol Dweck, a psychologist at Stanford University who talks about the power of our mindset. In *Mindset: The New Psychology of Success* Dweck writes: "Mindsets are beliefs—beliefs about yourself and your most basic qualities." She further states:

> Mindset change is not about picking up a few pointers here and there. It's about seeing things in a new way. When people – couples, coaches and athletes, managers and workers, parents and children, teachers and students – change to a growth mindset, they change from a judge-and-be-judged framework to a learn-and-help-learn framework. Their commitment is to growth, and growth takes plenty of time, effort, and mutual support. (Dweck, 2006, p. 238)

I have spent three decades as a teacher and researcher of human genetics and biological anthropology whose doctoral research focused on the genetics of mentally challenged individuals. Throughout this period, I have always studied the brain and the mind in order to help individuals attain their maximum learning potential. In this work I will focus on my observations of the different mindsets seen in different sets of learning groups in which I have played various roles over the years:

- Indian graduate students whom I taught before coming to the United States.
- Undergraduate students majoring in science, liberal arts and the non-biology major students learning biology at UMass Boston in both on-ground and online courses.
- The lifelong learners of the Osher Lifeline Learning Institute at UMass Boston.[1]
- Faculty members from across India who participated in a recent Institute on Global Learning and Communications
- Freshmen Success community students
- Non-tenure-track faculty members of UMass Boston attending Center for Innovative Teaching (CIT) Faculty Development Seminars[2]

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[1] For details regarding the Osher Lifelong Institute at UMass Boston visit:
http://www.umb.edu/olli
[2] For details regarding the CIT Seminars visit:
http://www.umb.edu/cit/faculty_seminars/cit_dev_seminars

UNDERSTANDING THE INDIAN GRADUATE STUDENTS' MINDSET

When I taught in India, I worked with graduate students who were the high achievers, those pursuing a master's degree in genetics. Only the best five students in the country were allowed to join the program. This was a very intense course in both theoretical and practical training for pursuing a career in genetics. Each faculty member would spend an entire day with the students. So, I worked in very close association with the students. Further, when I took them for a ten day field study to a remote area in India, we engaged in dialogue at a deeper level, discussing the ethical questions in science into the early hours of the morning while conducting experiments through the night. The students were highly motivated but equally competitive. Here to begin with, the mindset was of a fixed nature, as their final goal was to get the highest grades. My goal was to change that mindset so that my graduate students would look at genetics and life in a holistic manner. When a teacher gives tools to a student; that teacher must make that student commits to the proper use of the tools, and this is especially important in the field of human genetics.

UNDERSTANDING THE MINDSET LEADING TO MY TOOLKIT

In 1993, after a decade of teaching in India, I came to the United States to teach, relishing the opportunity to use all the new technologies available here, though not available in my native country. My dream was to make a CD for narrating the story of DNA to one and all in my own unique way, with music and audio, and animations I would create. I remember burning my first CD in 1998. I went through the era of getting my computers custom built to include all the required drives, floppy, jazz, zip and external hard disks. This seems strange today, when what does not fit on a thumb drive can all be stored in the cloud but in 1998 what we were calling multimedia workstations had to be custom built. Over the years I have continued my commitment to instructional media development, moving from audio and animations to the creation of instructional videos, first using Macromedia Director, which allowed me to produce movies and export them as executable standalone files. I then went on to create small games using this software. Despite advances in media development software, creating instructional videos and games remains time consuming, yet these media materials make it easy for me to teach difficult concepts in science. Today, I have a large collection of educational movie files I have created for different courses. I have listed my archived material in a single menu system that allows me to access media instantaneously during course meetings.

Keeping up with new technologies is a struggle. In 2005, Macromedia was acquired by Adobe Systems (Graham, 2008). The acquisition was part of trend called "convergence" that created a new generation of animation and video design tools I felt I needed to master. Though that may have been my first instance evolving as an eLearning consumer, I have since learned that whenever the technology changes, it takes me time to reorient my mind to the new tools that come into existence. Before a technology is fully understood and used, a newer version arrives on the scene, leaving me no choice but to adapt. Change will be the order of the day, but what becomes imperative is to develop and maintain a mindset which will be ready to adapt to the change in a shorter time period, keeping the mind in a learning mode eternally.

One of my proudest achievements as a media designer is my documentary movie entitled, "The Journey to the Cave dwellers of South India – A genetic study." I edited the movie using Adobe Premier under the guidance of professional video production specialists. "The Journey" documents a field trip I made to Kerala, India, to visit a tribe discovered in 1973. The movie depicts how my field team set up a laboratory in a reserved forest to collect blood samples from the members of the tribe who volunteered to contribute to the study. I show this movie to my Anthropology and Biology students to highlight the importance of ethnographic, clinical and population genetics field studies. Viewing the movie leads students to discuss certain genetic markers which were analyzed and raises ethical questions about the study of human samples in general. I have found that both my Anthropology and Biology students appreciate the fact that their own teacher had gone to a remote area to study people who were still living in caves and had brought back information to share in class.

I began my teaching career in India, in 1983. At that time, an overhead projection system was a big technological advance. The later shift to the use of data projectors meant the dawning of the age of PowerPoints, a technology still in common use, though often now maligned as a media that places a barrier between teacher and learner, limiting face to face interactions and impeding cognition (Maise, 2013; Tufte, 2003). However, I am among those who feel that PowerPoint presentations are of benefit in large classes and other appropriate situations (Doumont, 2005; Gabriel, 2008; Yu, 2014). Writing about the specific context of media used at political science conferences, Salmond and Smith (2011) criticize the typical use of visual aids, suggesting presenters should use fewer and simpler slides, further proposing that slides should contain visually rich information that illustrates a speaker's point without distracting the audience from his or her words. Following the specificity that Salmond and Smith apply to measure the effectiveness of a given presentation for a given purpose, I believe that what's appropriate in a classroom presentation depends on the subject matter being presented and entirely depends on the art of presentation of material by the speaker to the audience. The visually rich information on science subjects that I teach helps students learn challenging concepts with greater ease and, therefore, I am using PowerPoint slides unapologetically. For my online students, I have extended access to slide presentation material using Adobe Presenter tools that allow me to annotate and web publish lectures. In response to this relatively new eLearning practice I've adopted, one of my online students commented, "This is a life saver." To my thinking, that's the best defense of an established eLearning practice currently under siege.

However, I don't advocate for adoption of every eLearning technology that comes into being and in some cases my selectivity is idiosyncratic, and here I will provide an example. Today, Prezi software, which helps create presentations with zoom and transition features that break the metaphor of the 'slide", supports cloud storage of presentations, allowing presenters to download lectures wherever the content will be delivered.

However, Prezi does not match with my own proprioceptors[3] and Prezi presentations literally make me dizzy. Apparently I'm not alone in reacting to Prezi with physical discomfort. Research suggests some people do become similarly uncomfortable during presentations created with Prezi and similar, high motion presentation software (Ellis, 2013). In my teaching practice I have resisted the adoption of Prezi and the use of online virtual worlds such as SecondLife, which also feels physically uncomfortable to me. To the best of my ability, I have been intentional with regard to the set of eLearning tools I have chosen to include in the personal tool kit. In large part, that is because I have developed this toolkit for delivering contents in a personalized manner.

In "What's in Your Teacher Tool Kit?" (Mindsteps 2012), the educational consulting group, Mindsteps Inc., advocates for solving the challenges we face in teaching using a small set of tools, rather than becoming enamored with the latest fad in education. Hence, it is not an indication of a mindset problem when an educator elects not to adopt the latest eLearning technology. A growth mindset does not require that we indiscriminately accept all new technologies on the horizon but rather that we each choose what suits our personal teaching styles.

Ginnis cites research that indicates digital media such as animations, documentaries, and PowerPoint slides have made a positive impact on student learning outcomes (2002). In *Teacher's Toolkit: Raise Classroom Achievement with Strategies for Every Learner*, Ginnis suggest that, by learning something, the learner should come to see the world in a slightly different way; and alter his or her behavior or attitude in some way. *The Teacher's Toolkit* attempts to provide some of the means of arriving at "deep learning". Even though today there is a huge collection of media on the web to choose from, I find using my own teaching tool kit makes the delivery of concepts more personalized,. Students further feel that the teacher has put in a special effort for making their learning more comfortable and joyous and this greatly helps improve communication and connections leading to a deeper discussion on the subject matter.

UNDERSTANDING THE UMASS UNDERGRADUATE STUDENTS' MINDSET

In my daily practice at UMass Boston I teach at the 300's level. My students are undergraduates majoring in biology and biochemistry. I have been teaching bioinformatics in two laboratory courses, namely, Biochemistry and Developmental Biology. I help my students to navigate through the National Center for Biotechnology Information (NCBI) web site and teach them to use the BLAST (The Basic Local Alignment Search Tool), a program that generates Phylogenetic trees and other tools available to analyze the protein or genome databases. Today, bioinformatics tools are essential for any science student going into higher realms of scientific study.

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[3] Proprioceptors are receptors located in muscle and joint tissue which contribute to an individual's unique perception of motion and movement of body parts. Proprioception is closely akin to kinesthetics. Both phenomena have become important areas of study within the neurosciences.

Over the past four decades, the progress made in the field of molecular studies and in the information technology sector has been enormous. The two fields have merged to give rise to a new field Hesper and Hogeweg (1970) have termed "Bioinformatics". This interdisciplinary field develops methods for storing, retrieving, organizing and analyzing biological data along with the development of software tools to generate biological knowledge. This is the subspecialized subject area I teach to undergraduate science majors. During my bioinformatics classes I have noted how my students possess and act from one of two distinct mindsets: Students either like or dislike the analysis of the databases. Database analysis is new for their mindset. When I sometimes do teach biology to non- biology major students, these mindsets also exist. I feel challenged as they repeatedly say, "I am not good in biology, I cannot understand the concepts in biology. Somehow I must get through the semester".

These were the mindsets and statements that made me wonder how I could help students to understand difficult concepts in science. In response to this challenge, I began in all my courses to use the concept of the *office hour* time as a sacred space to help students change their mindset from a fixed perceptions to a perception of receptivity to learning. *Office hour* became the time when I could address students when they said, for example, "I am not capable of learning biology," and I could attempt to move my students to take on a flexible, growth mindset in which they might start to say, "Yes, I can learn biology." Now this special hour has become an hour to tap the inner potential of each student and to show them that they are capable of learning by providing a 'successful' learning experience. During office hours, I train the non-biology major students to read the textbook and explain the concepts to them in simple terms. If my students struggle with the best textbooks I can find, I need the same flexible mindset I ask of them to find the means to translate what I've learned and teach them the language of science within which my field communicates. Taking this concept of the *office hour* I have duplicated the protocol by recording myself reading from an eBook using the motion screen capture software, Camtasia, while highlighting the important concepts in the text. I then upload the annotated screen capture of my reading for students to access. Here I've found an eLearning solution to add to my toolkit, judiciously, to meet a particular need, play to my own strengths, and strengthen my students' weaknesses.

Briceño (2013) talks about deeper learning as an activity that requires students to think, question, pursue, and create. According to Briceño, when students engage in deeper learning, they acquire deeper understanding and skills, and become more competent learners in and out of school. Further, he contends that, for students to drive their own learning, two essential focus areas hold the most promise, namely, Learning Mindsets and Learning Strategies & Habits.

1. Briceño describes four Learning Mindsets as follows:
   - Mindset #1: A Growth Mindset: *"I can change my intelligence and abilities through effort" (*para 6).
   - Mindset #2: Self-Efficacy: *"I can succeed" (*para 9).
   - Mindset #3: Sense of Belonging: *"I belong in this learning community" (*para 10).
   - Mindset #4: Relevance: *"This work has value and purpose for me" (*para 11).

2. He describes Learning Strategies & Habits in these terms:
   We have the opportunity to teach not only knowledge and skills, but also the self-management and learning-to-learn skills needed in school and life….
   We must teach students how to learn. We must teach them know know-how such as:
   - how the brain works. and how we can increase its capabilities,
   - how to manage our learning, including how to set learning goals, self-assess, approach new subjects, manage homework, dive deeper, learn from mistakes and know what to do when things get hard,
   - how to engage in *deliberate practice* to develop expertise,
   - how to foster innovation and creativity,
   - how to work in teams,
   - how to manage emotions,
   - how to develop willpower,
   - how to develop desirable habits through cues, routines and rewards, and
   - how to combine habits with tools to manage one's self and one's learning.

   (Briceño, 2013, para. 13-13)

What Briceño describes is the very pursuit I undertake during the office hour time I conduct to help students to learn all the above listed concepts.

UNDERSTANDING MINDSET AND THE CONCEPT OF EPIGENETICS

Here I would like to conduct a virtual office hour of sorts, to introduce the concept of epigenetics, a word coined by Waddington in 1942. Waddington understood epigenetics as the study of the "causal mechanisms at work" governing "the relation between phenotypes and genotypes" (Waddington, 2012, p. 10). Today, we talk about the concepts of epigenetics being as 'above genetics'. We have two genomes in all our body cells, each being contributed by one parent, and an epigenome, which provides instruction as to how the genome will be expressed. Metaphorically we can think of the genome operating like the hardware of a computer and the epigenome as operating like software which gives instructions to the genome to differentially express the genes. Plasticity, as the word is used in biology, refers to the ability of many organisms to change their biology or behavior in response to changes in the environment ("ResearchItaly: Biological Plasticity," 2013). Neuroplasticity describes the remarkable capacity the brain possesses to reorganize pathways, create new connections and, in some cases, even create new neurons (Doidge, 2007; Gopnic & Melzoff, 1999; Hockenbury & Hockenbury, 2007). Today, we know that our brains undergo daily renovations to adapt to our ever-changing world (Wesson, 2010). All this is understood by learning about the biology of the cell and the cell membrane. Consider this further in light of the discussion of learners and teachers' mindsets.

Science continues to apply principles advanced by Waddington to address questions about how epigenetic mechanisms can help people learn, and be creative and innovative through the process of nurturing the internal and external environments. We

know that some factors such as exercise, good nutrition, peer mentoring makes a difference in learning processes. Epigenetics is all about the change of gene expression, the underlying DNA sequence remains the same but by tagging some chemical functional groups we can change the expression of a DNA sequence. There are many scientific papers published in this field. It is at the individual level that the expression of the genes can be modulated, and this speaks to the viability of adopting an individualized, personalized learning strategy. As we develop a pedagogical framework for future courses we should keep a clear focus on the epigenetic aspects developing a mindset for learning. As Lipton (2003) has realized, rather than being controlled by our genes, our cells are controlled by their own perception of the environment.

UNDERSTANDING THE LIFELONG LEARNERS' MINDSET

Recently, I had the most interesting experience of teaching a lecture series on Genetics and Epigenetics for the Osher Lifelong Learning Institute (OLLI). The participants in this non-credit educational series were adult learners. Having taught undergraduate Biology and Anthropology students for so long, I was struck by how different the mindset of these learners proved to be. Here, I could clearly see that, after a full life career, individuals were actively engaged in learning. When I teach adult learners in my regular courses, my students are either changing careers or have just started or resumed college studies. With the OLLI students I noticed a much more flexible mindset. The sooner the learner learns to have a flexible mindset, the sooner deeper learning happens, and faster the learner finds the path to success. The lifelong learners had already had a successful career and knew how to maintain the flexible mindset they required to learn new material. Essentially, these students did not require the *office hours* construct to guide them to the learning mindset.

UNDERSTANDING THE MINDSET OF INDIAN FACULTY

Even more recently I experienced a similar epiphany about learners who possess a predisposition to adopt a learning mindset without the need for my *office hour* structure. I had not returned to India to teach since 1993. While I had delivered a few keynote addresses and had presented a few lectures in my homeland, I had neither taught nor designed educational content for an Indian audience in over 20 years until this past December, when I led a team comprising IT administrators and faculty members to conduct an International Institute. UMass Boston offered the institute in collaboration with Shaheed Rajguru College of Applied Sciences for Women (Delhi University). The topic of the institute was "New Frontiers in Global Learning and Communications," and the subject matter was extended learning on eLearning. Our delegation worked with 51 Indian faculty members from 14 different universities and 20 institutions. Participants were provided with information and presentations on various topics including Exploring New Frontiers, Emerging Technologies, Writing and Reading in 21st Century Platforms, Instructional Design Models, Social Learning Theories and Applications, Adaptive Learning Design, and Assessment. Formal instruction was followed by group project development and presentations. The overall objectives of this institute was to train

faculty on how to engage students through the use of new digital technologies and change the mindset of students and other faculty members by providing the tools to enable them to cope with and contribute to the new digitized world. In addition, the event attempted to address needs for developing effective communication skills for both faculty and students, as well as improving writing skills in English, the *lingua franca* of the world today.

The teachers attending this institute had very little experience with eLearning tools prior to attending the institute and had no prior experience in online teaching. These Indian faculty members teach for colleges in which the only delivery format is face-to-face instruction and institutions with university-mandated sets of syllabi provided for all to follow. Nevertheless, within a short period of training, the participating faculty members were able to develop and present outstanding group projects demonstrating mastery of the digital tools and were able to create an online course. This was possible because the learners were already motivated and their mindset enabled them to learn quickly. During the institute we did cover concepts of epigenetics and neuroplasticity which may also have helped in some biological way to make the minds of these learners more creative, innovative and receptive to new concepts. Having kept tabs on members of the institute over the past three months since my return to Boston, I am delighted to learn many are in the process of incorporating the use of Wikis and LMS course shells into their teaching practices.

UNDERSTANDING THE MINDSET OF THE FRESHMEN SUCCESS COMMUNITY

The questions remain how to approach my primary learning population of undergraduate science students, who do not possess the predisposition for a learning mindset. Above we examined among Briceño's concepts Mindset #3: Sense of Belonging: "*I belong in this learning community*." It may be that learning community proves the most important element of the toolbox to foster the learning mindset. I myself recently joined a new learning community when I began teaching freshmen biology students who belong to a success community connected to the UMB College of Science and Mathematics (CSM) Student Success Center (SCC), a program established in 2008-2009[4]. The Center fosters belonging through programing that includes a peer mentoring program. Working through SCC, I began a project involving students in pure observation and provided each student with an iPad to collect unique observations seen in nature. At the end of the semester, students had collected valuable observations which they presented in the form of group projects. My goal in this project has been to nurture the minds of these STEM beginners in an effort to set them on the path to successful inquiry. My preliminary observations regarding their levels of engagement with the learning suggest they may achieve the deep learning Ginnis describes.

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[4] See Student Success Center - University of Massachusetts Boston at for details regarding the full services of the CSM SSC: http://www.umb.edu/academics/csm/student_success_center

UNDERSTANDING THE MINDSET OF UMASS BOSTON FACULTY MEMBERS

I have proposed that faculty members as well as students require the learning mindset and I extend that to suggest that faculty members therefore require the same belonging within a learning community I describe in a student context, above. This spring, I participated in such a learning community as the facilitator of a seminar for the non-tenure-track faculty members of UMass Boston. This has been a unique experience during which I have interacted with my colleagues on a weekly basis addressing issues around pedagogy, when teaching with and without technology. Eight faculty members were participating from different disciplines in this seminar in which we addressed topics similar to those covered in the Institute I led in Delhi, though at UMB this learning community convened for a semester long interaction. We viewed and discussed the various aspects of bringing about innovation in our individual classrooms. As I interacted with fellow members of the faculty I engaged in the process of understanding the mindset of teachers from different disciplines. The members of this group learned from the strengths of their colleagues. To begin the seminars, I uploaded all materials into an LMS course shell so that faculty members would be able to use the LMS from the important perspective of a student. Here I will note that I perceive the mindset of students in my fully online courses to be quite different from that of students in my on-ground courses. While in face to face classes students can be passive participants, my online students have to communicate through the threaded discussion platform. Most of my online students jump into the weekly modules on a regular basis and keep to the discipline of finishing the work on time.

Some faculty members in the seminar I led found it easy to jump into the learning. Some had already been using the LMS for their course enhancement. A few were actually teaching online courses and therefore had had to use the LMS extensively for their course delivery. However, for others who were just becoming familiar with the delivery system, our group operated as a peer mentoring program not unlike the mentoring service provided to UMB CSM students through the Student Success Center discussed above. Placing the teacher in the role of learner, and mentoring the teacher-learner through peer and facilitator support is one way my institution is helping to establish the mindset Briceño promotes.

I noted above my concern for the mindset of students in my on-ground courses, stating specifically that they are inclined to behave as passive participants, observing that my online learners are, through their use of threaded discussions and synchronous conference sessions, more highly engaged in their learning. Though eLearning options exist for on-ground students, of course, my concern has been to engage on ground learners during our regular course meetings. Here I would like to address my use of clickers in the classroom, an eLearning technology I have adopted in an effort to increase student participation during class meetings.

MINDSETS REGARDING THE USE OF CLICKERS

Clickers are hand-held remote devices with buttons that students push to answer multiple choice questions. That sounds unremarkable, but in my experience, clickers have enabled my students to become active class participants, and that is remarkable. I find that once I pose a multiple choice question to a lecture hall full of students, they engage in a hustle and bustle until my declaration of the answers established by the science we are studying. The literature suggests my experience is commonplace. Research by Osterman (2007) suggests clickers make traditional lectures feel qualitatively different and that the use of clickers helps students become more actively engaged in the classroom learning process. Kenwright (2009) has asserted the important attribute of clickers is the immediate feedback and assessment they provide to both the instructor and the students. Hatch, Jensen & Moore (2005) found clickers helped instructors to assess student knowledge immediately and to help identify problem areas and misconceptions that could be addressed before students had left the classroom harboring misconceptions. Keough (2012) published a review of 66 studies of student perceptions and/or outcomes associated with the use of clicker technologies which tracked eight general student perceptions/outcomes: actual performance, satisfaction, perceived performance, attention span, attendance, participation, feedback, and ease of use. Overwhelmingly these studies found benefits to the use of clickers in both student performance and student outcomes, as shown in Table 1, directly below.

Actual performance	Overall, the findings indicate significant increases in performance when clickers are in use (p. 826).
Satisfaction:	Overall, the findings indicate students experience high levels of satisfaction when clickers are used (p. 827).
Perceived performance:	Overall, the findings indicate students perceive that the use of clickers increases their performance (p. 827).
Attention span:	Overall, the findings seem to provide strong evidence for contributing to student attention span (p. 827).
Attendance:	Of … 9 studies, 7 found significant increases in attendance when clickers were used as compared with attendance rates in similar classes without clicker use (p. 827).
Participation:	With this one exception, the findings indicate high levels of student participation when clickers are in use (p. 828).
Feedback:	Overall, the findings indicate students perceive that clickers provide a high level of feedback (p. 828).
Ease of Use:	Overall, the findings indicate that students find clickers easy to use (p. 828).

Table 1: Overall findings from Keogh's review of 66 studies in eight categories of assessment of students' uses of clickers

Keogh's review makes the clicker story seem simple success narrative but other studies reveal that the achievement still depends upon reflective teaching practice. Connor (2009) found one of the biggest challenges for teachers using clickers was to craft meaningful, thought provoking questions at an appropriate level for the students. I've

found that to be case for the past few years I have been using clickers to increase student participation and engagement in the lecture hall classes I teach to over 100 students. However, the results of my own preliminary research suggest that most students value our use of clickers to some degree. From a simple poll I administered to 50 students in my Biology 101 course taught spring 2014, I found that 30% of the students felt that clickers in our classroom practice were "very useful," 48% felt clickers to be "somewhat useful," while 22% rated clickers to be "not useful at all" to our classroom practice. Illustration 1 below provides these results in bar graph format.
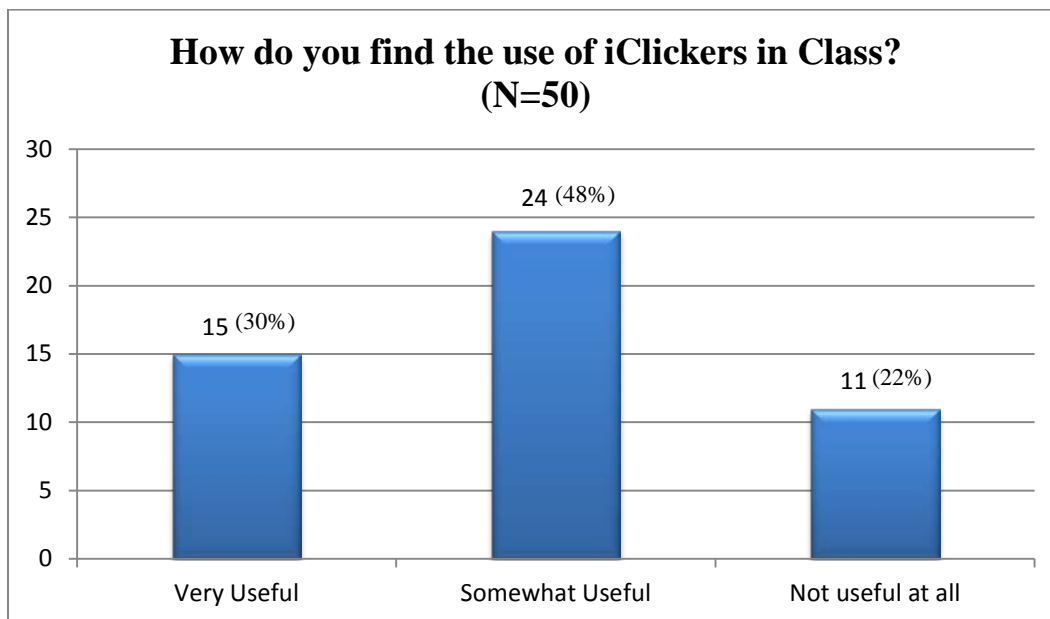
Illustration 1: Student ratings of usefulness of clickers

       Recalling that my *office hour* protocol is designed to help improve learners' mindsets by removing their sense of being overwhelmed by complex textbook language and scientific concepts, I further polled my students to learn if they felt the use of clickers reduced the degree to which they felt intimidated by learning during class meetings. 46% selected "yes" as their answer to the question, "do you feel less intimidated answering questions using the clickers;" 40% indicated they were "somewhat" less intimidated; 14% indicated "no, not at all" did clickers lessen their level of intimidation with learning during my lectures. Illustration 2 below provides this date in bar graph form.

Do you feel less intimidated answering questions using the iClicker? (N=50)
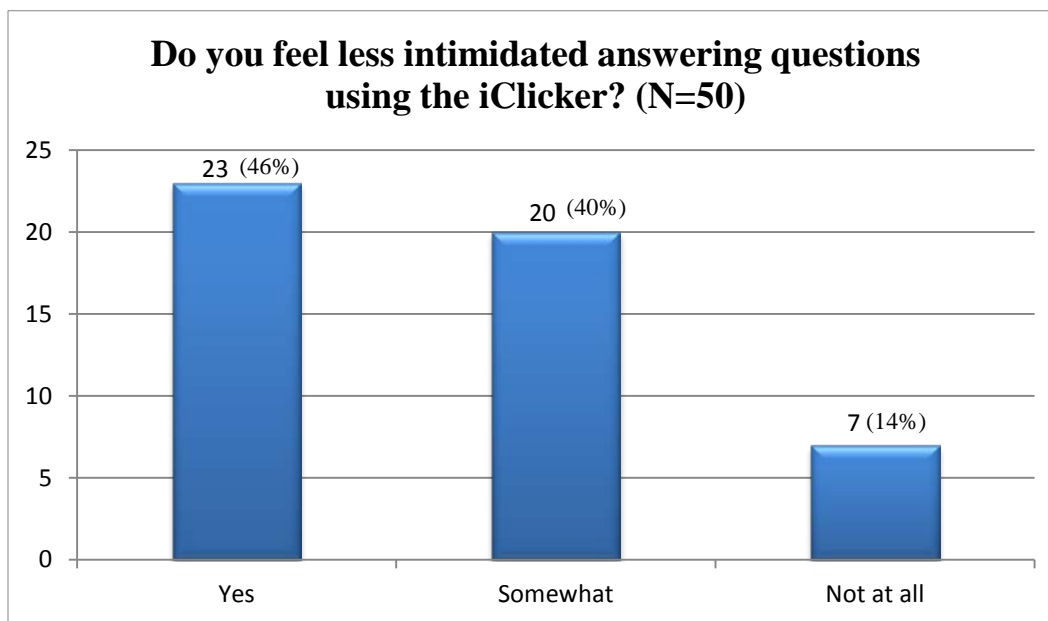
Illustration 2: Student perceptions regarding clickers' capacity to lesson feelings of intimidation

Although it is generally assumed that clickers are best suited for use in large classes (Mollborn and Koekstra, 2010; Peterson, Kilpatrick and Wobbkenberg, 2010), I have once in the past used clickers in a small class setting, and found them to be equally effective for promoting class participation in the small groups. This is not especially surprising. Established and recent studies support the contention that clickers can add value to small as well as large classes (Caldwell, 2007; Sevian and Robinson, 2011). Beckert, Fauth & Olsen (2009) conducted a simultaneous study comparing the use of clickers in a small upper-division level course and a larger lower-division level course. The researchers actually found that members of the smaller class had slightly higher favorable ratings of the clicker use than members of the larger course.

CONCLUDING REMARKS

The writing of this field study has provided me with the occasion to examine my own eLearning practices and the basis for those practices. At the same time I have mapped my teaching against literature on the use of the technologies I've used and brought to the forefront reports of how the landscape may be changing, calling into question my readiness of mindset to adapt. Recent trends in the literature show that educational institutions are attempting to adopt practices that support flexibility, inclusiveness, collaboration, authenticity, relevance, lifelong learning, and are extending institutional boundaries, and promoting global interactions; the acquisition of meta-cognitive knowledge and skills are all on the rise (Felix, 2005). Role reversal will be the

order of the day, with the teacher becoming the learner and the learner becoming the teacher in a short time span.

In a detailed report within the Higher Educational Academy project entitled "Flexible Pedagogies: preparing for the future," Gordon (2014) discusses how the learners can pace, place and mode their learning, leading to a personalized learning experience. He suggests that learners can choose a wide range of devices and platforms for learning. With so much flexibility, new issues surface for the institutions including concerns regarding plagiarism and other serious management issues. It would be easy to turn away from this landscape, hunker down and say, good enough. I question, though, if teachers of the future have the choice to say, 'no thanks; I do not need all these technologies?' Perhaps adoption will remain a matter of free will, but I intend to follow the Darwinian principle regarding survival of the fittest. Whether a teacher wants to go tech or not, students are on the move with great speed, either because the IT industry has gone so far so swiftly that the common citizen is already wired in different ways, or because eLearning tools really have made great strides in helping to deliver difficult concepts in easier fashions. Here again different scenarios can emerge; one might be that the teacher is more tech savvy compared to the students or another that the students in class are more prepared. We have today a mixed bag of people, be they the teacher or the learners. Therefore, I predict that, in order to relate to the students, a teacher will have to know at least the basics of the new technologies. Otherwise the teaching and practice will not go hand in hand when a teacher tells the students to learn subject matter new to the student, while the teacher shows no capability to learn new technologies. Thus, in today's world we all have to develop a new mindset to be able to adapt to a new digital era. I believe the teacher's eLearning pedagogy must include this flexible, growth oriented learning mindset, an epigenetic approach.

Looking at my teaching journey through the years, I conclude that technology has kept me engaged in the process of learning. Now more than ever, though, I feel the need for an overt pedagogy of eLearning that acknowledges that teachers and learners must embrace the mindset to adapt.

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Dewey, Desi, and DEC: Exploring the educational philosophy of Indian open, online, and distance education

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ABSTRACT

This paper explores pedagogical underpinnings of current Indian open, online, and distance education. Tracing the history of national and cultural adherence to the precepts of American educational theorist and philosopher, John Dewey, the paper notes the Deweyesk perspective has not translated into constructivist distance educational practices. The work surveys the history of distance education in India, and reviews literature in the field produced by Indian academics, whose recent reports suggest that online education may be transforming Indian educational philosophy, bringing a more constructivist approach to teaching on the sub-continent.

- The paper is organized into the following sections:
- A brief history of open, distance, and online education in India
- The role that John Dewey's ideas play on the subcontinent
- Philosophical underpinnings of Indian online education
- The current state of Indian online education

KEYWORDS: John Dewey, Web 2.0, Open Education Resources, elearning, online learning, e-education, constructivism, Pragmatism

INTRODUCTION

This paper will explore the pedagogical underpinnings of current Indian online education. The paper takes its name from the American educational guru and philosopher, John Dewey, the Hindi word "desi" which loosely means "local", and DEC, the Indian Distance Education Council. Recent reports suggest that online education is transforming Indian educational philosophy, bringing a more constructivist approach to teaching on the sub-continent.

The paper will be organized into the following sections:

- A brief history of open/distance/and online education in India
- The role that John Dewey's ideas play on the subcontinent
- Philosophical underpinnings of Indian online education
- The current state of Indian online education

A BRIEF HISTORY OF OPEN, DISTANCE, AND ONLINE EDUCATION IN INDIA

IGNOU

IGNOU, or the Indira Gandhi National Open University, was first created by an act of Parliament in 1985. With over three and a half million students, it is the world's largest university and serves both urban and rural students with the mission of offering citizens everywhere access to a quality education. IGNOU is an open institution, allowing students of any age the opportunity to pursue a university program. For many students, IGNOU delivers education at a distance using a variety of delivery models including distribution of printed materials, video and television, and more recently, online education.

DEC

Also created in 1985 under the IGNOU act, the Distance Education Council (DEC) was formed to coordinate and promote the IGNOU. DEC's responsibilities include setting and maintaining academic standards in distance education and making "full use of the latest scientific knowledge and new educational technology" to support education at a distance. DEC is responsible for authorizing any distance education endeavor in India.

IITS AND THE ELITES

The 1951 Institutes of Technology Act created what are known as the IITs, or Indian Institutes of Technology, the premier and most highly competitive educational institutions in India. Although traditional and risk averse in many arenas, the IITs have at various times taken leadership roles in the undertaking of various technological projects that expand the scope of distance education, particularly in online and mobile learning. Of note is IIT Bombay with its video course offerings, provided for free over the Internet.

THE ROLE JOHN DEWEY'S IDEAS PLAY ON THE SUBCONTINENT

Within limits, we may say that Dewey is the key figure in educational philosophy in the U.S. Born in Vermont, educated at several universities including the University of Vermont and Johns Hopkins University, teaching at the University of Chicago, where he was one of the founders of the University's Laboratory School, and at Columbia, where the Bank Street school began, Dewey's progressive educational ideas stood in sharp contrast to earlier educational approaches, whether those anchored by the teaching of Greek and Latin, or those focused primarily on rote memory. Arguing that those conservative approaches were not worthy of the name of education, Dewey proposed that education should not be regarded as preparation for a student to engage with the world but that education should be part of the world. Curriculum should support this idea, too. Hence, a curriculum should steep a student in daily, practical activities such as cooking,

citizenship, and democracy, because these are the very activities in which every adult must participate. Indeed, most of the constructivist ideas that have marked U.S. education for the past forty years trace their intellectual lineage to Dewey. "My Pedagogic Creed," Dewey's educational philosophy essay, clearly defines the nascent constructivist movement a full seventy years before others took up its ideas. "The individual who is to be educated is a social individual and … society is an organic union of individuals," (p. 6) wrote Dewey, expressing the core idea which crafts the relationship between learning inter-psychologically and learning intra-psychologically.[1] Dewey becomes even more explicit when writing "that the psychological and social sides are organically related" (p. 5). Here the term, "organically," refers to that which is natural or innate.

Notice that in both of the above statements, Dewey uses the word organic, not in the manner that a breakfast cereal might, but rather to bring home the notion that learning grows out of its situation within the world rather than functioning as consequence of a clearly defined pathway. An educational structure is a scaffold, not a mold. In our era, Dewey's ideas are often associated with social learning media. Glassman and Kang (2011) suggest "[t]he promise of the Web 2.0 is similar to ideas proposed by Ambrose Pierce and John Dewey" (abstract), explaining that "[a]t the core of Web 2.0 tools is control of data by users, architectures of participation, remixable data and the ability to transform data, and the harnessing of collective intelligence" (94). Brown and Adler (2008), argue that "the most visible impact of the Internet on education to date has been the Open Educational Resources (OER) movement (p. 18), which they associate with "the practice of what John Dewey called 'productive inquiry'" (p. 20).

In the most telling line from his creed, Dewey states that "the process and goal of education are one and the same thing" (p. 13); indeed, this is perhaps the most defining line of the entire constructivist movement. For Dewey and his followers, knowledge is not something that can be transmitted; it is not a thing; rather it is the process itself by which we make meaning of the world.

Although the US educational system makes much of Dewey's views, he also was firmly entrenched within the philosophical movement known as American Pragmatism, exemplified by the writings of Pierce and James. Followers of American Pragmatism asserted that knowledge comes from the adaptation of man to his environment. The word spread in form of a philosophy more so than an educational movement. In India, it is not unusual to find Dewey regarded as the exemplar of non-Platonic philosophy rather than as an educational guru. Dewey's role in Indian intellectual life is best exemplified by the writings of B.R. Ambedkar (Mukherjee, 2009). It is Dewey's progressive thinking that set in motion Ambedkar's attack on the Indian caste system and the establishment of the rights of the untouchables. Significantly, India's first president, Jawaharlal Nehru, sent greetings to Dewey on the occasion of Dewey's ninetieth birthday.[2] Moreover, Dewey was no stranger to India intellectual endeavor; he wrote the introduction to Chatterji's *India's Outlook On Life: The Wisdom Of The Vedas* (Chatterji, 2007).

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[1] This distinction speaks to the role that social learning has in individual learning
[2] Information regarding the birthday greetings Jawaharlal Nehru sent John Dewey from the Dinner Program retrieved from the Dewey Center at Southern Illinois University.

PHILOSOPHICAL UNDERPINNINGS OF INDIAN ONLINE EDUCATION

Indian online education is part of the worldwide mainstream of educational thinking, different, perhaps, from that in the US, but not so much so because its primary language is still about access, scalability, and the hope that technologically-mediated education will improve the lives of its people.

Dewey was the quintessential progressive educator, and many educationalists worldwide embrace his ideas, specifically those that speak to a "constructivist" approach to learning, an approach that assumes meaning is made at the intersection of idea and experience. Constructivism stands in sharp contrast to the behaviorist model of learning, which focuses on changes in observable behavior and is shaped by a subject's response to stimuli. Often, though, the endorsement of Dewey's ideas comes only in words, not in the acts of designing and discussing teaching and learning. Indian educationalists are no exception. A survey of Indian online educational researchers and theorists reveals that pattern.

THE CURRENT STATE OF INDIAN ONLINE EDUCATION

Given the Indian proclivity to embrace Dewey, the philosopher, we might ask if Dewey's educational ideas have permeated the area of online education in India. The remainder of this paper will explore the nature of online pedagogy within the context of that question.

India has embraced both open education and distance education, and has embraced the use of technology. As a socialist democracy, India is committed to providing access to its educational system. As mentioned in the opening paragraphs, India's Indira Gandhi Open University is the largest such institution in the world. But it has been less than "cutting edge" in the employment of technology. IGNOU is still largely a correspondence center with various local hubs to provide additional face-to-face support. That being said, there is a wide body of literature that discusses how technology is now facilitating education throughout India.

Multimedia is supplanting text in some educational offerings. Sahni and Sharma (2012) discuss a study whereby teacher trainees involved in a distance learning course were given material in one of two forms, text or picture and sound. What's revealing is not so much the outcome of the study[3], but how the researchers *present* the study. They couch the language of the report in behavioral terms: "If information is presented via two or more of these channels, there will be additional reinforcement" (p. 35). Additionally, they take an almost anti-constructivist approach as if making meaning is not to be encouraged: "If words alone are presented to the learners, they try to form their own mental images and this may cause them to miss the actual points of learning" (p. 35).

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[3] Sahni and Sharma reported that the multimedia program provided better learning and was more effective with low achievers than high achievers.

Juxtapose this idea with a recent paper by Kumar, Tewari, Shroff, Chittamuru, Kam and Canny (2010): In a study of mobile learning, they focused specifically on unsupervised learning with mobile phones. They referred to the material being accessed as having "educational content" yet at different occasions, referred to them as "eLearning games" or simply as "games." The study itself looked at rural children and explored two major issues: access to electricity to charge the phone and the social networks created to use the phone. The researchers treat the social relationships, and the importance of those relationships to the learning endeavor, as of importance at least equal to the way phone use enabled access to new content, an idea much more in tune with Dewey's ideas of making schooling an integrated component of life rather than an activity distinct from life.

Where Kumar et al open exploration of networked relationships and embed those within a social constructivist approach, Lama and Kashyap (2012) tie their study of community radio in open distance learning even more specifically to Dewey's work. Here the language itself echoes Dewey: "Education has to be set in a practical world" (p. 244). Lama and Kashyap describe a community radio project as being focused on the practical as well as the academic. For youth, programs on how to take a job interview coexist alongside courses in tourism and hospitality management. For women, programs run the gamut from women's legal issues to beauty and health topics. And, it should also be pointed out that full degree programs are offered in computer networking, journalism, and library information science. The community radio programming these researchers describe exists at the bachelors' and post-graduate level.

Sharma (2012) takes a different stance in exploring distance education and the barriers to learning. He explores the problems of "loss of student motivation due to the lack of face-to-face contact with teachers and peers" (p. 45) and lumps together the traditional correspondence, print media model with models that are electronically mediated, dismissing the difference based on the premise that the barriers exist regardless of the medium. Yet he does suggest that attention must be paid to create new models of learning, noting that "participatory and active learning models are preferred by distance learning students" (p. 45).

Thomas and Kothari (2011) discuss the opportunities and problems of the entire open source movement in India, particularly with regard to the digital repositories of the Indira Gandhi National Open University. The main repository is E-GyanKosh, where all copyright is reserved by IGNOU. While other open universities in India may use all of these materials, users cannot reuse, remix, copy or build upon the contents. Indeed, E-GyanKosh even has a wiki that is protected by copyright. Only the Indian Journal of Open Learning (IJOL) holds a creative commons license.

Shinde and Deshmukh (2012) place web-based education within a framework supported by Dewey's pedagogical perspective by recognizing the importance of creating global citizens as one of the primary roles of education. "It is only through improving the educational condition of a society that the multi-faced progress of its people can be guaranteed" (p. 90). Shinde and Deshmukh cite the use of technology in the schools as

an indication that India is keeping pace with the educational systems of other nations in the world. They particularly discuss online education as a method to bring the educational advantages of an urban experience to rural students as well. The authors also discuss uniformity of curriculum as an outcome of web-based technologies, and specifically target interactivity, speed, and flexibility as key components on how Indian education is making use of eLearning. Their paper also explores the use of blended learning and the sharing of Internet links among students and teachers on "an almost daily basis" (p. 91). While the authors point out the technical advantages of bringing web-based education into the educational mainstream of India, they also note some of the social benefits cited by U.S. educators such as creating a more diverse student body, supporting life-long learning, and the democratization of education. Additionally, they believe that the current use of the Web in Indian education is shifting the very method of education: active, student-centered, dynamic, group work on real world problems, student directed, developing competencies, all straight out of Dewey's work of a hundred years ago.

     As democratic as open and distance education is, it has typically carried a stigma and by many is considered inferior to traditional face-to-face education. While this is changing in the U.S., globally such an attitude remains; however, Rao (2006) reports the shifting of attitudes in India where, because of digital technologies, distance education is gaining in status. Rao's report was written a full 6 years before that of Shinde and Deshmukh's and perhaps consequently we do not see the same Dewey-like understanding of education. Distance education, per Rao, "is a modality consisting of a broad, mixed, category of methods to deliver learning" (p. 228). For Rao, then learning is *delivered* rather than co-developed; information and knowledge are disseminated rather than constructed. The following statement by Rao enables us to better understand the structure of Indian distance education:

> In India there are four types of institutions offering distance education, namely: IGNOU, State Open Universities, Directorates of DE functioning under conventional Universities (Dual Mode Universities) and private professional institutes. However, only the IGNOU uses third generation tools (Internet based education)…. (p. 228)

     Lama and Kashyap (2012) embrace a decidedly *Deweyesk* perspective which identifies distance learning as a tool to empower humanity. For some reason, though, they place the individual at a distance from the learning experience by their consistent use of the term "Human Resources" when referring to humans engaged learning. That said, they do note the fact that forms of distance education that employ digital resources provide flexibility in curriculum "which can be molded and shaped according to the need of the society" (p. 243).

     Singh, Singh, and Singh (2012) tackle the differences between a traditional and an open educational system, particularly as seen through the eyes of rural versus urban students. Their study looked at satisfaction levels and draws the conclusion that rural students were much more satisfied with open education provided through a distance education model than with traditional, teacher-led education. In particularly, students felt

that it was important to be offered a curriculum that understood their backgrounds and noted they felt estrangement as outsiders in the cities to which they otherwise would have to travel and live in order to engage in traditional education.

Ibrar (2012), a computer scientist, focused on the technology of India's online education and it is here that we begin to see the full range of possibilities: blogs, social bookmarking, wikis, RSS feeds, podcasts, instant messaging, text chats, and Internet forums are all used within the Indian online context. In his breakdown he employs the dimension of time, splitting VoIP, WebEx, videoconferencing, chat rooms from the asynchronous email, printed courseware, and even compact discs. Although Ibrar presents the potential for a *Deweyesk* teaching model, he describes the use of "existing materials and present theme as a static package via the Internet" (p. 8). He also focuses on the idea that content "is delivered" (p. 8). Ultimately, Ibrar proposes a very non-constructivist, *non-Deweyesk* approach, as represented in this sentiment: "[T]he entire course content is planned properly and includes various activities and assignments so as to make sure that the student learns in a comprehensive and proper manner" (p. 8).

Anitha (2012) prepared a study comparing eLearning and traditional learning in management education. She sought a rationale in the literature for choosing one over the other and cited two trainers in the business realm who addressed the limitations of online education with regard to the teaching of soft skills. She then prepared some charts that showed both pedagogical effectiveness and preferred learning mode, a figure which favored hybrid over traditional and traditional over online; however, she failed to demonstrate how she arrived at these measures.

Anand, Saxena and Saxena (2012) looked at the impact of eLearning on rural areas and find the practice is growing. Although they frame their discussion firmly in terms of "delivering" education, they move into the *Deweyesk* realm when talking about the development of "people's social and mental ability" (p. 51). Additionally, they distinguish eLearning's most important audience as the rural and/or poor gentry.

Bhateya and Rani (2012) define "e-education" as "the process of learning online" (p. 1), and discuss "the status of e-education and India." The authors cite market projections for the growth of the online learning industry in India (an increase from $10B to $45B over three years) to demonstrate the national commitment to a new educational paradigm. This article explores the Khan academy, Educomp, edX and Udacity's recent projects, and lists a host of benefits resulting from online learning including "real-life application of classroom materials" (p. 4). But the most clearly articulated alignment with a student-centered and *Deweyesk* approach rests with their endorsement of the idea that online learning can provide students with enriched learning experiences, support more successful learning strategies, and personalize students' educational experiences.[4]

Das (2010) argues that open and distance learning must move beyond the normal advantages (cost-efficient, more convenient, etc.) and focus on quality: quality of material, quality of the learner. Das suggest it is particularly important to ensure "learning outcomes comparable to the on-campus program" (p. 168). Indeed, he mentions that educational objectives need to be defined for each online course. Das explores student-faculty interaction, group activities, and access to academic services.

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[4] Here we may see future exploration of adaptive learning

He uses "learner-centric" (p. 169) language throughout a discussion of faculty development and explores the notions of access, quality, and continuous evaluation of the student.

Shah and Balam (2013) look to online education as a potential force for equalizing urban and rural educational offerings; Dewey himself was a strong supporter of rural and agricultural education. However, the language in their work suggests that they too see eLearning as something to be delivered whole rather than co-created. Yet, as dated as this approach might seem in light of the differentiation I've made between behavioral approaches to education and Dewey's constructivism, Shah and Balam describe email and chat as facilitating communication "among students and between students and the instructor" (p. 21) If, however, we are to draw conclusions about their constructivist credentials, their concluding lines show that they have a way to go; they suggest online "[c]ourses will be designed with the art of interactivity and the magic of good E-learning" (p. 21).

Finally, Kumar (2014) compares open-online education between India and China. He discusses how eLearning can improve "the quality of life of the people" (p. 126) by making education accessible in the "remotest corner of the county" and discusses the "heightened level of interaction with learners and learning resources that can ameliorate the conventional barriers of isolation…" faced by distance learners (p. 128).

In discussing online education, the cited researchers run the gamut from traditionalists to the Frierists, from those who think that information poured slowly into the learner's head will gel over time, perhaps even ferment, to those who understand education as a process of exploration, development, a process of becoming human. Ultimately even those who most seem to discuss knowledge as "a thing to be transmitted" appear to embrace Dewey's core commitment to educating students to become active participants in a vibrant, democratic society. This theme seems to run through every report originating from India, the world's largest democracy.

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Logging in to Learning Analytics

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ABSTRACT

According to the most recent Higher Education Editions of the Horizon Report (Johnson et al., 2013; Johnson, Adams, & Cummins, 2012; Johnson, Smith, Willis, Levine, & Haywood, 2011), learning analytics (LA) is an emerging technology that will be widely adopted within the next few years. In this article, I use the McKinsey 7S Model (Waterman, Peters, & Phillips, 1980) as a way to organize a review of the learning analytics (LA) literature, in order to help organizational leaders assess and increase an organization's readiness for LA. More specifically, I identify the 7 areas of an organization that need to be aligned for optimal performance; and explain what suggestions and cautions the current LA literature offers in relation to each of the 7 areas.

KEYWORDS: learning analytics; organizational assessment; McKinsey 7S, higher education, online education

INTRODUCTION

"Learning analytics" is defined by the Society for Learning Analytics Research (SOLAR) as: "The measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environment in which it occurs" ("About," n.d., para. 3). According to the most recent Higher Education Editions of the Horizon Report (Johnson et al., 2013; Johnson, Adams, & Cummins, 2012; Johnson, Smith, Willis, Levine, & Haywood, 2011), learning analytics (LA) is an emerging technology that will be widely adopted within the next few years. In this article, we use the McKinsey 7S Model (Waterman, Peters, & Phillips, 1980) to organize a summary of the LA research and to offer support to leaders who want to assess and increase their institution's readiness for LA. More specifically, we describe the seven areas of an organization that need to be aligned for optimal performance and explain what suggestions and cautions the current LA literature offers in relation to each of these areas.

What do leaders in the assessment of student learning and development have to gain by welcoming the arrival of LA? To quote Long and Siemens (2011):

> The idea is simple yet potentially transformative: analytics provides a new model for college and university leaders to improve teaching, learning, organizational efficiency, and decision making and, as a consequence, serve as a foundation for systemic change (p. 32).

The enthusiasm of Siemens and Long is shared by many others in the higher education field (e.g., Campbell & Oblinger, 2007; Crow, 2012; Oblinger, 2012a, 2012b; Parry, 2012; and, Buckingham Shum, 2012b). In a study of the current state of LA, Bichsel and Grajek (2012, June) found that the vast majority (84%) of institutions believed LA was more important for the success of higher education now than two years ago and (86%) anticipated that it will be even more important two years from now. Unfortunately, there are risks inherent in acting too soon as well as in acting too late (Stiles, 2012).
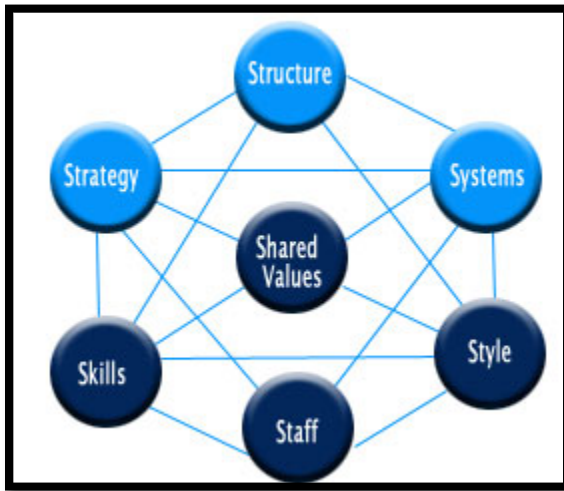
Figure 1: The McKinsey 7S Model (Source: McKinsey & Company)

According to Waterman, Peters, and Phillips (1980), an organization needs to be aligned in seven areas to perform well: shared values (super-ordinate goals); strategy; structure; systems; style; staff; and, skills. The model they formulated—known as the McKinsey 7S—has been widely used over the past 30 years to prepare for and implement various organizational changes (Carter & Carmichael, 2009; McKinsey & Company, 2008; Peters, 2011). By comparing the current situation to a proposed future situation, the McKinsey 7S Model helps to identify vulnerabilities and inconsistencies that could otherwise undermine change efforts ("The McKinsey 7S Framework," n.d.). Proponents suggest organizations should use the 7S model to assess and increase readiness for any significant initiative.

Shared Values: What ideas are commonly held regarding what is considered "right and desirable" for the organization and for individuals (McKinsey & Company, 2008, p. 112)? How are these ideas evidenced in the culture and work ethic ("The McKinsey 7S Framework," n.d.)?

Suggestions:

Booth (2012) suggests that the adoption of analytics be guided by the "9 Principles of Good Practice for Assessing Student Learning," published in 1992 by the American Association for Higher Education's (AAHE) Assessment Forum, "if learning analytics is ultimately to be a transformative set of practices and tools for improving student learning" (p. 52).

9 Principles of Good Practice for Assessing Student Learning (Astin et al., 1992)
- The assessment of student learning begins with educational values.
- Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.
- Assessment works best when the projects it seeks to improve have clear, explicitly stated purposes.
- Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes.
- Assessment works best when it is ongoing not episodic.
- Assessment fosters wider improvement when representatives from across the educational community are involved.
- Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
- Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.
- Through assessment, educators meet responsibilities to students and to the public.

Cautions:

Learning analytics efforts that are not guided by such values or principles could result in collection of data that is:
- (incorrectly) assumed to be ethical, just because it is accessible (Boyd & Crawford, 2011; Brown, 2012)
- superficial or simplistic (Buckingham Shum, 2012a, 2012b; Buckingham Shum & Ferguson, 2011; Parry, 2012; Shattuck, 2012; Siemens, 2012b)
- treated as more objective and accurate than it actually is (Boyd & Crawford, 2011; Griffiths & Getis, 2012)
- used for purposes unrelated and even antithetical to student learning (Buckingham Shum, 2012; Parry 2012).

Shared Values (or Super-ordinate Goals): What ideas are commonly held regarding what is considered "right and desirable" for the organization and for individuals (McKinsey & Company, 2008)?

7S Checklist Questions ("The McKinsey 7S Framework," n.d.)
  Shared Values:
- What are the core values?
- What is the corporate/team culture?
- How strong are the values?
- What are the fundamental values that the company/team was built on?

Strategy: What actions are taken to gain and maintain competitive advantage (McKinsey & Company, 2008)?

Suggestions:

Suggested steps for developing a learning analytics strategy include:

- arrange informal discussions with key stakeholders on campus to elicit their concerns and priorities (Campbell & Oblinger, 2007)
- list the institutional pressures that analytics could address on your campus (Campbell & Oblinger, 2007)
- clarify what you hope to achieve (whether on the level of the individual, course, department, or institution) and ensure it is consistent with institutional priorities (Campbell & Oblinger, 2007; Cavanagh & Dziubian, 2012)
- help stakeholders see the connection between learning analytics and institutional priorities (Griffiths & Getis, 2012; Smith, 2012, 2011; Wagner & Ice, 2012)
- design projects with the ultimate audience(s) in mind (Brown, 2012, 2011; Brown & Diaz, 2011; Ferguson, 2012; Siemens, 2011b)
- identify what data your organization currently collects (Brooks, 2012a; Petersen, 2012; Pistilli & Arnold, 2012; Pistilli, Arnold, & Bethune, 2012; Sharkey, 2012; Smith, 2012, 2011; Soares, 2012)
- craft the questions you will need to ask in order to achieve your goals and select relevant data (Brown, 2012; Educause, 2011; Griffiths & Getis, 2012; MacFadyen, 2012; Swan, 2011; Tozman, 2012; Wilkinson & Crews, 2011)
- develop a list of other organizations that are using learning analytics to address similar problems, particularly among peer institutions, and gather information about their experiences (Campbell & Oblinger, 2007; Wagner & Ice, 2012)
- compare learning analytics project(s) with alternative methods to achieve the same or similar goals (Campbell & Oblinger, 2007)
- estimate ROI based on potential costs (dollars, staff support, faculty time, etc.,) and potential benefits (reduced costs of remediation, increased retention, etc.) (Campbell & Oblinger, 2007; Petersen, 2012)
- consider whether the project can be conducted incrementally (Brown & Diaz, 2011; Campbell & Oblinger, 2007)
- determine what obligations will arise for the institution, faculty, and/or students if the analytics generate actionable results (Campbell, 2012; Siemens, 2011b)

Cautions:

The primary caution is not to expect *immediate* full and enthusiastic support from all stakeholders. As Smith (2012) points out, "analytics is not just a tool but also a business and change process, and as such, it's useful to consider successful organizational approaches to change…." (Diaz & Brown, p. 10). In order to increase acceptance of and participation in learning analytics, the concerns of each constituency need to be addressed (Campbell & Oblinger, 2011; Messineo, 2011; Oblinger, 2012).

Executive officers may be concerned about privacy, security, return on investment, and, results that are unfavorable for the institution (Campbell & Oblinger, 2007).

- IT may be concerned about the need to adopt new systems, respond to new expectations, and hire new staff with the necessary skills (Campbell & Oblinger, 2007).
- Student Affairs personnel may be concerned about encroachment into their area of student development, inaccurate identification of students at risk, and/or inadequate resources to assist those who are accurately identified (Campbell & Oblinger, 2007).
- Faculty may be concerned about evaluations of their effectiveness, limitations on their autonomy, and/or imposition of additional responsibilities (Campbell & Oblinger, 2007; Educause, 2011; Messineo, 2011; Oblinger, 2012b).
- Students may be concerned about privacy, accuracy, and impersonality (Campbell & Oblinger, 2007; Educause, 2011; Oblinger, 2012b).

Strategy: What actions are taken to gain and maintain competitive advantage (McKinsey & Company, 2008)?
7S Checklist Questions ("The McKinsey 7S Framework," n.d.)
Strategy:

- What is our strategy?
- How do we intend to achieve our objectives?
- How do we deal with competitive pressure?
- How are changes in customer demands dealt with?
- How is strategy adjusted for environmental issues?

Structure: Who reports to whom and how is responsibility for tasks distributed and integrated (McKinsey & Company, 2008)?

Suggestions:
In a recent survey, Bichsel and Grajek (2012) found a number of different structures in support of LA: institutional leadership (president/chancellor); area leadership (provost/CBO); a dedicated LA leader; an operational unit (IT/IR); but, most often, multiple leaders. Among the institutions surveyed, the responsibility for services and activities was most often fulfilled by IT and/or IR. The focus of those LA services/activities was most often in the student and financial areas and least often in faculty areas. While there was no one structure identified as optimal, Bichsel and Grajek (2012) did find that institutions with strong analytics programs were facilitated by substantial collaboration between IT and IR, an observation that others have made as well (e.g., Smith, 2011).
Cautions:
While clear lines of authority and distribution/integration of responsibilities are desirable (even if the location of those lines may vary across institutions), the reality is that people at the systems/enterprise level, researchers, and educators may operate independently and possibly redundantly. Even if there is strong support for learning

analytics among various constituencies, the "silo-ed" nature of many/most universities may make it difficult to move forward in a streamlined way (Booth, 2012; Brooks, 2012b; Campbell, 2012; Diaz & Brown, 2012; Little, 2012; Siemens, 2012a, 2012c). Booth (2012) therefore urges educational technologists, instructional designers, assessment specialists, faculty developers, and learning consultants to dismantle any barriers to "working and learning together" (p. 53).

Structure: Who reports to whom and how is responsibility for tasks distributed and integrated (McKinsey & Company, 2008)?
7S Checklist Questions ("The McKinsey 7S Framework," n.d.)
Structure:
- How is the company/team divided?
- What is the hierarchy?
- How do the various departments coordinate activities?
- How do the team members organize and align themselves?
- Is decision making and controlling centralized or decentralized? Is this as it should be, given what we're doing?
- Where are the lines of communication? Explicit and implicit?

Systems: What processes and procedures are used to complete tasks (McKinsey & Company, 2008)?

Suggestions:
The specific processes and procedures each institution uses will depend on its LA strategy and structure. In general, however, institutions need to have (documented) systems in place to ensure appropriate:
- granting of permission/approval from IRB and other relevant departments (Campbell & Oblinger, 2007; Roush, 2012)
- data collection/exclusions (e.g., Brown, 2012; Brown & Diaz, 2011; Campbell, 2012; Diaz, 2012; Fritz, 2012; Long & Siemens, 2011; MacFadyen, 2012; McElroy, 2012; Siemens, 2012a, 2012b; Shattuck, 2011)
- data quality (Brooks, 2012a; Siemens, 2012a; Stiles, 2012)
- data storage/retention/recovery (Siemens, 2012a, 2012b; Stiles, 2012)
- data access/sharing (Buckingham Shum, 2012; Campbell & Oblinger, 2007; Milliron, 2012; Soares, 2011; Stiles, 2012)
- privacy/security of data (Educause, 2010, 2011; Siemens, 2011a; Stiles, 2012)
- data extraction and analysis (e.g., Baron, 2012; Campbell & Oblinger, 2007; Sharkey, 2012; Siemens, 2012a; Siemens et al., 2011; Strader & Thielle, 2012)
- data reporting (Brown & Diaz, 2011; Campbell & Oblinger, 2007; Siemens, 2012a; Smith, 2011)
- improvement/refinement of processes and procedures (Campbell & Oblinger, 2007; Siemens, 2011b; Siemens & Smith, 2011)
- action/accountability in response to results of LA projects/program (Baron, 2012; Brown, 2011; Campbell, 2012)

Cautions:

According to Siemen's (2012c) keynote address at the most recent Learning Analytics and Knowledge Conference, a significant gap currently exists between research and practice in the area of LA. Vendors have stepped in to bridge this gap by developing products and services, but their work is usually considered proprietary (Siemens, 2012b; Siemens et al, 2011). Siemens (2012c) cautions that "the growing prominence of protected IP can hinder iterative and rapid improvements to LA techniques" (p. 1); others in the field also advocate for open systems (e.g., Baron, 2012; Brooks, 2012a; Little, 2012). And while Siemens (2012c) does not believe that improved communication between researchers, vendors, and practitioners [such the panelists in the May 3, 2012 CIEE launch event discussed above] will close the research-practice gap entirely, he does believe that it could make each more aware of the needs and contributions of the other (Siemens, 2012c).

Systems: What processes and procedures are used to complete tasks (McKinsey, 2008)? 7S Checklist Questions ("The McKinsey 7S Framework," n.d.)

Systems:
- What are the main systems that run the organization? Consider financial and HR systems as well as communications and document storage.
- Where are the controls and how are they monitored and evaluated?
- What internal rules and processes does the team use to keep on track?

Style: What style of leadership is adopted ("The McKinsey 7S Framework," n.d.)? How do managers characteristically engage their time, attention, and symbolic activity (McKinsey & Company, 2008)?

Suggestions:

Writers/researchers have drawn attention to the importance of organizational culture in the success of any learning analytics project. Learning analytics projects are more likely to thrive in organizations with an orientation toward "collaborative scholarship" (Booth, 2012), "continuous improvement" (Smith, 2012; Soares, 2012), "quantitative approaches" (Campbell & Oblinger, 2007), a "culture of evidence" (Petersen, 2012) and/or "a culture of assessment" (Hrabowski, Suess, & Fritz, 2011).

Cautions:

When learning analytics projects are not a natural fit with current organizational culture, efforts will need to be made not only to develop the learning analytics initiative, but also a culture conducive to it (Campbell & Oblinger, 2007; Hrabowski, Suess, & Fritz, 2011; Stiles, 2012).

Style: What style of leadership is adopted ("The McKinsey 7S Framework," n.d.)? How do managers characteristically engage their time, attention, and symbolic activity (McKinsey & Company, 2008)?

7S Checklist Questions ("The McKinsey 7S Framework," n.d.)

Style:
- How participative is the management/leadership style?
- How effective is that leadership?
- Do employees/team members tend to be competitive or cooperative?
- Are there real teams functioning within the organization or are they just nominal groups?

Staff: What are the organizational demographics (not the personalities) of the people in the organization (McKinsey & Company, 2008)? Their general capabilities ("The McKinsey 7S Framework," n.d.)?

Suggestions:

Successful learning analytics projects require input from various constituencies on campus (and potentially beyond); the projects, then in turn, produce "output" with important implications for those constituencies (Campbell & Oblinger, 2007; Educause, 2011; Smith, 2012). A number of departments/divisions with personnel whose areas of expertise could be especially relevant for learning analytics, including:

- provost's and deans' offices
- centers for faculty development
- centers for instructional design/development/technology
- enrollment management
- institutional research
- statistics, education, and computer science departments
- IT (including LMS administrators, programmers, user interface experts)
- IRB
- student services

Personnel from other units can be included, as needed, in order to increase awareness and investment in the projects as well as to improve their quality and credibility (Brown & Diaz, 2011; Campbell & Oblinger, 2007). Job descriptions should include learning analytics responsibilities, so as to convey their importance (Brown & Diaz, 2011).

Cautions:

According to Smith (2011) in "Bootstrapping Your Analytics," if personnel do not buy into the learning analytics process, contribute to its development, and/or understand its results, they will not use it. In addition, if personnel experience learning analytics as extra work, without any additional resources/rewards/recognition, they may not be able/willing to give it the attention it deserves.

Staff: What are the organizational demographics (not the personalities) of the people in the organization (McKinsey & Company, 2008)? Their general capabilities ("The McKinsey 7S Framework," n.d.)?

7S Checklist Questions ("The McKinsey 7S Framework," n.d.)

Staff:
- What positions or specializations are represented within the team?
- What positions need to be filled?
- Are there gaps in required competencies?

Skills: What are the skills and competencies of the employees ("The McKinsey 7S Framework," n.d.)? What are the capabilities of the organization, above and beyond those of its individual employees? (McKinsey & Company, 2008).

Suggestions:

The skills necessary for a successful learning analytics program will depend, to some degree, on each of the six areas already discussed. However, the literature does suggest certain areas to consider:

You will need a "project champion," someone who is capable of building infrastructure and enthusiasm for your learning analytics program (Smith & Siemens, 2011).

You will need an IT department that has not only the technical ability for "end-to-end implementation" of a learning analytics program, but also a sensibility about the critical issues for the institution that the learning analytics program(s) will address (Campbell & Oblinger, 2007, p. 16). If the current staff members do not have all the necessary knowledge and skills (which is often the case), they may need to seek out additional education themselves and/or the expertise of others on campus (Campbell & Oblinger, 2007). Individuals who are strong in statistics (including predictive modeling), programming, computer interface and end user experience design, and/or learning outcomes and assessment could be important allies in the learning analytics effort (Campbell & Oblinger, 2007; Smith, 2011).

While evaluation and revision have always been an important part of instructional design and development, the unprecedented access to "real time" data about what/how students are learning both enables and demands "real time" responses. To best support faculty and students, you will need instructional designers who can use learning analytics information to guide "micro-interventions" (Brooks, 2012b) or "rapid prototyping" (Daugherty, Teng, & Cornachione, 2007; Ni & Branch, 2008) on-line and in the classroom.

In their article, "Five Dirty Little Secrets in Higher Education," Noone and Swenson (2001) assert that "professors know a lot about their disciplines and very little about teaching" and "professors know even less about learning than they do about teaching" (p. 24-26). As a result, it is not surprising that Wagner and Ice (2012) ask, "How will educators respond to growing expectations around data-driven decision making when their 'art of teaching' may be confounded by empirical evidence to the contrary?" (p. 40). To help ensure that the faculty response to learning analytics is a positive and productive one, you will need high-quality faculty development services (Campbell & Oblinger, 2007; McElroy, 2012).

Finally, for your learning analytics program to be successful, you will need students who are "purposeful," "engaged," and "tenacious" in their pursuit of education (Milliron, 2012).

At this early point in the history of learning analytics, most of the necessary skills are developed in other fields or "on the job." Education and training in the specific area of learning analytics is not yet easily accessible (Siemens, 2012c). According to Siemens (2012c), only a few universities currently offer master's degree programs in [business, not learning] analytics and none offer doctoral programs. Certificate programs for university leaders and administrators are being developed, but are not yet available (Siemens, 2012c). However, this survey of the literature of the literature and case study of one institution's attempt to launch an LA initiative may provide a starting point for others.

Skills: What are the skills and competencies of the employees ("The McKinsey 7S Framework," n.d.)? What are the capabilities of the organization, above and beyond those of its individual employees? (McKinsey & Company, 2008).

7S Checklist Questions ("The McKinsey 7S Framework," n.d.)

Skills:

- What are the strongest skills represented within the company/team?
- Are there any skills gaps?
- What is the company/team known for doing well?
- Do the current employees/team members have the ability to do the job?
- How are skills monitored and assessed?

We suggest that any organization assessing its readiness to engage in learning analytics must reflect on the status of the organization in each of the 7 areas outlines the McKinsey 7S Framework. To complete such an assessment, the organization also needs to examine the interactions among and across the 7 areas. The following questions (adapted from "The McKinsey 7S Framework," n.d., Matrix Questions) are helpful for such an assessment:

Are your institution's values consistent with its structure, strategy, and systems? To what extent are the values evidenced in the style, staff, and skills? Do the values have the potential to support or sabotage a learning analytics program? What needs to change, if anything?

How well do the strategy, structure, and systems support each other? Where would changes need to be made in order to provide a solid foundation for a learning analytics program?

How well do the style, staff, and skills support the strategy, structure, and systems? How well do they support one another? Where would changes need to be made in order to have a unified and cohesive approach to learning analytics? The better all seven areas are aligned around your LA initiative, the more successful and satisfying it will be.

"Committing yourself to building those skill-sets you don't currently possess… [is] a transformative process, and transformations are rarely easy" (Milliron, 2012, p. 26). This is just as true for us and our institutions as it is for our students. Fortunately, we have the McKinsey 7S Model, suggestions and cautions from the LA literature to guide us in this process. As we delve deeper into this new area, we believe more deeply that learning analytics can enable us to transform our assumptions about education into evidence of impact, but first we had to "log in" and join the larger community involved in this pursuit.

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Library Portal 2.0: The Social Research Management System

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ABSTRACT

Library 2.0 (L2) has been discussed in depth in library circles in recent years. This article looks at L2 initiatives and technology implementation with regard to L2 and proposes a reboot, repositioning the library portal as a Social Research Management System (SRMS). This SRMS adheres to the L2 principles of purposeful, user-driven, library services. The SRMS is envisioned as the center of academic research and activity at universities, not as a peripheral tool. Creating a new generation library portal (the SRMS) is a group endeavor, thus by utilizing both on-campus and peer resources, the realization of the faceted, modularized, SRMS can come to fruition.
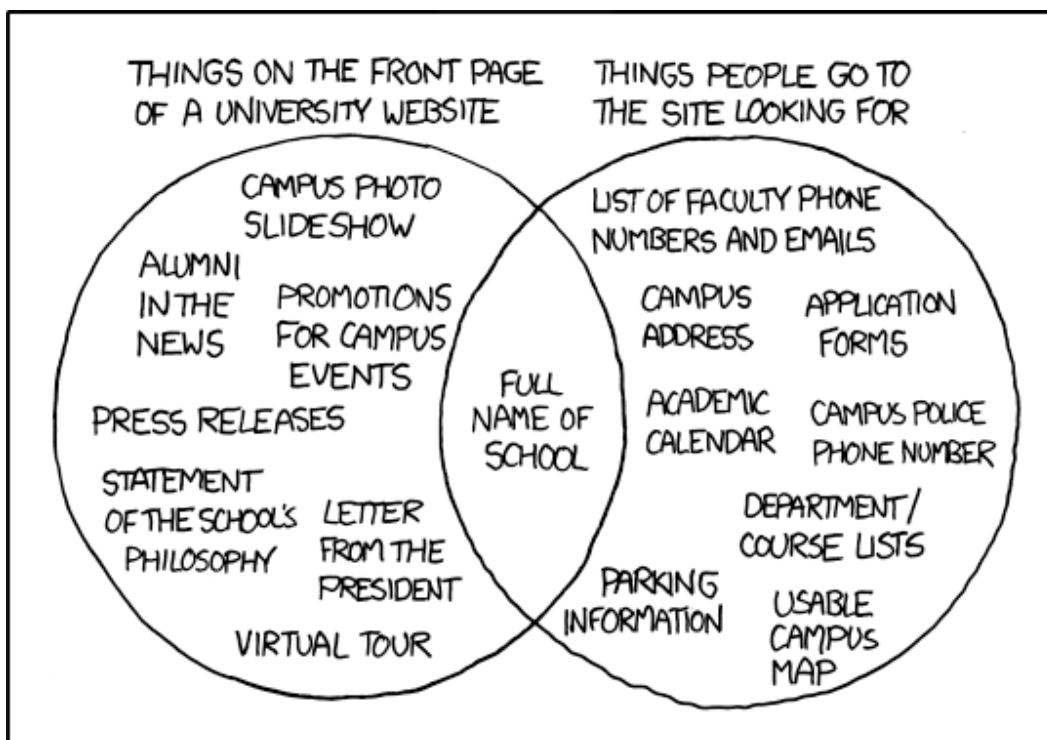
"University Website" - by Randall Munroe - http://xkcd.com/773/

INTRODUCTION

Libraries, both academic and public, are truly a wealth of information, and any college student who doesn't use the library and its resources is really missing out on a lot of useful information, both for work and play. That being said, we, as professionals in the information fields, are not making it that easy to engage our potential customers in part because we provide information in a "push" manner. Even though the comic strip at the beginning of this article pokes fun at University websites, the critique holds true for University Library portals as well: What we have on our library portal is different from what our patrons[1] expect, and there is, sometimes, only a small overlap between what's offered and what's expected. This is one reason that patrons inexperienced with research take refuge at a Google search when it comes to research.

Current library portals expect information to be *pulled* by our patrons, for patrons to initiate the conversation with the library. However, with the vast amount of information that we have available, and the learning curve required to get the most out of library resources, our inexperienced patrons may be inundated. Thus they turn, instead, to a quicker, easier, and cleaner solution: Google. If the comic at the beginning of this article were more geared toward current library portals, in the left circle we would have information such as a link to the library catalog, a link to interlibrary loan, a link to a listing of all databases and resources that the library has access to, and a link with a staff directory and event calendar. While this isn't an exhaustive listing, in short, the circle would contain links to each and every resource. The circle on the right, however, what patrons expect, would be a singular question: "where, and how, can I get a hold of a specific resource?" So what's the common ground between what the library portal offers and what patrons are looking for? That would probably be the library's name, and possibly hours of operation.

Since the advent of Web 2.0 more than a decade ago, we've also seen Business 2.0, Education 2.0 and Library 2.0, among many other 2.0 monikers. The problem is that advances in technology are only one part of the equation; we also need a paradigm shift in order to make best of use of the technology available to us; otherwise we are just replicating existing structures in a new medium (McLuhan, 1967) and this isn't necessarily the best use of our technological resources. A good example of this is the Online Public Access Catalog (OPAC). Libraries did a good job bringing the card catalog to the electronic era, making it keyword and subject searchable, thus adding more functionality to the card catalog, however we have not yet realized the full potential of the catalog, as far as its interaction with new technologies is concerned. There are still *many* different silos of information in a library that do not speak to one another and don't work with one other, and enhancements to the OPAC, both from a technological and a metadata perspective, have yet to materialize.

It's inconceivable that the same group of professionals that gave us classification systems such as Dewey and Library of Congress - ways of collocating similar and related information - cannot take the next logical leap and assist patrons with *smart* discovery of resources (collocation in the digital age) by utilizing technology that is now

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[1] "Patron" is a library term for a user of library services.

well over 10 years old. In this article we'll be looking at what has been done in the world of Library 2.0 and I'll be proposing a new model for a library portal that moves from a "Yahoo paradigm," that of a web directory, to a "Google paradigm," that of the smart web search.

LIBRARY 2.0: CURRENT STATE

The concept of Library 2.0 has been on librarians' radars for better than half a decade. While no unifying definition of Library 2.0 has been distilled, the accepted definition has been constant and purposeful change that empowers library users through participatory user-driven services (Casey and Savastinuk, 2007). This definition is not techno-centric, however a lot of Library 2.0 initiatives have adopted technology for the realization of Library 2.0 projects. In keeping with the *going-to-the-where-the-patrons-are* theme of some Library 2.0 implementations, many libraries have created profiles on social networking sites (SNS) like Facebook and Twitter (Widdows, 2009; Xu, Ouyang and Chu, 2009), as well as starting library blogs (Cohen, 2007; Xu, Ouyang and Chu, 2009; Stephens and Collins, 2007). The advice given by some is reminiscent of Nike's motto: *just do it*, go ahead and implement a presence on these Social Networking Sites; go where your patrons are. Do not focus exclusively on the library website and catalog functionality and expect patrons to come to you (Widdows, 2009). However, this *me too* approach really dilutes the library's message as an organization. Just because a patron has an SNS profile, it doesn't mean that patron will connect to you or see your message.

Just because patrons blog, it doesn't mean that they will read and comment on *your library's* blog. What's happening here is that we are using new media to replicate old-media functionality. Instead of using the SNS medium to replicate functionality from our existing library portal, we ought to do something transformative with the medium. Another example of old-media translated to new-media is the use of blogs for reader's advisory. This isn't a bad idea per se, but just because you blog it doesn't mean that you will get patrons to read it and participate, especially if that blog is not on your library portal.

Other uses of Web 2.0 technologies that are considered to fall under Library 2.0 include wikis which are used as a library intranet, for staff only (Courtney, 2007; Sodt and Summey, 2009). While this use *does* have its benefits, it doesn't really help the patron to find information in the library and through the library. A better use of a wiki would be to enable patrons to provide user-sourced reader's advisory and reference, thus working with information-savvy and tech-savvy patrons, not against them (Jacso, 2002). Casey and Savastinuk's (2007) recommendation to plan your projects and get buy in from coworkers and current patrons alike is more sage than the *just do it* mantra.

There are other projects however which have looked beyond the *me too* approach to implementation and have gone a step further. The University of Virginia at Arlington for example worked on a newer concept of an OPAC that is faceted and contains relevancy ranking (Cohen, 2007). While this is great, efforts like this are hampered by old metadata schemes such as Machine Readable Cataloging (MARC), created in the days of punch-card computing, even though improved metadata schemes have been around for a decade now. Simply developing a new OPACs won't be much help because

OPAC architecture is only one element in the equation. It is the metadata that reside in the OPAC are the most valuable resource not the OPACs themselves. If these resources and standards differ from library to library it will be difficult to create Library 2.0 services that work across many different types of libraries.

Another great project is the effort to bring library resources into the Learning Management System (LMS). An example of such a project is realized at the University of North Carolina at Greensboro where library provided up-to-date, customized links to databases and e-journals at the course level (Cohen, 2007). This is a great first step because this system allows librarians to target appropriate resources to specific groups of users in specific courses. We ought to continue along this path, to borough deeper and present patrons with individualized library services, library services on a per-patron basis, not just customized library services on a course level basis.

As an example of an open source library effort we've got the *LibX* Firefox plug-in which allows patrons to search their library's holdings through their browser (Cohen, 2007). While this is certainly a good start, there are two underlying issues. First, the architecture of this plugin assumes that patrons will be using Firefox as their browser. The second issue is that it's just a conduit to the OPAC search at your library, so it is limited by the searching capabilities of your own OPAC. The key here is that we don't *just* need a library search box in our browsers; instead we need a *better* library search box.

Finally, a great example of OPAC improvement comes from the Jönköping University Library in Sweden. The work done here is much more focused on the back-end of the OPAC providing spelling suggestions for searches, finding book images from Amazon, providing forward linking to catalog content, and providing contextual help for patrons (Cohen, 2007).

ENTER THE PORTAL (2.0)
INTRODUCTION

Despite of all of the great work done on Library 2.0 thus far, three things are clear. What's clear from all of the examples above is that the talent, and the will, exists to bring forth the next generation library services, we're just doing it separately and not cooperatively. In the end, if we want to put all of these contributions together we might be creating a franken-service because each individual cog has been created separately and doesn't necessarily fit together with other parts. What we ought to be working toward is a nicely polished and functional library platform, a Social Research Management System if you will. The parts and the talent to put them together are here, but in order to realize this goal we ought to *work together* to create that user-centered library.

First, OPACs need to change so that they both can accommodate additional and different data types regarding their bibliographic entries, and can interface with networks where this information is available. Libraries need to stop fighting the users (Jacso, 2002) and embrace what patrons bring to the table to improve services. Second, we ought to realize that the library portal, the OPAC and our database offerings are not

islands, as Daniel Forsman comments (Cohen, 2007), therefore these technologies ought to connect and interface in a meaningful way to the services that our patrons already use.

Finally, the library portal needs to change; to move away from the static database-directory model (the old "Yahoo" model) to a more integrated-search and recommendation model (the "Google" model). In addition, library websites ought to be modular so that new innovations can be tested independently and released without affecting existing users. Modular library websites would make possible the offering of new features that library patrons could opt-into using. The modus operandi of Library 2.0 up to now seems (mostly) to have been "the library where you are" (Cohen, 2007; Chad and Miller, 2005; Widdows, 2009; Courtney, 2007), however the medium does limit the message, thus offering library services in Facebook, or in the LMS, may not be the best place to setup shop; a better library portal is a better proposition. This doesn't mean that you abandon outreach efforts, you just can't neglect the library portal altogether.

MODULARIZATION

Change is difficult. One of the difficult things about changing an organizational website is that there are so many constituencies to please. Typically what you end up with is a library website looks something like what the figure at the beginning of this article mocks; in an attempt to please everyone you please no one. The new library portal ought to be simple and widgetized.[2] At its most basic option you will have a page that operates like a Google search page which consists of a search box and the library's contact information and hours of operation. Patrons could customize their library profile and preferences. Beyond that everything should be controlled by a widget whose placement on the page is customized by the patron.

This model offers multiple advantages. First, it keeps with Library 2.0 philosophy of empowering library users. Library users can figure out which modules are relevant to them, and they can activate them and place these modules where they are most personally useful. Second, again in keeping with Library 2.0 philosophy, this modular model allows for constant, *non-disruptive*, change. By rolling out new features as modules libraries avoid disrupting existing library users' practices, and allow for an opt-in action from the user. Also, by having a modularized architecture, libraries are able to push out some modules as fully tested products, while allowing some beta modules to go out to users who want to try them and provide feedback. Again, this won't affect users who don't want to be impacted by additional functionality. Multiple stakeholders can get their information on the website as a (user-removable) module so all stakeholders can be satisfied without producing a website that inspires parody.

Finally, deploying a modular model compensates for the fact that one library can't do it all. For modularized portals, modules can be developed, or co-developed, by fellow librarians in other libraries, by library professionals working for library vendors, by other campus subject-matter-experts such as the computer science department, and by

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[2] A *widgetized* portal includes *widgets*, defined by NetLingo The Internet Dictionary as "an application that sits on top of a Web site and offers users additional interactive features (widget, n.d.)

open source enthusiasts alike. This means that, through collective action, everyone benefits. There is precedent for this in other parts of the academic world, such as in LMS including Moodle, Sakai, and Canvas all of which accommodate development through crowd sourcing.

A BETTER OPAC

While the OPAC isn't the heart of the library, it is certainly one vital component. The library's OPAC system contains the records of that library's holdings, such as books and journals, and can tell you if a library owns a specific resource, if it's available for loan, and some basic information about that resource. In essence the OPAC is just one giant read-only database for the patron. Sure there are other redeeming features of integrated library systems (ILS), of which OPACs are a part, features that help librarians manage the back-end of acquisitions and circulation; however the OPAC shouldn't be designed for the librarian, but rather for the patron. We don't write books with authors of the book in mind, but rather with potential readers in mind. Yet what's happening to our OPACs equates to the authorship of a text for the author alone. Our OPACs seem to be designed for librarians, with a one-way information flow and poor searching options. This is part of the reason patrons don't necessarily go to the OPAC but go to sites like Amazon when they are looking for books. Amazon has a better interface and a better search system, which means that clients can find what they are looking for.

How does one create a better OPAC? First you need more space for more information, information that comes to you from your patrons. Patrons ought to be able to tag resources available in the OPAC to provide more in-depth descriptions of the resources. Patrons ought to be able to have some way of rating a resource and providing additional metadata. The cataloguing practices of professional librarians ought to be improved through the use of newer, more expansive cataloguing schemas. Combined, these two approaches would result in quality metadata coming from both sides; the professional librarians and the library patrons.

This aspect of cataloguing data brings me to a second point: why the duplication? Often cataloguing of resources is not original cataloguing[3], but rather copy-cataloguing[4]. Why the duplication of data? Why not focus on creating one central authoritative source of information for all books on WorldCat and then OPACs can link to these authoritative records and create meaningful mashups[5] between the library record, the patron record and data from Web 2.0 services. This would change the current practice to one that relies upon object-oriented information linking among compatible cloud services.

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[3] Creating a descriptive record of the resource from scratch.

[4] Creating a copy of a record from a service, like WorldCat, and storing it in your local database, perhaps with some modifications that are relevant to local contexts.

[5] A mashup is defined by NetLingo The Internet Dictionary as "a Web page or application that integrates complementary elements from two or more sources" (Mashup, n.d.)

ONE SEARCH TO RULE THEM ALL

How many search boxes does a library have? There is a search box for each database that the library subscribes to, there is a search box in the OPAC, there is a search box for each online audiobook and ebook provider to which a library subscribes, one for the library portal, another for the *LibGuides* installation; and of course, let's not forget Google and Google Scholar as well! The point here is that *there are just way too many search boxes* on a present-day library portal and this makes it easy for the patron to just give it all up and go to Google in the first place.

Instead of doing what librarians are supposed to do best, finding and organizing knowledge, we're instead asking our users to define what sort of information they want from the onset and *then* we point them to the right resource. This is the wrong tactic because what library patrons want is one search to examine *all possible library holdings*. One search for all books, ebooks, audiobooks, journals, articles, FAQs, and so on. Library users don't care if a book is held by your local library branch or if it's something that can be received through interlibrary-loan. If it exists, regardless of whether the library has local access to it, there should be one search to find it, and a single click to order it (if possible), or find it in the library's stacks.

Luckily, we're not that far away from this being a reality. WorldCat already allows us to see which libraries have what books. Google Scholar is similar for academic articles, and it also searches Google Books. What needs to happen is for librarians to bring these disparate searches together into one bigger search. We need one query that searches WorldCat, Google Scholar, the local library subscription databases, as well as all local FAQs and LibGuides to provide the patron with one list of results. The patron should then have the granularity to hide results of specific document types, such as articles or books. WorldCat does this already; it just needs the capacity to search additional data sources. Once a patron discovers a source of, that patron should be a single click away from information regarding the physical or electronic location (if this is a local resource) or with a way of requesting this resource, if available through an off-site source.

The library search engine needs to be forgiving, like a good reference librarian, and offer the patron suggestions. If a patron has misspelled a search query, the search tool should provide some spelling suggestions. If a patron is looking for a specific subject, the search engine should recommend additional related subjects and resources that are collocated with materials for which the patron is actively searching. If a patron has found a book of interest, the search could provide the patron with an image of a virtual bookshelf so the patron can see which books are collocated with the book he's examining. In short, a library search box should be designed to conduct a mini reference interview in order to massage search results to the point that those results are most useful to the patron.

Finally, I will note that if you spend enough time at a reference desk, you will learn that a lot of local campus questions come up, for example, "how does one sign up for the math placement exam." Reference desks are a prime location for collecting questions of campus significance, organizing them, finding out answers to those questions, and then making those questions and answers easy to retrieve. This sort of campus knowledge should also be retrievable through the unified search mechanism provided by the library.

LOCALIZED AND PERSONALIZED INFORMATION

The idea of personalized and localized information is nothing new; however it seems to be escaping libraries. This wasn't always the case. Libraries created, and still create, reader's advisories. These reader advisories are a traditional library service of referring fiction and non-fiction resources to library patrons (Readers Advisory, n.d.). The problem is that reader's advisories are somewhat stuck in a pre-electronic, pre-connected world, even though we use electronic means to create and distribute them. They are still static lists of books and articles to read based on a favorite author or subject, and it need not be that way. Companies like Amazon and Netflix use recommender systems, systems which leverage a user's personal preferences, as well as preferences of users similar to the user, to recommend books, movies and other media. Recommendations are based on what you've ordered, what you've looked at and what you've rated (Resnick and Varian, 1997; O'Donnavan and Smyth, 2005; Adomavicius and Tuzhilin, 2005). The age of the personalized reader's advisory is here, it's just not implemented! What I'm describing is a specific instance of learner analytics, "the use of intelligent data, learner-produced data, and analysis models to discover information and social connections, and to predict and advise on learning" (Siemens, 2010, para. 2). Leveraging both public and private sources, libraries should be able to provide recommendations to their patrons automatically through their portal.

The first level of learner analytics that a library should be able to tap into is public data, this is data that the library can get from a user's Facebook, Netflix, Amazon, LibraryThing, CiteULike, and GoodReads accounts, to name just a few. Patrons could opt-in to let the library sample their tastes in academic articles, books, movies, and other media. The library system should be able to recommend books, newspaper stories, periodicals and academic articles based on those preferences. The patron can then rate the recommendations to improve the recommender system's efficiency and accuracy.

In the case of college students, a second level of data, private data, would come from the student information system (SIS) that keeps track of which courses the student is registered in and what major(s) and minor(s) the student has declared. Based on a student's major and current course-load, the library system should be able to indicate to the patron whether the textbooks are available in the library, and, if not available, where the student can find them. Such a system could tie into course reserves and make these available to the student based on the students course registrations, and could create a just-in-time reader's advisory for the student, based on declared major, course-load or research topic. Books, articles, and resources could be conveniently earmarked by the patron and automatically entered into a bibliographic system such as RefWorks or Zotero for future use. This functionality should also be built into the search results provided by the unified search engine mentioned previously. Finally, students should be able to fine-tune their preferences to add areas of interest to their profiles, so the recommender system can take into account SIS data, social profile data (if a patron opts into this service), and additional patron data the individual elects to include. This way reader's advisories become localized and personalized to the individual patron thus providing greater value.

SOCIAL FEEDBACK

For at least the past ten years companies like Amazon have encouraged the consumer to tell them about the products they are peddling. Consumers can give rate and provide in-depth reviews of the wares that they've purchased. Other subscription companies like Netflix allow consumers to rate movies and television shows. In the world of the book, GoodReads and LibraryThing let you rate and review books you've read, while services like CiteULike and Mendeley allow you to add tags, notes and rate *individual* research articles that you've read. Even on Facebook, a decidedly non-academic platform, academics can share their "likes" of articles and books!

These ratings and reviews, in addition to the people we've "friended" on these various services provide the data points for recommender systems to recommend books, movies and research articles for researchers both experienced and in-experienced (the apprentice researcher). It would be very useful for libraries to work with their users, not fight them, by incorporating, and encouraging, the use of these services. By allowing patrons to "like" books and articles, librarians not only can improve their recommender systems, they can also collect valuable metrics of usage that can be used to justify collection development and collection maintenance. By linking to bookstore and in-print reviews of a given book the librarian can help the patron by providing additional information and context for this book. By allowing patrons to tag and review books, the librarian can enable the patron to contribute to this system. These ideas are not new, after all, in the days of the printed card catalogue patrons used to pencil in notes about the books. One person's note became another person's recommendation for (or against) that particular book.

In the previous section, I alluded to another useful link between the library service and the outside world. The next generation library portal must allow patrons to seamlessly export (or sync) their notes and collections to outside systems. The patron's friends and colleagues will not all be users of their library, so locking up the patron's data in a closed system isn't useful to the patron. Allowing the patron to export into systems like CiteULike, Mendeley, Zotero, and RefWorks allows patrons to extend their collaborative actions with friends and colleagues from around the world, even though they are not all using the same library system.

HELLO, WORLD!

One of the main reasons that librarians have been building Facebook pages and blogs and building services on other Web 2.0 platforms is that they are going where the user goes. This isn't a bad thing per-se, but as mentioned earlier the host Web 2.0 platform can be constraining, thus limiting the information that you can provide for your patrons and restricting how you provide it for them. What is important here is that o*ther places matter*. This doesn't mean that we ought to necessarily merge with them, but we ought to bring them into the sphere of the library portal, if goal is to make the university library portal the center of academic activity. Two on-campus examples are campus email and the LMS. Both of these systems do generate data that students need in their day-to-day academic life; and in order to access email and the LMS, students need to log-into these separate systems. The next generation library portal ought to offer plug-ins to

campus email systems and to the campus LMS; in this way students will be able to make the library portal their campus homepage but still be able to see new incoming mail, compose and respond to email requests, see what assignments are due and when, and perhaps submit assignments via the new library portal, while seeing the campus calendar, as well as their own school calendar, and reviewing who has responded to online course discussion threads. If students only come to the library portal when they need to do research, which is the norm now, we've lost the eyeballs of a large user base.

The same holds true for off-campus services that students may be using such as Facebook and Twitter. These services do provide APIs to tie your services with theirs, so the next generation library portal can have widgets which access patrons' social media streams, allowing patrons to see what's happening in Facebook and Twitter without needing to go to those sites. Posting a new status update should be just as easy on the library portal as it is on the main site of the host service, supporting patrons continued use of their favorite social media tools while at the same time growing the patrons' use of the library portal as their main academic homepage. The benefit here is that you are not subtracting functionality by asking the users to give up Facebook to do their research, and you are not limiting functionality by trying to accomplish your goals within Facebook.

POTENTIAL ISSUES

There is an old adage that nothing worthwhile is ever easy to accomplish. The same is true with this proposal for a renewed, user-centric library portal. The main hurdles around implementation of this project are concerns over patron privacy, staffing to make this vision happen, and angst over loss of control over library records such as library holdings records. Even though, as described earlier, these technologies and processes have been around for a while in areas outside of libraries, they have yet to be implemented by libraries. They have however been discussed both in print and online.

The first, and perhaps the foremost, concern among librarian is the patron's privacy. The sanctity of patron privacy has been so important to the American Library Association (ALA) that safeguarding patrons' privacy in the professional code of ethics (American Library Association, n.d.). In the past decade, legislation such as the USA PATRIOT Act has posed a threat to patron privacy in libraries (American Library Association, n.d.; Martin, 2003; Klinefelter, 2004; Lichtblau, 2005; Ramasatry, 2005; Drabinski, 2006; Matz, 2008), so much so that some libraries have done the unthinkable and have destroyed patron lending histories once items have been returned (Nicholson, 2003; Matz, 2008). I regard this as an unthinkable action on the part of librarians, and quite reactionary, considering that it is this rich patron data that can help patrons discover new information sources that are relevant to them! In addition to advantages that could accrue to the individual patron through judicious use of activity data, we must consider how aggregate activity data can be used as a base for a patron-driven rating of sources upon which to build recommender systems, both human and non-human, to assist in finding additional data sources relevant to the patron population at large. Knowing, for example, that a particular patron "likes" various kinds of Japanese animation on Facebook, and that this patron is an Art student, and currently enrolled in a specific sociology course, could help the library provide helpful suggestions for academic articles

on the influence of this particular art form on Japanese culture and daily life. These recommendations would be provided *without* having to have the patron search for this specific set of keywords in some library database. This type of reader's advisory isn't achievable without the use of aggregate data from the patron.

How can one overcome these issues around patron privacy? First, it's important to realize that issues brought forth by legislation like the USA PATRIOT Act are not new and have been with us for a while (Corrado, 2009; Matz, 2008), so hiding behind the PATRIOT Act isn't a good excuse. Furthermore, patrons who are already using external services, such as Facebook, have little to no privacy, and the amount and type of data that library patrons willingly place in these external services is much more valuable than the books they checked out from the library.

In system I'm proposing, patron data that is imported from the SIS would the only data that is not opt-in. This patron data exist in the ILS already, so adding some additional fields of information such as majors, minors, and current courses isn't information that is private and inaccessible, it is simply data that we underutilize. Having this base of patron information overcomes the *new user problem*, the problem faced by librarians who lack adequate information about users to recommend something useful to them (Adomavicius and Tuzhilin, 2005). Mining this data can thus help the recommender system to allow the librarian to give the patron at least some basic recommendations.

The second concern is staffing and access to the knowledge to make this happen. How does one find qualified employees to undertake these projects considering that budgets are always becoming smaller, and library science students don't always come to the table with the necessary skills to make this happen? This seems like an insurmountable object! In a public library this may undoable, but in higher education it is not! The good news about academia is twofold. First, there is a giant knowledgebase already on campus. Various schools and colleges can participate in the project to offer management, information systems, user interface and computer science expertise to make such projects happen. Both faculty and students looking for independent studies can participate in this project. Since the components are really designed to be modular, once APIs are created, teams can break apart to work on separate, sandboxed components to the system.

The second piece of good news is that academia is basically collaborative, and by tapping into the open source movement, one can develop a next-generation library portal by collaborating with the open source community and with other like-minded higher education institutions. Open Source ILSs, like Koha[6] and Evergreen[7], have certainly proven that this is possible! The library portal elements created at the university level can then trickle down to the public library and the special library which may not have the resources to start projects like these.

Finally, the last major hurdle may be the perennial fear of having services in the cloud; the fear of losing control of data. The fear of not owning data such as book cataloguing records and patrons' ratings of books is quite valid. The key thing here is

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[6] For more information on Koha please see: http://www.koha.org/

[7] For more information on Evergreen please see: http://evergreen-ils.org/

that we don't need to warehouse all of the data that we create. If another service naturally hooks into that niche, why not use it? GoodReads offers star ratings and reviews for books. Why duplicate that function? Just tie your ILS into GoodReads and enable patrons to see GoodReads reviews on the book-record page, and allow patrons to write reviews using GoodReads, LibraryThing, or their service of preference. The truth is that some Web 2.0 services will fold and close their doors, but other services exist and will take their place to keep providing patrons with the ability to review books and to view reviews (just to name one of the many SRMS functions).

The only real records that a library ought to retain control of are patron records: who are they (majors, minors, fields of interest, etc.), what they have checked out, and the history of their loans and their research preferences and of any fines that they might owe.

CONCLUSION

Within the past five years, through the push of Library 2.0 as a concept, libraries have been working their way into the collaborative space where they meet their patrons to perform information based transactions. The underlying principle has been to go where the patrons are. Some ideas in this space, such as searching library holdings through a learning management system, have been good; others, such as creating Facebook pages have been potentially ill-conceived. The paradigm needs to shift. Instead of libraries going to patrons' spaces, spaces which do limit the library's ability to offer services, better that we create a space online where patrons want to come because they can satisfy their research needs through library services that connect to other facets of their digital lives. Instead of fighting patrons and creating an isolated island of library services on the web, we ought to work with our patrons to transform our library portals into collaborative work spaces.

Some of this work has been done already; we just need to put the pieces together. We have the talent, the expertise, and the interest to work with others to make it happen! It is no longer an option to use legislation as a red herring, the justification for leaving our online library services in the past; it never should have been in the first place. Comics like the *xkcd comic* which opens this article makes us chuckle; they do so because they represent a reality. It's time to move beyond chuckling and rectify this situation, time to move beyond the quick-fix of the library Facebook page and time to get back to the library's roots: *making it possible to connect information with patrons who need it!*

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Beyond Assumptions: How Urban Students View and Practice Digital Literacies In and Out of School

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ABSTRACT

This qualitative, ethnographic case study investigates digital literacy practices and perceptions of students at an urban public high school in the Boston metropolitan area comprising a racially, ethnically, linguistically, and economically diverse student body, an under-studied demographic. The study compares in-school and out-of-school literacy practices and posits the role schools might play in preparing learners. The study examines digital literacy practices among student based on information gathered through focus groups, survey methods, and interviews. Three controlling questions guided the study:

1.   What digital literacy practices are students in Washington High School engaging in outside of school?
2.   What purposes do these youth have for engaging in these digital literacy practices? What role do these digital literacies play in youths' lives?
3.   How are students asked to use digital literacies within the school setting? How do these compare to students' life world uses? With Web 2.0 conceptions of digital literacies?

KEYWORDS: digital literacy, digital literacy practices, urban high school, consumerist, Web 2.0

What does a typical day in the digital lives of Washington High School youth [all names of people and places are pseudonyms] look like? Vance wakes up and immediately checks his Facebook page, noting with interest any pictures in which he is tagged. Marcus texts surreptitiously throughout all of his classes, trying to avoid a dreaded phone confiscation from one of his teachers. Ronnie, who only has texting capabilities on his phone (texting-only plans are cheaper), joins in on one of these marathon conversations. After school, Dan takes a picture with his flip phone of himself posing by a sailboat and sends it to his mom. Unlike Vance's activities, this picture will not end up on Facebook as Dan has been burned by this medium before and is now staunchly anti-social media. Meanwhile, Kenny and his college friend/collaborator work on a website for one of their town's local businesses, a project for which they will be paid.

Much has been written about the so-called digital literacies these students' practices represent. With the advent of the Internet, the ways in which people interact with text has changed in significant ways (Coiro, Knobel, Lankshear, & Leu, 2008). The term "digital literacies" reflects these changes. It reflects that text no longer need be approached in a purely linear manner, with the reader beginning at "the beginning" and ending at "the end." Hyperlinks ensure that we can lead off reading in the middle of a text and navigate to somewhere new; in fact, some texts now have no clear and finite ending point. Text has come to include other aspects besides words on a page – images and sounds became integral to understanding (Brown, 2000; Lankshear & Knobel, 2006; **C.** Luke, 2002; Mills, 2010). The ways and practices that people use to interact with these "new" types of texts are referred to here as "digital literacies."

Many have touted the possibilities of digital literacies, particularly with regards to their creatively-empowering potentials. Digital literacies open up possibilities for who gets seen as an expert, who is able to publish and how widely, and what gets counted as a text (Lankshear & Knobel, 2006; Gee, 2012). Digital literacies allow for a "participatory culture" (Jenkins, 2009), one in which contributors might find voice and agency. Additionally, being savvy with these sorts of literacies is becoming more important to success in the economic world (Leu et al., 2011). Despite these possibilities, teachers and schools have struggled to find meaningful ways of incorporating digital literacies (Hagood, Provost & Skinner, & Engelson, 2008). In thinking about how to employ digital literacies effectively in schools, it is useful that we consider both a) how specific youth are using these practices in their day-to-day lives and how this might be utilized in the classroom; and b) what practices and literacies youth might need to adopt and develop in order to find success outside of school.

Moje (2009) has suggested that new literacies research should pay particular attention to youths' practices across cultural, class, and regional groups as a means of "representing more fully the range and intensity of practices" (p. 355). Noting the digital literacy practices and perceptions of urban youth from working class backgrounds may give teachers insights on how to both build upon and expand these practices. Doing so allows us to ask what role digital literacies play across different demographics. If we fail to consider demographic difference, we operate from the false assumption that *all* students

practices align with the suburban youth most commonly studied. By considering a wide range of groups, we can avoid the historic practice of setting white middle class cultural values as the standard for achievement.

With this in mind, I conducted a case study investigation of the digital literacy practices and perceptions of students at Washington High School. This large public school is diverse in its racial, ethnic, linguistic, and social class makeup. Therefore, this work expands on the sparse literature on digital literacy practices within urban schools. In examining information gathered through focus groups, survey methods, and interviews, I use three guiding questions:

1. What digital literacy practices are students in Washington High engaging in outside of school?
2. What purposes do these youth have for engaging in these digital literacy practices? What role do these digital literacies play in youths' lives?
3. How are students asked to use digital literacies within the school setting? How do these compare to students' use outside the school setting? With Web 2.0 conceptions of digital literacies?

In investigating these questions, attention is first paid to my role as the researcher and the perspectives that I bring with me. I explore the theoretical base framing new literacy and review the literature regarding students' digital literacy practices. With this established, I turn to the practices and perceptions of students at Washington High, elaborating on the findings and implications.

THE ROLE OF THE RESEARCHER

I am a former high school language arts teacher who fits the assumed demographic of the "typical" teacher – white, female, middleclass (Sleeter, 2001). Through my teacher preparation program, I became well versed in the study of literature; I felt well prepared to teach narrative, persuasive, and expository writing. However, I felt much less prepared to tackle challenges presented by the fact that my students' home literacies interacted with – both complementing and butting up against – the school-based literacies I fostered in my classroom. For instance, although I was aware, that my students were engaging in digital literacy practices outside of my classroom, I had no idea how they were actually practicing these literacies. Consequently, I had no idea of how to incorporate my students' literacy practices into my lessons, though it seemed to me important to honor, acknowledge and support their digital culture interests. Students experienced my conscious attempts to include *outside* literacy practices into my instruction as inauthentic. For example, I once asked my students to provide written feedback on postings in a class wiki. The students viewed our use of the wiki as overly structured, bound by deadlines, and *old school* in its lack of visuals, and viewed this exercise with waning enthusiasm. Unfortunately I'm not alone in the struggle to find useful ways of enacting digital literacies. Research supports the idea that teachers struggle to employ these "new" forms of literacy effectively (Hagood et al., 2008; Yeo, 2007).

As a researcher, I believe that learning from students – and making sure we listen to youth from a wide variety of contexts, cultures, and backgrounds – is crucial in understanding literacies that continue to gain significance in certain realms of our world. With this in mind, I investigated the practices and perceptions of youth at Washington High with both an eye toward their digital literacy practices and how these uses may or may not aid them in their futures. It was my goal as the researcher both to identify how students use and perceive digital literacies and to help teachers meet students where they are while simultaneously thinking about where they might be heading.

"NEW" LITERACIES: A THEORETICAL FRAME

I work from the assumption that literacy is socially situated and given meaning through historical, political, and cultural contexts (Gee, 2004; Scribner & Cole, 1981). Lankshear and Knobel (2006) draw the following distinction between the New Literacy Studies and "new" literacies:

> To say that 'new' literacies are ontologically new is to say that they consist of a different kind of 'stuff' from conventional literacies we have known in the past. It is the idea that changes have occurred in the character and substances of literacies that are associated with larger changes in technology, institutions, media and the economy, and with the rapid movement toward global scale in manufacture, finance, communications, and so on (p. 24).

The general public's literacy practices have been drastically impacted by the inception of the Internet. Whether it be browsing an online article and navigating hyperlinks or composing an interactive blog complete with pictures and video, today reading and writing practices often look different than they did even a few short years ago. It is necessary to reevaluate ideas regarding what it means to be literate in today's society, including rethinking how we approach the study of literacy in schools (Coiro et al., 2008).

Lankshear and Knobel (2006) arrived at their assertions regarding what constitutes "new" literacies by comparing and contrasting Web 1.0 and Web 2.0 thinking. Within this model, one ceases to think solely in terms of physical space, but also conceives of the wide-open possibilities of cyber space. Collective intelligence and collaboration trump the idea of one "expert." Within the notion of "expertise," roles are shared, exchanged, and distributed. The Web 2.0 model is a belief that is transformative; it's a new way of thinking about literacies. The Web 1.0 model is "old wine in a new bottle" (p. 55); it does nothing significantly different from the ways we've approached literacy for years.

Employing a Web 2.0 conception of digital literacies means accepting that these "new" literacies make use of multimodality in complex and sophisticated ways (Mills, 2010). By modalities I mean here the integration of text, video, images, sound and movement. The Web 2.0 conception further implies a shifting notion of authorship and identity (Vasudevan, DeJaynes, & Shmier, 2010), with practices such as "remixing" becoming commonplace. "Remixing" involves taking existing texts and cobbling

together or replacing elements of audio, visual, and/or print to create something fresh and new (Lankshear & Knobel, 2006). It means rethinking literacy practices as means of providing ongoing services rather than finished products. An example of a literacy practice as an ongoing service would be the active fan fiction sites that have sprung up in connection with popular books, animation, music, video games, movies, and TV shows. In fan fiction forums, authors compose and publicly post texts based on their favorite media. Other participants have the opportunity to post commentary and reviews of these texts. These sites give rise to collaborative writing, peer review, and experimentation with different genres (Black, 2009). Fan fiction sites provide opportunities for participants to experiment with, rewrite, and relive beloved stories with others who share their love of the originating text.

CREATIVE POSSIBILITIES

Some are quick to point out how digital literacies have revitalized communication. C. Luke (2002) has suggested that digitally mediated literacies have ushered in an "explosion of writing" (p. 137), with a return to letter writing the likes of which hasn't been seen since the 18th century. Digital literacies can expand our sense of audience; as Bruce (2002) explains: "The notion of a community of writers thus seems more real and present than ever before" (p. 7).

Above all else, however, those who extol the virtues of digital literacies' possibilities point out that these sorts of practices allow the participant to become not just a consumer of text, but also a producer, a creator (Bruce, 2002; Gee, 2012). Different than other literacy practices, digital literacies allow more free range in our ability to push back with our own responses. Graham and Benson (2010) refer to this as "creating knowledge rather than simply gathering it" (p. 94). Participants of digital literacy practices are able to create and post their own media and designs and gain extended audiences without the professional credentials that have traditionally been required to do so (Gee, 2012). The multimodality possibilities of digital open the doors wide to the creator. People fluent in digital literacies can incorporate text, video, images, sound and movement in complex and sophisticated ways. Digital literacies are used to communicate, to discover, to critique, and to reflect (Tierney, Bond, & Bresler, 2010).

Because conceptions of "expertise" and authorship are changing, educators and students have struggled with negotiating how works are authorized, validated, and evaluated in an academic sense. What looks like "remixing" and collaborative writing in the digital literacies world may look more like plagiarism in traditional schooling definitions (Thomas & Sassi, 2011). Additionally, teachers may worry that students are unwilling or unable to determine a material's credibility or quality. Schools are accustomed to seeing knowledge as coming from someone deemed "expert"; in this view, knowledge is often viewed as "located" either in individuals or institutions rather than in the collective (Lankshear & Knobel, 2006). The different viewpoints of the world of school and world of digital literacies have proven difficult for both student and teacher to reconcile.

RESEARCH OF YOUTHS' DIGITAL LITERACY PRACTICES

Much of the literature concerning youths' digital literacy practices falls into particular demographic patterns. Many studies explore youth from middle to upper class socioeconomic, primarily white backgrounds (Chandler-Olcott & Maher, 2003; Jacobs, 2006; Lewis & Fabos, 2005). One study of the out-of-school practices of three "struggling" gaming aficionados tracked the gaming behaviors of boys from a suburban school, recognized by *Newsweek* as one of the "top 500 schools in the nation" (Abrams, 2009, p. 339).

Most research concerning youth from urban demographics has been conducted largely in the last ten years. For instance, Turner (2011) profiled the skills urban youth acquired through a multimodal media production unit[1], while Schillinger (2011) studied the wiki interactions of girls in a private school with girls from an urban public school. Additionally, several recent studies have explored digital literacy practices of English Language Learners (ELL) including in-class use of podcasts (Smythe & Neufeld, 2010; Wilson, Chavez, & Anders, 2012), and ELLs participation in primarily English-text fan fiction communities (Black, 2005).

Still needed are systematic examinations of what urban adolescents from working class backgrounds are thinking about and doing with digital literacies. Without this data, we run the risk of defaulting automatically to addressing digital literacy practices that may be far from universal, never fully understanding how digital literacy practices are shaped and occur in different socioeconomic contexts. For students who already experience a deficit in how their lived experiences are portrayed or ignored in mainstream media (students of color, students from economically disadvantaged homes, and students with first languages other than English), misrepresentation and under representation follow all too familiar patterns.

THE STUDY CONTEXT

Washington High School (WHS), constituting about 1500 students, is part of an urban district in a city that is itself within ten 10 miles of a major metropolitan area (Massachusetts Department, 2012). WHS bills itself as an academic center that also offers courses providing career and technical skills, such as auto-mechanics, graphic design, culinary arts, and broadcasting. In 2010, WHS relocated to a new building equipped with many sophisticated technological tools, including digital interactive whiteboards in every classroom.

According the Massachusetts Department of Secondary and Elementary Education website, students at WHS identified as about 10% African American, 30% Asian, 6% Hispanic, and 54% White. Thirty-two percent of the students in the school speak a first language other than English, and 54% of the students are eligible for free or reduced lunch (Massachusetts Department). With these demographics, students at WHS represent a population whose digital literacy practices warrant more study.

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[1] Other digital media projects take place primarily in out of school spaces, such as Nichole Pinkard's partnership with the Chicago Public Library and her creation of the Digital Youth Network (digitalyouthnetwork.org, n.d.)

METHODOLOGY

I used a case study methodology to examine practices and perceptions and to raise questions regarding the status quo (Merriam, 1998). For this study, I designed a sequential survey and qualitative individual and focus group approach to best ascertain students' viewpoints and determine their uses of digital literacies.

THE PARTICIPANTS

I first met with a focus group of students who self-identified as being interested in and savvy about technologies. The focus group consisted of nine senior boys, all enrolled in an elective engineering and technology course. We sat around a large table in a room decorated with posters about possible future careers in technology. (One picture labeled "Girls in Engineering" stood out blatantly, as no girls were enrolled in the class). The boys filled me in about their uses, preferences, and thoughts about technology. In our second group meeting, the youth provided feedback on terminology and questions to include in the survey to be distributed to the larger student body.

To gain a broader view of students' uses and perceptions, a study hall group of 90 students was asked to take the survey. Thirty-seven students chose to participate. Participation was voluntary and no incentive was offered. Of these 37 students, 19 were female and 18 were male. Twenty-five of the students identified as White, two as Black or African-American, three as Asian, one as Hispanic or Latino/a, and six as having more than one ethnic or racial background. In order to gain further insight into the survey, all participants were invited to take part in an additional focus group. Of those invited only two freshmen students, Dan, a white male, and Patrick, an Asian American male, agreed.

DATA ANALYSIS

For the purpose of data analysis, I used audio recording and subsequently transcribed the first focus group and follow-up interview. Additionally, I drafted research memos with initial thoughts and observations to aid me in recreating our conversations. Through the use of these memos I was able to tie pieces of data together and began to recognize the general themes that arose from the data (Miles & Huberman, 1994). A grounded theory approach to the analysis of data was used. The goal with grounded theory is to "focus … data collection and to build inductive middle-range theories through successive levels of data analysis and conceptual development" (Charmaz, 2005, p. 507). This approach to data analysis is appropriate for researchers aiming to stay immersed in their "studied worlds" while attempting to develop theory explaining the hows and whys about what they're seeing (Charmaz). Guiding questions initially allowed me to explore the attitudes and perceptions of members of the preliminary focus group and to identify their digital literacy practices. Consistent with a grounded theory approach, I used both open coding, through which I attempted to identify, name, categorize, and describe phenomena found in the data, and axial coding, through which I sought to relate these codes' categories and properties to one another (Strauss & Corbin, 1998). By using open and axial coding with the data in conjunction with my theoretical

framework concerning Web 2.0 "new" literacies, I was able to determine what questions might be beneficial in the survey targeting the larger population at WHS. I broke down the data into categories while continually comparing and reevaluating these categories. Using this constant comparison method with the survey data and the focus group data helped me to determine patterns, similarities, and points of departure. From this, I determined gaps in my understanding, which then led to my conclusion that a follow-up interview would add a desired depth to my knowledge of digital literacy practices of WHS students (Strauss & Corbin). I used the focus group interviews, the survey, and the follow-up interview to establish patterns in the data and to triangulate my observations.

FINDINGS

WHAT DIGITAL LITERACY PRACTICES ARE STUDENTS IN WHS ENGAGING IN, BOTH IN AND OUT OF SCHOOL?

Scholars and researchers have stated that outside of school, many youth are using digital literacies in creative and generative ways (Lankshear & Knobel, 2006). In other words, they are using new literacies to actively create something to share rather than engaging in activities involving passive watching or reading. While some youth at WHS do exhibit these creative behaviors, others seem to behave solely as technology and media consumers.

Among the creative behaviors students surveyed engage in, picture taking and posting is a hugely popular activity. Other generative activities included website creation, video production, and "remix." Some students also reported seeking collaboration opportunities, sharing creations with larger audiences, and asking for feedback from other parties online. (See Table 1.) All the creative behaviors are consistent with Web 2.0 conceptions of digital literacies.

"Students engage and feel comfortable in…"	Number of Students/ (Percentage)
Creating a website	10 (27%)
Creating videos on cell phones or on computers	15 (41%)
Creating and posting videos online	9 (24%)
Participate in the practice of remixing	10 (27%)
Sharing something they've made online	9 (24%)
Asking for feedback on something they've made	9 (24%)

Table 1: Generative Behaviors of Students at WHS

Far to the right on the spectrum of creative behaviors was Kenny, a member of the initial focus group. Kenny not only told of his personal ventures creating music using the Apple software, GarageBand, he also spoke of an entrepreneurial enterprise he had started with a former WHS student, now a pupil at a nearby university. Together, they

offered their services to a number of local businesses, creating websites that extended the businesses' visibility in the community and beyond. Several businesses had hired these two young men to provide their knowledgeable and expert services. For students like Kenny, generative uses of digital literacies provide not just creative personal outlets, but also represent potentially lucrative career opportunities.

However, with the exception of the category of taking and posting pictures, for each of the categories representing "creative" behaviors, less than a quarter of the students surveyed reported engaging in the literacy practice. By contrast, the categories representing digital literacies more aligned with a consumerist approach to digital literacy practices, such as reading content, checking Facebook, or watching online programming, proved to be far more popular digital literacy practices, with the majority of surveyed students reporting engagement. (See Table 2.)

In what ways do you use the Internet?	Number of Students/ (Percentage)
Reading things that interest you	24 (65%)
Watching things that interest you	25 (68%)
Checking social networking sites (like Facebook)	33 (89%)
Watching videos/shows	28 (76%)

Table 2: Consumerist Behaviors of Students at WHS

Even among members of the preliminary focus group, the young men who self-identified as liking and being skilled in the use of technologies, the majority reported far more consumerist than creative activity. Marcus, for example, checked Facebook many times a day but rarely posted to it, stating that posting pictures and tagging were stereotypically female behavior. He reported that most of the creative digital literacy practices in which he engaged occurred in conjunction with his advanced engineering class.

WHAT PURPOSES DO THESE YOUTH HAVE FOR ENGAGING IN THESE DIGITAL LITERACY PRACTICES? WHAT ROLE DO THESE DIGITAL LITERACIES PLAY IN YOUTHS' LIVES?

From my first conversation with the students at WHS it became apparent how important new media and digital technologies are in their day-to-day lives. The young men in the senior engineering and technology class stated emphatically their reliance on cell phones, with one student admitting to racking up a two hundred dollar phone bill while visiting family in the Dominican Republic. Another student described his "typical day" with technologies, stating: "I'm on my computer from the time I get home until I go to bed. I do my homework, I'm on Facebook, I talk to friends."

The urban youth's I surveyed used digital literacies in primarily social and relational ways. Marathon texting conversations made up students' days, especially for youth like Ronnie whose cell phone plan included only texting capabilities. Students

surveyed also used Facebook as a way of "catching up on the gossip" and seeing each other's worlds in pictures. An interviewee, Patrick, indicated that his use of online gaming played a crucial role in his social life, enabling him to team up with friends online to take on opponents from around the world.

The survey information corroborated the interviewees' reported social interests in digital media. Over 90% of students reported spending time with other users online. (See Table 3). In an open-ended survey question, one participant stressed, "I use my computer to video call friends and talk to them on Facebook." Utilizing digital literacies allowed the youth surveyed to fulfill social and relational needs (Ito et al., 2010). What was less evident was any online gathering centering on interests rather than relationships – what Gee (2004) calls "affinity spaces" – which tend to lead to the most creative and generative behaviors (Ito et al.)

Activities Spent With Other Online Users	Number of Students/ Percentage
Playing games online with other users	15 (41%)
Engaging for social reasons, such as talking to friends	30 (81%)
Engaging for school reasons, such as homework help	24 (65%)
Gaining feedback on things like writings, drawings, video	9 (24%)
Sharing an interest through something like a fan site	10 (27%)
Sharing something I've made	9 (24%)

Table 3: Activities Spent with Other Users

HOW ARE STUDENTS ASKED TO USE DIGITAL LITERACIES WITHIN THE SCHOOL SETTING? HOW DO THESE COMPARE TO STUDENTS' USES OUTSIDE THE SCHOOL SETTING? WITH WEB 2.0 CONCEPTIONS OF DIGITAL LITERACIES?

Many students reported being asked to use technology in their classes, with 27 of them (77%) reporting that they were asked to use technology in school once a week or more. When asked about the sorts of technologies they used in school, the most prevalent response was that they were required to use computers. Some students also identified as "technologies" the use of specific software, explicitly listing Microsoft Word and PowerPoint. Others indicated they were required to employ skills such as word processing and researching on the Internet.

However, when asked to consider how technology use in and out of school matched up, students stated they did not see a close alignment. While 41% of those surveyed suggested that the digital literacies expressed in an out of school were "somewhat similar," only two students indicated a good match-up between home and school based digital literacy practices. Most of the students did not seem to feel that the

ways they were using digital literacies outside of school were reflected inside of the school setting. While some of this may have had to do with different tools and access at home, it became apparent that the biggest differences lay in the practices encouraged and supported. The majority of students reported technology use matches between in-school and out-of-school worlds were "not that similar" or "not at all similar." One survey participant responding in the last, open-ended question noted that technology was for "school and recreation." That divide, while perhaps unconsciously stated, seems telling.

The study participant perhaps most enthusiastic about the in-school use of technologies was interviewee Dan, who described the school's technological capabilities as "amazing." Dan cited the school's inventory of new computers, broadcasting equipment, Smart Boards, and specialized software for graphic design. In reporting how he saw in-school and out-of-school uses as different, he stated:

> You can go from, like, using a phone at your house and just a simple laptop or something like that to here where you have, um, engineering. You have welding uses a lot of technology. They have a plasma machine, and that's just amazing, they can cut whatever you want for them. Um, and the auditorium – there's so many different audio systems; there's so many different lighting systems. It's very diverse.

Importantly, the majority of technology usages that Dan reported appear to occur in elective courses. Washington is a school that specializes in career and technical programs, such as the engineering track. When discussing the use of technology in his core classes, however, Dan talked about a more limited use of these tools. Although every classroom has a Smart Board, Dan noted that these were sometimes underutilized, specifically stating, "I know my history teacher, he uses the SmartBoard. He uses it for PowerPoints and stuff like that. But my math teacher, she doesn't even deal with it; she just goes straight to the whiteboard and just writes whatever she wants to do." While school personnel at WHS do have access to sophisticated technological tools, data from the focus group, survey, and interviews suggest that students perceive these technologies are sometimes underutilized or used only in highly specialized settings. It appears that students who were not taking technical classes that incorporate specific technologies had limited exposure to more collaborative, creative, and authentic uses of digital literacies in line with Web 2.0 conceptions.

DISCUSSION AND IMPLICATIONS

The data from this study suggest the lives of urban students at WHS involve digital practices, integrally, just as studies have shown is generally the case for suburban youth. WHS students use digital technologies to keep tabs on one another, to project facets of their identities, to maintain relationships. However, in this small sampling, evidence points to these youth practicing digital literacies in manners more consistent with consumerist tendencies than creative activity or to support their formal learning. This corroborates the work of Attewell and Winston (2003), which found that youth from households with higher socioeconomic status (SES) tend to pursue their interests with

digital literacy in more academically and career-oriented ways than youth from lower socioeconomic households. By contrast, the researchers concluded members of a low-SES group exhibited behavior with multimedia that was "limited to consumption, not creation" (p. 194). While all of the youth in the study were using digital literacies to achieve specific, goal-oriented purposes, the youth from the higher SES-backgrounds were more likely to use these literacies in ways that granted them access to academically and career-bound notions of success.

Learning and media theorists such as Gee (2004) and Jenkins (2009) have made persuasive arguments about the potential learning possibilities of digital literacies. However, the benefits accrue most to those who practice digital literacies in creative ways. Without engagement in the more creative and critical practices of digital literacies, these youth may be relegated to the role of mere consumer rather than become shapers of the culture around them.

As a new facility, WHS does have access to a number of impressive technological tools. Students surveyed reported that many of these technological tools operate in the service of "non-academic" classes, the technical and career courses such as graphic arts, plumbing, and broadcasting. However, as evidenced by the focus group, survey data, and interviews, students may only be using these technological tools in extremely specialized ways. Those not enrolled in courses serving specific career or technical aspirations may instead be exposed, in school, to practices that Fishman and Pinkard (2001) described as the result of "technology planning" instead of "planning for technology." The researchers note this is a common trap schools fall into, particularly urban schools. In this faulty model, educators assume that simply being surrounded by technology is beneficial to students, and this becomes an end unto itself.

If, as my limited student data might suggest, WHS has fallen into the "technology planning" trap that has led to a "computer skills" model of classes, as opposed to a model that relies on careful instructional design, then the school is not alone. Warschauer, Knobel, and Stone (2004) found that in schools with students from low-SES backgrounds, teachers spent disproportionate amounts of time on software and hardware operations, choosing to focus on skills rather than technology that serviced their curriculum and encouraged deep thinking. In urban schools, "technology" is taught as its own separate class, instructed as discrete and out-of-context "technology skills," often within the computer lab. In this model, digital literacies are not truly being utilized as students are "learning the technology" instead of "learning with technology." This use of technology ignores the possibilities of multimodal digital literacies serving and being served by core curriculum (Tierney, Bond, & Bresler, 2010). Technologies need to go beyond being seen as "adjunct[s] to the classroom" to truly make a difference (Fishman & Pinkard, 2001, p. 64). Otherwise, as promising as these technological tools may be, they go from potential purveyors of authentic and transformative digital literacies

Mahiri (2011) stresses instructional design over a school-based focus on teaching students the skills involved in digital tools, an approach which forefronts creative activity. Mahiri quotes the perspective of a principal interviewed during the study: "It's really about imagining the kinds of things you want students to create and thinking about the design and intersection of the kinds of applications that will allow them to do these things" (p. 136).

In Mahiri's estimation, the key to incorporating digital literacies into the classroom in real and transformative ways is to help teachers see new media as "central to their designs for student learning" (p. 142). Educators must find ways to both meet students where they are and incorporate youths' digital literacy practices. Simultaneously, educators must push youth forward with the types of creative digital literacy practices that will help them beyond consumption to critique and transform the world around them. We need further research to identify the specific characteristics of teachers and students involved in generative, creative digital literacy practices in schools, as well as additional studies that examine the myriad and complex ways youth of diverse demographics practice and view digital literacies.

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