EMERGING ED-TECH AND ACCESSIBILITY

Disha Vora

Thesis Prepared for the Degree of

MASTER OF ARTS

UNIVERSITY OF NORTH TEXAS

December 2013

APPROVED:

Susan Squires, Committee Chair
Mariela Núñez-Janes, Committee Member
Jim Fruchterman, Committee Member
Lisa Henry, Chair of the Department of Anthropology
Thomas Evenson, Dean of the College of Public Affairs and Community Service
Mark Wardell, Dean of the Toulouse Graduate School
Recent developments in the field of education have led to a proliferation of educational technologies (or “ed-tech”), yet access to educational content for students with special needs remains a challenge. This research study aims to assess the current state of accessibility in emerging ed-tech and to identify barriers in enabling educational content to be born accessible. Detailed discussions with various ed-tech platforms revealed less of a need for technical tools, but a more prevailing need for knowledge and education around accessibility – what it means and how best to incorporate accessibility into their platforms. The more experienced teams advocate incorporating accessibility into product development right from the design phase, while the younger teams expressed challenges in navigating accessibility laws and the dire need for easy-to-follow guidelines and best practices. A detailed review of educators' content creation processes reveals multiple dependencies in the ecosystem of ed-tech where partnerships and compatibilities are crucial in enabling accessibility throughout the process. Likewise, an urgent need exists for increasing awareness of accessibility among instructors authoring educational content using emerging ed-tech.
ACKNOWLEDGEMENTS

Foremost, I would like to express my gratitude to my advisor, Dr. Susan Squires, whose expertise, understanding, and patience, added considerably to my graduate experience and research. I would like to thank Dr. Mariela Nuñez-Janes for the assistance she provided at all levels of this research study.

A very special thanks goes out to my client organization, Benetech, and in particular Anh Bui, for her ongoing guidance and contribution throughout the research process. I must also acknowledge the support I received from the Global Literacy team at Benetech, including Betsy Beaumon, Robin Seaman, Mario Oliveros, and Suzy Haines.

My sincere thanks goes out to all the research participants, who remain anonymous, and who offered their valuable time and candid participation, without which this research would not have been possible.

And last but not least, I would like to thank my best friend and husband, Manjunath, without whose unconditional love and encouragement, I would not have completed this thesis.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1.1 The Client: Beneficent Technology, Inc., “Benetech”</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1.2 Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1.3 Key Areas of Exploration</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>UNDERSTANDING THE LANDSCAPE</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2.1 Accessibility in Education</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2.1.1 Why Make Ed-tech Accessible?</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2.1.2 Assistive Technologies</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2.2 Literature Review of Trends in Education</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2.2.1 Common Core State Standards</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2.2.2 Open Educational Resources (OER)</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2.2.3 Rapid Expansion of Online Education</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>2.2.4 Shared Data Networks and Personalization</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>2.2.5 Ed-tech Market Map</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>2.3 Literature Review of Anthropology and Other Related Disciplines</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>2.4 Summary</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>2.5 Informational Interviews</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>METHODOLOGY</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>3.1 Understanding the Landscape</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>3.2 Data Collection</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>3.2.1 Ed-tech Interviews</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>3.2.2 Educator Interviews and Observations</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>3.3 Data Analysis</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>3.4 Presentation</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>3.5 Timeline</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>FINDINGS AND IMPLICATIONS</td>
<td>34</td>
</tr>
</tbody>
</table>

ACKNOWLEDGEMENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS
4.1 It’s Not Just About the Technology... ................................................................. 34
  4.1.1 Organizational Life Cycle ................................................................. 34
    4.1.1.1 Introduction ................................................................. 35
  4.1.1.2 Growth ................................................................ 36
  4.1.1.3 Maturity ................................................................ 37
  4.1.1.4 Decline ................................................................ 38
  4.1.2 Iterative Design Process .............................................................. 38
  4.1.3 Summary ........................................................................ 41
4.2 Content Creation Workflows ..................................................................... 41
  4.2.1 Content Creation by an Individual .............................................. 42
  4.2.2 Content Creation by a Team ..................................................... 47
  4.2.3 Assessment ........................................................................ 49
  4.2.4 Summary ........................................................................ 50
4.3 Attitudes towards Accessibility ................................................................. 50
4.4 Further Challenges .................................................................................. 53
5. OPPORTUNITIES .......................................................................................... 56
  5.1 Education about Accessibility ........................................................... 56
  5.2 User Feedback Mechanism ............................................................... 57
  5.3 Consultation ................................................................................. 58
  5.4 Accessibility as a Differentiator ......................................................... 59
6. LIMITATIONS AND FURTHER RESEARCH ............................................... 61
7. PERSONAL REFLECTIONS ........................................................................ 63

APPENDICES ..................................................................................................... 66

BIBLIOGRAPHY ............................................................................................... 73
LIST OF TABLES

Table 1 Total and online enrollment in degree-granting postsecondary Institutions .................... 13
Table 2 Project timeline .................................................................................................................................................. 33
# LIST OF FIGURES

**Figure 1.** Assistive technology products and features ................................................................. 7

**Figure 2.** “Online education is critical to the long-term strategy of my institution” .................. 12

**Figure 3.** Total and online enrollment in degree-granting postsecondary institutions .......... 12

**Figure 4.** Total and online annual enrollment growth .................................................................. 14

**Figure 5.** Ed-tech Market Map by NewSchools Venture Fund .................................................. 17

**Figure 6.** Conceptual map of anthropological contributions to disability (Reid-Cunningham 2009) .......................................................................................................................................................... 19

**Figure 7.** Culture Based Model Framework ID-TABLET (Young 2008) .................................... 22

**Figure 8.** Initial hypotheses of information flow ....................................................................... 25

**Figure 9.** Information flow when a MOOC offers university courses ....................................... 26

**Figure 10.** Organizational life cycle ......................................................................................... 35

**Figure 11.** Iterative design process ............................................................................................ 39

**Figure 12.** Content creation workflow ....................................................................................... 42

**Figure 13.** Content creation by an individual ............................................................................. 42

**Figure 14.** Content creation by a team ....................................................................................... 47
LIST OF ABBREVIATIONS

CMS: Course management system

Ed-Tech / EdTech: Educational technologies

IEP: Individualized education program

LMS: Learning management system

MOOC: Massive open online courses

NFB: National Federation of the Blind

OER: Open educational resources

PARCC: Partnership for Assessment of Readiness for College and Careers

PLE: Personal learning environment

RFP: Request for proposal

VPAT = Voluntary Product Accessibility Template

W3C: World Wide Web Consortium

WCAG: Web Content Accessibility Guidelines
1.1 The Client: Beneficent Technology, Inc., “Benetech”

Benetech is a nonprofit organization based in Palo Alto, California, integrating business, technology and social awareness to create global solutions that serve humanity. They identify social problems and market niches where technology could make a tremendous difference for improving thousands of lives, potentially millions. Functioning similar to a technology startup, they seek strategic partners and philanthropic investors to build solutions in the nonprofit sector. Their return on investment is not measured in dollars, but rather in the number of lives they affect: return on humanity. Benetech’s four main program areas are Global Literacy, Human Rights, Environment, and Benetech Labs.

In a world dominated by the printed word, images, video, and other ever-evolving media, millions of people remain locked out due to lack of access to these commonly used standard formats of content, driven by visual impairment, learning disabilities such as dyslexia, mobility impairments, or developmental disabilities. While a number of other non-profit and government organizations have been working to address these needs for some time, it has often been without the use of the technological advances taking shape in the broader commercial market. As part of a larger mission to serve populations with unmet literacy needs, Benetech’s Global Literacy Program addressed this by developing technology that people with disabilities need today, while also catalyzing the systemic changes necessary in the long term.¹

The Global Literacy Program’s flagship product is Bookshare, a web-based digital library that gives people with print disabilities the same ease of access to books and periodicals enjoyed by those without disabilities. The Bookshare library serves over a quarter million members – mostly students – with a collection of over 200,000 titles in a variety of accessible formats. Benetech also launched the DIAGRAM Center, a research and development hub working to set standards, generate best practices and design tools to ensure that images found in digital educational content are accessible to everyone. Other initiatives include Route 66 Literacy, a web-based program that makes it easy for any literate person to teach adolescent and young adult beginning and struggling readers, such as people with developmental disabilities, to read.

1.2 Statement of the Problem

In order to improve the availability of accessible content, Benetech seeks to go where the content is created, so that it is born accessible. The long term vision is for textbooks and all educational content to be created as accessible from inception, and distributed through mainstream channels which are also accessible. This means that Benetech is seeking to better understand the space of creating tools, products, processes, and guidance for content creators such as mainstream publishers, open educational resource publishers, and teachers who create curriculum.

---

Based on the current understanding of the major players in this sector, there are two key categories of educational content creators:

i. Prescriptive content creators: These comprise mainly of the large traditional publishing houses such as Pearson, McGraw Hill, etc. – centralized institutions that have traditionally created educational content taught via standardized curriculum in public schools; and

ii. Emergent content creators: These are comprised of emerging educational technologies – dynamic, adaptive knowledge creators that provide new and innovative ways of creating and delivering educational content, such as enabling the use of user generated content, online media, social networks, etc. Massive open online courses (MOOCs), learning management systems (LMSs), and social learning platforms are some examples of emerging educational technologies.

From this point forward in this report, these educational technologies are referred to by their commonly used industry term, “ed-tech.”

Key personnel in the Global Literacy team at Benetech include some highly experienced veterans from the publishing industry who continue to provide their knowledge, expertise, and ongoing contact with traditional publishing houses. Thus they feel reasonably confident about their understanding of the first category of content creators mentioned above. However, Benetech would like to gain better understanding of the content creation process with emerging educational technologies and how accessibility can be better addressed on these platforms.
1.3 Key Areas of Exploration

The key objective of this research study is to create a holistic understanding of the emergent educational technologies, the resultant content creation process, and how accessibility can be better addressed in this process across K-12, higher education, and continuing education. This includes, but is not limited to, exploring areas of inquiry such as:

- What are the new and emerging developments in the emerging educational content creation process?
- What is the level of awareness and integration of accessibility tools among these ed-tech players?
- What are the key barriers to adoption of accessibility tools?
- Where are the key areas of opportunities?
2.1 Accessibility in Education

Accessible technology enables users with disabilities to access electronic information. With the increased use of technology in schools, and approximately 95% of students with disabilities included in general education classrooms\(^4\), it is even more important to ensure that all students have equal access to technology and the educational opportunities it provides.

2.1.1 Why Make Ed-Tech Accessible?

For starters, it is the right thing to do. Integrating accessible technology into schools, and introducing it to students with disabilities early in their educational lives, not only enhances their learning, but also their future employment options.\(^5\)

Accessibility is the law. The U.S. Department of Education requires states funded by the Assistive Technology Act State Grant program to comply with Section 508, a federal law mandating that all electronic and information technology developed, procured, maintained, or used by the federal government be accessible to people with disabilities.\(^6\) The World Wide Web Consortium (W3C), has an established the Web Content Accessibility Guidelines (WCAG) which


\(^6\) What is Section 508? – Definition from Whatis.com (2013) Retrieved from [http://searchcio.techtarget.com/definition/Section-508](http://searchcio.techtarget.com/definition/Section-508)
explain and establish standards on how to make web content more accessible to people with disabilities.

Accessibility presents a substantial market opportunity. According to the report, *Accessibility and Universal Design: Compliance and Opportunity* (EdNET Insight, 2011), “the population of students who can benefit from accessible materials is considerable – going well beyond those with legally defined print disabilities. As many as 25% of K-12 students could benefit from accessible materials—a market that could include 12 million students or more … The potential market for accessible materials is even larger when one includes students enrolled in post-secondary institutions.”

### 2.1.2 Assistive Technologies

Assistive technologies are designed to help students with disabilities such as visual impairment (blindness, low vision, color blindness, etc.), learning impairment (dyslexia, attention deficit disorder, etc.), hearing impairments, language impairments, etc. Technology products need to be designed such that they can function with assistive devices and allow access to the electronic information displayed. For product designers, the challenge is to remove the obstacles that prevent accessibility tools from functioning effectively.

Figure 1 below demonstrates some examples of assistive technology products and features:

---

7 Copyright 2011 Market Data Retrieval
Figure 1. Assistive technology products and features

---

8 Adapted with permission from: Microsoft Accessibility in Education (2013) Retrieved in September 2013 from: http://www.microsoft.com/education/PublishingImages/265x150/tf/MS_Accessibility_Infographic_FINAL.png
An example of what the user experience looks like when using assistive technologies is shown in Appendix A.

2.2 Literature Review of Trends in Education

Detailed study of published material reveals some important changes in the field of education that have created tremendous opportunities for the growth of emerging educational technologies. Conversely, these trends also pose significant challenges in terms of accessibility of these emerging technologies. Let’s look at some of these key trends in K-12, higher education, and continuing education.

2.2.1 Common Core State Standards

The Common Core State Standards Initiative has established an internationally benchmarked set of educational standards for K-12 in English language arts and mathematics, and has been currently adopted by 45 states in the US. The standards are designed to establish what students are expected to have learned when they graduate from high school and enter postsecondary education or the workplace.\(^9\)

The Common Core State Standards create a staircase of increasing text complexity, so that students are expected to both develop their skills and apply them to more and more complex texts. They include sample texts that demonstrate the level of text complexity appropriate for the grade level and compatible with the learning demands set out in the

---

standards. The standards establish what students need to learn, but they do not dictate how teachers should teach. Teachers will continue to devise lesson plans and tailor instruction to the individual needs of the students in their classrooms. This ensures teachers have the flexibility to make their own decisions about what texts to use, while providing a reference point when selecting their texts.10

The standards also take into account the rapidly changing information age. To help address the demands of technology, the initiative incorporates research and media skills into every subject. Students will be required to conduct extensive research independently, question the author, evaluate claims and evidence, and consider multiple perspectives. Concurrently, teachers will be using technology to teach and engage students with their lessons and to collaborate with colleagues across state, thus taking advantage of lessons learned across the nation.11

In addition to curriculum changes, and perhaps just as important, will be changes to assessment standards. There will be a fundamental shift from the current memorization and test-prep based culture to one where students are asked to read closely, make inferences, cite evidence, analyze arguments and interpret words and phrases as they are used in a text. Additionally, computer-based, next-generation assessments will be rigorous because of their alignment with the Common Core Standards. There will be a move from paper-and-pencil, bubble-in assessments to online assessments with drag-and-drop features, constructed response, and the like. The Partnership for Assessment of Readiness for College and Careers

---

(PARCC) and Smarter Balanced are two major consortia currently developing guidelines around testing aligned with Common Core Standards.

These are some of the areas that introduce tremendous opportunities for the proliferation of ed-tech tools in K-12 education that are more interactive and media driven than ever before. They also pose new challenges in terms of accessibility of media-rich content and rapidly evolving formats and platforms used for the development of curriculum and assessment.

2.2.2 Open Educational Resources (OER)

The William and Flora Hewlett Foundation defines OER as “teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.”

Thus OER are openly licensed, digitized educational materials that offer opportunities for educators, students, and self-learners everywhere to share, use, and reuse knowledge for teaching, learning, development and research, across K-12, higher education, and continuing education. The creation and use of OER represents a shift in education by providing a

---

mechanism for instructional innovation and networks of teachers and learners sharing expertise, best practices, and peer-based learning.\textsuperscript{13}

Several initiatives worldwide have been critical in the growth of the OER movement. One such initiative is OER Commons which aims to aggregate, share, and promote open educational resources to educators, administrators, parents, and students. OER Commons also provides educators tools to align OER to the Common Core State Standards, to evaluate the quality of OER, and to contribute and share OER with other teachers and learners worldwide.\textsuperscript{14}

As OER continue to grow and become a critical resource for curriculum development, they pose new challenges in terms of accessibility of content – how and at what stage will these resources be made accessible in the content creation process?

2.2.3 Rapid Expansion of Online Education

Online learning has shown significant growth over the past decade, and many factors have contributed to this growth, despite some barriers to widespread adoption.

According to the report \textit{Changing Course: Ten Years of Tracking Online Education in the United States} (Allen et al., 2013), close to 70\% of chief academic officers at degree-granting higher education institutions reported that online education is critical to their institution’s long-term strategy in 2012 (see Figure 2).


\textsuperscript{14} Learn About the Movement – OER Commons (2013) Retrieved from \url{http://www.oercommons.org/learn-about-the-movement}
Additionally, the report also showed a steady increase in the percentage of post-secondary students who were enrolled in at least one online course, over the past ten years (see Figure 3). The proportion of higher education students taking at least one online course stood at 32% in 2011 (see Table 1).

Table 1 *Total and Online Enrollment in Degree-Granting Postsecondary Institutions*\(^{17}\)

<table>
<thead>
<tr>
<th>Fall</th>
<th>Total Enrollment</th>
<th>Students taking at least one Online Course</th>
<th>Online Enrollment as a Percent of Total Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>16,611,710</td>
<td>1,602,970</td>
<td>9.6%</td>
</tr>
<tr>
<td>2003</td>
<td>16,911,481</td>
<td>1,971,397</td>
<td>11.7%</td>
</tr>
<tr>
<td>2004</td>
<td>17,272,043</td>
<td>2,329,783</td>
<td>13.5%</td>
</tr>
<tr>
<td>2005</td>
<td>17,487,481</td>
<td>3,180,050</td>
<td>18.2%</td>
</tr>
<tr>
<td>2006</td>
<td>17,758,872</td>
<td>3,488,381</td>
<td>19.6%</td>
</tr>
<tr>
<td>2007</td>
<td>18,248,133</td>
<td>3,938,111</td>
<td>21.6%</td>
</tr>
<tr>
<td>2008</td>
<td>19,102,811</td>
<td>4,606,353</td>
<td>24.1%</td>
</tr>
<tr>
<td>2009</td>
<td>20,427,711</td>
<td>5,579,022</td>
<td>27.3%</td>
</tr>
<tr>
<td>2010</td>
<td>21,016,126</td>
<td>6,142,280</td>
<td>29.2%</td>
</tr>
<tr>
<td>2011</td>
<td>20,994,113</td>
<td>6,714,792</td>
<td>32.0%</td>
</tr>
</tbody>
</table>

The increase from 1.6 million students taking at least one online course in fall 2002 to the 6.7 million for fall 2011 represents a compound annual growth rate of 17.3%. For comparison, the overall higher education student body has grown at an annual rate of 2.6% during this same period – from 16.6 million in fall 2002 to 21.0 million for fall 2011.\(^{18}\)


In addition to online courses and programs offered by degree-granting institutions, the past few years have also seen a rapid increase in open online education in various forms. Massive Open Online Courses (MOOCs) such as Coursera (https://www.coursera.org/) and Udacity (https://www.udacity.com/) have gained tremendous popularity, albeit with mixed results due to low retention rates and skepticism around long term sustainability. Udemy (https://www.udemy.com/) and Course Hero (www.coursehero.com/) provide tools for any person with an expertise to create online courses and make them available on their marketplaces for free or for a fee. Khan Academy (www.khanacademy.org/) provides thousands of curated video tutorials online for free on various topics in math, science, economics, and humanities.

These are a few examples of the explosion of online educational content available today. Content is available not only for educators supplementing their curriculum and students enrolled in K-20 institutions, but also for any individual interested in continuing education for personal or professional growth without enrolling in any formal institution. The average age of online learners has risen to 34 in 2013, up from 27 in 2002, demonstrating the role of online education in continuing education and lifelong learning.

Online education thus opens up a world of access to educational content, but how far is this truly accessible to everyone, especially to users with special needs?

2.2.4 Shared Data Networks and Personalization

Student data of all kinds are stored in fragmented systems across testing programs, instructional software, grade books, and learning management systems. InBloom (formerly Shared Learning Collaborative) has been created with the goal of tying together curriculum, teachers, students, grades, and learning tools in K-12 education.

InBloom aims to achieve this via its three components:

- Data such as student names, demographic information, discipline history, grades, test results, teachers, attendance, graduation requirements, etc. that can be managed and accessed with ease and security across school districts

---

22 inBloom (n.d.) Retrieved from https://www.inbloom.org/
- Content accessed via web resources and tags provided by the Learning Resource Metadata Initiative and U.S. Department of Education Learning Registry, and aligned with the Common Core Standards
- Applications built by third parties that use student data to ultimately enable a more personalized learning experience for each student

Shared data networks will thus enable tracking student performance, cloud-based personalization of educational content for individual as well as groups of students, and the rise of the marketplace for data-driven application vendors. An extended benefit of such personalization is that educational content can be modified according to every user’s needs and presents opportunities to make content accessible to students with special needs.

2.2.5 Ed-tech Market Map

NewSchools Venture Fund published the following visual representation of the ed-tech market in May 2013 (see Figure 5)\textsuperscript{24}. This map clustered ed-tech companies into four categories – Curricula, data, talent management, and instructional systems – each defined as follows:

- \textit{Curricula}: Digital content created for the purpose of educating learners
- \textit{Data systems}: Systems that manage, analyze, and report student informational such as demographics and achievement data
- \textit{Instructional systems}: Applications and systems used to aid teachers in instruction and classroom management

• Talent management: Applications which support professional development and teacher effectiveness as well as human resource systems.²⁵

Figure 5. Ed-tech Market Map by NewSchools Venture Fund²⁶


The educational content creation process comprises of organizations and sub-categories that fall under curricula and instructional systems in the Ed-tech market map shown above.

2.3 Literature Review of Anthropology and Other Related Disciplines

Early in the process of conducting a literature review of topics relevant to this research in anthropology, it became evident that a multi-disciplinary review would be required to understand various anthropological aspects of accessibility in education. Thus, various publications in educational anthropology, disability studies, instructional design, design anthropology, as well as those that spanned multiple practices, were studied.

Anthropology of disability, according to Reid-Cunningham (2009), has determined that disability is “socially constructed: It depends very little on the degree of functional loss or impairment; rather it is defined by societal standards for normative bodies, behaviors, and role fulfillment. As a result, disability is viewed less as a limitation or dysfunction than as the perceptions and prejudices of an ablebodied majority that restrict the independence of people with disabilities.”

In her article, “Anthropological Theories of Disability” (2009), Reid-Cunningham summarizes three concepts: deviance, liminality, and stigma (see Figure 6). Deviance may be defined as straying from the “prevalent or valued norms” in a way that the society perceives as “negatively deviant.” Liminality refers to a ritual or rite of passage in which there is a change of social status. Goffman’s concept of stigma is adopted: “a discrediting attribute and undesired differentness from social expectation.”
Furthermore, “the significance of disability is culturally produced, and different cultures conceive of disability in diverse ways ... Religious teachings, laws, customs, and media portrayals also reflect, define, or perpetuate how people approach disability” (Reid-Cunningham 2009).

This raises an interesting question to consider – how do various entities in the field of education and educational technologies perceive disability? Do they consider it deviance, liminality, or stigma?

Hershenson, in his article, “Toward a Cultural Anthropology of Disability and Rehabilitation” (2000) discussed critical questions that should be raised in constructing an ethnography of disability and rehabilitation, some of which include:

---

• If disability exists as a concept within a culture, how does the culture indicate that those in the culture should act (including react and feel) toward persons who are categorized as disabled?

• What structure (i.e. ideas, behaviors, material objects) are there in the culture to promote or facilitate the culturally approved ways of acting towards those with disabilities?

• Does the concept of disability, if present in the culture, lead to a concept of rehabilitation?28

Conversely, these translate to questions for this research undertaking:

  o How do the ed-tech organizations and educators react towards and feel about students with disabilities?
  o What infrastructure and organizational philosophies are available to address accessibility in educational technologies and the content creation process?
  o Is ed-tech accessibility positioned to enable educational content to be born accessible?

An article in educational anthropology, “Beyond a ‘Culture of Silence’: Inclusive Education and the Liberation of ‘Voice’” by Suanne Gibson (2006), addresses a discrepancy between contemporary education policy and practice, in that the policy advocates inclusive education, while this does not translate into practice. It is argued this discrepancy “has been created and endured by a ‘Culture of Silence’ prevalent in modernist education systems where voices of the ‘other’ remain silenced.” The article also suggests that “by encouraging dialogue

28 Hershenson (2000)
between pupils, families, schools, education authorities and other related professionals, which is both flexible and transparent in its processes and responsive in its outcomes, the ‘Culture of Silence’ acting as barrier to inclusive education may be exposed and potentially broken” (Gibson 2006).

In reviewing literature relevant to instructional design, the article “Cultural Issues in the Design of Technology-Enhanced Learning Systems” illustrates some of the challenges in designing and implementing learning systems in three case studies, and emphasizes, “An appreciation of the role of culture in education is essential as it leads researchers and teachers to a deeper and more valid understanding of the nature of student learning” (Chen, et al., 1999). The authors of “Identifying Complex Cultural Interactions in the Instructional Design Process” (Russell et al., 2013) urge readers to “move the conversation about culture in instructional design and technology beyond stereotyping learners and towards recognizing the complex interaction between the cultures of all stakeholders and the implications for all steps in the design process” (Russell et al., 2013).

Young introduced the culture-based model (CBM) Framework (see Figure 7), “an intercultural instructional design framework that guides designers through the management, design, development, and assessment process while taking into account explicit culture-based considerations” (Young 2008).

Models of culture provide a framework for cross-cultural analysis, research, and design, and are conceptualized to contemplate what is known, unknown, and likely to happen. In anthropology, models of culture conduct a holistic exploration of cultures looking for shared behavior and knowledge. In business, models of culture help people understand how culture
affects management and the impact of cultural values and practices in business. In the field of instructional design, models of culture focus on integrating culture into the design and development process and on improving learning through culture-based design principles. Thus multi-disciplinary models of culture provide a framework to examine cultures, guide the design of culture-based products and services, and foster cross-cultural communications, relations, and meanings (Young 2008).

Figure 7. Culture Based Model Framework ID-TABLET (Young 2008)29

In her article, ‘Learning to Ask Naïve Questions with IT Product Design Students’ (2008) Gunn explores the role of design anthropology in designing technology solutions, and discusses multi-disciplinary approaches in applying design anthropology to teaching and learning, and IT product development.

Design anthropology investigations involve going to work with people and are concerned with finding ways of articulating and locating understandings within the worlds of others ... Design anthropology will have an increasingly important role in creating an awareness of the social and environmental relations around everyday practice, and articulating it in a way that can be understood by people participating within a process of designing ... practicing an anthropology with teachers could help both themselves and their students find ways of gaining a better understanding of both the subject of study and the teaching and learning process itself.30

In “The Clash of Cultures: Hybrid Learning Course Development as Management of Tension” (2010), the authors examine the impact of distinct cultures coming together when traditional faculty work in a team environment to design courses. “E-learning projects ... are more effective and progressive where the tensions between potentially conflicting cultures are anticipated and openly worked through. Development of a shared culture is an incremental yet essential element of success that ought to be as deliberately managed as the more tangible outputs such projects pursue” (Cowie and Nichols, 2010).

Mcloughlin (1999) advocates, “The design of Web-based instruction can draw on a range of epistemologies, learning theories and goal orientations, styles of collaboration and teacher support, all of which must be evaluated for cultural contextualization while meeting the need for flexible learning environments ... Culturally sensitive or appropriate on-line instruction can be provided if designers are aware of the socio-cultural background and learning styles of their learners, and if an appropriate instructional paradigm is applied to the process of development.”

In addition to theoretical background, case studies of ethnographic research conducted with students with disabilities helped envision in-classroom learning and teaching behavior in

---

30 Gunn (2008)
special education, and comprehend the methodology, challenges, and insights generated. For example, Youdell’s research (2010) draws on ethnographic data generated inside an English “special” school for boys designated as having “social, emotional and behavioral difficulties”. Davis’s article (2000) critically examines a number of proposals within disability studies and proposes a variety of strategies for change within the context of how ethnographers do fieldwork and disseminate their findings. The paper “Talking to Teenagers - Using Anthropological Methods to Explore Identity and the Lifeworlds of Young People Who Use AAC” by Mary Wickenden (2011) outlines the methodology used in an ethnographic study of identity with teenagers who use augmentative and alternative communication (AAC); this method enabled the researcher to see the many ways in which disabled teenagers experience their worlds.

2.4 Summary

A review of anthropological literature raises important cultural aspects to consider while conducting this research, such as:

- Perceptions and prejudices of technology designers that dictate the extent to which accessibility is addressed
- The presence or absence of a “Voice” for accessibility in the broader educational content creation process
- The extent to which culture-based understanding of learners, teachers and the learning environment are applied in the instructional design processes
- The effects of shared cultures, cross-cultural communications and relationships between various entities involved in the learning process.

Literature review of trends in education shed light on some important sources of movement in the field of education and their impact on the proliferation of educational technologies. Furthermore, this helped construct some initial hypotheses of the flow of information and high-level steps of the educational content creation process. Several scenarios emerged as shown in Figures 8 and 9.

Figure 8. Initial hypotheses of information flow
2.5 Informational Interviews

In addition to, and in parallel with the literature review, informational interviews were conducted with team members of the Global Literacy Program at Benetech. This helped place insights from the secondary research in the context of the team’s priorities, and further refine the areas of inquiry that this research needs to address.

Informational interviews with the team also helped further clarify the level of detail required to understand the content creation process. As highlighted in figures 8 and 9, a more detailed understanding of how information flows from the point at which the instructor begins to plan a lesson to the point at which the student sees it on his/her screen, and where, if at all, accessibility is addressed in the process, needed to be pursued from the point of view of the platforms as well as the educators.

Figure 9. Information flow when a MOOC offers university courses
While other published data helped understand individual components of educational technologies from a high level perspective, a number of questions remained unanswered, such as:

- Who are the actual content creators?
- Where and how is the content being created? What tools are being used?
- Who are we really targeting? How do we get their attention?
- What is the level of accessibility in the process?
- What do they care about and what are they looking for in terms of accessibility?

Furthermore, the team distinguished between accessibility of text versus accessibility of images, videos and interactives. Based on their experience in the publishing industry, it was well established that accessibility of text was relatively easy to accomplish on most platforms. Images and graphic content occupy a significant portion of educational material, even videos and gaming are gaining increasing usage. However, without accessibility accommodations, the enhanced learning from these tools is often lost; even math equations are often rendered as nothing but “image” in most screen readers.

Emphasis was placed on understanding the depth of accessibility addressed in the emerging ed-tech space – did this merely imply accessibility of text, or were images, videos and interactives also being addressed?

The overall direction of these discussions was around finding technical tools that would help make emerging ed-tech more accessible.
3.1 Understanding the Landscape

In order to gain an in-depth understanding of emerging ed-tech and the content creation process, it was necessary to begin with an initial literature review of published data readily available. A vast array of online publications addresses various aspects of emerging ed-tech, as well as some aspects of accessibility in education. Various publications in anthropology and other disciplines related to this research were also reviewed.

Additionally, in order to place this review in context and narrow down areas of exploration during fieldwork and analysis, informational interviews were conducted with members of the Global Literacy team at Benetech. These individual and team interviews conducted in parallel with the literature review, served to validate initial hypotheses, prioritize areas of inquiry, and to begin populating an initial sample set for recruitment.

3.2 Data Collection

The emerging educational content creation process involves both ed-tech platforms that provide the infrastructure to create content, as well as educators who author the content and make it available to students. Triangulating perspectives from both sides is necessary to fully understand the content creation process in detail. These two sides thus constituted the two sample sets for data collection.
Informed consent forms and informed consent notices were used for in-person and telephone interviews, respectively. Copies of both are shown in Appendix B.

3.2.1 Ed-tech Interviews

A comprehensive list of potential recruits was populated that comprised of Learning management systems (LMSs), Course management systems (CMSs), Massive open online courses (MOOCs), Social learning platforms, Open Education Resources (OER), industry experts, and marketplaces for educational resources. Approximately 25 organizations were contacted over a period of four months requesting an interview to discuss the content creation process and accessibility on their platform. Target markets for these platforms spanned K-12, higher education, as well as continuing education.

Nine organizations gave consent to conduct the interview, while keeping their identities confidential. This sample included two MOOCs, four LMSs, a social learning platform, a search engine for learning, and a free program for creating online courses. Most of these organizations are relatively young and in their early growth stages, and thus qualified for the “emerging” ed-tech sample. Two of the organizations are well established, yet qualified for this sample as they have shown tremendous growth and changes in their product portfolio over the past few years, both organically as well as through acquisitions.

Most interviews were conducted with senior leadership from these organizations. All interviewees led or were part of the product development or design functions, and had working knowledge of accessibility of their platforms.
Interview questions included a brief discussion on the background of the organization, detailed discussion on the workflow of content creation on their platform, their product design process, current state of accessibility and challenges. Where geographically feasible, the interviews were conducted face-to-face, while others were conducted over the phone.

All interviews were audio recorded with the respondent’s prior consent. Where appropriate, photography and video recording were conducted without capturing any confidential or identifiable information. All audio recordings were transcribed for use in data analysis.

3.2.2 Educator Interviews and Observations

Four interviews were conducted to understand and observe the educator’s content creation process, tools used for content creation and delivery, and their attitudes towards accessibility. On client’s request, all interviews were conducted in general education, not special education, to ensure generalizability of the insights.

A convenience sample was made available via contacts established in the vicinity of the researcher’s residence. Proximity was important since the interviews needed to be conducted face to face in order to observe the content creation process.

It is important to note that educators in general span across a wide spectrum in terms of their technology proficiency. These four educators are not representative of the entire spectrum, rather a subset of teachers who use a wide variety of ed-tech tools in creating and delivering their content.
The sample included one school administrator responsible for technology integration in a school district, one high school teacher who used ed-tech tools extensively, a second high school teacher who also created and taught courses on a MOOC, and another teacher who exclusively taught online courses on a MOOC. Thus the interviews covered perspectives of public school administration, high school teachers, as well as online course teachers.

Each interview began with a brief discussion of the teacher’s background and work history, followed by a detailed observation and discussion of the tools used for content creation and delivery, and a discussion on their awareness and attitude towards accessibility.

All interviews were audio recorded with the respondent's prior consent. Photography and video recording were used during observation of the content creation process, without capturing any confidential information. All audio recordings were transcribed for use in data analysis.

3.3 Data Analysis

Data Analysis was conducted using Miles and Hubberman’s three concurrent flows of activity: 1) data condensation; 2) data display; 3) drawing and verifying conclusions.31

Data condensation involved coding secondary data, transcripts of interviews, and videos and photographs collected in field. Software application Atlas.ti was used to prepare the codebook and assign codes throughout the data.

Data display involved using frameworks and structures to organize data into visual formats and show relationships between concepts and variables. For example, flow diagrams

were used to describe various processes, such as the iterative design process and content creation workflows. A range of responses were received in ascertaining the state of accessibility of each participating ed-tech platform, spanning from those beginning to consider the accessibility of their platform to those claiming to have had significant experience and progress in incorporating accessibility. In order to analyze characteristics of these organizations across this range of responses, the organizational life cycle framework was used to demonstrate the correlation between their stage of life cycle and state of accessibility.

Both inductive and deductive techniques were used in identifying patterns. Conclusions were drawn lightly in the beginning, and solidified through the process of verification across the dataset.

3.4 Presentation

In order to ensure timely delivery of insights to the client, a presentation was conducted that summarized key findings from the research and recommendations. The Global Literacy team helped prioritize insights in terms of relevancy to the audience, which included cross-functional experts from across the organization. Web-based application, Prezi was used to present the research results.

3.5 Timeline

Table 2 represents the timeline of this research study beginning in January 2013. The first two months were spent understanding the landscape through detailed literature review and informational interviews with the client team. Once the key areas of exploration and
potential respondent pool were identified, recruitment began in March, followed by interviews beginning in April. Recruitment for ed-tech companies and educators continued in parallel with fieldwork, which was concluded in July after a total of 9 ed-tech interviews and 4 educator interviews and observations. Data analysis occupied most of July and August, followed by a presentation at the client’s office on 27th August, 2013. The thesis was written and evaluated through September and October, 2013.

Table 2 Project Timeline

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the Landscape</td>
<td>Recruitment</td>
<td>Data Collection</td>
<td>Analysis</td>
<td>Client Presentation</td>
<td>Thesis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 4

FINDINGS AND IMPLICATIONS

This chapter discusses themes uncovered in the research study, beginning with insights from ed-tech organizations, followed by detailed description of workflows of the content creation process, attitudes towards accessibility, and major challenges.

4.1 It’s Not Just About the Technology...

One of the overarching themes uncovered in this study is a compelling need for knowledge about accessibility. Ed-tech organizations want to do the right thing in terms of incorporating accessibility, but do not always understand what this means. Respondents expressed a dire need for understanding what accessibility is and how best to incorporate it into their platforms. Thus the top of mind concern was not technical in nature. Discussions gravitated more around knowledge pertaining to accessibility rather than the need for technical tools. This pattern emerged early on during data collection, and was consistently repeated all through the process. There are various aspects to this theme. Let us examine these aspects in detail:

4.1.1 Organizational Life Cycle

Shown below is a theoretical model of a typical life cycle that business organizations tend to go through. Beginning with the introduction stage where the product is first developed and launched, the organization enters into a phase of rapid growth as the product becomes
successful in the market and gains customers. After a period of high momentum, revenues reach maturity and growth slows down, eventually leading to decline and death of the business.

![Organizational life cycle](image)

Figure 10. Organizational life cycle

A large number of emerging ed-tech organizations tend to be in the introduction and growth phases. This is also true of most of the organizations interviewed in this study. Two of the participant organizations are more established and mature in many aspects of their business, but continue to display elements of growth as they incorporate changes into their product portfolio, both organically as well as through acquisitions.

There is a correlation between the life stage of an organization, and how far along they are in terms of incorporating accessibility. Let us consider this correlation in detail:

4.1.1.1 Introduction

Early on in the introduction stage, the most important goal for a startup is to launch a product that works. Ensuring funding, acquiring the right customer base, and most importantly
creating a working product and getting it launched are the top priorities. At this stage, for the most part, they tend to be fairly unaware of accessibility, implementing it, and the experience of the end user who has special needs. There is consistent feedback that accessibility is one of the bottom-most priorities during the introductory stage. As one of the respondents stated it, ... most people are not even thinking about it. There are other hurdles just to create an online course, let alone thinking about accessibility. But I think that’s where the issue is, is that it’s kind of right now considered a separate claim, as opposed to something that is just part of the whole integrative process.

... In the early stage, issues that have a voice get addressed, while all others get pushed behind into the pipeline. Currently, accessibility is one of the issues that get deprioritized.

4.1.1.2 Growth

In the growth phase, as organizations begin acquiring customers and product usage gains momentum, they begin to learn about accessibility in various arbitrary ways. In the absence of clear guidelines and credible sources of knowledge, anecdotal information trickles in in a variety of ways – unstructured, isolated instances of feedback from users with special needs; trial and error based on limited knowledge; RFPs mandating accessibility features – a wide range of responses were received.

Well, I’ll tell you, from our standpoint, it was low priority. The point where you start to think about it is when you’re responding to an RFP from a school district for a lot of money, and all of a sudden, they have a requirement. And the requirement is that the materials that you’re providing are accessible.

What was consistent among these responses was that those who are farther along in the process of incorporating accessibility, admitted being lost early on; had they known what they know now about accessibility, it would have saved them a lot of time and effort early on.
I definitely think if there’s a resource for MOOC providers or for online course providers in general, which provides help on, ‘These are resources. These are things other people have done. These have been proven, effective approaches.’ … Certainly when we originally started out, having that would have been tremendously helpful, because the first thought around this is, ‘Okay. I don’t really understand. We have lots of video content. How do we make that accessible to people who have trouble seeing?’ So, better understanding, especially in the context of online education and media.

Over a period of time, they slowly incorporate accessibility into their platform based on inadequate knowledge and haphazard user feedback. This aspect is addressed in further detail in the subsequent sections.

4.1.1.3 Maturity

Mature, well established organizations in the ed-tech market have a strong suite of products and have accessibility embedded across their product portfolio. At this stage, the organization has a larger customer base, and is focused on building customer loyalty and long-term relationships. Accessibility is treated as a horizontal function that gets incorporated into every product and every feature right from its inception. These players have learnt to do so often the hard way, established benchmarks and best practices in implementing accessibility, and made it part of their design process over a period of time.

[Accessibility is] something that attention is paid to at all levels of the organization. And we internally take great pains to make sure that our entire organization is aware of the importance that we place on it … Believe me, we were not always the way we are now. We were certainly people who subscribed to exactly the same philosophy as everybody else, but we’ve had a lot of experience, and we’ve actually just learned that it is easier to do if you think about it ahead of time.

Our organization feels that accessibility is extremely important. It is something that is taken very seriously at the highest levels of executives in our organization … It’s important in the design of the application. It’s important to the engineers
who are building it. It’s important to the technical writers who write all of the help documentation that goes around it.

Culturally, they are more heavily invested in enabling accessibility than in the previous stages. Many organizations at this stage also publish documents such as Voluntary Product Accessibility Template (VPAT) that explain in great detail all the accessibility features built into their platforms. On an ongoing basis, they may also publish educational material and engage in online forums to help their users author accessible content.

4.1.1.4 Decline

Since this research studied emerging organizations, none of the participating organizations were in the decline stage, and therefore no insights were gathered.

A noteworthy exception here was that of an LMS that markets itself as one specializing in accessibility features. They had adopted the philosophy of building a product that breaks barriers to learning, and adopted accessibility as a point of differentiation during their growth phase. Their success in adopting and using this differentiation resulting in accelerated growth, proves that if this knowledge is made available to ed-tech startups in their introductory and growth stages, it can help them build differentiation in the market place.

4.1.2 Iterative Design Process

Pertinent to the life stages of an ed-tech startup and the corresponding level of accessibility, is the Iterative Design Process commonly followed when creating a product or feature.
As shown in the flow diagram above, a typical design process begins with identifying an unmet need and understanding the customer base for the product or service. Preliminary designs and early versions of the product are created that are then placed through early alpha testing.

As explained earlier, in the early stages, the most important goal is to launch a working product. Therefore thorough testing and refinement of the product often takes place after the first launch. When user feedback is gathered after launch (often in an unstructured manner), feedback on and requests for accessibility features begin to arise. Startups then go back to the drawing board and then incorporate accessibility into a product that has already been partially or substantially built.

... accessibility is not the top thing that we want to look into. So, in the phase that we are in, this research mode, we’re trying to figure out what works. Are we meeting the user’s need? Then we’re kind of not looking at accessibility at that stage. But once we decide that this is what we want to do, we want to make designing for accessibility a very natural part of how we work.
When new features are added, such as a quiz feature, similar iterative design process occurs, where the feature is designed and launched in its early version. Then based on user feedback, accessibility is added into the feature.

In such a scenario, accessibility is not an integral part of the design process in the early stages. This results in a suboptimal user experience for those with special needs because the product was not designed for accessibility from its inception.

Another significant issue here is the lack of reliable user testing mechanisms for accessibility. As stated by one of the respondents from a growth-stage organization:

“we’ll learn that the new screen reader tool ... someone will reach out and say they’re having trouble with this or that functionality ... You do the basics, and then because don’t have the resources to test for all the various tools that may be used on all the different platforms, then it’s as-needed with that.”

For the most part, early stage startups are unaware of and don’t have the means to observe first-hand what the user experience looks like for someone using assistive technologies such as a screen reader.

I think that the awareness thing is really the key, right? Helping people be aware of the actual problems, and not just kind of having that checklist that says, ‘Yeah, we’re compliant with this,’ ... that doesn’t mean it’s going to be a worthwhile or usable experience. But it’s hard to become aware of that when you’re not using those types of tools when you deal with the system ... just following the standards doesn’t necessarily guarantee that that’s going to be a good experience for someone on the other end.

Mature organizations, on the other hand, have formalized user testing processes in place and access to special needs users who provide feedback in a consistent, organized manner. As explained by a respondent from one such mature organization:

We have discovered over much experience over the past several years that accessibility is actually more effective and much easier to implement if it’s done in the very beginning. If you have built an entire feature, and then have to come backwards and try to fix everything to make it accessible, it’s not as easy to do.
And our entire development organization has realized this over several years of development, and now it is something that we pay attention to from the first ideation phase that we go through. We start talking about, ‘Well, is there anything in here that would negatively impact whichever potential user scenario it might impact?’

Another organization has a screen reader user on staff for rigorous quality control:

“We have a woman that actually is a native screen reader user on staff, who’s really tightly integrated in our development process ... So she’s sitting with the team that’s making these core components and sort of testing them out. And she’s like a regular part of looking at things. And really, it has to pass her before it’s released. And so, it’s not a ‘Oh, well, she doesn’t like it, but we’re in a hurry.’ She’s a requirement.”

4.1.3 Summary

Ed-tech startups need more handholding in their early and growth stages. Providing knowledge, guidelines and best practices early on would help them incorporate accessibility into the design process so that the products are built accessible from the ground up. Feedback mechanisms need to be established where startups can conduct testing with users who have special needs.

4.2 Content Creation Workflows

Let us now analyze the content creation process in detail, and understand when, if at all, accessibility is addressed in the process.

The initial hypothesis was that there would be differences between the content creation process for K-12 versus post-secondary and continuing education. However, upon closely analyzing the data collected via interviews and observations, it was found that the real
differences in the workflows arise when the educator authors content independently, versus when the educator is part of a content creation team.

Figure 12. Content creation workflow

4.2.1 Content Creation by an Individual

Figure 13 shows the content creation process when the educator creates content independently. The process is similar, whether the content is being created for K-12 or post-secondary education. Continuing education courses created on MOOC platforms also follow a similar process when the creator works independently.

Figure 13. Content creation by an individual
Sources of content described by respondents include:

- District curriculum, lesson plans, and textbooks serve as guidelines for the topics that teachers are expected to cover, and as starting points when creating content.

- Publishers such as Pearson, McGraw Hill, Wiley, Macmillan, etc. publish vast amounts of content online which may include text, images, videos, and more recently, interactives. These may be made available to the educators via subscriptions purchased by their school district or university.

- Additional subscriptions may be purchased for online content such as Discovery Education (http://www.discoveryeducation.com/), netTrekker (www.nettrekker.com/), BrainPOP (www.brainpop.com/), etc.

- User-generated content from sources such as YouTube (www.youtube.com/), Flickr (www.flickr.com/), SlideShare (www.slideshare.net/), and content licensed by Creative Commons (creativecommons.org/) is commonly used along with appropriate sourcing information.

- Search engines such as Google (www.google.com) and Google Scholar (scholar.google.com) often serve as starting points when looking for content outside of the curriculum and subscriptions.

- Experts creating continuing education courses may use a wide range of topical resources that specialize in their subject matter.

While not fully comprehensive, these cover some of the most commonly used sources for content creation. These sources are accessed by the instructor either directly through the
website, or the school district’s or university’s intranet where these sources are pre-populated, or through the LMS that the instructor may be using.

The content creation process then involves authoring tools, and aggregation and delivery platforms. A wide range of authoring tools are used to create original content such as Microsoft PowerPoint, Microsoft Word, iBooks, Keynote, Educreations, iMovie, Garageband, etc. Camtasia is gaining popularity for creating mashups of presentation, audio and video files, and incorporating all the material into large video lessons.

MOOCs that enable instructors to create their own courses online provide extensive training and tutorials on enhancing the quality of courses by incorporating high production values in audio and video recording, using professional equipment and studio settings. MOOC instructors interviewed for this study had reviewed these training materials in detail and were using a number of tools, techniques and practices for producing higher quality course material.

Next, the instructor posts the original content as well as content from external sources discussed earlier into one location that acts as an aggregator. Personal websites, LMSs, MOOCs, and social learning platforms are commonly used platforms for aggregating and delivering content to students according to the lesson plans and schedule. When uploading content into a platform, the instructor has various options in that they can upload original or sourced content in the form of text, documents, presentations, images, videos, mashups, etc. YouTube and Dropbox (www.dropbox.com/) also serve as delivery mechanisms for original or sourced content, though they may not be used as primary aggregators.

The aggregation and delivery platforms, in turn, become the go-to place or a starting point where students access all their lessons, educational material, and assignments provided
by the instructor. Depending on the capabilities of the platform, instructors may be able to deliver quizzes and tests, while students may also be able to submit their completed homework, participate in online discussion boards within the platform, send messages to the instructor and classmates, etc.

There are various points at which the accessibility of these platforms comes into play. While authoring original content, it is up to the author to enter alternative text and use other means to ensure that the content is created accessible. While uploading this original content, the platform needs to provide capability to enter descriptions and alternative text. Conversely, the instructor needs to enter descriptions and alternative text into the appropriate fields. Currently, platforms do not make it mandatory for the instructors to enter alternative text.

If we recognize that you’re trying to upload an image, for example, we’ll prompt the teacher to add the ALT tags to the image so that that image meets the appropriate accessibility guidelines as well. However, the instructor can choose not to add the ALT text. We just give them the capability to do so and prompt them that they should. At this point in time – although I would love to see it get to this level – at this point in time it’s not something we enforce or require, or say you can’t create the content if you don’t put the ALT tags on the image. The same is true if you’re adding media files – video, audio, etc. We give you the options to upload caption files associated with your videos or transcripts associated with your audio files. Whether a teacher chooses to do so or not is completely on them.

Platforms may also provide capability to import content from external sources, such that it can be accessed from within the platform, without having to go to an external website. External sources for user-generated content commonly include YouTube for videos and SlideShare for presentations. These external sources provide their own level of accessibility, for example, a user uploading a video on YouTube may enter a long description or transcript. In this scenario, if content at the source has corresponding descriptions available, the platform needs
to provide capability to automatically import these descriptions along with the content. Established LMSs often provide this capability; newer platforms often do not, and therefore any YouTube video or SlideShare presentation imported into the platform may lose its description unless manually entered by the instructor.

Similarly, some LMSs provide capability to import content from publishers via partnerships. Publishers may offer their own level of accessibility of content at the source, such as long descriptions or subtitles for videos. These partnerships need to be established such that when publisher content is imported, the corresponding descriptions and transcripts also get imported into the LMS automatically. Established LMSs consistently work towards ensuring such capabilities when establishing partnerships with publishers and other content providers.

Once a partnership has been established and we start talking about what is the interaction that we’re going to build, how is this feature going to work, then it is the collective responsibility of the development team to raise any accessibility concerns, start thinking about what that interaction is going to be like, and in some cases, even working with that partner vendor to fix things on their side that will improve the accessibility of the tool. We do go to that level with it. Once we get our hands on it and start building something, we do offer advice and consultation to those partners as well. What they choose to do with it, obviously, is up to them.

An additional layer of complexity arises when the platform enables applications (or ‘apps’ as they are commonly referred to) built by third-party vendors for supplemental material, interactive content, adaptive quizzing, etc. These apps also need to have accessibility built in, so that when these are used by the instructors on the platform, they can also be consistently accessible to special needs students. Currently, accessibility of these apps is not made mandatory by the platforms.
4.2.2 Content Creation by a Team

Consider organizations such as MOOCs where content is created not just by the individual instructor, but where the instructor is a part of the broader content creation team. Such a content creation process is described in Figure 14.

*Figure 14. Content creation by a team*

The first component of the process is a Course Team, comprising of one to two instructors, and one to two educational assistants. Instructors may be university faculty, industry experts, and/or internal instructors from within the organization. This course team creates the script or the story for the course.

The Production Team is responsible for storyboarding, that is refining and finalizing all the course material. Because a lot of the content is delivered via videos, this team is also responsible for recording and editing these videos.
Concurrently, internal wikis or repository may be available that includes textual content and images that can be used by both course team and production team across various courses or lessons. These may also include course notes, student contributions and other supplemental material.

Transcription for the video lessons is often done via captioning services or crowdsourcing. Amara (http://www.amara.org/) is one such service that is widely used. These transcripts are then incorporated into the videos as subtitles, transcripts or descriptions. Once all the course material is created, it is published via YouTube or made available to the students for download within their platform.

In terms of who is ultimately responsible for incorporating transcripts into the videos, there seems to be no formalized process for this step. Anyone in the course team or production team could do this, however no individual is held responsible to ensure that all videos have transcripts incorporated in them before being published. Similarly, any person could address accessibility of content in the internal Wikis or repository. Because of the unorganized nature of this process, there are instances when accessibility gets addressed only when feedback is received through their support or online forum that they need to make certain content accessible.

While minor best practices have been incorporated into the process, such as leaving room at the bottom of the screen while recording video for subtitles, the process for ensuring that all content is built accessible is still unorganized when content is created by a team.
4.2.3 Assessment

In order to create a quiz or test on the platform, the instructor is offered various choices in types of questions, such as essay type, multiple choice, etc. These quizzes also need to provide capability to enter alternative text for images. Established LMSs provide such capabilities, while newer platforms often do not. The reason for this inconsistency is that enabling quizzes is treated just like adding any new feature on a platform. If accessibility is part of the design process (as it is in mature organizations), then the quizzes are designed for accessibility from inception. If not (as seen with early stage and growing organizations), then the quiz feature is first created and launched. Additional functionalities, such as amount time spent by the student on a question, are given higher priority; accessibility may later be addressed as an afterthought.

If images, videos, interactives, documents, etc. are entered into the quiz, then instructors need to ensure that these are also accessible by entering appropriate alternative text. Interactive quizzing continues to remain difficult to make accessible.

An exception here is one of the LMSs interviewed in this research that specializes in accessibility features, and has capabilities to incorporate students with special needs into the same quiz. If these students need extra time, the instructor does not have to create a copy of the quiz, they can make those adjustments for these specific students within the same quiz on that LMS platform; in many others that is not the case.
4.2.4 Summary

Content is not created on any one platform in isolation. It is an ecosystem of educational technologies where partnerships and compatibility are crucial in enabling accessibility throughout the content creation process.

Multiple dependencies exist in the process that together dictate the accessibility of the content created. The platform itself needs to incorporate accessibility features. Content creators need to enter alternative text and use other means to ensure that they are authoring accessible content using the features provided on the platform. When external content is used, this content needs to have alternative text entered at the source. When external content is imported into the platform, there needs to be compatibility to ensure that accessibility is not lost in the process. Third-party applications (or ‘apps’) need to be created with accessibility features built in. External transcription services may be needed to add alternative text for videos. When content is created by a team, responsibility needs to be established to ensure a formalized process for making content accessible.

4.3 Attitudes towards Accessibility

There is a prevailing perception that accessibility is not mandatory. With the exception of the mature ed-tech organizations, for the most part, even amongst educators, accessibility is seen as a ‘nice to have’ or an add-on, lower priority feature. One of the respondents from a growing startup said:

I’ve been in the education world for quite some time in ed-tech ... being 508 compliant is part of the conversation, but it’s not required. And I hate to say that, but because it’s things that aren’t required, people kind of tend to push it aside, and not make it a priority.
Emerging ed-tech organizations are asking for help. They want to do the right thing. But they don't know exactly what this means, what needs to be done, and what the best practices are. They do not have the means to see their platform from an end user perspective for someone who has accessibility needs. Some have learnt lessons the hard way, some are still trying to get there. Most don't have an established feedback mechanism. All need credible easy-to-use sources of knowledge and best practices.

You know, I'd love to say that [accessibility is] always addressed in the design phase. Historically, it hasn’t always been. And some of that was a lack of understanding on our part of these ever-evolving principles and guidelines.

There is an overwhelming amount of literature published on a continuous basis in the field of education. There is also an ever-growing assortment of material on accessibility; however it is scattered, unorganized, difficult to navigate, and even more difficult to assimilate in ways that can be meaningfully applied.

There is reluctance among educators in terms of making a commitment to accessibility. Instructors interviewed in this study were generally unaware of the importance of entering alternative text while creating original content as well as while importing content from external sources into the delivery platforms. The traditional school system seems to demonstrate a certain level of apathy towards special needs students. Educators are aware of IEPs, and that 15-20% of students in their district have special needs. However, it seems like a herculean task to try to address every type of disability because “there are too many”. More often than not, they seem unwilling to do it unless absolutely necessary, and will do the bare minimum to meet legal requirements. Particularly if the school has a separate program or department for
students with special needs, teachers tend to completely defer to that program or department to assume all responsibility.

I think in many ways, accessibility is seen as something that’s nice to have but not absolutely mandatory. If we run across a resource where there is no accommodations made for accessibility, then I think that would cause a bit of an issue, but the minimum requirements for accessibility are not that difficult to meet, to be honest. Text has to be readable, has to be accessible within some sort of reading program. You’ve got to evaluate for contrast, so your color-blind students will be able to see – you know, make differentiation between objects. Most people are able to do those things pretty easily.

School districts and universities show a range of attitudes. For some of them, it is just a check box to meet minimum requirements, for some it is critically important and have entire teams dedicated to accessibility. When discussing what influences their purchase of educational technologies, the school administrator interviewed in this study stated:

I can't technically say that it’s mandatory, but it’s certainly something that’s always a point of evaluation ... We certainly do look to add readability, and the ability for it to have text that can be read to the student. We also look for course closed captioning. So it may give a vendor a little bit of a leg up if they’ve incorporated all those features, but it may not also be a deal breaker. So, it’s certainly a point of consideration, but I wouldn’t say it’s the primary one. We’re primarily look for a good solid curriculum, good solid pedagogy.

With so many dependencies, partnerships and compatibility requirements in the ecosystem of ed-tech, it is difficult to place ultimate responsibility on any one entity. Instructors have a role to play in the content creation process, but often pass on the buck to the special needs department in their schools. Platforms can provide capability to make content accessible, but cannot make it mandatory for content creators to use it:

The part that we play is in providing accessible technology to the institution, so the schools themselves can feel comfortable that the platform that they’ve chosen for their online learning is accessible. And that’s where our responsibility ends. After that, it really is up to the institution to ensure that they’re providing
their teachers with the right information about what’s expected and what’s required ... there is very little in terms of regulation that we can do to effect that.

Ultimately, it’s their responsibility to ensure that they’re meeting the needs of their target audience. We’ve talked about it with them, but there’s really no way for us to be able to police all of that ... We make sure that the application itself is accessible.

School districts often require long descriptions and alternative text to be filled in by vendors, but make it optional at teacher level. In a team that creates content, everyone in the process is deemed responsible, but often no one is made accountable. To a great extent, it is a web of dependencies.

When it comes to using educational technologies, there is some indication that educators are beginning to open up their minds to, and becoming somewhat aware of possibilities; even if their actions don't always suggest that are doing everything that is necessary. They still don't fully understand accessibility, but with technology it doesn't seem that impossible any more. It's a start, and a more welcome attitude compared to the apathy in the traditional school system. This may be driven by the perceived ease of addressing accessibility on technological platforms.

4.4 Further Challenges

In the absence of easy-to-use guidelines, understanding and interpretation of accessibility laws as they exist today, poses a major challenge to emerging ed-tech startups. Consistent feedback suggested that it is very difficult to navigate through these laws and truly understand the mandatory requirements.

A lot of the documents out there are very legal-based right now. From a culture perspective, with our company, people really want to make an effort to make
things more accessible, but when you go to a legal reference standpoint, you end up having to get a lawyer to translate everything for you.

I really don’t know much about it from a legal perspective. We would all benefit immensely if somehow we can dumb it down so that ... we are not lawyers, but we need to be informed about the law. So dumb it down so that it’s accessible to non-lawyers.

Additionally, school districts and educators have varied interpretations of laws around accessibility. As stated by the school administrator:

Well, we’re aware of what the different federal laws are, but again, they’re still kind of squishy at this point. I think in many ways, accessibility is seen as something that’s nice to have but not absolutely mandatory.

Mandatory requirements often seem to come from the point of view of budget allocations, not from the point of view of what is best for students

Respondents were asked if there are new and emerging forms of content that will become important in the near future and pose additional challenges for accessibility. Some of their responses include:

- Accessibility of OER
- Applications or “apps”, especially mobile apps
- Accessibility of online video players
- Flash used for creating interactive media
- Interactive content, games, simulations, and adaptive learning
- Collaborative learning

Inter-platform compatibility will continue to pose challenges for accessibility as browsers, operating environments, and devices continue to evolve. One of the platforms
compared building for accessibility to building for an entirely new environment that they know
nothing about, such as a new browser or moving from iOS to Android for the first time.

Quality Assurance... Making sure that if you’re making it work for a particular
tool that you’re also mapping to other users. And that actually following
particular guidelines leads to a good experience versus having to really kind of
rethink things from the ground up.

A new breed of instructors is now entering the education market. Any person with an
expertise in any area can become an instructor with online platforms that provide tools to do
so. These new instructors are likely to have no prior experience in education, let alone in
accessibility. Educating them about accessibility will open up an entirely new set of challenges.
CHAPTER 5
OPPORTUNITIES

Various hurdles exist today in enabling educational content to be born accessible. These, in turn, open up new areas of opportunities that need to be addressed.

5.1 Education about Accessibility

A consistent voice across ed-tech organizations conveys a dire need for education about accessibility, especially in the early and growth stages. They need a go-to resource that provides clear guidelines, steps to be taken, best practices, and case studies around making educational technologies accessible. This includes converting legal requirements for accessibility into simplified language and action-oriented instructions.

Honestly, I’m not an expert on accessibility. I would even say my awareness of that – at the heart, we are very clear, but the brain doesn’t know much ... We are very committed. We are very sure that this is what we want to do. But it’s not like we know exactly how to go about it ... I think that’s a huge role that these organizations [like Benetech] can play and do play, in many respects, is to support people like us who care about it and want to do the right thing, but just don’t know what that means.

Taking it a step further, ed-tech developers can be educated on different types of accessibility for different types of learning disabilities, along with guidance on prioritizing which scenarios to design for.

Educators need to be educated on accessibility as well. More detailed, rigorous instructions and requirements to create accessible content need to be imparted by school districts, as well as teacher education institutions. Ed-tech platforms need to establish detailed
guidelines on how users can create accessible content on their platforms, and find more innovative ways to train and motivate content creators to use the accessibility features.

I would love a little to-do list of things that would help our instructors make their courses more accessible, and what does that mean exactly. So, does it mean make sure you always add in the ALT tag information? ... we’re always working with instructors ... ‘Five things that you can do as an instructor to make your course accessible’ – I want that document ... to get that from someone who is really knowledgeable – that would be great!

With the advent of a new breed of instructors who are not trained in the field of education, ed-tech platforms have a greater responsibility in educating them about accessibility. They already provide a great deal of detailed training on producing high-quality online courses. Accessibility needs to be incorporated into this training.

In addition to creating educational material, there is a need to establish a voice for accessibility in design circles. Product designers from ed-tech startups are often members of formal and informal networking groups. Discussions and knowledge sharing about accessibility can be introduced into these instructional circles, thereby making this topic top of mind and influencing from the top down.

5.2 User Feedback Mechanism

Currently, no infrastructure is available for startups to see firsthand what the user experience looks like for someone using a screen reader or other assistive technology.

There is opportunity to establish a community to provide ongoing feedback, made up of instructors and students who are most likely to use accessibility features. By allowing startups to tap into this community on an ongoing basis and training them to make it as part of their
design process, it ensures that whenever a new product or feature is developed, it goes through this organized system of user feedback before being launched.

An LMS specializing in accessibility features described this turning point in their organization in the early stages:

There was a point where we didn’t understand as much, and we kind of had to have that ‘Road to Damascus’ moment, where we saw somebody that was an AT user trying to use our software. I mean, we were just like everybody else, where we thought we were doing pretty well, because we gave ALT text for images and we gave our frames names. But then we sort of saw that someone really had trouble getting around our software … having that personal experience … we can latch on to standards and stuff, but seeing how it made a difference to somebody and how it’s not this impossible thing really made a difference to us as a company.

Seeing is believing. Without appropriate means for accessibility testing, ed-tech developers will continue to build bare minimum accessibility features into their platforms without truly understanding how the experience is changing on the user’s side.

5.3 Consultation

Lack of understanding and the current state of accessibility in early-stage and growing educational technologies makes it incongruous to have discussions about technical tools needed to enable accessibility across all platforms. Such a “one size fits all” solution may not be the ideal way to approach this industry in improving the accessibility of the content creation process at this time.

A more appropriate strategy would be to audit each product and organization individually, and provide consultation on a one-to-one basis. A holistic approach would include identifying current gaps in the platform and the development process, sharing first-hand
experience of special needs users using their platform with assistive technology, comprehensive education on accessibility solutions, and communicating this information across functions and organizational levels. The ultimate goal would be to help incorporate accessibility into the design process so that the organization eventually becomes independent in naturally incorporating accessibility into all future development from inception.

As part of an ongoing relationship, it may help to continue tracking performance on an ongoing basis, ensuring that enhancements to the platforms and new releases are appropriately designed for accessibility, and communicating new developments in this area in a timely manner.

5.4 Accessibility as a Differentiator

Designing platforms and features for accessibility has the potential to add differentiation in a crowded and ever-expanding marketplace. This differentiation can not only help meet and exceed requirements in RFPs, but also help gain access into school districts and universities that would otherwise keep them out.

For the most part, what you find in RFP documents are that the universities will say, ‘Hey, you need to be NFB Gold-certified.’ And so that’s a box that we have to check. However, it’s also a great selling point when we go to universities that don’t ask. Letting them know that their students who have visual impairments or whatnot, that we are certified with the NFB and some of the other accessibility features, like being able to grant some users additional times or additional attempts on assignments or quizzes – yeah, these are good selling points as well.

Learning search engines could potentially influence search results such that content that is readily accessible would appear rise to the top. They could also partner with top websites,
tools, and other resources that are widely used by special needs students and educators, and be showcased as an accessible resource to direct traffic to them.

Platforms could potentially provide third-party application (‘app’) developers with tools or testing means, and mark apps as meeting certain aspects of accessibility, thereby encouraging app developers to incorporate accessibility.

New use cases can emerge if the technology is tested for and enhanced for certain scenarios of accessibility:

[Product from my previous startup] was a portable note taker for writing and keyboarding, and what we learned is a lot of people who had dysgraphia and dyslexia found that to be a very effective tool, especially because a lot of people who have fine motor impairment couldn’t write but they can type ... and we didn’t know anything about this back when we started our previous company. And through those 14 years ... it became almost 15-20% of our users were probably people with a variety of special needs but mostly dysgraphia and dyslexia.

By providing means for effective user testing and feedback, such exploration of potentially new uses of the product becomes possible, thereby enabling the technology to expand its market, and create differentiation in an otherwise crowded market.
CHAPTER 6

LIMITATIONS AND FURTHER RESEARCH

This research was designed to study the educational content creation process, therefore the focus was entirely on the authors of content, and educational technologies that provide the creation tools and delivery infrastructure.

One of the limitations of this research design is the absence of the perspective of the end user of content, i.e. students who have accessibility needs. Further research is needed to observe, understand and analyze how educational content is accessed using assistive technology on various traditional and emerging platforms, identify unmet needs, and triangulate insights from the content creation, delivery, and consumption perspectives.

A holistic understanding of what accessibility really means has ensued, beyond its applications in technology development. Broader analysis of all the products and solutions used by special needs students to enable accessibility in various scenarios in daily life could potentially help designers go beyond a technical checklist and find creative, innovative solutions for their own platforms.

While educators were included in this research, a deeper dive is needed to gain a more thorough understanding of the educator’s perspective. It was uncovered that teachers in this research were not using the accessibility features and that the school administrator did not place high priority on accessibility of the educational technologies purchased by the district. However, the sample size for teachers as well as school administrators was very small. A larger, more representative sample of teachers and school administrators needs to be recruited to
dive deeper into the motivations and true reasons for the lack of focus on accessibility in the education system.

A step further would include an evaluation of teacher education programs to examine the state of instruction on working with special needs students, and to uncover areas of improvement.

A final note on limitations – there may be a potential sample bias among respondents from educational technologies, in that it may indicate a mildly heightened interest in discussing accessibility than the norm. The invitation to participate in this research stated that the focus of the study was accessibility of educational technologies. Among all potential recruits who were contacted, about one in three expressed interest in participating; though it is unclear if this indicates the proportion of organizations or individuals who genuinely care about accessibility. The question of why others who were contacted, did not respond, remains unanswered.
Overall, this research undertaking has been a highly rewarding experience. It has enabled me to explore areas to bring anthropological research to social innovation, especially to professional non-profit organizations such as Benetech.

As an outsider to the education industry and to the non-profit sector, I adopted an etic approach in this research. This approach helped uncover insights in the emerging ed-tech sector, which has been increasingly top of mind for the Global Literacy team at Benetech. Methodologically, my representation as a student, an unbiased neutral entity without a personal stake helped gain access and trust with research participants. Moving forward, this trust factor will continue to be important, both for recruitment as well as for gaining open and honest participation. Any subsequent research by the organization in this field will need to be represented as an inquiry to gather insights which will ultimately be beneficial to the participants and end users.

The most challenging aspect of the entire research process was recruitment – identifying the right individuals to contact in every organization, communicating in ways that generate interest and response, and finally gaining access to conduct the interview given participants’ busy schedules. Fieldwork and analysis were relatively smoother components of the overall process.

This study highlighted and reiterated the power of first-hand experiences and storytelling. At least two instances were especially memorable – the first one when an organization uncovered new use cases for their product, and the second instance which was a turning point
for another organization – both were significant events that took place by simply observing first-hand students with special needs using their products. When individuals have such fascinating personal experiences, they have the potential to become advocates within the organization, and provide a much-needed voice for accessibility. Story telling thus becomes a highly effective means of communication.

‘Culture of Silence’ (Gibson 2006) was cited in the literature review section of this document. Gibson suggested that communication between the various stakeholders can facilitate in breaking the culture of silence and provide a voice for people with disabilities. I saw beginnings of this occurring in a few of the interviews where participants were genuinely interested in learning more about accessibility, and expressed that even discussing this topic over an interview draws more attention to accessibility than it currently does.

The most intriguing part of this research was the shift of the conversation from building technical tools for accessibility, to a consistent emphatic need for knowledge and education about accessibility. In my opinion, from an anthropological perspective, uncovering and highlighting this human side versus pursuing the agenda with a purely technical mindset, has been a substantial contribution of this study.

In the words of the Director of Product Strategy of the Global Literacy Team at Benetech:

Disha’s research was well-received as both timely and revealing. Her insights provided some groundwork for Benetech to consider how to address the burgeoning ed-tech sector as we continue to work to bring accessible educational content to the students that need it. Her presentation arrived just as Benetech's Global Literacy team entered a major strategic planning phase and informed the discussion of what services and products would be critical for us to consider. It also underscored the importance of having this kind of thoughtfully analyzed research as a factor in strategic planning.
My hope is that this research will help open additional areas of inquiry and influence their strategic decision making process moving forward to incorporate the rapid changes taking place in this industry.
APPENDIX A

USER EXPERIENCE OF A SCREEN READER USER
Websites without appropriate use of alt tags leave blind readers with little information to interpret meaning. Screen readers will not help convey website content without functioning descriptive “text equivalents” like alt tags.

APPENDIX B

INFORMED CONSENT FORM FOR IN-PERSON INTERVIEWS

INFORMED CONSENT NOTICE FOR TELEPHONE INTERVIEWS
Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

**Title of Study:** REVIEW OF EDUCATIONAL CONTENT CREATION

**Student Investigator:** DISHA VORA, University of North Texas (UNT) Department of Anthropology.

**Supervising Investigator:** DR. SUSAN SQUIRES

**Purpose of the Study:** You are being asked to participate in a research study which involves in-depth understanding of emergent segments in educational content creation with a special focus on accessibility.

**Study Procedures:** You will be asked to participate in an interview that will take about one hour of your time. The interview will be held at a pre-determined location approved by the interviewee, such as the interviewee’s office. This interview will be audio recorded for subsequent review and analysis. If an observation exercise is conducted to observe the content creation process for approximately an hour, the interviewer may use additional photography or video recording devices to record the observation.

**Foreseeable Risks:** No foreseeable risks are involved in this study.

**Benefits to the Subjects or Others:** We hope to learn more about emergent segments in educational content creation with a special focus on accessibility.

**Compensation for Participants:** None

**Procedures for Maintaining Confidentiality of Research Records:** The confidentiality of your individual information will be maintained in any publications or presentations regarding this study. Interview transcriptions and notes will not have any identifying information and kept in a locked cabinet at the office of Dr. Squires once the study is completed.

**Questions about the Study:** If you have any questions about the study, you may contact Disha Vora at xxxxx or Susan Squires at xxxxx.

**Review for the Protection of Participants:** This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (xxx) xxx-xxxx with any questions regarding the rights of research subjects.
Research Participants’ Rights:

Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Disha Vora has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

__________________________________________________
Printed Name of Participant

________________________________________  ________
Signature of Participant                                      Date

For the Student Investigator:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

________________________________________  ________
Signature of Student Investigator    Date
Title of Study: REVIEW OF EDUCATIONAL CONTENT CREATION

Student Investigator: DISHA VORA, University of North Texas (UNT) Department of Anthropology.

Supervising Investigator: DR. SUSAN SQUIRES

Purpose of the Study: You are being asked to participate in a research study which involves in-depth understanding of emergent segments in educational content creation with a special focus on accessibility.

Study Procedures: You will be asked to participate in an interview that will take about one hour of your time. This interview will be audio recorded for subsequent review and analysis.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others: We hope to learn more about emergent segments in educational content creation with a special focus on accessibility.

Compensation for Participants: None

Procedures for Maintaining Confidentiality of Research Records: The confidentiality of your individual information will be maintained in any publications or presentations regarding this study. Interview transcriptions and notes will not have any identifying information and kept in a locked cabinet at the office of Dr. Squires once the study is completed.

Questions about the Study: If you have any questions about the study, you may contact Disha Vora at xxxxx or Susan Squires at xxxxx.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (xxx) xxx-xxxx with any questions regarding the rights of research subjects.

Research Participants’ Rights:

Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:
• Disha Vora has explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
• You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
• You understand why the study is being conducted and how it will be performed.
• You understand your rights as a research participant and you voluntarily consent to participate in this study.


inBloom (n.d.) Retrieved from https://www.inbloom.org/


