Finding Anything Extreme?:
Analyzing the Learning and Development Potential of Extreme Learning Websites

Minkyoung Kim
Indiana University, Bloomington
kimmink@indiana.edu

Eulho Jung
Indiana University, Bloomington
euljung@indiana.edu

Abdullah Altuwaijri
Indiana University, Bloomington
aaltuwai@indiana.edu

Yurong Wang
Indiana University, Bloomington
yurwang@indiana.edu

Curtis J. Bonk
Indiana University, Bloomington
cjbonk@indiana.edu

Abstract: The advancement of learning technology during the past decade or two has broadened the possibilities for online learning both in formal as well as informal settings. With a focus on the latter, research in extreme learning explores how people learn or teach with technology in unusual or unique ways outside of traditional educational settings. The purpose of this research, therefore, is to offer some insight into where and how the cutting-edge technology for educational purposes in authentic learning environments takes place. Researchers collected and evaluated 135 extreme learning websites under five main categories using 8 structured criteria. The results for different types of extreme learning are compared. In addition, the top 20 rated extreme learning Web sites are introduced.

Introduction

Extreme learning is related to informal and non-traditional learning. It explores how people learn or teach with technology in unusual or unique ways outside of traditional educational settings. Extreme learning can involve learning while on a boat at sea near the North Pole or when sailing around the world. It also occurs when tracking the blog and podcasts postings of those in similar adventures such as riding a bike or a car around the world or through the Americas. Extreme learning also includes more sedate and passive forms of learning including watching an online video in TED, LinkTV, CurrentTV, or YouTube. Through extreme learning Web resources, those stuck behind prison walls, injured and in a hospital bed, or unemployed and unable to pay for college

tuition can learn to be more productive members of society. Others might be in transition from one career to another and find open educational resources and OpenCourseWare can arouse new interests and confidence (Iiyoshi & Kumar, 2008). Still others might be retired and offer their educational ideas and mentoring services to anyone interested in the topic. Others might be earning their MBA while in war zones in Iraq or Afghanistan.

We are living in an age of open education where anyone can now learn anything from anyone else at any time (Authors, 2009). Technology, when thoughtfully employed, can empower people. Such empowerment moments can offer purpose and meaning in one's life. Despite the life altering possibilities, minimal research exists on extreme learning to date. As such, there is a need to capture snapshots as well as longer views of human growth resulting from extreme teaching and learning situations.

Decades of research on technology integration in schools and university settings as well as corporate and military training have rarely explored issues of human development and change. Most often, such research is conducted in a local or extremely narrow educational setting. In response, this research project takes a broader and more global or borderless perspective. Given the educational potential of extreme learning, this study was designed to uncover essential characteristics of successful online resources related to more unusual or extreme forms of learning.

Literature Review

Internet technology changes the way people learn as well as the learning environments for that learning. There are myriad opportunities for personal as well as collaborative learning. Zaidel and Lou (2010) indicated that personalizing the learning process using the Internet can enhance student performance on academic tasks. Other researchers (Kartal & Uzun, 2010; Kern & Warschauer, 2000; Kong, 2009) contend that Web resources and services provide opportunities to vastly improve the learning experience. They argue that presenting the learning content according to one's needs and preferences profoundly impacts learning targets.

Adventure learning, a form of non-traditional learning, is defined as "an approach to the design of online and hybrid education that provides students with opportunities to explore real-world issues through authentic learning experiences within collaborative learning environments" (Veletsianos & Klanthous, 2009, p.85). Doering and Veletsianos (2008) pointed out that the adventure learning approach is to "design, development, and ultimately learning is based upon the understanding that experience rather than osmosis guides meaningful learning experiences" (Doering & Veletsianos, 2008, p.25). Adventure learning provides students with experiences that are exciting, engaging, motivating and authentic via the implementation of problem-based tasks (Miller, Veletsianos, & Doering, 2008). While AL offers a starting point for the field of extreme learning, Veletsiano and Klanthous (2009) identified only eleven published papers on adventure learning. Clearly, much more research that needs to be done.

Methodology

The list of extreme learning Web sites was developed through two stages: (1) a team of a dozen researchers located and shared potential extreme learning sites; and (2) a subgroup of four researchers rated 135 of these Web sites using an eight-part coding scheme. This coding scheme was developed by the entire research team based on a set of technology features and instructional resource characteristics found in the research literature (see Appendix A).

Members used different methods for locating extreme learning sites including personal knowledge, conducting Web searches, scanning books, blog posts, and technical reports, and soliciting expert recommendations. The resulting list of resources was categorized five areas: (1) language learning, (2) outdoor/adventure learning, (3) social change/global learning, (4) virtual education, and (5) other/miscellaneous.

After much fine-tuning, the final version of the evaluation criteria include eight areas: (1) content richness, (2) functionality of technology, (3) extent of technology integration, (4) novelty of technology, (5) uniqueness of learning environment/learning, (6) potential for learning, (7) potential for life changing, and (8) scalability of audience. Ratings were made on each Web site through multiple phases based on the eight criteria using a 5-point Likert scale (1 is low; 5 is high). Given the use of four raters, a statistical measure of internal consistency, namely, Cronbach's alpha, was performed to determine the consistency among them. The alpha coefficient for the four items is .744, suggesting that the items have acceptable internal consistency.

Result and Discussion

Research significance

This research offers insights into where and how the cutting-edge technology for educational purposes in authentic learning environments, especially outside conventional perspectives of where learning takes place. Furthermore, by categorizing and evaluating hundreds of extreme learning Web sites, educators should begin to fathom the potential of extreme learning.

General Findings

To date, we have evaluated 135 websites using the scale. The Web sites evaluated were composed of 38 language learning, 34 outdoor and adventure learning, 19 social change and global learning, 23 virtual education, and 21 other/miscellaneous. As the Table 1 indicates, the outdoor and adventure websites scored the highest rating (3.1), whereas the other/miscellaneous category was rated the lowest (2.6). Overall, the criteria of uniqueness of learning environment/learning and potential for learning were rated as the highest (3.2). In contrast, the novelty of technology was rated as the lowest average (2.6).

Table 1. Average Web Site Rating According to Extreme Learning Criteria and Category

Categories (Number of site) / Criteria	Language Learning (38)	Outdoor / Adventure learning (34)	Social Change / Global (19)	Virtual Education (23)	Other/ Misc. (21)	Average (Total 135)
1. Content Richness	2.9	2.9	2.5	3.3	2.7	2.9
2. Functionality of Technology	3.2	3.1	2.6	3.0	2.6	3.0
3. Extent of Technology Integration	3.0	2.8	2.5	2.8	2.5	2.8
4. Novelty of Technology	2.8	2.6	2.4	2.6	2.3	2.6
5. Uniqueness of Learning Environment / Learning	2.8	3.8	3.3	3.1	2.7	3.2
6. Potential for Learning	3.1	3.3	3.1	3.4	2.8	3.2
7. Potential for Life Changing	2.7	3.2	3.0	3.1	2.6	2.9
8. Scalability of Audience	3.1	2.9	2.7	3.3	2.8	3.0
Average	3.0	3.1	2.8	3.1	2.6	2.9

Findings with criteria

Further analysis was conducted based on the eight criteria. As Table 1 reveals, virtual education was identified as the highest in the richness of its content (3.3). Not surprisingly, it is reasonable that the virtual education Web sites contain the most credible and up-to-date knowledge considering the most virtual education websites are managed by accredited academic institutions. Outdoor and adventure learning received the highest score in uniqueness of learning environment and learning (3.8). High scores in this criterion is a signal that much non-traditional, unique, or extreme learning environment is possible. Outdoor sites, of course, take learners outside the normal classroom settings and experiences. It is interesting to find that across all rated sites, the novelty of technology was deemed low (2.6). This result implies that emerging and cutting-edge technologies are not typically employed for nontraditional educational purposes. Of course, such a finding runs counter to prevailing notions that the latest technology naturally penetrates into our daily life outside of traditional educational settings.

Findings with categories

Detailed results are shown as follows for all categories of extreme learning except other/miscellaneous.

1. **Language Learning:** The average score of language category (3.0) reveals scores without much fluctuation in terms of the average score in each criterion. In language education websites, the highest score on functionality of technology (3.2) and the lowest score was on potential for life changing (2.7). Given that functionality of technology received the highest rating, technology interactivity and support seems to be one of the most-valued factors in language education.

2. **Outdoor and Adventure Learning:** Of the four main types of extreme learning we

explored, outdoor and adventure learning was tied with virtual education for the highest average score category (3.1). Overall, the highest score of this category is on the uniqueness of the learning environment/learning (3.8) and the lowest score was on novelty of technology (2.6). This finding is parallel to the general notion in which adventure learning is effectively promoted by providing authentic learning environments.

3. **Social Change and Global Learning:** Most of criteria's scores on this category are below the average scores across all Web sites; only uniqueness of learning environment/learning (3.3) was above the average (3.2). The highest score (3.3) is on uniqueness of learning environment/learning. Such findings were attributed to the different nature of social change and global learning category. In effect, one of the common features of social change Web sites include being inspirational and motivational, rather than directly providing educational materials.

4. **Virtual Education:** Taking into consideration that many open resources learning websites such as OpenCourseWare by MIT are free and open to the public, the highest score in potential for learning (3.4) and content richness (3.3) seems reasonable. We believe that the low score on novelty of technology (2.6) was impacted by the fundamental role of virtual education Web sites.

Characteristics in highly rated websites

In order to analyze the common characteristics of highly rated Web sites, we first listed up top 20 websites by average scores (see Appendix B and C). Among them, there were 6 in the Language learning category as well as 6 Outdoor/ adventure learning, 1 Social change and global learning, 5 Virtual education, and 2 in the Other/Miscellaneous category. Most of high-scored Web sites received high ratings on functionality of technology and extent of technology integration. Such results reveal the importance of proper design of extreme learning technology resources for educational purposes.

Conclusion

Many interesting characteristics of extreme learning emerged from our analyses. In addition, our new coding scheme with eight key criteria should prove helpful to others intending to conduct research in this field. As indicated, there are many variables that result in effective Web sites for extreme learning. Such variables include content, technological richness as well as issues related to the scalability, novelty, and uniqueness of the technology and the learning activities taking place there. More specifically, it is important to offer a highly interactive resource for language education, provide an authentic learning environment in outdoor and adventure learning, and deliver online educational materials in an effective way shown in virtual education.

It is not too surprising that virtual education was the highest rated in terms of content richness and the most scalable. That is what they intend to do. In addition, it makes sense that language learning sites incorporated the widest range of technology tools; many of which were easy to use. The most unique ways in which technology was employed was found in adventure learning as well as in social change and global learning sites. Such a finding would naturally be expected. If you want to change your life or simply learn something but do not wish to pursue a degree, you might explore as well as participate in outdoor and adventure learning sites. Those wishing for a new career might explore virtual education as a potential life-changing event. Virtual education sites also offer the most in terms of human learning.

This is just a start. As we continue investigating additional Web sites during the coming year, we intend to include more than 200 Web sites analyzed for our conference presentation. In addition, during the coming year, we will be interviewing participants in many of these sites about their learning gains and life changing experiences. Based on those results, focus groups will be structured to clarify themes resulting from those interviews. There is much that can be learned about those experiencing life and learning at the extremes.

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Appendix A. Extreme Learning Web Site Coding Scheme

No	Criteria	Definition	1 (Low)	2	3 (Medium)	4	5 (High)
1	**Content Richness**	This criterion deals with how much information the Website, resource, or project contains on the topic chosen, how adequately it fulfills the purpose of learning, and whether the information is credible and up-to-date or not.	The Website, resource, or project doesn't contain much information on the topic chosen, and doesn't adequately fulfill the purpose of learning. The information is not credible or is out-of-date. There are few resources providing access to learning content; it may appeal to different learning preferences or styles.	-	The Website, resource, or project contains less information on the topic chosen, and fulfills the purpose of learning to some extent. The information is somewhat credible or is up-to-date. There are some resources providing access to learning content; it may appeal to different learning preferences or styles.	-	The Website, resource, or project contains much information on the topic chosen, and adequately fulfills the purpose of learning. The information is credible and up-to-date. There are a wide range of resources providing access to learning content; it may appeal to different learning preferences or styles.
2	**Functionality of Technology**	This criterion deals with the ease of access, navigation, and use of the Website, resource, or project and whether it contains effective and appropriately employed technology to serve the stated learning purpose.	The Website, resource, or project is difficult to access, navigate, and use and contains ineffective technology for the stated learning purposes of potential users.	-	The Website, resource, or project is relatively intuitive or easy to access, navigate, and use and contains somewhat effective and appropriately employed technology to serve the stated learning purposes of potential users.	-	The Website, resource, or project is extremely intuitive and easy to access, navigate, and use and contains highly effective and appropriately employed technology to serve the stated learning purposes of potential users.
3	**Extent of Technology Integration**	This criterion deals with the range, amount, and types of technologies employed including issues of interaction, collaboration, and information collection, contribution, and community through such technology.	The Website, resource, or project contains few technologies for learning. Technology tools are not interactive, collaborative, or participatory and do not promote communication or sense of community. User contribution is limited or nonexistent.	-	The Website, resource, or project contains some range of technologies for learning. Technology tools are moderately interactive and collaborative and might enhance information exchange or user communication and contribution.	-	The Website, resource, or project contains a wide range and amount of technologies for learning. Technology tools are highly interactive and collaborative and can greatly promote information collection and dissemination as well as user communication and contribution.
4	**Novelty of Technology (Coolness Factor #1)**	This criterion deals with whether the Website, resource, or project contains emerging, unusual, or novel technologies.	There is no experimentation with emerging, unusual, or novel technologies for learning and the technologies which are used are out-of-date.	-	There is some experimentation with emerging, unusual, or novel technologies for learning which might motivate or engage potential users/learners.	-	There is extensive experimentation with emerging, unusual, or novel technologies for learning; some of which is quite exciting, motivating, or appealing for potential users/learners.
5	**Uniqueness of Learning Environment / Learning (Coolness Factor #2)**	The Website, resource, or project serves the purpose of learning in a non-traditional, unique, or extreme learning environment, which is highly different from traditional classroom settings.	The Website, resource, or project is just a replication of formal or traditional school-based learning. The learning is essentially what the user or learner might experience in a traditional teaching or training situations. The Website, resource, or project might be rather plain or unappealing to the potential learner or user; it is one of dozens of such sites.	-	The Website, resource, or project is somewhat unique or different from traditional learning. There are learning opportunities that are somewhat novel or hard to find in formal or traditional settings. The Website, resource, or project makes an attempt to connect people to each other as well as to novel resources and activities and current information not easily found in books or other traditional learning resources. There is also some room for creative expression of the users.	-	The Website, resource, or project is unique or different. There are learning opportunities that are novel or hard to find in formal or traditional settings. The Website, resource, or project connects people to each other as well as to novel resources and activities and current information is not easily found in books or other traditional learning resources. There is also extensive room for creative expression of the users.

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6	**Potential for Learning**	This criterion deals with whether the Website, resource, or project enables and provides learning activities or learning opportunities for the target audience to achieve the intended learning goals. There might be many markers, targets, or goals for such learning as well as celebration of those who have completed one or more learning-related units, activities, or segments. Such markers might come in the forms of self-tests, discussions, reviews, interactions, etc. or various rich media resources. The paths for learning are varied and extensive.	The Website, resource, or project enables and provides few learning activities or opportunities for the target audience to achieve the intended learning goals. There are extremely limited markers, targets, or goals for such learning and limited acknowledgment related to those who have completed one or more learning-related units, activities, or segments (i.e., self-tests, discussions, reviews, interactions, etc. or various rich media resources). The paths for each learner may be not unique. There may be few ways to socially network or collaborate with others at the Website, resource, or project.	-	The Website, resource, or project enables and provides some learning activities or learning opportunities for target audience to achieve some intended learning goals. There might be some markers, targets, or goals for such learning as well as celebration of those who have completed one or more learning-related units, activities, or segments (i.e., self-tests, discussions, reviews, interactions, etc. or various rich media resources). The paths for each learner may be somewhat unique. There may also be some ways to socially network or collaborate with others at the Website, resource, or project.	-	The Website, resource, or project enables and provides the potential for learning activities or learning opportunities for the target audience to achieve most or all of the intended learning goals. There might be markers, targets, or goals for such learning as well as celebration of those who have completed one or more learning-related units, activities, or segments (i.e., self-tests, discussions, reviews, interactions, etc. or various rich media resources). The paths for each learner may be highly unique. There may also be ways to socially network or collaborate with others at the Website, resource, or project.
7	**Potential for Life Changing**	This criterion deals with whether the Website, resource, or project influences or improves the quality of life and extends or changes the perspective of the world for the intended audience. As part of this, there is potential for individuals to experience life changing or empowerment moments from the use of the Website, resource, or project.	The Website, resource, or project does not offer much in the way of improving or influencing the quality of life or the perspective of the world for the intended audience. The impact is quite narrow or limited. Users might not gain anything beyond basic skills.	-	The Website, resource, or project somewhat influences or improves the quality of life and the perspective of the world for intended audience. People are somewhat empowered to learn in ways that change their lives or broaden their outlook, perspectives, or knowledge and competencies. They can connect to other people or to knowledge and information in some ways that they might not have felt or experienced previously.	-	The Website, resource, or project significantly influences or improves the quality of life and extends or changes the perspective of the world for the intended audience. People are empowered to learn in ways that change their lives or broaden their outlook, perspectives, or knowledge and competencies. They can connect to other people or to knowledge and information in many ways previously unseen or seldom experienced.
8	**Scalability of Audience**	This criterion deals with the potential impact of the Website, resource, or project including the possibility to broaden the size and scope of its potential intended audience.	The Website, resource, or project has a narrow focus or does not have wide appeal or potential impact. The intended or actual audience is quite limited.	-	The Website, resource, or project has the potential to impact many people or a somewhat wide audience. It might have relevance to several different audiences or types of users.	-	The Website, resource, or project has high possibility to impact a broad audience or large scale and scope from one or more educational sectors (e.g., K-12, higher education, corporate, government, non-profit, or informal).

Appendix B. Average Score of Top Twenty Extreme Learning Websites

Criteria / Categories (No of top 20 sites / Total sites)		Language Learning (6/38)	Outdoor / Adventure learning (6/19)	Social Change / Global (1/23)	Virtual Educ. (5/21)	Other/ Misc. (2/21)	Ave (20/135)
1. Content Richness	Top 20	3.9	3.5	4.0	4.4	3.8	3.9
	General	2.9	2.9	2.5	3.3	2.7	2.9
2. Functionality of Technology	Top 20	4.3	3.9	4.0	3.9	4.0	4.0
	General	3.2	3.1	2.6	3.0	2.6	3.0
3. Extent of Tech Integration	Top 20	4.0	3.5	3.8	3.3	3.8	3.7
	General	3.0	2.8	2.5	2.8	2.5	2.8
4. Novelty of Technology	Top 20	3.4	3.4	3.5	3.0	3.5	3.3
	General	2.8	2.6	2.4	2.6	2.3	2.6
5. Uniqueness of Learning Environment / Learning	Top 20	3.6	4.3	3.8	3.6	4.0	3.9
	General	2.8	3.8	3.3	3.1	2.7	3.2
6. Potential for Learning	Top 20	3.9	3.8	3.5	3.9	4.4	3.9
	General	3.1	3.3	3.1	3.4	2.8	3.2
7. Potential for Life Changing	Top 20	3.4	3.7	3.5	3.7	3.9	3.6
	General	2.7	3.2	3.0	3.1	2.6	2.9
8. Scalability of Audience	Top 20	4.0	3.5	3.5	4.1	3.8	3.8
	General	3.1	2.9	2.7	3.3	2.8	3.0
Average	Top 20	3.8	3.7	3.7	3.7	3.9	3.8
	General	3.0	3.1	2.8	3.1	2.6	2.9

Appendix C. Top Twenty Rated Extreme Learning Websites

Categories	Websites	Total No.
Language Learning	1. Livemocha (http://www.livemocha.com) 2. BBC Learning English (http://www.bbc.co.uk/worldservice/learningenglish) 3. Chinese Pod (http://chinesepod.com) 4. Palabea (http://www.palabea.net) 5. Kan Talk (http://www.kantalk.com) 6. nciku (http://www.nciku.com)	6
Outdoor / Adventure learning	1. Earthducation (http://lt.umn.edu/earthducation0) 2. Jon Bowermaster (http://www.jonbowermaster.com/) 3. Around the World 4*4 Expedition (http://www.theworldbyroad.com) 4. Polar Husky (http://www.polarhusky.com) 5. Penguin Science (http://www.penguinscience.com) 6. Explore Arctic (http://www.explore.org)	6
Social Change / Global Learning	1. Link TV (http://www.linktv.org)	1
Virtual Education	2. MIT Open Courseware (http://ocw.mit.edu) 3. Open Yale Courses (http://open.yale.edu) 4. Khan Academy (http://www.khanacademy.org) 5. MIT OCW for High School (http://ocw.mit.edu/high-school) 6. impossible2possible (http://impossible2possible.com)	5
Other/Misc.	1. Ed Tech talk (http://edtechtalk.com) 2. Explo.tv (www.exploratorium.edu)	2
	Total	20