CUSTOMIZABLE MODALITY PATHWAY LEARNING DESIGN: EXPLORING
PERSONALIZED LEARNING CHOICES THROUGH A LENS OF
SELF-REGULATED LEARNING

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Dissertation Prepared for the Degree of
DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS
May 2016

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Open online courses provide a unique opportunity to examine learner preferences in an environment that removes several pressures associated with traditional learning. This mixed methods study sought to examine the pathways that learners will create for themselves when given the choice between an instructor-directed modality and learner-directed modality. Study participants were first examined based on their levels of self-regulated learning. Follow-up qualitative interviews were conducted to examine the choices that participants made, the impact of the course design on those choices, and what role self-regulation played in the process. The resulting analysis revealed that participants desired an overall learning experience that was tailored to personal learning preferences, but that technical and design limitations can create barriers in the learning experience. The results from this research can help shape future instructional design efforts that wish to increase learner agency and choice in the educational process.
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ACKNOWLEDGEMENTS

First and foremost acknowledgement must go to my wife, Dr. Katie Crosslin, for not only her love, support, and understanding in the entire Ph.D. process (which she well understands), but also for the invaluable feedback and review of the initial stages of this dissertation as well as her critical analysis of Chapter 4. This dissertation is dedicated to her and my son Riley. I also would like to acknowledge the extra time and effort from my HumanMOOC co-instructors: Whitney Kilgore, Maha Al-Freih, and Patrice Prusko. They allowed me to experiment with their course as well as put in many hours of time and effort themselves. Whitney is the one that initially said “yes” when I begged her to offer HumanMOOC again so that I could continue my dissertation topic when the other course options fell through. Along with my co-instructors, the participants of HumanMOOC deserve acknowledgement for the time, effort, energy, and passion that shaped the ideas in this dissertation in more direct and indirect ways than I can ever list. A special acknowledgement is in order for my committee and all of their help and guidance along the way. Co-Chair Dr. George Siemens is responsible for kicking off and shaping the idea that eventually became the “customizable modality pathway design,” along with providing extensive feedback and guidance at the LINK Research Lab. Dr. Scott Warren provided extensive feedback prior to the defense that was invaluable. Dr. Cathleen Norris came in at the right time and kept it all moving forward when we ran into the inevitable problems. Of course, my chair Dr. Lin Lin provided years of invaluable feedback, guidance, help, and encouragement to get me where I am today. A heartfelt thank you to all of these incredibly important people, as well as to my friends, family, co-workers, and fellow UNT Learning Technologies students for four years of support, feedback, and understanding.
LIST OF TABLES AND FIGURES

Figure 1: Screenshot of the Canvas................................................................. 54
Figure 2: Activity bank screenshot............................................................... 55
Figure 3: Blog hub screenshot................................................................. 56
Figure 4: Diagram of customizable modality pathways design....................... 58
Figure 5: Modality possibilities................................................................. 59
Figure 6: Personalized pathway example 1.................................................. 60
Figure 7: Personalized pathway example 2.................................................. 61
Figure 8: HumanMOOC visual syllabus..................................................... 62
Figure 9: HumanMOOC neutral zone......................................................... 63
Table 1: Summary of Modalities and Pathways............................................. 64
Table 2: Study Demographics................................................................. 85
Table 3: Descriptive Statistics................................................................. 87
Table 4: ANOVA Correlations between SRL and Demographic Factors........... 88
Table 5: Results of Coh-Metrix Analysis.................................................... 89
Table 6: SRL and Continuum Scores.......................................................... 91
Table 7: Correlation for SRL and Instructor-Centered/Student-Centered Continuum........ 91
Table 8: Correlation for SRL and One-Modality/Two-Modality Continuum........ 92
Table 9: Correlations for Both Researcher Rated Continuums......................... 93
Table 10: Correlations for Instructor-Centered/Student-Centered and Concreteness........ 93
Table 11: Correlations for Instructor-Centered/Student-Centered and Imagability......... 93
Table 12: Basic Demographics of Interviewees............................................ 94
Table 13: Education, Location, and Industry Information for Interviewees........... 95
Table 14: Code and Category Development for Question 1........................................110
Table 15: Code and Category Development for Question 2.........................................112
Table 16: Code and Category Development for Question 3.........................................115
Table 17: Code and Category Development for Question 4.........................................117
Table 18: Code and Category Development for Question 5.........................................119
Table 19: Code and Category Development for Question 6.........................................122
Table 20: Code and Category Development for Question 7.........................................125
Table 21: Code and Category Development for Question 8.........................................127
Table 22: Code and Category Development for Question 9.........................................129
Table 23: Code and Category Development for Question 10.......................................132
Table 24: Theme Development for all Questions.......................................................135
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapters</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>iii</td>
</tr>
<tr>
<td>List of Tables and Figures</td>
<td>iv</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Background of Self-Regulated Learning and MOOCs</td>
<td>2</td>
</tr>
<tr>
<td>Theoretical Framework of MOOCs</td>
<td>2</td>
</tr>
<tr>
<td>Self-Directed Learning in MOOCs</td>
<td>2</td>
</tr>
<tr>
<td>Problem Statement</td>
<td>7</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>7</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>8</td>
</tr>
<tr>
<td>Research Questions</td>
<td>8</td>
</tr>
<tr>
<td>Research Design</td>
<td>9</td>
</tr>
<tr>
<td>Assumptions, Limitations, Scope, and Delimitations</td>
<td>10</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>12</td>
</tr>
<tr>
<td>Summary</td>
<td>13</td>
</tr>
<tr>
<td>Outline of the Study</td>
<td>13</td>
</tr>
<tr>
<td>2. Literature Review</td>
<td>14</td>
</tr>
<tr>
<td>Instructional Design</td>
<td>16</td>
</tr>
<tr>
<td>Engagement in Online Education</td>
<td>18</td>
</tr>
<tr>
<td>Self-Directed Learning</td>
<td>20</td>
</tr>
<tr>
<td>Self-Regulated Learning</td>
<td>22</td>
</tr>
<tr>
<td>Control Theory</td>
<td>23</td>
</tr>
<tr>
<td>Self-Efficacy Theory</td>
<td>23</td>
</tr>
<tr>
<td>Goal Setting</td>
<td>24</td>
</tr>
<tr>
<td>Action Regulation</td>
<td>24</td>
</tr>
<tr>
<td>Educational Psychology</td>
<td>24</td>
</tr>
<tr>
<td>Motivation, Goal Orientation, and Self-Efficacy</td>
<td>25</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

Massive open online courses (MOOCs) have gained considerable attention in educational circles in recent years. While offering courses online for free is not a new idea, recent efforts in this area have attracted such large numbers of learners that a new term was coined to describe this phenomenon (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015; Liyanagunawardena, Adams, & Williams, 2013; Rodriguez, 2012). By 2012, several outlets had declared “MOOC” the educational buzzword of the year (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015; Liyanagunawardena, Adams, & Williams, 2013; Rodriguez, 2012). MOOCs tend to be taken as optional education intended to enrich learners’ knowledge or skills outside of a formal degree plan (Kop, Fournier, & Mak, 2011; Freitas, Morgan, & Gibson, 2015; Rodriguez, 2012; Sheu, Bonk, & Kou, 2013). Since MOOCs are typically offered as no cost or low cost courses that do not require learners to pass or complete the course, many questions remain as to what motivates such high numbers of registrations, as well as why some learners complete these courses and many others do not (Clow, 2013; Jordan, 2015; Ferguson, et al., 2015; Freitas, Morgan, & Gibson, 2015; Khalil & Ebner, 2014; Liyanagunawardena, Adams, & Williams, 2013; Qiu, et al., 2016). Coming to an understanding of the reasons why some self-regulated learners engage with MOOCs and others do not could provide valuable insight into how learning designs for traditional courses could leverage customizable pathways and self-regulated learning. By investigating the reasons why learners choose various pathways in a flexible course format designed to let them choose their preferred epistemological modality (instructor-centric or learner-centric), this mixed-methods study seeks to explore personalized learning choices in a customizable modality pathway course (defined as a course that allows
learners to choose and change the power dynamic modality for their learning experience, thus creating their own personalized pathway) through the lens of self-regulated learning.

Background of Self-Regulated Learning and MOOCs

Following on the premise of the introduction, this chapter expands upon the background of MOOCs in order to connect the theoretical foundations of open online learning with the research into experiences of self-regulated learning in MOOCs (including related topics such as engagement and self-directed learning). The first course, to later be labeled as a MOOC, was offered in 2008. This course, Connectivism and Connective Knowledge (CCK08), was initially designed as an open online course by George Siemens and Stephen Downes (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015). The course grew beyond initial enrollment estimates to over 2000 participants, what was then considered a massive number. While much larger numbers were still to be attained, these initial surprising numbers led Dave Cormier to coin the term “massive open online course” (Dabbagh et al., 2016). However, the size of CCK08 was not intended to be the most interesting aspect of the course. Siemens and Downes had designed the course to be an experiment in a new learning theory that they had recently begun working out called connectivism (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015).

Theoretical Framework of MOOCs

The beginnings of connectivism can be seen as an attempt to shift the power structure of courses away from relying on the instructor as the center of the course and onto a more learner-centered design that leverages networking and social connections as well as technology as a part of the sense-making process of learning (Siemens, 2005). Connectivism is a response to learning theories such as behaviorism, cognitivism, and constructivism, which Siemens and Downes felt
did not address modern learning situations adequately (Siemens, 2005). In Siemens’ (2005) own words, connectivism addresses modern learning situations because

Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing. (p. 6)

The first MOOCs should be seen in this context: learning in a course where the control of power has shifted from a centralized instructor to a network of connections, and where content acquisition has shifted from a centralized expert to a nebulous connection of shifting elements and participants. This context did not last long, as a new format of MOOC arose a few years later.

This new format of MOOC came about in 2011, when Peter Norvig and Sebastian Thrun created a course for Stanford University title artificial intelligence that attracted over 160,000 students at its peak (Cabiria, 2012). This new form of MOOC was seen as very behaviorist in nature – with extensive use of instructor-created content, automatically graded tests, and very controlled avenues for learner interaction (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015). This version of the MOOC gained the attention of the world at large, but the difference between the two versions was not lost on certain scholars.

In examining the differences between these two versions of MOOCs, Stephen Downes coined the terms “xMOOC” and “cMOOC.” The original form of MOOC was labeled “connectivist MOOCs” or cMOOCs for short, while the newer form of MOOCs were labeled “MOOC as eXtension of something else” or xMOOCs for short (Downes, 2013a). Downes describes the difference between the two terms by saying that a “cMOOC is designed as a
network… while an xMOOC is based on a central course site and content that will be followed by all students” (Downes, 2013b, para. 25). What the two terms basically highlight is a difference in the power dynamics of the two terms: xMOOCs rely on content and activities that are distributed from a centralized expert or experts, while cMOOCs rely on student-centered learning with a decentralized power structure. However, not all MOOCs fall into easy classifications. In 2014, an experimental format was created by Siemens and others that combined the xMOOC format with the cMOOC format as distinct pathways or layers in one course, allowing the learners to customize the epistemological modality they engaged the course activities with as need throughout the duration of the course. This format has been referred to as “dual-layer” (Dawson, Joksimović, Kovanović, Gašević, & Siemens, 2015; Rosé et al., 2015), “multiple pathways” (Crosslin & Dellinger, 2015), and “customizable modality” (Crosslin, Dellinger, Joksimović, & Kovanović, in press). Regardless of where the power may reside in any MOOC, there is one factor that has remained a constant for most MOOCs: the open nature of MOOCs means that due to either large numbers or de-centralized structure, learners are responsible for regulating their own learning (Kop & Fournier, 2011).

Self-Directed Learning in MOOCs

While some colleges offer credit for MOOC participants that pay tuition and complete certain MOOCs, the majority of MOOC learners sign-up and participate in MOOCs due to personal reasons more than any other reason (Hew & Cheung, 2014). Because of the responsibility that is placed on MOOC learners to not only regulate but also direct their learning, MOOCs have become an interesting testing ground for self-directed learning (Kop & Fournier, 2011). Self-directed learning is “any study form in which individuals have primary responsibility for planning, implementing, and even evaluating effort” (Hiemstra, 1994, p. 9). Self-directed
learning is often seen as a continuum that encompasses all learners in every learning situation to some degree (Hiemstra, 1994). Teachers can also have a place in self-directed learning, including accomplishing such tasks as interacting with learners, evaluating learning outcomes, or procuring content and resources (Hiemstra, 1994). The earlier forms of cMOOCs were studied in relation to self-directed learning as early as 2010, before xMOOCs came on the scene (Kop & Fournier, 2011). Kop and Fournier (2011) focused on personality traits and other learner characteristics that affected their direction in learning. Other studies also focused more on the learner (Sheu, Bonk, & Kou, 2013). Unfortunately, interest in self-directed learning and MOOCs seems to have decreased as these studies revealed that MOOC participants value what other self-directed learners in other fields also value.

However, even though research into self-directed learning and MOOCs has waned, interest in self-regulated learning and MOOCs continues to occur. Milligan, Littlejohn, and Margaryan (2013) used self-regulation as a lens to determine patterns of engagement in MOOCs, identifying how participants were active, passive, or lurking in the course. Haug, Wodzicki, Cress, and Moskaliuk (2014) found that open badges or certificates could serve as motivators for self-regulated MOOC participants. Chung (2015) explored how design issues affect self-regulation among non-English speakers in courses offered primarily in English. Gasevic, Kovanovic, Joksimovic, and Siemens (2014) identified self-regulated learning as one of “main research themes that could form a framework of the future MOOC research” (p. 135). Many of these studies touch on issues of how design affects self-regulation, but few seem to explore learner perceptions of instructional design overall.

According to Mikroyannidis, Connolly, and Berthold (2013), educational initiatives like MOOCs are related to self-regulated learning because
These initiatives may provide an abundant amount of learning resources for free, but it is up to the learner to find the right ones to meet her learning needs and aspirations. Today’s learner is expected to be able to plan her learning journey, search for appropriate learning resources, use these resources for her learning and reflect on her progress. In other words, a self-regulation skill set is required that will enable someone to learn how to learn. (p. 3)

Because MOOCs are typically planned and evaluated by the instructors, designers, or other students, they often do not fall as much into self-directed learning (based on Hiemstra’s, 1994, definition above) as they do into self-regulated learning as described by Mikroyannidis, Connolly, and Berthold (2013). Therefore, this study will focus on self-regulated learning over self-directed learning. Several aspects of self-regulated learning in MOOCs are still not fully understood, including how the design of learning materials and activities can affect learner self-regulation.

What is known about MOOCs is that the basic design of many MOOCs require a shift in power dynamics and control that some instructional designers might not be ready for. Mackness, Mak, & Williams (2010) identified autonomy, connectiveness, and interactivity as important factors that influenced student success in the CCK08 MOOC. These factors would imply a shift away from the dependence on the instructor and more reliance on self-regulated learning. Kizilcec, Piech, and Schneider (2013) performed a cluster analysis of learner types in MOOCs and noted that “the clusters reveal a plurality of trajectories through a course that are not currently acknowledged in the design and discourse around MOOCs” (p. 177). In other words, what would learning look like if learners were given the option to create a personalized pathway through different course modalities? Current research acknowledges what MOOC learners do in the courses as well as what factors influence those choices, but if a course design that allows personalization influences or affects self-regulated learning is still not addressed in the literature.
Problem Statement

Based upon this analysis of the literature, a general need for more research into the relationship between customizable pathways learning design and self-regulated learning in MOOCs was identified. While some literature does touch on the relationship between learner personality and self-regulated learning in MOOCs, these studies only look at part of the entire picture. Self-regulated learners tend to have a level of motivation and experience that can help them overcome obstacles to learning such as poor learning design (Wang, Shannon, & Ross, 2013). Therefore, the gap in knowledge that was identified is the lack of insight into learners’ choices when given the learning design option of customizable modality pathways, as viewed through the lens of self-regulated learning in MOOCs.

Purpose of the Study

This study addresses learners’ experiences of pathway choices and self-regulated learning in MOOCs that relate to the learning design of MOOCs. An explanatory sequential mixed methods design was utilized (Creswell & Clark, 2011), which involved collecting quantitative data first to identify and select participants for qualitative interview questions. The explanatory sequential design variant that was utilized was the participant-selection variant (Creswell & Clark, 2011). In the first, quantitative phase of the study, self-regulated learning data was collected from MOOC participants online to identify participants that scored both high and low on the self-regulated learning instrument. The second, qualitative phase was conducted as a follow-up to the quantitative analysis to examine learners’ personalized pathway choices and experiences of self-regulated learning in a particular MOOC, specifically related to the learning
design of that MOOC. This exploratory follow-up explored learner experiences and choices through a text-based online interview survey form.

The population of this study was adult learners that registered to take a MOOC designed with a customizable modality pathway format. This customizable modality pathway design contained an instructor-led pathway and a connectivist pathway. Learners were free to choose either pathway, both pathways, or to move back and forth between pathways as they desired. This freedom meant that learners were able to personalize their course experience to their specific needs and contexts. The open nature of MOOCs meant that study participants were any age (over 18), ethnicity, or gender that resided anywhere in the world. Participants self-selected to participate in the quantitative survey, and then those participants that completed the survey were contacted for an online interview that collected qualitative data.

**Significance of the Study**

The results of this study can help shape instructional design in traditional online courses by illuminating the design factors that encourage learners to stay engaged towards self-regulated learning. Instructional designers can utilize this information to make better decisions about course design by basing those decisions on designs that are identified as beneficial for self-regulated learning and personalized learning design. Policy makers in education could use this information to set quality standards for online course design. Learners could also use the information to help self-identify courses that would be better suited for their self-regulated and personalized learning goals.

**Research Questions**
This study investigated three primary research questions and six sub-questions. These questions are:

1. What are the attributes of the MOOC learners’ pathway choices through the course content and activities?

2. What are MOOC learners’ experiences in the customizable learning pathways? To what extent are their pathways related to the course designs? The sub-questions for the first research question are:
   - What are MOOC learners’ patterns in choosing the customizable learning pathways?
   - Are there any relationships between learner modality patterns and the course design? If so, why?
   - Are there relationships between learner modality patterns and the course activity design? If so, why?

3. Are there any relationships between learners’ self-regulation experiences and the course designs in the customizable modality course? The sub-questions for the second research question are:
   - What are the MOOC learners’ experiences in terms of their self-regulation?
   - What do learners see as the relationship between their pathway choice, the course content design and self-regulation?
   - What do learners see as the relationship between their pathway choice, the course activity design and self-regulation?

Research Design
The participants in this study were recruited from the Humanizing Online Instruction MOOC (HumanMOOC) offered in winter 2015. Participants self-selected to participate in the initial quantitative survey. Participants could have potentially been from any demographic, however, MOOCs are sometimes found to attract higher numbers of highly educated young males (Christensen et al., 2013) from more affluent neighborhoods (Hansen & Reich, 2015). Participation in both the MOOC itself and the interview was voluntary. Participants that self-selected to participate in the qualitative interviews were contacted to participate in an interview survey that investigated pathway choices and experiences with self-regulated learning that related to the customizable modality pathway course design.

The quantitative instrument was the *SRL in Massive Open Online Courses* survey (Milligan, Margaryan, & Littlejohn, 2013). This instrument was minimally updated in language to reflect the research questions of this study. Structured qualitative interview questions with pre-determined wording were presented online in a pre-determined sequence and supplemented through course email with probing questions.

The procedure for the study had two main stages. The first stage involved sending out the quantitative survey via course email to all adult participants in HumanMOOC. Participants accessed the survey online after consenting to taking the survey. Demographic information was also collected for analysis. Participants completed the self-regulated learning survey were contacted to participate in follow-up online interviews. Qualitative interviews were conducted online via a text survey, with follow questions sent through course email. Participants were asked a series of 10 questions over the course of half an hour or longer. Open-ended qualitative interview questions with pre-determined wording were presented in a pre-determined sequence and supplemented with probing questions. The responses to the interview and follow-up
questions were analyzed for themes that arise in relation to pathway choices, course design
issues, and self-regulated learning.

Assumptions, Limitations, Scope, and Delimitations

In this study, the main assumption was that participants answered the survey and
interview questions as honestly as they could to the best of their knowledge. These responses are
assumed to be accurately based on participants’ experiences and feelings regarding
HumanMOOC. Additionally, the assumption exists that all participants were active in some
small or large part in HumanMOOC. Some course analytics were accessed to assure that survey
and interview participants had enrolled and participated in some way.

Due to the mixed methods nature of the study, the main limitation of this study is that the
results are not quantifiably generalizable to the larger education population. Additionally, the
primary researcher also served as instructor and lead instructional designer for HumanMOOC.
This could have introduced a bias towards certain design structures in the data collection of the
qualitative feedback. Perceptual misrepresentations are also a limitation in any qualitative
research study, as well the ability of the quantitative instruments to accurately record complex
ideas such as pathway choices and self-regulated learning.

The scope of the study included a sample population that was difficult to predict. Open
enrollment in MOOCs makes predictions of numbers difficult. Additionally, the inconsistent
participation rates as well as high drop-out rates that many MOOCs experience make a consistent
scope difficult to conceptualize. HumanMOOC attracted between 695 initial and 871 final
enrollees. At least 461 learners participated at one point or another over the entire duration of the
course. A total of 28 learners earned some form of course badge, with 18 of those earning the
course completion badge. However, these numbers do not represent all of the learners that feel they completed all of their personal learning goals for HumanMOOC.

This study was limited to the learners in the designated MOOC. Many other MOOCs exist that could have served as potential pools for research participants. However, few of those courses were designed in a customizable modality format, and access to the activity data in those courses was difficult to obtain for non-course staff. Finally, this study was limited to adults over the age of 18 that enrolled in the course. MOOCs can often attract learners that are under the age of 18; therefore, this study was limited to adult participants.

Definition of Terms

The following definitions were utilized in this study:

*Open learning.* Self-directed learning designs where the learning content and materials are freely available online to anyone that is interested in utilizing them (Fasihuddin, Skinner, & Athauda, 2014).

*Self-directed learning.* Experiences that places primary responsibility for most aspects of learning (including planning, implementing, and evaluation) under the control of individual learners (Hiemstra, 1994).

*Self-regulated learning.* Experiences that place primary responsibility for the regulation of learning (including learning strategies, self-oriented feedback, and independent motivational processes) under the control of individual learners (Zimmerman, 1990).

*Engagement.* The state of a learner being engaged with learning that includes factors such as learner behavior, institutional practice, socio-cultural context, and the learner’s own motivations and expectations (Kahu, 2013).
Summary

The purpose of this chapter has been to identify the need for this study and propose a research solution for the identified problem. The problem that was identified was a gap in the research literature about MOOC learners’ experiences with customizable modality pathway learning design in relation to self-regulated learning. A mixed methods explanatory research design was proposed that quantitatively examined MOOC learners, some of whom were then interviewed qualitatively. These interviews were designed to explore learners’ personalized pathway choices related to self-regulated learning in a customizable modality pathway course design.

Outline of the Study

Chapter 1 introduced the background of the study’s problem, the problem statement, the purpose of the study, the significance of the study, the research questions, basic research design, assumptions, limitations, scope, delimitations, definitions, and the outline of the study. Chapter 2 will explore the issues surrounding self-regulated learning, the shifts in control and power dynamics in self-regulated learning experiences, the philosophical and theoretical foundations of MOOCs, the history of MOOCs, the basics of customizable modality design, and research into self-regulated learning (as well as the related issues of self-directed learning and engagement). Chapter 3 introduces the population and sample, instrumentation, procedure, and data analysis. Chapter 4 details the results of the study, while Chapter 5 discusses conclusions based on the results and recommendations for future research.
CHAPTER 2
LITERATURE REVIEW

One of the more hyped concepts of the past few years has been Massive Open Online Courses (MOOCs), heralded as both a waste of resources (Jakovella, 2013) as well as a disruptive force (Conole, 2013) that will destroy education as we know it. Between these two extremes of the public hype can be found an interesting set of ideas that are not technically new, but that combine emerging technologies with existing ideas to ask interesting questions about the future of online learning.

In many ways, the term “Massive Open Online Course” or MOOC would in itself indicate various major paradigm shifts from the “Small, Closed, Face-to-Face” design of traditional courses in grade school and college education. Traditionally, most courses are only open to a certain subset of learners (those accepted to a specific school or college), held in a physical classroom, and capped at a number that is relatively small when compared to the greater school population. Online learning has been around for several decades now, but has only recently begun to gain widespread recognition beyond the adventurous programs that have been offering them since they began (Harasim, 2000). However, online educational courses are often designed as distance versions of face-to-face courses in terms of learner roles, instructor roles, and collaborative interactions (Wallace, 2003). MOOCs possibly change these dynamics by opening up the courses to anyone who wants to take them, allowing for hundreds or thousands of learners to sign up and take the course.

One of the byproducts of the openness of MOOCs is the questions that are raised about power structures in education related to self-regulated learning, self-directed learning, and engagement. When traditional structures of control (grades and tuition) are removed from
courses, how can courses be designed to leverage self-regulated learning? While self-regulation tends to deal with examining various characteristics of the learner, the effect of learning design on learner self-regulation, self-direction, and engagement is also a very important aspect to examine. In their study of the engagement factor of interaction, Garrison and Cleveland-Innes (2005) concluded that “it is clear from these results that the shift in how students approached their study is strongly influenced by the design and teaching approach” (p. 140). Candy, in his article “Linking Thinking: Self-directed learning in the digital age” (2004), writes extensively about the connection between self-regulated learning, self-directed learning, and engagement, as well as how the design of courses, programs, or websites can have an impact on each one. While the learner is the main factor in self-regulated learning as well as the related factors of self-directed learning and engagement, instructional design can also be seem as a major influencing factor as well.

The goal of this chapter will be to examine how power and control issues relate to self-regulated learning in MOOC course design, with the goal of pointing towards gaps in research that can be addressed in this study. This examination will begin with an exploration of the history of instructional design, learner engagement, self-directed learning, and self-regulated learning. From there, the focus will shift to determining various contexts and definitions related to power issues in education. This section will end with a discussion of a new learning theory or paradigm that was the precursor to the modern MOOC movement. The history of MOOCs will then be discussed, with an added examination of various classifications of MOOCs (including customizable modality MOOCs). Finally, these classifications of MOOCs will lead to a discussion of the power dynamics that exist in current MOOC structures as well as how these power issues are possibly miscommunicated. Along the way, this paper will also examine how
the paradigm shifts caused by MOOCs have raised many intriguing questions, such as: Will the
design of MOOCs have an impact on self-regulated learning? If so, what are those impacts? To
examine these questions, this chapter will first lay the groundwork for instructional design,
engagement, self-directed learning, and self-regulated learning before turning to the basic
concepts of power and control in education that could be impacted by these paradigm shifts.

**Instructional Design**

For the purpose of this study, instructional design will be defined as “the systematic and
reflective process of translating principles of learning and instruction into plans for instructional
materials, activities, information resources, and evaluation” (Smith & Ragan, 1999, p. 2). The
formal field of instructional design can be traced back to the work of Robert Gagne, Leslie
Briggs, John Flanagan, and others as they developed formal military training programs (Reiser,
2001). The success of these programs led to the continuation of the idea of systematic training
design after the war ended (Gagne, 1962). Gagne is also known for contributing the ideas of
domains of learning (verbal information, intellectual skills, psychomotor skills, attitudes, and
cognitive strategies), events of instruction (teaching activities), and learning hierarchical analysis
(Reiser, 2001). Other foundational ideas that were developed during this period include task
analysis (Miller, 1962) and programmed instruction (Skinner, 1954), both based on the idea of
using quantitative studies to develop a formal system to improve education.

One of the more popular concepts to come out of this time period that is still going strong
to this day is the idea of behavioral objectives (Reiser, 2001). Mager (1962) is usually credited
with creating a system of design objectives that focused on the behaviors, conditions, and criteria
that learners engaged with in order to learn content or activities. However, many would also
point to Bloom’s Taxonomy (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) as a focal point for behavioral objectives. Behavioral objectives often take on many forms, but still remain a popular fixture in the field of instructional design.

The shock of the launch of Sputnik in 1957 caused the United States government to drastically change educational methods in order to catch up with this monumental achievement (Reiser, 2001). While many of these efforts were guided by subject matter experts, they were not tested on actual learners and ended up not being very successful (Reiser, 2001). In response to this problem, Scriven (1967) developed a system of testing materials with learners that involved testing materials with actual learners before releasing the material (formative evaluation) and then evaluating the results after the lessons are completed (summative evaluation).

In the 1970s, several dozen formal models for instructional design were created or expanded (Reiser, 2001). One of the more popular models to gain attention at this time was the ADDIE instructional design method, named after the five stages of design it encompasses (analyze, design, develop, implement, and evaluate) (Peterson, 2003). While the exact origins of the ADDIE model are unknown (Molenda, 2003), it remains one of the most popular instructional design models in use to this day.

After a lull in interest in instructional design in the 1980s, new progress was sparked due to the growth of personal computers (Reiser, 2001). This newfound interest led instructional designers to focus either on computer-based training or developing new interactive media. However, changes in the field of instructional design in the 1990s were not all technical in nature. The 1990s also saw an increase in the popularity of constructivism, a theoretical mindset that looked at learning as a constructive process rather than behavioral transmission (Duffy &
A design process that once had one main epistemological lens now began to see multiple lenses competing for designers’ allegiances.

The most recent shift in society to affect the field of instructional design has been towards the use of the Internet to deliver courses (Harasim, 2000). New design theories, modalities, and domains have been developed in the relatively short lifespan of online learning (Harasim, 2000). In the 1980s, Moore (1989) had identified three modalities of interaction in education (student-teacher, student-student, and student-content). But the 1990s, during the early years of online education, the authors Hillman, Willis, and Gunawardena (1994) added student-interface interactions while Anderson & Garrison (1998) added three more modalities to account for advances in technology: teacher-teacher, teacher-content, and content-content. However, online learning was not finished creating new modalities for interaction, eventually influencing Dron (2007) to add group-content, group-group, learner-group, and teacher-group. Finally, the networked nature of the Internet has created a new modality that focuses on “interactions with and learning from sets of people or objects form yet another mode of interaction” (Wang, Chen, & Anderson, 2014, p. 125). Online education has evolved into a unique field that requires the examination of concepts such as engagement, self-regulated learning, and power dynamics from a lens specific to the connected digital world.

Engagement in Online Education

One of the foundational concepts in education and instructional design is engagement. Wintrup, Wakefield, and Davis (2015) trace the current emphasis on engagement in learning to the earlier work of Vincent Tinto (1993). Wintrup, Wakefield, and Davis (2015) label Tinto’s work as seminal in that it is responsible for “shifting the focus from ‘retaining’ students (an
institutional need) to actively engaging them in learning and personal development” (p. 12). Robinson and Hullinger (2008) summarizes Kuh’s (2003) work in engagement into a good working definition of engagement: “engagement pertains to the efforts of the student to study a subject, practice, obtain feedback, analyze, and solve problems” (Robinson & Hullinger, 2008, p.101). According to Kuh (2001), Chickering and Gamson (1987) created the most widely-known set of learning engagement indicators called the "Seven Principles for Good Practice in Undergraduate Education." These seven principles are “student-faculty contact, cooperation among students, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents and ways of learning” (Kuh, 2001, p. 1; Chickering & Gamson, 1987, p. 2).

Kuh (2003) connected these seven principles with the National Survey of Student Engagement (NSSE). The NSSE is generally considered to be the main standard of student engagement in the United States, have been used to assess millions of students since it was created (Buckley, 2013). The NSSE is “specifically designed to assess the extent to which students are engaged in empirically derived good educational practices” (Kuh, 2001, p. 2). The importance of the NSSE highlights how important engagement has become as a factor in modern education. However, the NSSE and the Seven Principles for Good Practice in Undergraduate Education were both designed for traditional educational settings. The question remains: “how do they apply to online settings?”

While these seven principles are well studied in traditional educational settings, Wintrup, Wakefield, and Davis (2015) point out that these traditional institutional approaches probably have limited relevance to online learners. In support of this point, other researchers have noted that online learners require modified indicators of engagement (Robinson & Hullinger, 2008; Garrison & Cleveland-Innes, 2005; Herrington, Oliver, & Reeves, 2003). To address this
shortcoming, Candy (2004) provided a suggested list of new online learning engagement dimensions that he refers to as *digital engagement*: connectivity, competence (digital literacy), content (quality and access), credibility and confidentiality, capturing information, and collaboration. The context for this digital engagement is self-directed learning, which will be the focus of the next section of this chapter.

**Self-Directed Learning**

For the purpose of this study, self-directed learning is defined as “any study form in which individuals have primary responsibility for planning, implementing, and even evaluating effort” (Hiemstra, 1994, p. 9). While the term “self-directed” might imply a focus on the learner and absence of an instructor, teachers also have a role in self-directed learning. These roles can include such tasks as interacting with learners, procuring content and resources, or evaluating learning outcomes (Hiemstra, 1994). Rather than a level to be achieved, self-directed learning is often considered a continuum that generally encompasses all learners in every learning situation in some manner or another (Hiemstra, 1994). In many ways, self-directed learning can be seen as a long-existing concept in the history of education.

Candy (2004) notes that self-directed learning has been one of the main modes of knowledge acquisition for many people since the beginnings of humanity. Of course, knowledge was often discovered by the educated elite, but most individuals had to learn by exploring the world around them, quite often on their own terms without a person in the professional position of “teacher” guiding them (Candy, 2004). The high point of this informal era of self-directed learning was probably attained in the 1800s, where according to Candy (2004)

> If there was ever a high water mark for self-direction in an earlier age, it was probably the nineteenth century. That era saw the establishment of both religious and secular societies
to promote and support learning, the creation of mechanics’, scientific and literary institutes and mutual improvement societies, the spread of lyceums and athenaeums, of libraries and reading rooms. It also witnessed an upsurge in the publication of improving books and manuals, literary and philosophical journals, encyclopaedias and do-it-yourself guides, which often appeared in weekly installments. (p. 46-47)

However, while self-directed learning itself is ancient, the formal research of self-directed learning began much more recently, with the work of Houle (1961, 1972, 1988), Tough (1971, 1978), and Knowles (1975, 1980).

Houle, in his 1961 book *The Inquiring Mind: A Study of the Adult who Continues to Learn*, is often viewed as the launching point of the field of formal research into self-directed learning (Candy, 2004). This influential book was based on a collection of lectures on the topic of why some adults continue to learn as they get older. One of Houle’s more well-known students was Allen Tough. Tough contributed several concepts to the study of self-directed learning, such as the idea that the majority of adults engage in independent learning (Tough, 1978) and a quantifiable definition of what self-directed learning is (Tough, 1971). Tough’s (1980) work also highlighted how difficult it is to quantify something as arbitrary and private as self-directed learning. Knowles is often seen as the researcher that popularized self-directed learning by differentiating between andragogy and pedagogy. Knowles originally classified andragogy as the science of adult learning (where as pedagogy is the education of children), but the term has since expanded to include informal learning at all ages. Merriam and Caffarella (1999) explain this change by stating that "pedagogy-andragogy represents a continuum ranging from teacher-directed to student-directed learning and that both approaches are appropriate with children and adults, depending on the situation" (p.275).

Candy himself has also contributed ideas to the concept of self-directed learning. In his comprehensive review of existing literature (1991), he identified four issues present in self-
directed learning: learners making decisions about what they learn, learners taking control over all aspects of learning, learner’s willingness to become independent, and the projects that learners engage with outside of formal learning environments. Many of these ideas are mirrored in the concept of self-regulated learning, so the next section will explore the distinction between the two.

Self-Regulated Learning

The concepts of self-regulated learning and self-directed learning are often closely connected in the literature (see, for example, Wehmeyer, et al., 2012; Shogren, Palmer, Wehmeyer, Williams-Diehm, & Little, 2011; Michalsky & Schechter, 2013; etc). In many of these cases, it seems that the difference between the two boils down to regulation and direction, with regulation being a subset of direction. According to Skinner (2013), “self-regulated learning is the process by which students set goals, monitor their performance, measure their success, and adjust their behavior accordingly” (p. 93). Based on this, self-regulated learning fits within several of the issues that Candy (1991) identified with self-directed learning, but does not contain every aspect for those issues.

While self-regulated learners have probably always existed as long as humans have been learning, the study of key processes that learners actually use to regulate their own learning is much more recent (Zimmerman, 1990). Zimmerman (1990) explains the importance of studying the perspective of regulation in learning by pointing out that “this perspective shifts the focus of educational analysis from students' learning ability and environments as ‘fixed’ entities to their personally initiated processes and responses designed to improve their ability and their environments for learning” (p. 4). Sitzmann (2011) takes the self-regulated learning definitions
of Boekaerts, Maes, and Karoly (2005); Karoly (1993); Pintrich (2000); Winne (1995); and Zimmerman (1986, 2000) and combines them into a learning context-focused definition: “Self-regulated learning refers to the modulation of affective, cognitive, and behavioral processes throughout a learning experience in order to reach a desired level of achievement.” (p. 3).

Sitzmann (2011) also points out how self-regulated learning arose from various theories from several disciplines, including control theory (from cybernetic engineering), self-efficacy theory (from clinical psychology), goal setting (from organizational psychology), action regulation, and educational psychology. The next several paragraphs will briefly touch on each of these disciplines and how they contributed to self-regulated learning theory.

**Control Theory**

Control theory is an area of cybernetic engineering that focuses on how learners will eliminate problems with their attainment of goals by means of a negative feedback loop (Carver & Scheier, 1981, 1990; Powers, 1978). As learners progress through training, those that accomplish more goals will have a positive self-evaluation of their accomplishments, while those that moved slower through the goals will have a negative self-evaluation. If there is a negative self-evaluation, the learner will allocate more resources to meet a desired range of goals. Without control theory, self-regulated learners might not be able to address what is holding their learning back from obtaining their desired learning outcomes.

**Self-Efficacy Theory**

Self-efficacy theory is an area of clinical psychology that focuses on the cognitive processes that learners use to acquire and retain new information or skills (Bandura, 1977). The basic idea is that learners utilize past experiences to negotiate new ones by taking positive steps that involve goal setting and persistent effort (Bandura, 1991; Wood & Bandura, 1989). For
example, learners with high self-efficacy will set goals that are higher or better than their previously attained goals and will then expend the necessary persistent effort to meet those goals. Without self-efficacy, self-regulated learners might not be able to evaluate their knowledge or skills gaps in order to determine where they need to focus their educational efforts.

**Goal Setting**

Along with self-efficacy, goal setting is a major concept that supports self-regulated learning. Locke and Latham (1990, 2002) have been instrumental in researching how goal-setting operates by directing learners towards actions that focus on goal-related activity, increases effort and persistence, and leads learners to push towards utilizing tasks and strategies that are more relevant to the goals they wish to accomplish. Without the ability to set goals, self-regulated learners may not be able to know where to focus their energy and attention in order to acquire more knowledge or skills.

**Action Regulation**

Action regulation is a theory that basically examines the way that learners need to set a goal and then take actions to accomplish that goal, especially when evaluated against competing goals (Hacker, 1985). While much of action regulation can occur individually, external feedback is still required in order to assist the learner in evaluating their progress towards goals. Sitzmann (2011) points out the importance of errors in action regulation theory, because “they are a critical component of feedback and influence the efficiency of action” (p. 7). Without action regulation, self-regulated learners might not be able to focus on specific goals in order to determine where they need to progress.

**Educational Psychology**
The field of educational psychology has made many contributions to the concept of self-regulated learning. Most prominent among these contributions are the works of Zimmerman (1986, 1990), who contributed a social cognitive model derived from the works of Bandura (1986). Zimmerman focused on how learning conditions are always changing; therefore, learners must prepare themselves for learning, maintain focus throughout the learning process, and finally self-reflect on accomplishments after learning has occurred. Without this constant evaluation of their own cognitive processes, self-regulated learners might not be able to adapt to ever changing conditions in formal or informal learning situations.

*Motivation, Goal Orientation, and Self-Efficacy*

Motivation, goal orientation, and self-efficacy are two important concepts tied to self-regulated learning. According to Pintrich and De Groot (1990), “student involvement in self-regulated learning is closely tied to students' efficacy beliefs about their capability to perform classroom tasks and to their beliefs that these classroom tasks are interesting and worth learning” (p. 38). A few years later, Wolters, Shirley, and Pintrich (1996) noted that “a coherent social cognitive model of goal orientation, motivation, and self-regulated learning is emerging that will be very fruitful and productive for future research on classroom learning” (p. 236). Currently, there is growing evidence that a learner’s process of self-regulation and beliefs about personal motivation are related in an interactive fashion (Schunk & Zimmerman, 2012). The positive effects of increased self-regulated learning, motivation, and self-efficacy have also been connected to online learning achievement and satisfaction as well (Wang, Shannon, & Ross, 2013).

The main thread that runs throughout self-directed and self-regulated learning is a power shift away from the instructor as dispenser of knowledge and driving force for accomplishment
of educational goals. While many educational scenarios are designed with power resting with the instructor, any shift towards self-directed or self-regulated learning will require some or most of power to be delegated to the individual learners. The next section will provide framework for these changes by examining the various dimensions of power and control in education.

Power Issues in Education

Power and control are two concepts that are probably a part of all areas of life. However, creating a consistent definition of power has proven difficult for theorists and researchers alike, due to most researchers focusing on definitions for their specific research study (McLeod & Lin, 2010). For the purpose of this paper, the definition provided by Yukl (2006) will suffice: “the capacity of one party (the agent) to influence another party (the target)” (p. 146). Foucault (1980) described the issue of power in this manner:

…in any society, there are manifold relations of power which permeate, characterize and constitute the social body, and these relations of power cannot themselves be established, consolidated nor implemented without the production, accumulation, circulation and functioning of a discourse. (p. 93)

Education is one part of our society that is involved with the production, accumulation, circulation, and functioning of a communicative discourse. Many educators and researchers are seeking to “understand human communication as a universal means to comprehend the social world” (Warren & Wakefield, 2012, p. 100) because “this communication and related academic principles are the core of social research and educational theory” (Warren & Wakefield, 2012, p. 100). As this chapter will examine, the nature of who is producing this narrative as well as who is accumulating and circulating it is one of the key foundations of power issues in self-regulated learning.
Habermas (1971) further connected power and control with education and knowledge with his concepts of the three kinds of knowledge: instrumental, communicative, and emancipatory. Instrumental knowledge is the basic knowledge that all humans need in order to survive and possibly control and self-regulate their own environment. In terms of Foucault’s statement above on power in society, this would be the establishment and accumulation of power. Communicative knowledge is based on the ability to interpret, engage with, and negotiate understandings of the world around us. Again, in terms of the statement Foucault made on power, this is the circulation and functioning of discourse. Finally, emancipatory knowledge is a process that critically questions not only ourselves, but also the social systems of society. This type of knowledge would seem to be outside of Foucault’s boundaries of relations of power. However, Foucault (1980) did conclude

If one wants to look for a non-disciplinary form of power, or rather, to struggle against disciplines and disciplinary power it is not towards the ancient right of sovereignty that one should turn, but towards the possibility of a new form of right, one which must indeed be anti-disciplinarian, but at the same time liberated from the principle of sovereignty. (p. 108)

Critically questioning ourselves as well as society around us could be one way to become anti-disciplinarian as well as liberated from sovereign control of others. This could also be another avenue to self-regulate our learning and existence. Therefore, the three forms of knowledge that Habermas (1971) describes (instrumental, communicative, and emancipatory) can be seen as a good framework for describing power relationships and control in education.

**Instrumental Knowledge and Power**

To that end, the first form of knowledge to examine is instrumental. This type of knowledge is probably the most familiar form in education, as it is most closely aligned with instructivism. Instructivism is a broad learning theory that basically “assumes the effectiveness
of passive reception of sanctioned information through memorization and recall" (Porcaro, 2011, p. 40). Within this broad framework falls the behaviorism of Skinner and Thorndike as well as the cognitivism of Gagne and Bruner. The main connective strand for these diverse ideas is that “instructivists, whether behaviorist or cognitivist, are ontologically objectivist and realist, and epistemologically empiricist…. they see learning as simply mapping the real, external world onto the minds or behaviors of the student” (Porcaro, 2011, p. 41). This means that the power to regulate learning and engagement rests outside of the learner – usually with an expert instructor or expertly-programmed set of media – and therefore those with the knowledge have established power and control that must be accumulated by a learner that is dependent upon a more knowledgeable, powerful other.

Other words used to describe instructivism are objectivism and institutionalism (Onyesolu, Nwasor, Ositanwosu, & Iwegbuna, 2013). Whatever the term that is used, the idea is still seen as a way to transfer knowledge into the brain of the learner in order to change behavior. According to Onyesolu, Nwasor, Ositanwosu, & Iwegbuna (2013), this method is the lecture method of instruction that is commonly utilized by 70-90% of university professors. What this means for higher education is that most instructors design themselves as the seat of power for the courses that they teach in some fashion. It would also mean that they are probably most likely transmitting instrumental knowledge design to help learners survive and control their environment. But a major issue that arises is that this means all learners are seeking to survive and control (or regulate) their environment, opening the door for possible conflicts of interest. Other forms of knowledge and power are needed to bring these competing agendas to a place of peaceful co-existence.

*Communicative Knowledge and Power*
The next form of knowledge to examine more in depth is communicative. This type of knowledge is also probably familiar to many in education, as it is most closely aligned with constructivism. Constructivism is a diverse learning theory that displays “a variety of ontological and epistemological perspectives” (Porcaro, 2011, p. 41). These varied perspectives include the cognitive constructivism of Piaget (which is almost cognitivism) as well as the sociocultural constructivism of Vygotsky. Despite the wide coverage of perspectives, the unifying strength of constructivism is that it is “well-suited for teaching the epistemic practices and collaborative problem-solving skills necessary in a knowledge society while empowering learners through democratic participation in learning and dialogue” (Porcaro, 2011, p. 43). Onyesolu, Nwasor, Ositanwosu, and Iwegbuna (2013) clarified this diverse perspective by defining it as a theory that is “rooted in the idea that the learner actively constructs his knowledge, not that it is passively acquired from without” (p. 40). This means that the power rests inside of the learner – usually with each learner bringing their unique perspective to a negotiation of learning – and therefore those with the knowledge have the role of sharing knowledge with those who don’t, with the goal being to come to a shared understanding and control. While Porcaro (2011) and Onyesolu, Nwasor, Ositanwosu, and Iwegbuna (2013) acknowledge that constructivism has many critics that do not feel it is really a learning theory, they also recognize the importance of its impact on educational design and theory. Porcaro notes that many critics feel constructivism ignores basic instructional science, while others feel constructivism is too broad of a concept to be a theory and therefore should be an epistemology. Porcaro’s response is that these critics focus mostly on what practices are not constructivist but then fail to describe what category these non-constructivist practices fall under. Onyesolu, Nwasor, Ositanwosu, and Iwegbuna note how constructivism has been labeled as everything from a fad to a religion, all in contrast to being a
true learning theory. The response from Onyesolu, Nwasor, Ositanwosu, and Iwegbuna (2013) also echoes one of Poracro’s points: “it cannot be over-emphasized that a learner enters his learning situation with pre-conceived notions or ideas about many phenomena” (p. 40).

Seeing that there are widely different aspects associated with constructivism, the question becomes: “do all aspects of constructivism relate to power dynamics”? According to Foucault (1980), power needs discourse in order to be effective in society. Therefore, the radical constructivism of Ernst von Glaserfield would not be much of a part of the discussion of power dynamics in education because in radical constructivism “communication is not necessary to involve sharing meaning among participants” (Liu and Chen, 2010, p.64). Of course, radical constructivism is important in understanding how learners construct knowledge within their mind. But eventually, in order for this construction of knowledge to be able to affect power or regulation of learning, it will need to be communicated as discourse. For this process, the discussion will turn to the ideas of social constructivism.

The concept of social constructivism is most often associated with Soviet psychologist Lev Vygotsky. According to Liu and Chen (2010)

From Vygotsky's perspective, learners construct meaning from reality but [do] not passively receive what [they] are taught in their learning environment. Therefore, constructivism means that learning involves constructing, creating, inventing, and developing one's own knowledge and meaning. The role of teacher is a facilitator who provides information and organizes activities for learners to discover their own learning. (p. 65)

This is not far off from von Glaserfield’s radical constructivism in some ways. The power has shifted away from an all-powerful expert that is transferring knowledge to a learner that is responsible for constructing knowledge. Oftentimes, the power over oneself is seen as the opposite of the ecological or expert power that instructors typically control in classroom settings (McLeod & Lin, 2010). However, Vygotsky did not see the process of acquiring knowledge as a
solo endeavor. He proposed the idea of the zone of proximal development: an identifiable “gap” that exists between what learners can achieve individually and what the same learners can achieve with the help of more knowledgeable others through engagement and social interactions (Vygotsky, 1978). The zone of proximal development is a key factor in not only the shift from teacher-centered instructivist power to student-centered social constructivist power, but also in the shift from learning as an individualistic activity to learning as a social activity that is shared among learners (Watson, 2001). To link back to Foucault, the zone of proximal development is one arena where power is produced, accumulated, and circulated as a function of discourse.

**Online Learning**

Much of the discussion about learning so far has been in reference to learning in general; the question remains as to how this can apply in situations of online learning. Ally (2004) makes a good connection between instructivist and constructivism concepts and the principles of effective online instructional design by leaning on the Clark/Kozma debate. As Ally (2004) points out “Clark (1983) has claimed that technologies are merely vehicles that deliver instruction, but do not themselves influence student achievement” (p. 3). So, while the point is that good instructional design can be achieved online as well as in face-to-face environments, the main focus of what is considered online learning in Clark’s (1983) point is more from an instructivist paradigm of information transmission. Constructivism views learning as a process that occurs within the learner, therefore an instructivist paradigm that sees learning as a process that is externally transmitted to the learner would be seen as invalid in a constructivist paradigm. The recent rise of social media has somewhat changed the nature of technology to be more focused on interactive human communication towards constructing knowledge and shared understanding (Livingstone & Brake, 2010). As Kop, Fournier, and Mak (2011) put it, “the Web
no longer consists solely of hyperlinked text pages, but has evolved into a complicated mesh of interlinked sites, consisting of human communication, writing, and digital artifacts\textquotedblright; (p.75). While hyperlinks are a form of interlink, websites can also have other technologies such as RSS feeds and APIs that interlink more than hyperlinks can (for example, a hyperlink usually only connects when the user clicks on it, but APIs can still interlink without user input). Also, while writing is a form of digital artifact, digital images and videos are also digital artifacts that now reside on the internet. The point made by Kop, Fournier, and Mak (2011) is that websites have moved beyond more static linked collections of static text and images. Therefore, the question becomes: Can constructivism work in a modern online environment?

Constructivist learning paradigms, when properly designed and implemented, have been found to produce promising outcomes in face-to-face environments, such as learners developing positive attitudes towards their own motivation, understanding, and skills (Neo & Neo, 2009). Therefore, if Clark\textsc{'}s (1983) point about media is true, constructivism should work in online environments as well. When examining the literature, Ruey (2010) found that \textquoteleft;a collaborative, interactive, constructivist online learning environment, as opposed to a passive learning environment, is found to be better able to help students learn more actively and effectively\textquoteright; (p. 706). Ruey\textsc{'}s own research supported these findings, leading to the conclusion that \textquoteleft;overall, a constructivist-based instructional approach seems promising to encourage adult learners to engage in more collaborative, authentic and responsible learning in an online learning environment\textquoteright; (pp. 714-715). While Ruey does not specifically refer to the zone of proximal development, his findings on the role of collaborative peer instruction illustrates the concept quite nicely. On the other hand, it also raises some issues where constructivism might fall short due to modern technological advances.
The main modern issue with the zone of proximal development is that it still depends on a more knowledgeable other to guide learners to the point of developing their own learning (Vygotsky, 1978). This would still closely mirror a typical formal learning situation in grade school or college. What about online situations where there are many knowledgeable individuals coming together to dig deeper into a topic they are already familiar with? Andersen and Ponti (2014) notes how the zone of proximal development can be seen as operating at two levels: individual and collective. Some have worked on newer learning frameworks to address the growing needs of society for learning through connecting and engaging with others in less formal situations. In these spaces, creating the scaffolding needed for the zone of proximal development is collective and self-regulated in nature. Additionally, scaffolding for open learning when many learners might start the educational process but not complete it can become problematic when the more knowledgeable others decide to not complete the learning process. The next section will examine one prominent attempt at new learning framework that has gained some attention.

Connectivism

This new learning framework is basically a reaction to behaviorism, cognitivism, and constructivism as understood by Dr. George Siemens. To Siemens (2005), behaviorism is a theory focused on behavior change due to stimulus and response, as observed through external changes rather than understanding internal processes. In contrast to behaviorism, Siemens (2005) sees cognitivism as an internal computer processing model, with external information (input) entering the learner to be processed and stored in the learner’s memory. Finally, Siemens (2005) views constructivism as a process where learners actively attempt to create and construct meaning by understanding their experiences. To sum these up, Siemens (2005) observes that “all
of these learning theories hold the notion that knowledge is an objective (or a state) that is attainable (if not already innate) through either reasoning or experiences” (p. 4).

After examining the concepts of behaviorism, cognitivism, and constructivism, Siemens (2005) came to the conclusion that these learning theories did not address modern learning issues adequately. Among the problems that he noted were issues such as learners changing fields often through their lifetime, the rise of the importance of informal self-regulated learning, the ability to off-load some cognitive tasks previously covered in older learning theories to technology, and the rising need to know where to find knowledge. But his main issue with older learning theories was that

A central tenet of most learning theories is that learning occurs inside a person. Even social constructivist views, which hold that learning is a socially enacted process, promotes the principality of the individual (and her/his physical presence – i.e. brain-based) in learning. These theories do not address learning that occurs outside of people (i.e. learning that is stored and manipulated by technology). They also fail to describe how learning happens within organizations (Siemens, 2005, p. 4)

In other words, Siemens concern is that, even though the power of learning might have existed with an instructor or a learner, there was little room for a shared power structure that allowed for learning to occur socially as a group in existing learning theories (according to his understanding of those theories). This is as opposed to within the individual as they interact with others as in social constructivism. His solution for the problem he identified was to propose a new theory, along with Stephen Downes, called connectivism. In Siemens’ (2005) own words

Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more important than our current state of knowing. (p. 6)
In many ways, this would link back to Foucault’s (1980) point that in order to be free from disciplinary power, one needs to be anti-disciplinarian (chaotic and complexity) while also liberated from the power of the principle of sovereignty (learning as process that is not entirely under the control of any individual). However, connectivism remains under the concept of societal power structures that Foucault (1980) described because it involves the “production, accumulation, circulation and functioning of a discourse” (p. 93). All of this assuming, of course, that connectivism is a true learning theory and not just a random collection of interesting ideas.

Some debate has occurred over whether connectivism is really a learning theory or not (Harasim, 2012; Calvani, 2009; Bell, 2011). Central to the debate over whether connectivism is a new theory or not lies the controversy over Siemens’ claims to have created a theory that replaces older theories. However, even defining what a learning theory is can prove difficult. Definitions range from general guidelines such as “conceptual frameworks that describe how information is absorbed, processed, and retained during learning” (Chaudhary, 2013) to more complex definitions that encompass explanations for how learning occurs that have been scientifically investigated through research methods in a manner that is practically connected to current and historical contexts (Harasim, 2012). For some, connectivism would count as a learning theory, but for others it does not. Additionally, some might object to the idea of connectivism replacing other theories. Calvani (2009) makes a strong point that replacement of other theories is not necessary, because a more nuanced view should be taken. While Calvani overemphasizes Siemens point about knowledge resting within technology and non-human connections, the point that pragmatically there is probably not one dominant learning theory that can only be used at all times is important to consider. In other words, learning is not always
about behaviorism or constructivism, but behaviorism and constructivism utilized at the appropriate times in the appropriate manner.

Bell (2011) agreed with Calvani that there is more than one applicable theory for all of learning. However, Bell examined various aspects of the arguments for and against connectivism as a new learning theory and came to an interesting conclusion. Bell sees connectivism as a phenomenon because it “has not established itself as a distinct learning theory, although its epistemology can make a contribution to new paradigms of learning…and its study and practice can provide a rich context for exploring those paradigms” (Bell, 2011, p. 106). Within these contexts for exploring various paradigms is where power dynamics most likely need to be worked out, especially since – as Bell points out – connectivism does contain an epistemology. As previously quoted, this epistemology places knowledge in an interesting arena that has not been explored extensively in the past: a group artifact that is not just transferring from one person to another or occurring inside of any given person, but one that is shared and communicated through discourse and engagement (electronic and otherwise).

Whether or not connectivism becomes universally accepted as a new learning theory or not is probably best left for future writers to determine. The importance of connectivism is that it formed the basis of a new educational experiment that Siemens and Downes embarked upon, having no idea that this experiment would spark contentious debate within educational circles. This experiment is the next idea to be examined in this paper.

History of MOOCs

In 2008, Siemens and Downes created what they thought would be another experiment in open learning in an online setting. Open learning had been a concept long before the World Wide
Web came along. Daniel (2012) connects Siemens and Downes efforts in 2008 to the work of Ivan Illich in 1971, who promoted the idea that education should be accessible to anyone that wanted it by allowing learners to share with each other what they are learning, as well as open to the world to observe the outcome of that learning. Of course, students of history will recognize how these concepts go back in time through many civilizations, back to at least the time of the Greek open agoras if not earlier (Feinberg, 2012). The new angle that Siemens and Downes brought to their course was the emerging ideas of connectivism (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015). The initial offering of their course, Connectivism and Connective Knowledge (CCK08), attracted over 2300 learners, of which about 20 paid for course credit through University of Manitoba (Rodriguez, 2012). As one would expect, this led to an overwhelming response to centralized course resources such as the Moodle discussion forums (Mackness, Mak, & Williams, 2010). The instructors’ response was to encourage learners to become autonomous learners by taking their discussions and questions to their own websites and blogs.

This shift in power structure was not just a symbolic gesture; it was the goal of connectivism all along. However, it seems that learners had to run into obstacles created by learning at scale first before they left what they were comfortable with and struck out to cross the zone of proximal development. Research conducted on CCK08 found that the learners that transitioned to blogs tended to perform more quiet reflection as well as tended to develop more personal relationships with others learners that also blogged (Mak, Williams, & Mackness, 2009). For those learners, connectivism appears to have been a success. However, not all learners experienced this level of success and high levels of student confusion with the course design were noted as a demotivating factor for students (Cabiria, 2012). However, the idea did catch the
attention of a few academics and the discussion continued. The actual term “Massive Open Online Course” was not associated with CCK08 at first. This term was coined by Dave Cormier to describe the course later (Dabbagh et al., 2016). For several years, MOOCs were mostly associated with connectivism (Daniel, 2012).

Growing MOOC Popularity

In 2011, another group changed the core power structures of MOOCs considerably. Peter Norvig and Sebastian Thrun created an artificial intelligence course for Stanford University that was offered in 44 languages, attracting 160,000 students at its peak (Cabiria, 2012). The old thresholds for “massive” were immediately being overtaken. By the next year, the term “MOOC” was declared the educational buzzword of 2012 (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015) – even though many academics immediately noticed something was different about this newer version of MOOC.

Anders (2015), Rodriguez (2012), Daniel (2012), and others have described this new brand of MOOC as very behaviorist in nature. These new MOOCs are very content heavy, assessing learners through automatically graded tests and offering few official avenues for interaction. Those that do offer discussion forums often warn that those forums will not be monitored by instructors. This model of MOOC is very instructivist in nature, with the instructor as the expert that disseminates knowledge to the learners that are dependent on a more powerful other to teach them. As Siemens (2005) had originally envisioned connectivism (and by extension, MOOCs) as a way to change power structures and structures of knowledge creation, these new forms of MOOCs are obviously very massive, open, and online… but still very different from the original form of MOOC.

xMOOCs and cMOOCs
These differences led to the most common distinction between MOOCs: xMOOC and cMOOC (Kovanović, Joksimović, Gašević, Siemens, & Hatala, 2015). The original form of MOOC was labeled “connectivist MOOCs” or cMOOCs for short. The newer form of MOOCs was labeled “MOOC as eXtension of something else” or xMOOCs for short (Downes, 2013a). Stephen Downes coined both terms and describes the difference by saying that a “cMOOC is designed as a network…while an xMOOC is based on a central course site and content that will be followed by all students” (Downes, 2013b, para. 25). Therefore, the power dynamics are very different in both forms of MOOCs: the xMOOC giving disciplinary power to the expert instructor, and the cMOOC releasing power over oneself to the learner to self-regulate their learning and form networks with other learners. While many MOOCs fall into the cMOOC and xMOOC distinctions, not all MOOCs fall so easy into such classifications.

While MOOCs are still a new idea and many are just beginning to explore different educational topics related to learning at scale, studies have already examined self-regulated learning in relation to MOOCs. Additionally, other researchers have examined related topics such as engagement and self-directed learning.

*Patterns of Engagement, Self-Regulated Learning, and Self-Directed Learning in MOOCs*

Engagement has recently become one of many important topics in MOOC research due to the large percentage of drop-outs that the average MOOC has been found to experience (Kizilcec, Piech, & Schneider, 2013). Milligan, Littlejohn, and Margaryan (2013) classified MOOC engagement into three patterns: active participation, passive participation, and lurking. Their study also interviewed participants and identified confidence, prior experience, and motivation as the differentiating factors between those three categories. This matches up with what McAuley, Stewart, Siemens, and Cormier (2010) state when they say “MOOCs work only
when people engage and connect from the basis of their own lives, interests, and understandings of their worlds” (p. 54). In many ways, this all points to how MOOC participants are more responsible for their own level of engagement with the course content and activities in order to foster self-regulated learning.

Because of the responsibility placed on MOOC participants to not only regulate, but also direct their learning, MOOCs have become an interesting testing ground for self-directed learning (Kop & Fournier, 2011). Not only do students need self-direction while in the course, they have also been found to have registered for personal reasons in the first place. While some colleges offer credit for MOOC participants that pay tuition and complete certain MOOCs, the majority of MOOC learners sign-up and participate in MOOCs due to personal reasons more than any other reason (Hew & Cheung, 2014). However, the main focus of the research into self-direction in MOOCs is on how learners act while in the course.

The earlier forms of cMOOCs were studied in relation to self-directed learning as early as 2010, before xMOOCs came on the scene (Kop & Fournier, 2011). Kop and Fournier (2011) focused on personality traits and other learner characteristics that affected their direction in learning. Other studies also focused more on the learner (Sheu, Bonk, & Kou, 2013). Unfortunately, interest in self-directed learning and MOOCs seems to have decreased as these studies revealed that MOOC participants value what other self-directed learners in other fields also value.

However, as previously touched on in Chapter One, research into self-regulated learning and MOOCs continues to gain interest. Milligan, Littlejohn, and Margaryan (2013) used self-regulation as a lens to determine patterns of engagement in MOOCs, identifying how learners were active, passive, or lurking in the course. Haug, Wodzicki, Cress, and Moskaliuk (2014)
found that open badges or certificates serve as motivators for self-regulated MOOC participants. Chung (2015) explored how design issues affect self-regulation among non-English speakers in courses offered primarily in English by finding that self-efficacy is positively correlated with self-regulation in non-English speakers. However, while many of these studies touch on issues of how design affects self-regulation, few seem to explore learner perceptions of instructional design overall.

According to Mikroyannidis, Connolly, and Berthold (2013), educational initiatives like MOOCs are related to self-regulated learning because

These initiatives may provide an abundant amount of learning resources for free, but it is up to the learner to find the right ones to meet her learning needs and aspirations. Today’s learner is expected to be able to plan her learning journey, search for appropriate learning resources, use these resources for her learning and reflect on her progress. In other words, a self-regulation skill set is required that will enable someone to learn how to learn.

(p. 3)

Based on Hiemstra’s, 1994, definition above, because MOOCs are typically planned and evaluated by the instructors, designers, or other students, they often do not fall as much into self-directed learning as they do into self-regulated learning as described by Mikroyannidis, Connolly, and Berthold (2013). Therefore, this study focused on self-regulated learning over self-directed learning. However, several aspects of self-regulated learning in MOOCs are still not fully understood, including how the power dynamics of the design of learning materials and activities can affect learner self-regulation.

Problems and Issues with MOOCs

However, before diving into power dynamics of MOOCs, some problems and issues related to MOOCs need to be discussed. While Glance, Forsey, and Riley (2013) found that “the evidence suggests that there is no reason to believe that MOOCs are any less effective a learning experience than their face–to–face counterparts” (p. 1); however, this does not mean that
MOOCs do not have their own unique problems. For example, Johnson et al. (2013) noted several issues such as the sustainability of a free model, how xMOOCs mirror traditional large lecture hall experiences, and how the rapid popularity of the MOOCs might derail deep analysis. Admiraal, Huisman, and Van de Ven (2014) found that self and peer assessment methods utilized in many MOOCs do not appear to be a valid method for assessing student performance in MOOCs. Liyanagunawardena & Williams (2014) also found issues relating to problems with emerging technologies that learners with limited technology access face in MOOCs, as well as language barriers for non-English speakers. Czerniewicz, Deacon, Small, and Walji (2014) also agree that MOOCs are unlikely to solve any educational problems in developing parts of the world due to issues such as lack of distance education providers, lack of internet access, and lack of online education experience in these areas of the world. Clearly, there are many other issues at work in MOOC design. Many of these issues deal with social justice issues that are outside of the scope of this paper, even though they are most definitely of utmost importance. Power dynamics and control affect all participants in MOOCs – learners and instructors alike – so now it is time to turn attention to what the literature discusses around these topics.

Power Issues in MOOCs

Studies of the CCK08 MOOC identified autonomy, connectiveness, and interactivity as important factors that influenced student success (Mackness, Mak, & Williams, 2010). These factors imply a shift away from the dependence on the more knowledgeable others as knowledge dispensers mindset of instructivist settings. Clarification of these concepts helps to focus in on how they relate to power issues such as how instructors tend to control the “production, accumulation, circulation and functioning of a discourse” (Foucault, 1980, p. 93) in traditional
classroom settings. For example, “autonomy does not mean casting learners adrift but it does require learners to embrace independent learning” (Mackness, Mak, & Williams, 2010, p. 271). While this points towards power over oneself and self-regulated learning, other concepts are a bit more diverse in impact. For example, “connectedness in a network is complex and subject to many enablers and disablers for personal and conceptual engagement” (Mackness, Mak, & Williams, 2010, p. 272). However, the main issue for learners in early cMOOCs was a need to shift power away from the instructor and to themselves. Due to the open nature of MOOCs, learners have ro rely on themselves to stay intrinsically motivation towards completion rather than rely on extrinsic motivators such as grades, course calendars, and instructor intervention. Kop (2011) reinforced this idea by stating that while “in a traditional classroom/learning environment, the educator was responsible for providing information, organizing time, and structuring the learning activities and goals, in a networked environment the learner him or herself takes responsibility for this” (p. 21).

Kop and Fournier (2011) also found that learners in MOOCs that did not actively contribute to the course (often referred to as “lurkers”) still believed that they were learning even if they were not sharing (as is the case in older educational contexts). This is interesting in a connectivist learning context in that this shows that constructivism can still occur even when the course is designed to be connectivist. In their research, “54.5% of respondents to the lurkers survey indicated that they have always been self-directed learners and do not think they have to actively share and reply to discussion forums and blogs to learn” (Kop & Fournier, 2011, p. 12). This is also interesting in the light of research that has found that a fairly small numbers of learners that register for MOOCs actually end up participating. For example, Mackness, Mak, and Williams (2010) found that 84% of the CCK08 participants either dropped-out or became
lurkers. Wulf, Blohm, Leimeister, and Brenner (2014) place the dropout rate of the Artificial Intelligence xMOOC at 87%. Therefore, large amounts of self-regulated learning could possibly be happening outside of the control of either the instructor or the network.

This disconnect between what MOOC learners actually do and how courses are designed for typical students that complete the full course has also been noticed in other studies. Kizilcec, Piech, and Schneider (2013) performed a cluster analysis of learner types in MOOCs and noted that “the clusters reveal a plurality of trajectories through a course that are not currently acknowledged in the design and discourse around MOOCs” (p. 177). Their findings seem to indicate that many students will audit or sample a MOOC for the specific information they are interested in and not engage with the rest. Gillani and Eynon (2014) also characterized the interaction that does happen in MOOC forums as “inconsistent and non-cohesive” (p. 25). Hew and Cheung (2014) found that reasons for why students take MOOCs varied considerably from student to student. Agreeing with this, Kizilcec, Piech, and Schneider (2013) point out that course design should take into consideration these learners varying reasons and inconsistencies. But this raises the question: does the intent of a MOOC’s design cause any problems or issues for learners as it would in a traditional course? The literature appears to be largely silent on this matter.

Kop, Fournier, and Mak (2011) add to this call to pay attention to design by stating: “it is not enough to introduce some tools to create an effective working environment; one should also design for the building of connections, collaborations between resources and people” (p. 76). In other words, a course designer cannot simply put the tools together and tell learners to magically connect! Consideration must be made for how the course is designed, how connections will be made, how learners engage with the content and each other, how learners self-regulate their
progress through the class, and how learning occurs. Introducing tools would be closer to the
disciplinary power of instructivism: *use these tools and connect or else*. Building a course that
helps a learner create personal learning networks (Kop, Fournier, & Mak, 2011) would be closer
to helping a learner take power over oneself in a networked learning environment. However, the
question still remains: how do learners perceive issues of self-regulation related to MOOC
course design? Are they even aware of the need for self-regulation in MOOCs at all? Again, on
this question, the literature falls silent.

However, is this silence an issue? Is there really a large disconnect between design and
issues of self-regulation? Andersen and Ponti (2014) examined how different types of learners
need specific learning design in a MOOC about computer coding: “the less experienced need
tasks focusing on understanding and reading, whereas more experienced users want tasks with
more coding and parsing” (p. 246). In other words, the less experienced learners need more
instructivism and guidance, while the more experienced ones needed self-regulation, application,
and interaction. Andersen and Ponti also looked at examples of how the instructor designed the
lesson for less experienced learners who ultimately had to ignore that design and learn what they
wanted on their own. Andersen and Ponti also comment that they are not following Siemens
(2005) in connectivism – their goal was to use sociocultural theories of Vygotsky to create
situations where the learner creates content alongside the instructor instead of just in response to
an instructional design of connectivism. This design was realized by allowing learners to self-
select to take on the roles of facilitator, participant, or follower in the course. Learners that
became facilitators were allowed to contribute content to the course. This power shift is even
farther away from instructivism than connectivism goes, in that connectivism still relies on the
instructor designing a path that learners loosely follow. However, again, the literature is still
silent as to how learners perceive the relationship between self-regulated learning and MOOC instructional design. For example, if the instructor communicates that the course content and structure will be designed by the learner but then takes control and tells the learners what is and is not a good idea. Will that frustrate learners to the point that they leave the course to learn on their own?

One recent example of instructors communicating one power structure (student-centered) but then utilizing another (instructor-led) in the class is in the E-Learning and Digital Cultures MOOC (EDCMOOC). Ross, Sinclair, Knox, Bayne, and Macleod (2014) describe the EDCMOOC as a hybrid between xMOOCs and cMOOCs, mainly because it combines teacher-designed structure with self-regulated social elements. However, an examination of those social elements, in the words of the instructors themselves, reveals an instructivist approach. For example, the content itself was

   teacher-curated and -annotated selection of resources on weekly themes, including short films, open-access academic papers, media reports, and video resources…. were the foundation for weekly activities, including discussion in the Coursera forums, blogging, tweeting, an image competition, commenting on digital artifacts created by EDCMOOC teaching assistants, and two Google Hangouts (Ross, Sinclair, Knox, Bayne, & Macleod, 2014, pp. 62-63)

If the teacher was the one with ultimate power over the content, and this content was in control of the discussion that happened in the social sphere, this would still be an instructivist approach to learning. The instructors later confirm this by stating that EDCMOOC is “a product of the academic identities, in all their complexity and contradictions, of its teachers” (Ross, Sinclair, Knox, Bayne, & Macleod, 2014, p. 63).

   The question remains: does this power dynamic disconnect in the EDCMOOC cause problems for learners? One way to find out would be to examine learner responses to satisfaction surveys. According to Ross, Sinclair, Knox, Bayne, and Macleod (2014)
However, one of the biggest challenges in evaluating EDCMOOC for course development purposes was how extremely varied the feedback was. For every person who hated the peer assessment, someone else loved it. The same was true of the subject matter focus, the structure of the course, the social elements, and the roles the teachers played. (p. 63)

The instructors chalk this confusion up to their own teaching philosophies and design, an issue that has been discussed in other educational formats such as blended learning (Freeman & Tremblay, 2013). However, what if the confusion was caused by a disconnect between the power dynamic they communicated and the one they actually utilized when teaching? If there were learners that stated that they did not like the structure, the social elements, or the instructor’s roles, would not that seem to point to some kind of issue with power dynamics? This is where the literature falls silent again, and where the challenge for future learning design research begins.

*Customizable Modality MOOC Design*

One possible way to deal with issues that power dynamics create is to allow learners to choose which power dynamic they would like to utilize while moving through course content and activities. In 2014, Siemens brought together a team of instructors, researchers, and practitioners (including the researcher as lead instructional designer) to work on an experimental MOOC format that would combine an instructivist xMOOC modality with a connectivist cMOOC modality. The goal of this new design was to create two distinct, but parallel, modality pathways in the new course, allowing learners to customize the epistemological modality they engaged the course content and activities with as need throughout the duration of the course. The end result of this design was a course that allowed “MOOC participants to navigate the course pathways in a way that best suits their particular learning needs, by utilizing one modality, both modalities, or a custom combination of either modality at different timeframes in the course”
This format was initially labeled a “dual-layer” approach (Dawson, Joksimović, Kovanović, Gašević, & Siemens, 2015; Rosé et al., 2015) or a “multiple pathways” design (Crosslin & Dellinger, 2015). Due to the confusion over terms like layer and pathway, Crosslin, Dellinger, Joksimović, and Kovanović (in press) decided to utilize the term “customizable modality” to describe the course design, with pathway designating the various individualized choices the learners chose while moving through the content. For the purpose of this study, the design methodology is referred to as customizable modality pathways design.

The first course to utilize this customizable modality structure was Data, Analytics, and Learning (DALMOOC), offered through the EdX and ProSolo platforms in the fall of 2015. Over 23,330 people registered for the first DALMOOC offering, with an estimated 13,535 learners showing at least some form of activity in the course (Dawson, Joksimović, Kovanović, Gašević, & Siemens, 2015). Over 1,500 learners were active up to the last week; however, it is difficult to tell how many of those completed the entire course and how many took a “pick and choose” approach to the course content and activities.

While analysis is still needed on the results of the first offering of DALMOOC, a few studies have looked at various issues that arose in the design. Crosslin and Dellinger (2015), when examining the social media feedback quotes on DALMOOC, noted:

At first glance, these quotes might seem to indicate that the course structure was not well understood. However, a closer look could also reveal that each participant forged their own path through the course in different ways, thereby validating the dual-layer design as effective (at least, in some cases). (p. 253)

Rosé et al. (2015) noted that while the dual-layer model shows interesting results, the frustration and confusion expressed by learners indicates the need to improve the tools that help learners connect, make decisions, and find support while navigating the course structure. Dawson,
Joksimović, Kovanović, Gašević, and Siemens (2015) point out the idea of self-regulated learning has been neglected in the conversation about customizable modalities:

The proposed models have been positioned in terms of their flexibility, personalised learning and cost efficiencies. Missing from this discourse is the increased reliance on student self-regulated learning. If MOOCs and other open education resources are going to be prominent forces in the development of new models of education then there is an imperative to establish more effective technical and instructional scaffolds to support students in developing productive learning strategies. (p.10)

Therefore, the current challenge in research is to explore what choices learners with varying levels of experience in different modalities make when presented with customizable modality pathway learning design, as filtered through the concept of self-regulated learning.

Chapter Summary

This chapter has provided supporting evidence of the lack of research into how MOOC design affects self-regulated learning. Few research articles discussed learners’ perceptions of self-regulation in relation to MOOC design. Most articles that touched on self-regulation, engagement, and self-direction did so from the perspective of learner characteristics. This chapter further supported the need for this research study and its value to the body of knowledge in the field of education because it exposed a need to examine critical issues in MOOC design that could help inform design in traditional online courses. Investigating how learners perceive modality choices and self-regulated learning in a MOOC environment allows researchers to see what factors encourage self-regulated learning when grades or failure are not an extrinsic motivator, possibly exposing themes that can improve course design in traditional courses. Transferring these concepts to traditional courses could help instructional designers and instructors create courses that encourage self-regulated life-long learners.
Chapter Three provides a description of the methodology, the population, and the context for this study. Three research questions are described, along with the analyses that were utilized to investigate these questions. Additionally, all instruments, data collection methods, and processes of analysis will be detailed.
CHAPTER 3
METHODOLOGY

This chapter discusses the methodology for this study. It includes information on the appropriateness of the research design, the overall research design, the setting and participants, research questions, instrumentation, data collection procedure, data analysis procedure, ethical considerations, and a concluding summary. Details of all instruments, the study procedure, and process of interviewing will also be covered. The goal of this chapter is to provide a detailed account of all aspects of the study methodology.

Appropriateness of the Research Design

While there were many methodologies that could have been utilized in this design, certain aspects caused most designs to be deemed inappropriate due to contextual considerations. Because of the open nature of MOOCs, special research design considerations were needed for this study. Completion rates in MOOCs can sometimes dip to 20% or lower (Clow, 2013), thus making various forms of research that rely on pre and post collection data difficult. However, since many MOOC learners voluntarily enroll in the course, their experiences with the course should lend insight into design structures that encourage and support self-regulated learning. Three long existing goals of many traditional courses are to increase engagement (Ames, 1992), foster self-regulated learning (Zimmerman, 1990), and produce self-directed learners (Grow, 1991); therefore, insight into how that occurs when the learners are volunteers could lend valuable insight into the design process. Experimental and quasi-experimental designs could also grant some insight into these processes, but the global open nature of MOOCs makes the control of key factors very difficult. Many MOOCs also lack grades and other forms of empirical
assessment. Therefore, a mixed methods design that identifies and interviews participants that complete a validated self-regulated learning scale was chosen as a way to gain insight into the complex relationship between customizable modality pathways design and self-regulated learning.

Research Design

This study was based on the participant-selection variant of the explanatory sequential mixed methods design (Creswell & Clark, 2011). This variant is also sometimes referred to as the quantitative preliminary design (Creswell & Clark, 2011). The focus of study was on the insights gained from the second qualitative phase. The first quantitative phase was used to profile and select the participants that best fit the goal of the study.

The first phase of the study involved quantitative data collection used to profile specific MOOC participants. Since the purpose of the study utilized a self-regulated learning lens, the first stage involved surveying all participants that chose to join the study based on an instrument that measures self-regulated learning. Basic demographic data was also gathered and used to investigate factors that may also show a significant effect on self-regulated learning. If certain factors were found to have significant impact on self-regulated learning, they were have been noted for the selection process. For example, if the age of MOOC participants was found to have a significant correlation to self-regulated learning, participants for the second stage would have needed to be selected from a wide range of age groups in order to gain insight into the perceptions of learners from all levels of self-regulation.

The second phase involved online, text-based structured interviews designed to explore the qualities of learners’ pathway choices and perceptions of self-regulated learning related to the
customizable modality MOOC design. Participants indicated if they were willing to conduct a follow-up interview, and second interview questions were sent to those that consented. Interviews were conducted online through text-based survey software. A pre-determined set of questions were presented to all participants in the same order, with probing questions sent through course email, as determined by the interviewer when the responses were unclear or incomplete. These responses were then analyzed through etic coding to produce categories by qualitative analysis. Thematic analysis was then conducted to identify themes within the responses. These themes were then used to discuss the research questions. Additionally, one of the researcher’s committee members suggested utilizing the Coh-Metrix written language analysis tool for exploratory analysis to examine various aspects of the interviewee’s responses intentionally chosen by the interviewer. Four indices from Coh-Metrix were selected for language analysis, and the researcher decided to rank the interview responses based on two factors to gain a deeper understanding of the Coh-Metrix results.

Setting

The setting for this study was an online software environment and was utilized for both stages. The first, a quantitative stage, was administered through the Qualtrics online survey tool. The second, employing a qualitative approach, was also administered through the same tool; however, a completely separate survey form was created for the secondary stage. Due to the open, global nature of the course, many participants were not as comfortable with spoken English as they were with it written. Therefore, online written interviews were chosen over verbal interviews to alleviate concerns with language barriers (see Appendix C for interview
questions). Additionally, written text responses opened up the responses to exploratory language analysis through the Coh-Metrix tool.

The educational setting for this study was a MOOC offered in the winter of 2015: *Humanizing Online Instruction: The #HumanMOOC* (HumanMOOC). HumanMOOC was administered through the Instructure Canvas system in conjunction with faculty from various universities. This course design was based on the unique customizable modality pathways format that contains two complete modality options for learners: one modality containing instructor-led content, and another modality designed for connectivist interactions.

The instructor-led modality contained a complete set of instructor-designed content and activities that could be utilized as a specific pathway to complete the course: learning objectives, text content, video content, instructor-guided discussions, instructor-guided activities, and assessments in the form of badges.

![Figure 1: Screenshot of the Canvas. This figure provides as example of the linear Canvas content in HumanMOOC.](image-url)
This content was placed in a linear fashion inside of the Canvas learning management system, utilizing tools within it (see Figure 1). The goal was to showcase to learners an acceptable linear pathway through the course content. Figure 1 showcases not only the linear nature of the instructivist modality, but also the confusing maturity of the Canvas user interface. Users are faced with several layers of options on the left side of the screen, as well as a crowded middle section.

The connectivist modality contained a less structured collection of tools and suggestions for learners: Twitter hashtags, an activity bank (a list of activity “ideas” that could help self-guided learners gain ideas for completing badges if they needed scaffolding), and a connect area (a place that aggregated learner blogs to aid in discovery of other distributed participants). This modality was intentionally left open and non-linear to encourage learners to form their own groups, ideas, and content connections. The utilized tools were suggested as a starting point.

Figure 2: Activity bank screenshot. This figure provides an example of the HumanMOOC Activity Bank, with alternate activity ideas for various competencies.
Learners used the Twitter hashtag (#humanmooc) to connect with other learners, ask questions, share content ideas, and form activity ideas (see Figure 2). Some learners even added new activities (four participant-initiated and led Google Hangout sessions spontaneously occurred). The blog hub was meant to bring in blog posts connected to the course into one central hub (See Figure 3). The activity bank served as a place where learners could go to gain ideas for activities to complete on their own or to earn badges.

The key difference in a customizable modality pathway design is that learners are free to choose which modality to participate in at any given moment of the course. Learners are able to choose either pathway, both pathways, or a custom mix of each pathway as needed. This choice does not have to stay the same for the entire course – it can change at any moment. For example, a learner may decide that the content in week 1 is a review of content they already know. So this learner could choose to go to Twitter and connect with other advanced learners. This group
decides to look at a deeper application of the introductory topic that is more in line with their real-life contexts. As the week goes on, the learner realizes that there are some gaps in their knowledge of the content, so they decide to go back into the learning management system to see what the instructor is teaching about those gaps. After gaining the missing knowledge, the learner re-joins the spontaneous group to dig deeper into the topic.

Both modalities are anchored with a weekly start and end point. Typically, the starting point is some sort of open or neutral space/zone that lays out the modality choices for the week. The ending point is often a competency or set of competencies that focuses more on learners demonstrating the skill or knowledge they gained that week than on the method that they utilize to demonstrate their knowledge.

The key power dynamic in customizable modality pathway design is that the learner is always in control of what modality they choose. The instructor does not dictate at what times the learners are all watching a video, or when all learners are forming groups and interacting. Instead of a linear pathway that is dictated for all learners at the same time, the pathway through a customizable modality pathway course will resemble something like Figure 4 below.
Figure 4: Diagram of customizable modality pathways design. This diagram provides a visual description of the pathway choices that learners can make in the customizable modality pathway design.

In Figure 4, learners enter into a course module through an area called the Neutral Zone. This area simply presents a brief introduction to the module, the competencies for the module, and explanations of both modality options. The learner would then follow links to the modality that they prefer. In the connectivist modality, they would be encouraged to utilize tools that would help them connect with others as well as with the content they desire. For the instructivist modality, learners would find themselves on a linear path through the content that the instructor feels would best lead them towards competency completion. Instructors would also develop the competencies into more formal learning objectives in this pathway. At any point learners can decide that they need either more instructor-led content or more connection with other learners or content and switch over to the other modality (or add it to the one they are current participating in). Learners continue to follow, change, or mix either modality until they have completed the
module’s competencies. In open online courses, the competencies would only serve as certification points for those seeking official statements of course completion such as badges or certificates. In more traditional or formal courses, they would serve as evaluation points based on open-ended rubrics or portfolio assessments.

While this process may seem straightforward in theory, the reality of this design is that specific modalities through the course will not look so structured. Actual pathways as designed will look less linear and more like Figure 5.

*Figure 5: Modality possibilities. This figure illustrates a theoretical example of all modality possibilities in HumanMOOC.*

Figure 5 shows how the design of a customizable modality pathways course module will be less structured – the blue lines represent the instructivist pathway that can have many options and even circular design, while the red lines represent the chaotic nature of connectivism that
includes many official possibilities as well as unofficial possibilities (represented by the gray lines). This paradigm will allow learners to create their own personalized pathway through the module content and activities. For example, an actual learner’s pathway could end up looking something like Figure 6.

*Figure 6: Personalized pathway example 1. This figure demonstrates a theoretical example of a linear HumanMOOC personalized pathway.*

Figure 6 represents how a theoretical learner could begin a course module in the blue instructivist modality, switch over to the red connectivist modality, find content outside of the official channels in the gray area, and then bring it all back together for competency completion. However, it is possible that learner pathways may not even end up being linear. Learners may end up picking and choosing parts of the course, as demonstrated in Figure 7.
Figure 7: Personalized pathway example 2. This figure demonstrates a theoretical example of a learner picking and choosing parts of a customizable modality pathway design.

Figure 7 represents how a theoretical learner might choose different parts of the neutral zone, the blue instructivist modality, the red connectivist modality, and the gray areas outside of the official channels to complete the module competencies that they are interested in.

In order to help HumanMOOC learners understand the differences between the course modalities, a visual metaphor was applied to the two choices. The instructor-led modality was labeled the “Stream” in order to serve as a metaphor for the linear, guided nature of that pathway. The student-centered, connectivist modality was labeled the “Garden” in order to serve as a metaphor for the unstructured exploratory, self-guided nature of that modality. To help learners make sense of these choices and tools, a “visual” syllabus was created to present graphics of the choices. Figure 8 is one of the graphics that explained the modality choices (note the circular images at the top meant to visually represent “Garden” and “Stream.”)
Figure 8: HumanMOOC visual syllabus. This figure displays on of the graphics from the HumanMOOC visual syllabus explaining modality choices.

Figure 8 is also another method of visualizing the modality choices for the learner. The added benefit to this layout over Figure 4 is the actual tools are placed in the graphic, helping learners connect the modality choices with the actual tools that are available to them. Many of the arrows also represent how learners can make changes to their pathways as needed.
Additionally, the Neutral Zone was also made available, with the goal of explaining all modality choices for each week and provide links to the modality that learners chose at any moment. The Neutral Zone also contained links to some activities that could help learners that were new to connectivist learning to scaffold into the new paradigm. The Neutral Zone took the form of a simply designed website with minimal distraction and clear instructions (see Figure 9).

Welcome to Back to Humanizing Online Instruction (#HumanMOOC)

We are currently in Week 1 (December 14-20, 2015)

This website serves as the main communication hub for the course, a neutral zone where you will come each week for updates and pathway guidance.

This week, we will be looking at instructor presence. Establishing instructor presence is critical in an online class so that students do not feel isolated and alone. Imagine if an instructor didn’t show up to teach in a face-to-face class? What makes an instructor successful in an online classroom is no different than a face-to-face classroom. Your role as the lecturer or faculty is to help your students become more involved in the subject area and content, connect them with you (the professor), and other students.

If you are new to this website, be sure to read the course Syllabus to become familiar with the unique structure or this course and the basics of the content.

Week 1 Competencies

Competency 1: Introduces self to class in engaging, visual manner
Competency 2: Reflects on pros and cons of instructor video in class
Competency 3: Demonstrates usage of interactive educational tool to connect with learners

Now it is time to choose either the Garden and Stream (or both). Click on the images below to read what that pathway will look like for Week 1:

Figure 9: HumanMOOC neutral zone. This figure provides a screenshot of the content in the HumanMOOC Neutral Zone.

Figure 9 is an example of the simplified nature of the neutral zone. Learners were just presented with the information they needed and not a large number of confusing links (as compared to the Canvas screenshot in Figure 1).
For learners that desired to have formal certification, badges were offered as an official option. Each week had a final badge, with participants that earned all three weekly badges could earn a final course badge. This modular approach was taken because past HumanMOOC participants sometimes desired to just learn parts of the course over the entire course load. Due to technology constraints, learners in both the Stream and the Garden had to submit artifacts to earn any badge within the Canvas gradebook.

<table>
<thead>
<tr>
<th>Factor</th>
<th>One Modality</th>
<th>One Modality</th>
<th>Two Modalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modality</td>
<td>Instructor-led</td>
<td>Learner-focused</td>
<td>Instructor-led mixed with</td>
</tr>
<tr>
<td>Metaphor</td>
<td>Stream</td>
<td>Garden</td>
<td>learner-focused</td>
</tr>
<tr>
<td>Epistemology</td>
<td>Instructivism</td>
<td>Connectivism</td>
<td>None</td>
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<tr>
<td>Technology</td>
<td>Canvas (text, video,</td>
<td>Twitter</td>
<td>Connectivism</td>
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<tr>
<td>Utilized</td>
<td>discussion tools,</td>
<td>Blogs</td>
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<td>assignment tools)</td>
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Table 1 contains a summary of the various modalities. The factor column lists the various factors such as modality, metaphor, and technology applied in each modality, with the rest of the table examining how those factors were designed in the course.

Participants

Participants were recruited from the winter 2015 offering of HumanMOOC. This offering attracted 695 initial registrations, but an additional 176 registered after the course started to increase the total registration to 871. Of those numbers, 573 logged into the course at least once and 461 spent enough time in the course to register activity in the software activity analytics.
Eighteen students fully completed all course badges, but it is unknown how many more completed their own personal learning goals for the course.

The first stage involved emailing the quantitative survey link to all who registered. These learners self-selected whether or not they wished to become a participant in the study. Participants guided themselves through the instrument, and those that completed the survey were invited to participate in the second phase interview. The results from this first stage were used to identify correlations between SRL and key demographics, as well as to build interview participant profiles for the second stage.

The second stage involved contacting those individuals that completed the first stage survey. Those that agreed to be interviewed were then given instructions on how to access the interview questions online. Because of the open nature of MOOCs, several learners dropped out of the course by the time they were contacted for interviews, and therefore were not interested in being interviewed. The goal for the secondary interview stage was to recruit enough interviewees to reach a minimum cutoff number of participants established by the researchers that would allow saturation of coding to be reached.

**Sampling Strategy**

Since the research in this study drew partially on quantitative methods, the ideal sampling strategy would have been a probability sampling technique. This technique would increase external validity and allow the researcher to make statistical inferences from the results to the general population. However, the company that administers the course registration for HumanMOOC does not collect learner statistics, so obtaining demographic records was not possible. Therefore, this study utilized convenience sampling by collecting results from all participants that self-selected to participate in the first stage survey. The only constraint on this
sample was to verify through course access logs that the self-selected participants had accessed course content.

Due to these factors, the same sampling strategy was carried over into the qualitative stage. Interviewees were recruited through a convenience sample from those that completed the first stage SRL survey. Those that self-selected to participate in the interviews were accepted as part of the second stage sample.

Research Questions

This study investigated three primary research questions and six sub-questions. These questions were:

1. What are the attributes of the MOOC learners’ pathway choices through the course content and activities?

2. What are MOOC learners’ experiences in the customizable learning pathways? To what extent are their pathways related to the course designs? The sub-questions for the first research question are:

   • What are MOOC learners’ patterns in choosing the customizable learning pathways?
   
   • Are there any relationships between learner modality patterns and the course design? If so, why?
   
   • Are there relationships between learner modality patterns and the course activity design? If so, why?
3. Are there any relationships between learners’ self-regulation experiences and the course designs in the customizable modality course? The sub-questions for the second research question are:

- What are the MOOC learners’ experiences in terms of their self-regulation?
- What do learners see as the relationship between their pathway choice, the course content design and self-regulation?
- What do learners see as the relationship between their pathway choice, the course activity design and self-regulation?

**Instrumentation**

The first stage of this study utilized the *SRL in Massive Open Online Courses* survey instrument, as well as a demographics survey designed by the researcher. The demographic variables chosen for the survey included standard variables such as age, ethnicity, gender, and educational attainment. The *SRL in Massive Open Online Courses* survey was chosen because it combines elements of several self-regulated learning instruments to create one instrument focused on MOOC environments. Because MOOCs can possibly reach anyone in the world, but are semi-higher educational in nature, this instrument was deemed the best fit out of the available options. The second stage of the study utilized a structured interview procedure developed by the researcher.

*SRL in Massive Open Online Courses Survey*

The quantitative instrument for this study utilized the *SRL in Massive Open Online Courses* survey. This survey, developed by Milligan, Littlejohn, and Margaryan (2013), contains “items adapted from a number of existing self-report SRL instruments…to enable the researchers
to derive Self-Regulated Learning (SRL) profiles for each participant” (p. 4) in a MOOC environment. Survey questions in the SRL in Massive Open Online Courses survey were adopted from the work of Toering et al (2012) and Maclellan & Soden (2006), as well as the Metacognitive Awareness Inventory (MAI) (Schraw & Dennison, 1994), the Online SRL Questionnaire (OSLQ) (Barnard et al, 2009), the Self-Directed Learning (SDL) Orientation scale by Raemdonck (Gijbels et al, 2010), and the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al, 1991). Validity of this instrument was assumed by the creators to have been established by the individual studies that various questions were adopted from, including predictive validity established by comparing pre-test scores on the MAI (Schraw & Dennison, 1994); construct validity established by higher order, confirmatory factor analyses on the OSLQ (Barnard et al, 2009); pre-survey analysis of the Orientation scale (Gijbels et al, 2010); and continual “internal reliability coefficient computation, factor analyses, and correlations with academic performance and aptitude measures” (Pintrich et al, 1991, p. 803) of the MSLQ. In response to the usage of a self-directed learning scale as one of the sources, Milligan, Margaryan, and Littlejohn (2013) noted that “although SDL is conceptually distinct from SRL, Raemdonck’s SDL Scale was used because it is more closely related to adult learning than the extant SRL scales” (p. 6). This adaption of various instruments to work in the MOOC setting was determined to be a good fit for the goals of this study. The questions on the SRL in MOOCs survey ask a series of Likert questions required participants to rank various statements about their self-regulated learning experiences and practices in MOOCs on a scale of 0 to 3, with 0 representing “Never” and “3” representing “Always.” Some of the statements on the instrument included: "When learning in this MOOC, I try to relate the material to what I already know," "In this MOOC, I pull together information from different sources, such as presentations, readings, and
discussions," "I set goals that present me with a challenge or go beyond what I have already achieved," and "I ask myself how well I accomplished my goals once I’m finished learning."

Second Stage Interviews

An interview format was chosen for the second stage of the study to collect qualitative data to help answer the remaining research questions. This was because interviews are often one of the best techniques for gaining an understanding of learners’ perceptions and experiences (Blandford, 2013). The structured question format was chosen to allow the researcher to ask specific questions about the research question consistently across interviewees, while still being able to ask probing questions as needed after the interview for greater insight. The initial questions were based on the literature about the topics of MOOCs, instructional design, customizable modalities, and self-regulated learning:

1. Can you tell me about your overall experience in HumanMOOC?

2. At several points in the course, you were given a choice of the learning modality to participate in (instructor-led or student-centered). How would you describe your overall pathway through those choices over the duration of the course?

3. What was your rationale for using the pathway that you choose?

4. What was your rationale for not utilizing a different pathway?

5. Did the course content design factor into the pathway you choose? Why is that so?

6. Did the course activity design factor into the pathway you choose? Why is that so?

7. Considering the results of your Self-Regulated Learning (SRL) survey, how would you describe your experiences with SRL in this course?

8. How would you describe the relationship between your pathway choice, the course content design, and self-regulation?
9. How would you describe the relationship between your pathway choice, the course activity design, and self-regulation?

10. What else would you like to share that would be related to these questions?

Interviewees were asked to explain their experiences, perceptions, and views of the design of the MOOC as well as their pathway choices through the lens of self-regulated learning by describing specific examples of their experiences with course pathways, activities, and designs. Examples of the interview questions include "Can you tell me about your overall experience in HumanMOOC?," "At several points in the course, you were given a choice of the learning modality to participate in (instructor-led stream or student-centered garden). How would you describe your overall pathway through those choices over the duration of the course?," "What was your rationale for using the pathway(s) that you choose?," and "How would you describe the relationship between your pathway choice, the course activity design, and self-regulation?"

Procedure

The creators of the SRL in Massive Open Online Courses survey have released their survey through an open license that allows anyone to use the survey. Since this instrument requires participants to answer a series of Likert scale questions, an online delivery system was utilized to collect data. HumanMOOC participants that self-selected to participate were directed to a URL for the informed consent form to begin the survey. Upon granting consent, participants were then directed through the demographic survey and the SRL in Massive Open Online Courses survey. Personally identifiable information was collected in this survey, but not used in the analysis. Participants that elected to participate in the interviews were given a non-gender
specific pseudonym to use when filling out the secondary interview form. Only the researcher has access to the instruments, forms, and the raw data from each instrument.

Interview participants were sent a URL linked to the second interview form and reminded of the informed consent form they completed. They were also told they were free to not continue if they desired to stop the interview. Since MOOCs can reach a global audience, many participants did not feel comfortable with spoken English; therefore, interview questions were presented via an online form that contains the interview questions in the pre-determined order.

Study data and consent forms from the first stage are being kept on a secure server on the researcher’s university computers. Interview responses and follow-up question responses are also kept on a secure server on the researcher’s university computers. All data will be removed and destroyed after three years. Participants and interviewees were not compensated for their participation. Participants potentially benefited from the study by learning about their own levels of self-regulation in learning and by reflecting on their course experiences and levels of self-regulation in learning if they choose to participate in the interview.

Data Collection Procedure

All instruments for both stage were administered online. The Qualtrics online survey software system was used to collect and store the data. The quantitative data was downloaded in comma-separated values (.csv) format, while the qualitative data was copied and pasted from the results into documents for coding. The quantitative dataset was verified for completion and course attendance and then loaded into SPSS for analysis. The qualitative dataset was separated by sentence and loaded into Microsoft Excel for etic coding.

Data Analysis Procedure
The main analysis for the quantitative instrument involved adding up the scores to see which participants scored highest and lowest. The SRL in Massive Open Online Courses scale is designed to grant a score. Therefore, this score was helpful in determining where participants fall on the self-regulated learning spectrum. However, further analysis into the data could have also yielded additional insights into the relationship between demographic factors and self-regulated learning in MOOCs. Descriptive statistics were first analyzed to determine if demographic variables reveal any correlating trends. Then, one-way ANOVA was conducted to compare various demographic variables to the results of the self-regulated learning scale. The goal of this analysis was to possibly guide selection of interviewees for part two. For example, if the analysis had found that as age increases, so does self-regulated learning, then the selection process would have needed to include a range of ages. However, if age was not found to correlate with self-regulated learning, then this demographic factor would not need to be considered a factor in the selection of interviewees. If the ANOVA revealed any unusual results, further statistical investigation would have been conducted using more advanced research methods.

For the qualitative part of the study, content analysis was utilized to investigate themes in the interviewees’ responses. Content analysis is a controlled analysis of text within the context they are communicated in with the goal of preserving the advantages of quantitative content analysis from communication science (Mayring, 2000). Since theory and knowledge of the relationship between instructional design and self-regulated learning in MOOCs is very limited, classical (or conventional) content analysis was conducted with the goal of inductive category development (Mayring, 2000; Hsieh & Shannon, 2005). Content analysis utilized etic coding in order to identify categories and themes that were then used to answer the research questions. Etic coding was selected due to the desire to take existing frameworks identified in Chapter two and
apply them to the new setting of a customizable modality pathway course. According to Lett (1990), “Etic constructs are accounts, descriptions, and analyses expressed in terms of the conceptual schemes and categories regarded as meaningful and appropriate by the community of scientific observers” (p. 130).

An additional layer of exploratory analysis was proposed during the topic proposal defense. This suggestion involved using the Coh-Metrix language analysis tool. Coh-Metrix “analyzes texts on over 200 measures of cohesion, language, and readability…[using] lexicons, part-of-speech classifiers, syntactic parsers, templates, corpora, latent semantic analysis, and other components that are widely used in computational linguistics” (Graesser, McNamara, Louwerse, & Cai, 2004, p. 193). While Coh-Metrix is primarily a readability tool, it can also be utilized in a wide range of written and oral language analysis (McNamara, Graesser, McCarthy, & Cai, 2014). Most of the indices rank concepts that would not apply to this study, but four were identified that could have had possible implications for the interview responses:

- **Type-token ratio**: LDTTRc (index 48): “Type-token ratio (TTR) is the number of unique words (called types) divided by the number of tokens of these words. Each unique word in a text is considered a word type. Each instance of a particular word is a token. For example, if the word dog appears in the text seven times, its type value is 1, whereas its token value is 7. When the type-token ratio approaches 1, each word occurs only once in the text; comprehension should be comparatively difficult because many unique words need to be decoded and integrated with the discourse context. As the type-token ratio decreases, words are repeated many times in the text, which should increase the ease and speed of text processing. Type-token ratios are
These four concepts were the ones deemed most likely to yield insights into the language that interviewees used to respond to questions. Type-token ration gives a sense of difficulty of the
comprehension of the words that interviewees utilize, possibly giving insight into how well they comprehended the course design. Concreteness might give a sense of how different learners prefer abstract or concrete words to describe their experiences. Imagability could give insight into how learners are able to construct mental images of their experiences. Meaningfulness could give insight into how interviewees utilize words to describe their choices and experiences.

**Exploratory Analysis**

However, the researcher was concerned that these four indices might not show significant correlation to just one factor (SRL score). Therefore, the decision was made to create two more factors for the purpose of exploratory analysis. Each interviewee’s self-selected pathway through the course was analyzed based on their own words as well as the overall sense gleaned from their responses. Using the researcher’s expertise, this analysis was then ranked on two continuums: one that rates each participant’s placement on a line that theoretically stretches between an instructor-centered framework and a student-centered framework, and the other that rates each participant’s placement on a line that theoretically stretches between those that choose one modality for the entire class and those that utilized two modalities throughout the entire course. For these two continuums, “instructor-centered” and “single pathway for entire course” were designated as “1.00”, while “student-centered” and “both pathways for entire course” were designated as “2.00.” Participants were then given approximate ratings between 1.00 and 2.00 on those two continuums (“Instructor-Centered/Student-Centered” and “One-Modality/Two-Modality”).

The goal of the “Instructor-Centered/Student-Centered” continuum was to examine differences in how interviewees expressed a desire for varying levels of the power dynamics represented by the two modalities in the course design. For example, an interviewee that spoke
of only participating in the instructivist Stream modality for the entire course would rate 1.00 on
the “Instructor-Centered/Student-Centered” continuum. On the other hand, an interviewee that
spoke of only participating in the connectivist Garden modality would rate 2.00 on the
“Instructor-Centered/Student-Centered” continuum. Interviewees that expressed a mixture of
Stream and Garden would be rated somewhere in the middle. Theoretically, an interviewee that
stayed mostly in the instructivist Stream but spoke of participating in a couple of Twitter
conversation in the connectivist garden might be rated 1.20, depending on how much importance
the interviewee placed on those conversations.

The goal of the “One-Modality/Two-Modality” continuum was to examine differences in
how interviewees described the complexity of their personalized pathway choices. For example,
an interviewee that spoke of only participating in the instructivist Stream modality for the entire
course would rate 1.00 on the “One-Modality/Two-Modality” continuum. However, an
interviewee that spoke of only participating in the connectivist Garden modality would also rate
1.00 on the “One-Modality/Two-Modality” continuum. In order to score 2.00 on the “One-
Modality/Two-Modality” continuum, interviewees would need to express participating in both
the instructivist Stream and connectivist Garden for the entire duration of the course. In other
words, this continuum does not rate power dynamics between instructivism and connectivism,
but complexity of interviewee modality choices. Interviewees that expressed a mixture of
modalities that fell in between just one for the entire course and both for the entire course would
be rated somewhere in the middle. For example, an interviewee that preferred to interact mostly
on blogs in the connectivist Garden but spoke of going into the Canvas LMS each week to read
all of the Stream content would might be rated 1.70.
These ratings are, of course, very subjective and not intended to be generalized to any population. They were designed to explore new paradigms created by customizable modality pathway design. Ideally, technology access logs, data analytics, and learner surveys would also be utilized to more fully explore these concepts. However, those tools were not available at the time of this study. Therefore, exploratory analysis was conducted to determine if some interesting factor might be discovered. If exploratory analysis uncovers any interesting trends in these continuums, future research could be designed to create validated scales, surveys, and taxonomies.

Ethical Considerations

IRB approval was obtained before participants were initially contacted. The main ethical issues that were taken into consideration with this study were informed consent, confidentiality of the information, and anonymity of the participants. Informed consent was obtained by an explanation section in the recruitment email and the initial survey. Confidentiality for the participants that only complete the first stage survey was preserved in that no names or personally identifiable information was accessed until potential interviewees were identified. For those that are selected to be interviewed, ensuring confidentiality and anonymity was more difficult. Those that choose to be interviewed were assigned a pseudonym by the researcher before the interview. All interview responses were assigned to this pseudonym, and any references or quotes in the discussion were attributed to this same pseudonym. Any quotations that use personally identifiable information such as job titles were not used. Storage of the study data was treated with the strictest of confidence. All data, recordings, or transcripts that are
stored were stored on a secure device with password protection. The researcher and major professor are the only ones with access to these files. Paper records were not kept.

Subjectivity Statement

An important aspect to be explored in this study is the beliefs, assumptions, preconceptions and personal positions of the researcher. The researcher has served as the primary developer for the customizable modality pathway design concept since it was first conceptualized for DALMOOC. The researcher created this design methodology with the belief that all learners have unique learning needs, therefore their learning experience should be personalized for their individual goals and preferences. This belief led to the researcher to take a neutral position on the superiority of one learning paradigm or epistemology over the other. The researcher tends to prefer connectivist, heutagogical learning situations, but now recognizes that other learners may prefer other epistemologies and power dynamics. The researcher also assumes that the customizable modality pathway design is an effective method for allowing learners to personalize their learning experience, but is open to the idea that research may prove the design ineffective. No monetary rewards or incentives (related to grants or employment) are tied into the success or failure of this design model. The researcher simply desires to see a system created that allows maximum personalization for the largest number of learners, even those that typically fall outside the standardized norm that quantitative research focuses on. Ultimately, the researcher would rather know the truth about the issues being studied here, and a conscious decision was made to accept all results regardless of whether they supported the researcher’s previous work or not. Additionally, multiple drafts of this paper were submitted to
the researcher’s committee for scrutiny and revisions. All concerns raised by committee members led to revisions in the methods, results, and analysis.

Proceeding work on this project, the researcher worked for several years as an instructional designer in a public University setting. This extensive background in one sector of the educational field is an important sociocultural implication for readers to take into consideration when considering this study. The design and analysis will reflect a major bias towards those fields. The researcher feels that all sectors of the educational world are important, and presents these results with the hope that readers can filter and adapt them into the sociocultural context that they desire to utilize them in.

A final note of the influence of past research is also in order. The researcher also designed and conducted a similar study on customizable modality pathway design on the Fall 2014 offering of DALMOOC. That study ran into extensive difficulties in recruiting participants for face-to-face online interviews. Only two participants volunteered for those interviews. Many other potential participants asked for an online form to complete in lieu of a face-to-face options. These potential participants felt that either lack of spoken English skills or unfamiliarity with the researcher (probably fueled by the open nature of MOOCs) were major barriers to volunteering for a face-to-face interview. Once the online option was released, dozens of participants came forward to complete the interview. Due to these difficulties and the time constraints of HumanMOOC (it only lasted four weeks compared to the nine weeks for DALMOOC), the researcher opted to have written interview responses as an option, even while knowing that most participants would probably chose that option. While written responses can sometimes be less robust that face-to-face interviews, and follow-up questions more time consuming, the ability to collect a greater number of responses was determined to be more important at this stage of the
development of the customizable modality pathway design model. This is a personal bias of the researcher at the time of the study that should be taken into consideration by readers. Future studies by the researcher will take this bias into consideration by searching for ways to encourage more face-to-face interviewees.

Internal and External Validity

Validity issues for the qualitative portion of the study were addressed through the lens of the four categories of trustworthiness for evaluating the worth of qualitative research as proposed by Lincoln and Guba (1985): credibility, transferability, dependability, and confirmability. The credibility of this study was established through several avenues:

- The first avenue was prolonged engagement – the researcher has been a part of the MOOC community since the beginning, interacting with and spending sufficient time to understand the culture of MOOC learners. Additionally, the researcher was part of the team that offered DALMOOC. Issues related to this involvement are addressed in the subjectivity statement.

- This prolonged engagement is also connected to triangulation as well as the second avenue for credibility: persistent observation. The researcher has also been persistent in staying connected with MOOC culture in order to study the phenomenon of self-regulated learning in MOOCs.

- Another avenue for establishing credibility is triangulation. Denzin (1978) and Patton (1999) have identified four triangulation types that are also present in this study: 1) methods triangulation occurs due to the mixed methods design of the study; 2) triangulation of sources occurred due to interviewing people with different modality
patterns in MOOCs; 3) analyst triangulation occurred when the researcher has other analysts examine the data; and 4) theory triangulation will occur when examining the data from both a connectivist and instructivist viewpoints.

- The researcher conducted peer debriefing with a disinterested peer. A university professor from a different discipline than the researcher reviewed the results in Chapter 4 and asked a series of informal questions intended to dig into the research process from a different viewpoint.

- Negative case analysis was performed to identify data that does not support the emerging themes. Codes were placed in a spreadsheet and matched up with categories. Categories were placed in another spreadsheet and matched up with themes. Codes and categories that were not matched up in these spreadsheets were identified as non-supportive data. Chapter 4 contains discussion of the non-supportive data.

Transferability of this study is established through the thick description in this report. The goal of the extensive descriptions of the subjects, settings, circumstances, and procedures is to empower those that wish to implement the findings in their own local settings. These descriptions should be adequate to help future researchers evaluate how to generalize these findings to their specific context.

Dependability was established by external (or inquiry) audit. The process and product of the study was reviewed by the researcher’s major professor. The purpose of this external audit was to evaluate the accuracy of the study. It also allowed her to determine whether or not the data and coding supported the interpretations and conclusions.

Confirmability was also established by the external audit by the researcher’s major professor and dissertation committee in order to identify any issues that affect the quality of the
study. Issues raised by the major professor and committee members were all addressed before final submission. Additionally, this paper serves as an audit trail since it contains a transparent record of every step of study. The previously discussed triangulation also serves as a means for confirmability. Reflexivity was also included in this paper as the researcher reflected (during and after the study) on how his beliefs, assumptions, preconceptions, and personal positions may have had an effect on the research process.

Conclusion

This study was designed to explore MOOC learners’ personalize pathway choices in relation to the customizable modality pathways learning design as viewed through a self-regulated learning construct. The research was conducted using one quantitative instrument, a demographic survey, and follow-up structured interviews. Participants were recruited from one MOOC. Quantitative data was analyzed for basic scores on the instrument, as well as one-way ANOVA for correlations between scores and demographic values. Content analysis was conducted on the qualitative interview data to identify categories and themes. Additionally, various aspects of the interviewee responses were rated on two continuums by the researcher, and these rankings were compared to the results of written language analysis in an exploratory analysis designed to identify additional aspects of the interviewees.

Chapter Four will address the data collected and results of the statistical and content analysis. The discussion of the data includes results of the quantitative and qualitative data analysis, and will address the research questions investigated by the researcher.
CHAPTER 4

RESULTS

Chapter four explores the results of data analysis and interviews for each research question. The chapter begins with a general description of the study participants, including age, gender, ethnic categories, educational attainment, and employment categories. Results of the SRL in Massive Open Online Courses survey are explained in the next section. These factors and results from the interviews are then explored to develop profiles of the individuals that participated in the interview process. Next, the chapter turns to the results of the content analysis, listing categories and themes that arose from the etic coding process. Finally, the research questions are examined in light of the learner profiles and results of the identified themes.

Participant Demographics

Determining participant numbers for MOOCs can be difficult. For HumanMOOC, course enrollment numbers started at 695 the day before class began and swelled to 871 by the end of the class. However, of that 871, only 573 actually logged into the Canvas learning management system. However, logging in was not necessarily an indication of participation in the course. Of the 573 that logged into the course, 461 logged enough activity to be recorded by the Canvas system. Additionally, only 320 spent more than 24 minutes accessing materials in Canvas across the entirety of the course. Furthermore, the access data indicates that there is a gap in the data—the times jump from 23 minutes and 16 seconds to 1 hour and 4 seconds. At first glance, this might seem a natural indication of a break in the participation levels. However, a few survey completers logged less than 24 minutes in Canvas, but still indicated completion of the course. Additionally, it should be noted that participants could have theoretically participated in the
HumanMOOC course without entering the Canvas system (although those that did not log into Canvas were excluded from the survey results). Much of the syllabus was offered on an independent website, and learners were encouraged to go outside of Canvas if they desired. However, these aspects would not have been know if learners did not spend time in the introductory “Week 0” module in Canvas. These limitations are noted for this study, due to the limitations of tracking users across blogs and social media. Future advances in technology will hopefully increase the ability to follow pathways more accurately. Because of this fact, the potential participant pool is limited to 461 participants to include most of the people that completed the survey and interviews.

Of the available population (N=461), 98 started and 70 completed the SRL in Massive Open Online Courses survey. Of those 70, two (2) responses used names that could not be found in the class rolls, and one was found to be from a participant that logged into the course but did not spend time with any of the materials and so these three were discarded. Of those 67, seventeen (17) participated in the qualitative interview stage. Most of the interviewees participated more than an hour total in the Canvas portion of the course, with one only clocking in eight minutes of activity, while still indicating completing personal learning goals. This aspect is noted only as a description of the study population, as completion of course or personal learning goals is outside of the scope of this study.

Special note should also be taken regarding those learners that officially finished the course. Not all participants enrolled in the course in order to complete official certification, which in the case of HumanMOOC was a series of badges. These badges technically only served as a simple reward for course completion for those learners that so desired such an intrinsic motivational technique. No extrinsic reward or certification was tied to badge completion,
therefore learners were left to assign value or not to the badges themselves. For example, one participant indicated that “I didn't approach the course wanting to ‘finish’ or get a badge, but rather as a great space to talk about some of the things I am interested in with the invisible or background guidance of the more formal course.” However, 28 learners earned at least one official badge, with a total of eighteen (18) earning the final completion badge that indicated they had earned all four badges.

Since the Canvas learning management system does not provide demographics for courses, certain demographics information was collected as part of the study. Table 2 is a summary of all demographics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>Education Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>41</td>
<td>71.2</td>
<td>High School or Equivalent</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Male</td>
<td>19</td>
<td>28.8</td>
<td>Four-year College Graduate</td>
<td>8</td>
<td>12.1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>Master's Degree</td>
<td>41</td>
<td>62.1</td>
</tr>
<tr>
<td>26-34</td>
<td>13</td>
<td>19.7</td>
<td>Doctoral Degree</td>
<td>12</td>
<td>18.2</td>
</tr>
<tr>
<td>35-54</td>
<td>38</td>
<td>57.6</td>
<td>Professional Degree (MD, JD, etc.)</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>55-64</td>
<td>11</td>
<td>16.7</td>
<td>Other (DC Degree)</td>
<td>1</td>
<td>1.15</td>
</tr>
<tr>
<td>65-older</td>
<td>4</td>
<td>6.1</td>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td>United States of America</td>
<td>46</td>
<td>69.7</td>
</tr>
<tr>
<td>Caucasian</td>
<td>52</td>
<td>78.8</td>
<td>Europe</td>
<td>9</td>
<td>13.6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>10.6</td>
<td>Oceania (Australia, New Zealand, etc.)</td>
<td>6</td>
<td>9.1</td>
</tr>
<tr>
<td>African American</td>
<td>3</td>
<td>4.5</td>
<td>Africa</td>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2</td>
<td>3.0</td>
<td>South America</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
<td>3.0</td>
<td>Canada</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Primary Language</td>
<td></td>
<td></td>
<td>Asia</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>English</td>
<td>55</td>
<td>84.6</td>
<td>College, University, Adult Education</td>
<td>45</td>
<td>68.2</td>
</tr>
<tr>
<td>Spanish</td>
<td>2</td>
<td>3.1</td>
<td>Primary/Secondary (K-12) Education</td>
<td>4</td>
<td>6.1</td>
</tr>
<tr>
<td>Russian</td>
<td>2</td>
<td>3.1</td>
<td>Consultant</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>German</td>
<td>1</td>
<td>1.5</td>
<td>Health Care and Social Assistance</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>Dutch</td>
<td>1</td>
<td>1.5</td>
<td>Self-employed/Partner</td>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>Greek</td>
<td>1</td>
<td>1.5</td>
<td>Trained Professional</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Turkish</td>
<td>1</td>
<td>1.5</td>
<td>Publishing</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Finnish</td>
<td>1</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In Table 2, The majority of the participants were female ($n = 47, 71.2\%$), while males made up $n = nineteen (19), 28.8\%$. Education level was also heavily weighted toward graduate degrees, with master's degree ($n = 41, 62.1\%$) being the most likely degree. Other educational levels were doctoral degree ($n = twelve (12), 18.2\%$), four-year college graduate ($n = eight (8), 12.1\%$), and professional degree (MD, JD, etc.) ($n = three (3), 4.5\%$), with high school or equivalent and other both accounting for 1.5% ($n = one (1)$). One participant chose “other” for education level – upon further investigation, this participant had completed a doctor of chiropractic degree that she did not feel fit into the typical doctoral degree category. The participants were overwhelmingly Caucasian ($n = 52, 78.8\%$). Other ($n = seven (7), 10.6\%$), Hispanic ($n = two (2), 3.0\%$), Asian ($n = two (2), 3.0\%$), and African American ($n = three (3), 4.5\%$) rounded out the other ethnicities.

Data Analysis Scores

The statistical analysis for this study included descriptive data about the SRL in Massive Open Online Courses survey scores, reliability calculations, and correlations. This section describes the descriptive data for the results, as well as reliability calculations on the final score. Additionally, correlations between the SRL scores and demographic factors are examined.
Scores on the *SRL in Massive Open Online Courses* survey can potentially range between 32 and 128. The range for this study was 73 to 122, therefore the data is skewed towards the higher end of the self-regulated learning spectrum for this instrument. Most of the participants have graduate or professional degrees, so this factor probably accounts for the skew in the results. However, none of the studies that have used this survey so far (Milligan & Littlejohn, 2014; Milligan, Littlejohn, & Margaryan, 2013) have used the results in a quantitative analysis manner; thus, comparison to other studies in regards to quantitative findings is currently lacking. However, two recent studies by Hood, Littlejohn, & Milligan, 2015 and Littlejohn, Hood, Milligan, & Mustain, 2016 took place where the researchers created modified versions of the survey by adding questions in order to perform quantitative analysis on the survey results. This modified version of the survey was not available at the time this study was under IRB review. The *SRL in Massive Open Online Courses* survey is typically utilized as a method to develop qualitative learner profiles, as is also the case in this study. However, the results of this analysis can provide some context for the interview analysis as well as the Coh-Metrix evaluation later and are included here. The descriptive statistics for the survey results are displayed in Table 3.

ANOVA correlations were used to compare total SRL scores with four demographic factors (age, education, gender, and ethnicity). No significant correlations were found between any demographic grouping and the SRL scores (see Table 4).

### Table 3

**Descriptive Statistics**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid 67</td>
</tr>
<tr>
<td></td>
<td>Missing 0</td>
</tr>
<tr>
<td>Mean</td>
<td>97.55</td>
</tr>
<tr>
<td>Median</td>
<td>98.00</td>
</tr>
<tr>
<td>Mode</td>
<td>89</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>11.246</td>
</tr>
<tr>
<td>Sum</td>
<td>6536</td>
</tr>
</tbody>
</table>
Table 4

<table>
<thead>
<tr>
<th>ANOVA Correlations between SRL and Demographic Factors</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How old are you?</td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.118</td>
</tr>
<tr>
<td>Within Groups</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Please indicate the highest level of education completed.</td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.155</td>
</tr>
<tr>
<td>Within Groups</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>What is your gender?</td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.165</td>
</tr>
<tr>
<td>Within Groups</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>What is your race?</td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.251</td>
</tr>
<tr>
<td>Within Groups</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

This indicates that there is no significant correlation between self-regulated learning and any specific demographic group. If there had been a correlation, this correlation would have to have been considered when selecting participants for the secondary interview stage. However, since no correlation was indicated after analysis, all participants were contacted for the secondary interview stage.

**Reliability**

Reliability for the *SRL in Massive Open Online Courses* survey was calculated using data from this study. Cronbach’s alpha for the 32-item survey ($\alpha = .90$) indicated that this instrument has high reliability. This reliability score aligns with other recent studies that utilized modified versions of the same survey, which ranged from .72 –.945 (Hood, Littlejohn, & Milligan, 2015; Littlejohn, Hood, Milligan, & Mustain, 2016).

Interviewee Analysis
In order to gain further insights into the language utilized by interview participants, their responses were analyzed utilizing the Coh-Metrix online tool and compared to their SRL scores as well as to their rankings on the two continua as determined by the researcher. For the 17 interview participants, the range of SRL scores was 86-113. The average score was 95.7, the median score was 93, and the mode was 87. These numbers were somewhat lower than the overall first stage survey results. This range was also narrower than the first stage survey sample, while also still skewing towards the higher end of the possible range.

Most of the indices for Coh-Metrix are designed for readability measures, but four indices in particular were selected for an exploratory analysis on the language that participants used to describe their experiences in HumanMOOC (Table 5). Those four indices were Type-token ratio (LDTTRc, index 48), Concreteness (WRDCNCc, index 99), Imagability (WRDIMGc, index 100), and Meaningfulness (WRDMEAc, index 101).

<table>
<thead>
<tr>
<th>Person</th>
<th>SRL</th>
<th>Type-Token Ratio</th>
<th>Concreteness</th>
<th>Imagability</th>
<th>Meaningfulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carter</td>
<td>86</td>
<td>0.396</td>
<td>295.108</td>
<td>333.658</td>
<td>412.452</td>
</tr>
<tr>
<td>Jordan</td>
<td>87</td>
<td>0.705</td>
<td>327.256</td>
<td>359.8</td>
<td>393.629</td>
</tr>
<tr>
<td>Casey</td>
<td>87</td>
<td>0.613</td>
<td>339.163</td>
<td>372.781</td>
<td>406.345</td>
</tr>
<tr>
<td>Hayden</td>
<td>88</td>
<td>0.855</td>
<td>306.697</td>
<td>349.6</td>
<td>413.037</td>
</tr>
<tr>
<td>Jessie</td>
<td>89</td>
<td>0.753</td>
<td>331.317</td>
<td>367.533</td>
<td>433.12</td>
</tr>
<tr>
<td>Alex</td>
<td>89</td>
<td>0.714</td>
<td>345.99</td>
<td>384.056</td>
<td>427.037</td>
</tr>
<tr>
<td>Avery</td>
<td>92</td>
<td>0.576</td>
<td>324.521</td>
<td>355.386</td>
<td>400.569</td>
</tr>
<tr>
<td>Reagan</td>
<td>92</td>
<td>0.697</td>
<td>313.133</td>
<td>344.745</td>
<td>391.05</td>
</tr>
<tr>
<td>Cameron</td>
<td>93</td>
<td>0.699</td>
<td>342.975</td>
<td>375.876</td>
<td>419.329</td>
</tr>
<tr>
<td>Reese</td>
<td>98</td>
<td>0.784</td>
<td>324.603</td>
<td>355.522</td>
<td>404.925</td>
</tr>
<tr>
<td>Taylor</td>
<td>99</td>
<td>0.745</td>
<td>345.257</td>
<td>379.098</td>
<td>412.46</td>
</tr>
<tr>
<td>Landry</td>
<td>99</td>
<td>0.726</td>
<td>333.993</td>
<td>364.547</td>
<td>408.783</td>
</tr>
<tr>
<td>Blake</td>
<td>100</td>
<td>0.787</td>
<td>328.492</td>
<td>350.91</td>
<td>405.349</td>
</tr>
<tr>
<td>Emery</td>
<td>101</td>
<td>0.678</td>
<td>342.114</td>
<td>373.693</td>
<td>431.388</td>
</tr>
<tr>
<td>Parker</td>
<td>105</td>
<td>0.597</td>
<td>324.036</td>
<td>358.246</td>
<td>403.285</td>
</tr>
<tr>
<td>Charlie</td>
<td>109</td>
<td>0.674</td>
<td>335.932</td>
<td>358.088</td>
<td>417.728</td>
</tr>
<tr>
<td>Jamie</td>
<td>113</td>
<td>0.636</td>
<td>342.461</td>
<td>372.883</td>
<td>415.069</td>
</tr>
</tbody>
</table>
In Table 5, the interview participants are listed in the order of their scores from the *SRL in Massive Open Online Courses* survey instrument, from lowest to highest. The final four columns list the results of four factors chosen from the Coh-Metrix evaluation of the interview responses (McNamara, Louwerse, Cai, & Graesser, 2005). *Type-Token Ratio* looks at the number of unique words in a text selection, with a higher number of unique words indicating a higher level of difficulty in that selection (because of the higher number of unique words written). *Concreteness* is a measure of the level of abstractness or concreteness of the words in a text selection. For example, “protocol” is considered a more abstract word that would rank lower at 264, while “ball” is considered a more concrete word that would rank higher at 615. *Imagability* is an index of words based on how easy someone can create a mental image of that word. For example, “reason” is a word that is hard to create a mental image of, and would be ranked lower at 285. “Hammer” is a word that is easier to create a mental picture of and would rank higher at 618. Finally, *Meaningfulness* is a ranking of how words in a text selection associate with the other words. For example, the word “people” associates with many other words and therefore scores higher at 612. A word like “abbess” does not associate as much with other words, and scores lower at 218.

Based on their responses, interviewees were rated by the researcher on the “Instructor-Centered/Student-Centered” continuum and the “One-Modality/Two-Modality” continuum. As a reminder, the “Instructor-Centered/Student-Centered” continuum is a rating of how participants preferred instructor-centered instructivism or student-centered connectivism on a scale from 1.00 to 2.00. The “One-Modality/Two-Modality” continuum is a rating of learner preference of participating in strictly one modality or both modalities on a scale from 1.00 to 2.00. Table 6
contains the results of these rankings as well as each participant’s SRL scores, organized from lowest SRL score to highest.

Table 6

<table>
<thead>
<tr>
<th>Person</th>
<th>SRL Score</th>
<th>Instructor-Centered/Student-Centered</th>
<th>One-Modality/Two-Modality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carter</td>
<td>86</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Jordan</td>
<td>87</td>
<td>1.10</td>
<td>1.10</td>
</tr>
<tr>
<td>Casey</td>
<td>87</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Hayden</td>
<td>88</td>
<td>1.10</td>
<td>1.10</td>
</tr>
<tr>
<td>Jessie</td>
<td>89</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Alex</td>
<td>89</td>
<td>1.80</td>
<td>1.50</td>
</tr>
<tr>
<td>Avery</td>
<td>92</td>
<td>1.80</td>
<td>1.90</td>
</tr>
<tr>
<td>Reagan</td>
<td>92</td>
<td>1.05</td>
<td>1.05</td>
</tr>
<tr>
<td>Cameron</td>
<td>93</td>
<td>1.90</td>
<td>1.70</td>
</tr>
<tr>
<td>Reese</td>
<td>98</td>
<td>1.80</td>
<td>1.15</td>
</tr>
<tr>
<td>Taylor</td>
<td>99</td>
<td>2.00</td>
<td>1.40</td>
</tr>
<tr>
<td>Landry</td>
<td>99</td>
<td>1.90</td>
<td>1.30</td>
</tr>
<tr>
<td>Blake</td>
<td>100</td>
<td>1.05</td>
<td>1.00</td>
</tr>
<tr>
<td>Emery</td>
<td>101</td>
<td>1.05</td>
<td>1.10</td>
</tr>
<tr>
<td>Parker</td>
<td>105</td>
<td>1.15</td>
<td>1.20</td>
</tr>
<tr>
<td>Charlie</td>
<td>109</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Jamie</td>
<td>113</td>
<td>2.00</td>
<td>1.35</td>
</tr>
</tbody>
</table>

Comparing the SRL scores with the rankings on the “Instructor-Centered/Student-Centered” continuum and the “One-Modality/Two-Modality” continuum in Table 6 reveals that there is apparently little connection between SRL and these continuums. Therefore, bivariate correlations were calculated between the Coh-Metrix results and the researcher continuum rankings. Tables 7 and 8 contain the correlations for these factors.

Table 7

<table>
<thead>
<tr>
<th>Correlation for SRL and Instructor-Centered/Student-Centered Continuum</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRL Score</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Pearson Correlation</td>
</tr>
</tbody>
</table>
Even though the sample size was small, Pearson’s correlations coefficients were utilized in the bivariate analysis due to all factors being intervals. Interestingly, no significant correlation was indicated between either Self-Regulated Learning and the “Instructor-Centered/Student-Centered” continuum or Self-Regulated Learning and the “One-Modality/Two Modality” continuum. Typically, most would assume that higher levels of self-regulation would correlate with higher levels of student-centeredness and more complex pathways. However, at least for the interview participants, this does not seem to be the case.

Interestingly, three statistically significant correlations were discovered in these statistics: the “Instructor-Centered/Student-Centered” continuum positively correlates with the “One-Modality/Two-Modality” Continuum ($p = 0.00$, with 75% of the variance accounted for in this
correlation), Concreteness ($p = 0.04$, with 49% of the variance accounted for in this correlation), and Imagability ($p = 0.02$, with 54% of the variance accounted for in this correlation). Tables 9, 10, and 11 contain the correlations for these factors.

### Table 9

**Correlations for Both Researcher Rated Continuums**

<table>
<thead>
<tr>
<th></th>
<th>Instructor-Centered/Student-Centered</th>
<th>One-Modality/Two-Modality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructor-Centered/Student-Centered</strong></td>
<td>Pearson Correlation 1</td>
<td>.755**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 17</td>
<td>.000</td>
</tr>
<tr>
<td><strong>One-Modality/Two-Modality</strong></td>
<td>Pearson Correlation .755**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 17</td>
<td>.000</td>
</tr>
</tbody>
</table>

*Note*: **. Correlation is significant at the 0.01 level (2-tailed).

### Table 10

**Correlations for Instructor-Centered/Student-Centered and Concreteness**

<table>
<thead>
<tr>
<th></th>
<th>Instructor-Centered/Student-Centered</th>
<th>Concreteness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructor-Centered/Student-Centered</strong></td>
<td>Pearson Correlation 1</td>
<td>.493*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 17</td>
<td>.044</td>
</tr>
<tr>
<td><strong>Concreteness</strong></td>
<td>Pearson Correlation .493*</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 17</td>
<td>.044</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

### Table 11

**Correlations for Instructor-Centered/Student-Centered and Imagability**

<table>
<thead>
<tr>
<th></th>
<th>Instructor-Centered/Student-Centered</th>
<th>Imagability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructor-Centered/Student-Centered</strong></td>
<td>Pearson Correlation 1</td>
<td>.545*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 17</td>
<td>.024</td>
</tr>
</tbody>
</table>

93
What this could possibly mean is that as the participants in this study became more student-centered, they also tend to utilize two modalities in their pathways, as well as becoming more concrete and imagable in either their word usage or the way they described their experience in the course. The implications of these findings are explored further in Chapter 5.

Interviewee Pathway Profiles

A total of seventeen (17) participants from the quantitative phase of the study were recruited to participate in the secondary qualitative structured interview stage. Since no correlation was found between SRL and any participant demographics, all participants that volunteered for the survey were accepted. Due to the complex nature of the customizable pathways design, a brief examination of the profiles of the interviewee is in order. Each interviewee’s self-selected pathway through the course is described based on their own words as well as an overall sense gleaned from their responses. These profiles demonstrate the complex nature of the self-selected pathway that each participant took through the course. Table 12 lists the basic demographics of the interviewees, while Table 13 lists their education level, their location, and the primary industry that they work in.

<table>
<thead>
<tr>
<th>Basic Demographics of Interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Alex</td>
</tr>
<tr>
<td>Avery</td>
</tr>
<tr>
<td>Blake</td>
</tr>
</tbody>
</table>
Cameron Hispanic female 35 to 54 English
Carter Caucasian male 55 to 64 English
Casey Caucasian female 35 to 54 English
Charlie Other female 26 to 34 English
Emery Caucasian female 35 to 54 English
Hayden N/A N/A N/A N/A
Jamie Caucasian female 35 to 54 English
Jessie Other male 35 to 54 English
Jordan Caucasian female 55 to 64 English
Landry Caucasian female 35 to 54 English
Parker Caucasian female 35 to 54 English
Reagan Caucasian female 55 to 64 English
Reese Caucasian male 35 to 54 English
Taylor Other male 35 to 54 Turkish

Table 13

<table>
<thead>
<tr>
<th>Name</th>
<th>Education Level</th>
<th>Location</th>
<th>Primary Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alex</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Avery</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Blake</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>Primary/Secondary (K-12) Education</td>
</tr>
<tr>
<td>Cameron</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Carter</td>
<td>Doctoral level degree</td>
<td>USA</td>
<td>Other</td>
</tr>
<tr>
<td>Casey</td>
<td>Master’s level degree</td>
<td>Europe</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Charlie</td>
<td>Master’s level degree</td>
<td>Europe</td>
<td>Self-employed/Partner</td>
</tr>
<tr>
<td>Emery</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Hayden</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Jamie</td>
<td>Doctoral level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Jessie</td>
<td>Master’s level degree</td>
<td>Africa</td>
<td>Consultant</td>
</tr>
<tr>
<td>Jordan</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Landry</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Parker</td>
<td>Professional (MD, JD, etc.)</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Reagan</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
<tr>
<td>Reese</td>
<td>Doctoral level degree</td>
<td>USA</td>
<td>Other</td>
</tr>
<tr>
<td>Taylor</td>
<td>Master’s level degree</td>
<td>USA</td>
<td>College, University, and Adult Education</td>
</tr>
</tbody>
</table>

As Tables 12 and 13 demonstrate, the interviewees are heavily weighted towards English-speaking Caucasian females between the ages of 34 and 54 that are highly educated, live in the United States, and work in the field of education. Therefore, the following profiles should be
considered with this sociocultural bias taken into account. Additionally, the high number of participants from the same sector is a good indicator that the HumanMOOC content was more appealing to those in this sector, and therefore could impact transferability to other sectors. Those wishing to transfer the results of this study should take the highly-educated, education-focused mindset of the participants into consideration when doing so. The interviewees are grouped together by their modality preference (instructivist-leaning, constructivist-leaning, and dual-modality) for profile examination.

*Instructivist-Leaning Interviewees*

Many of the interviewees expressed either a desire to follow the instructor-led Stream pathway, or a complete lack of understanding of the Garden pathway or the choice to take that pathway. Additionally, there is the anomaly of Carter, who basically answered the first question by indicating complete lack of satisfaction with the course design, and then answered the rest of the questions with the same sentence: “I was totally confused by this and didn't know how to proceed or use it.” While these type of responses are typically thrown out, Carter’s confusion is an important factor to note in order to keep the results fair, therefore his results were still included in the analysis. The only other factor that is known about Carter is that he also scored the lowest out of all interviewees on the SRL scale at 86. This number is still technically in the middle of the possible SRL range, but it is still on the lower end of the range for HumanMOOC. It is possible that his negative experience could be connected to his low SRL score. However, due to any other substance in his answers or responses to follow-up questions, there is not much more that can be said about Carter.

While Carter’s negative experience could be attributed to his relatively lower SRL score, contrasting his responses with Jordan’s would indicate this might not be the case. Jordan’s score
on the SRL survey is almost the same as Carter’s at 87. Jordan’s self-selected pathway was mostly the instructivist modality. However, Jordan also indicated that this path “was not at all linear” and that “the assigned activities were experiences I felt I needed.” Jordan’s main point was that although she chose the instructivist pathway for this course, a few activities were derived outside of the instructivist Stream from other learners. Jordan described her time in HumanMOOC as a “positive learning experience” that left her wanting to explore the course topic more after class. In her opinion, she followed the instructor-led Stream due to feeling “not as tech savvy as many.” However, she also noted that the content in the instructor-led Stream matched well with what she wanted from the course. The resources she explored outside of the course came from suggestions that other learners posted in the Canvas LMS or that were mentioned in the instructor-hosted Google Hangouts. When asked about her self-regulation, she indicated that “even though I followed the instructor-led path, I felt that my learning was very self-regulated.” This is an interesting response when compared to the fact that she scored lower than most of the others in the group. She also did not realize that the instructor was still guiding her pathway when she followed the Stream pathway by stating “I don't, in fact, feel that the learning was instructor directed.” This could mean that she was not as self-regulated as she thought, or that needing an instructor’s guidance is not as important as having a clearly-defined self-guided pathway.

Like Carter, Casey mainly utilized the instructivist stream, but for other reasons. According to Casey, this pathway choice was a forced one, because she did not know about pathway choices until later in the course. Casey indicated that “it was the only one available when I commenced so I kind of stuck to it.” Casey also indicated a possible preference for the connectivist Garden had that option been made obvious earlier by stating “I would have probably
chosen the other option of the student centered garden.” She experienced technical difficulties at the beginning of the course, which caused the course tools to appear differently on different devices. She noted this as the main reason for not noticing the Garden pathway until later in the course. Casey also indicated difficulty fitting the course into her schedule over Christmas. She felt that the course offered too much content over too short a time. She also felt that the wide range of technologies covered in the content compounded the scheduling problem. Her suggestion was that the course needed to be offered over a longer period of time with less activities scheduled each week. Overall, she felt that these various difficulties forced her to start and stay in the instructor-led Stream. Casey also scored an 87 on the SRL scale, which could be a reason why she faced these difficulties. Learners not being able to find the pathway choices is a design concern that should be addressed.

However, other learners like Hayden seemed to experience no difficulty finding the pathway choices. Hayden indicated that he “mainly chose instructor-led Stream” because he was new to the topic and wanted to stick with instructor guidance. Hayden indicated a favorable and comfortable view of the connectivist Garden, which statements such as “If the Stream pathway was too difficult to follow, I might go try the other pathway instead.” Hayden described his experience in HumanMOOC as “great,” giving him several new ideas. Hayden pointed out that the clear design of the instructor-led pathway made it “much easier to execute self-regulated learning.” While Hayden was clear that his choice was strictly about following instructivist content, the clarity of the course design was not a hindrance. Therefore, Hayden’s overriding motivation to take the course was learning the course content in the manner that it was designed by the instructors.
Like Hayden, Reagan also seemed to choose the instructivist Stream while still understanding the option to choose otherwise. She indicated “I think I followed the Stream, mostly” in response to being asked what pathway was chosen. When asked why she didn’t choose the Garden pathway, her response was “mostly time, but also some interest. I wasn't interested in a lot of interaction.” Reagan seemed to enjoy the course and felt that it was well-designed. Unlike Casey and Carter, Reagan did not find the course confusing: “the course was very easy to navigate.” Reagan’s SRL score was above the middle for the overall SRL scale (92), so her choice to stick with the instructivist Stream was not due to lacking in self-regulation. Reagan is a good example of a leaner that prefers instructivism even when given the choice, based on statements like “it was easiest for me to just go through the course page by page.”

Like Reagan, Blake also displayed an extreme preference for instructor-led content with no learner interaction. According to Blake, “I was seeking a linear sequence so I chose the Stream” and “I was not looking for peer interaction.” Blake did indicate some openness to sharing work with others, but not if that meant having to interact. Blake participated in HumanMOOC in order to augment her current educational practices. Her main focus was on completing the course as quickly as possible. Unlike Reagan, the overall course design was a little difficult for Blake to follow: “I found the design a little difficult to follow, but no, it did not influence my choice.” Blake is one of several learners that had some difficulty with the course design (“the course design itself, where the Stream was located, was difficult to find”), indicating that a theme is possibly emerging in the interviewee responses. Once she found the Stream, the course went better for her: “I enjoyed the course content and took away some interesting ideas.” She also did not mind that other learners wanted the Garden to bleed over into the Stream, though she was not interested in the interaction herself.
Emery was another interviewee like Hayden that indicated an interest in the Garden modality, but “due to time constraints I followed the instructor led Stream for all of my assignments.” However, she did state that “I would have loved to play a little more on the garden path and have bookmarked a lot of the resources to continue to explore them on my own in the future.” Ultimately, she did appreciate the ability to make pathway choices: “I was excited to see both streams that were available to me as a participant.” This appreciation for choice appears to be beginning to emerge as a possible theme in the interviewee’s responses. Emery is an instructional designer that took HumanMOOC as a way to pick up new ideas for the courses that she works with. She found the course easy to navigate, but wondered if having a longer course would have allowed her to explore the Garden pathway more. She offered up the idea that if the Garden contained its own set of activities that scaffold from each other in order to examine a problem, she might have made more of an effort to find some extra time to work on that pathway: “if there is that type of collaborative work going where I need to interact with others then the time period of a week might be fine per topic or if in order to make collaboration a key part it is easier to come up with one large design task that incorporates all of the outcomes for the course I think the deadlines could be more free floating.” She was also not aware of the Neutral Zone, but when asked about it she thought “it is probably a good scaffolding piece for those who are unsure what to do when moving towards a more unstructured path.”

Similar to Emery and Hayden, Parker’s pathway choice was described as “Instructor-led Stream, but I crossed into the Garden just a bit when I got a little confused with the Stream.” However, Parker indicated confusion with the Garden and lack of comfort with understanding the tools needed in the Garden. Parker described her HumanMOOC experience as an overall positive one, especially because she was able to connect with other professionals. She also feels
optimistic about future offerings of the course: “I think I could do ‘better’ if I take it another time (maybe next year) because I am more comfortable with the technology now.” Parker focused on the Stream more often because she likes to follow directions, even though, like Emery, she did have some trouble finding the content in the Canvas LMS in the first place. Once she figured out where she wanted to go, she appreciated the linear presentation of the material. She also was not aware of the Neutral Zone or what that design feature was designed to do. Parker’s SRL score was relatively high (105), so her comments should be of concern for course designers. She was probably able to overcome those problems due to high self-regulation. However, a possible emerging theme of interface problems in the LMS is also evident in Parker’s responses, as well as the theme of appreciating the ability to make modality choices (despite preferring one choice over the other).

Like Parker, Charlie is another interviewee that had a high SRL score, but still enjoyed the instructor-led Stream: “I very much enjoyed the instructor-led Stream but haven't participated much in discussions with others.” However, unlike the other interviewees, she did not have much to say about the Garden modality and may not have been aware of the available choices: “for now I have no idea what different pathways could be.” Charlie liked that the course contained shorter videos that summarized the content well. She did not really think the Canvas discussion forums were the best place to interact in the course: “often in the discussion after watching the video or below other topic offered by educators, participants posted not relevant questions (for example randomly telling about their organization) which I found distracting.” However, she approached the course more from a project manager perspective than an interactive one. She also liked how the content helped her learn about new ideas. Charlie spent some considerable time discussing how she does not really agree with the idea of survey questions. This was in response
to the question on self-regulated learning, so she may have misunderstood the purpose of that question.

Connectivist-Learning Interviewees

On the opposite end of the power dynamic spectrum are the interviewees that preferred the connectivist Garden to the instructivist Stream. Instead of creating a mixture of the two modalities, they stuck mostly with the one over the other. For example, Reese indicated that he felt the instructor-led Stream was chaotic and difficult to follow. Reese’s self-described pathway was “Garden approach” in all capital letters. However, Reese also indicated surprise at finding “little course instructor moderation or presence” in the Garden. Reese expressed confusion and disappointment with the technical design of Canvas layout, calling it a “horrible platform that seemed closed and lacked ready navigation or searches.” He mostly focused on participating through Twitter to interact with others. This facet about himself seemed to surprise him a bit, as well as his higher level of self-regulation in this course: “I was surprisingly self-regulated. This was largely due in part that I like following hashtags.” Reese found the course to be interactive, like a group of friends interacting online: “it seemed it was not a course but a bunch of online friends and colleagues focusing on whatever issues one wanted to share and work on together.” Reese scored fairly high (98) on the SRL scale, and this was supported by how he stated not understanding a question in the interview but still came up with an answer for it. Reese’s responses also support the emerging theme of technical and design difficulties affecting the learning experience, as well as how participants appreciated having modality choice.

Similar to Reese, but with a slight twist, Taylor indicated that both pathways were attempted at first, but the interactive nature of the Garden eventually caused that modality to win out. Taylor did not seem to have anything against the Stream, but saw the Garden as the more
interesting option: “you told me to watch the party from TV (LMS-Stream) or go outside and join the crowd.” Most of the responses in Taylor’s interview were indicative of probably the highest level of connectivism in the course. Taylor enjoyed many aspects of HumanMOOC, including the social media avenues that served as “social glue to connect different learners and different learning communities.” However, he did not really find the instructor-led Stream to be dynamic. He felt that it might have improved if the instructors had facilitated more interaction. Taylor was most interested in dynamic interactions wherever they might occur. While he did observe the content in the Stream from time to time, he had other interests: “My contribution was enriching the discussions. I created new content and discussion topics by writing blog posts or tweeting provocative ideas to increase the interest.” Taylor had a SRL score (99) similar to those that had trouble with the course design and technical issues, so there seems to be a contrast between how some learners could understand the design and others could not.

Like Taylor, Landry also scored 99 on the SRL scale. Also similar to Taylor, Landry initially responded that “I went back and forth between the Garden and the Stream.” Many of Landry’s responses indicated familiarity with both the Stream and the Garden, but fairly early in the interview the responses indicated a preference for the Garden (“I can say that MOST of my choices were of the Garden variety”). Most of her responses seemed to indicate a preference for choices and interaction. Few responses indicated a reliance on instructor guidance, except for a few references to looking at every option the instructors provided. Landry had participated in HumanMOOC in the past, but this was her first time to complete it. She described the course as “amazing,” highlighting how she loved interacting with a diverse group of learners. Landry did not feel that the course design influenced her as much, instead indicating that her personal learning goals dictated her hybrid pathway through the course content. She indicated that she
does naturally procrastinate, and that she had a period where she went without Internet access during the course, both of which were obstacles for her to overcome. But she notes the flexibility of the design and the encouragement of others as factors that kept her progressing towards course completion. Landry also utilized the Activity Bank extensively, mainly because she liked the flexibility of this feature: “I think the variety in the activity bank was one of the best features of the course.” She ran into problems with submitting her Activity Bank assignments (since this had to happen within the Canvas LMS), but appreciated that the instructors were helpful in this area. This would indicate that the design of the course needed to have clearer instructions on how to submit Activity Bank assignments. When asked about the Neutral Zone, she was not aware of what that was, indicating that the design of the course did not clearly steer learners towards this tool. Therefore, as Landry appreciated choice and flexibility, there were still technical and design issues that caused her some issues.

Jamie’s responses were on the same level as Landry when it comes to connectivism. She did not directly describe a course pathway, but indicated confusion with the instructor-led Stream that led to an exclusive focus on the learner-centered Garden. Jamie’s goals in entering the Stream were not to find content, but to “meet new people.” Like Landry, she also tried the Stream along with the Garden extensively at the beginning of the course, but quickly dropped to just the Garden pathway. Jamie is an experienced MOOC participant that found HumanMOOC to be “frustrating” and “great” at the same time. Her main goal was to meet new people to interact with and she felt she accomplished that goal. However, she found Canvas frustrating, and even felt its lack of social elements hindered her efforts to meet new people. Additionally, her desire was to focus on one aspect of the course content, therefore she was disappointed that a larger scope of the course topic was covered. In contrast to other learners, she sought more
permeability between the modality pathways. Jamie also visited the course blog hub, but was disappointed that it was not as active as she would have liked. She did, however, enjoy the activities that were created by other learners in the student-led Garden. She found herself surprised by many of the aspects of the course, especially those that framed instructivism in a positive light. When compared to the other learners that preferred an instructivist modality, these diverse perspectives highlight the need for customizable modality pathway design.

**Dual Modality Interviewees**

So far, most of the interviewees have expressed a strong preference for one modality over another, whether it is instructivism or connectivism. They might have dabbled in two modalities at one point or tried both for a little bit, but their main focus was on the modality that fit the power dynamic they preferred. A few interviewees seemed to get closer to embracing both modalities for the entire course.

For example, Jessie’s pathway description was more complex than other interviewees. Jessie indicated appreciation for the choice that the course design afforded while still stating “I was much appreciative of student-centered Garden.” However, several other statements indicated that he also followed the instructor guided options, such as “the course content provided the needed guidance which enabled me fully appreciate the concepts dealt with” and that “my pathway choice was consistent with the course content design.” Jessie had a favorable opinion of HumanMOOC, describing it as “interesting,” “relevant,” and “impressive.” He was focused on his personal learning objectives, which formed the basis for many of his pathway decisions. Jessie was also not satisfied with his own abilities to apply self-regulation to the student-centered Garden pathway and felt that his self-regulation was not at the level he thought it would be.

Overall, he indicated that he had a great level of appreciation for the choices and freedoms that
the customizable modality pathways design afforded him: “The ability to design own learning objectives, freedom to select desirable materials and also dictate the pace of learning. This provides a useful alternative for the learner in an era of information overload and competing interests.” The interesting aspect of Jessie’s responses is that his SRL score was relatively low (89) when compared to other interviewees, but he still overcame obstacles in the course identified by others with higher levels of self-regulation.

Like Jessie, Alex was another participant that scored lower on the SRL in Massive Open Online Courses survey than the majority of the participants at 89. Many participants joined HumanMOOC late, due to the open enrollment that was enabled for the duration of the course. Alex was one of those participants. When describing her pathway choices, Alex indicated that “I swam in the Stream and I picked and chose from the Garden.” Many responses indicated that she mixed both modalities throughout the course, but still found many connections by spending time in the instructor-led Stream (especially Google Hangout archives). Alex had favorable impression of her HumanMOOC experience, noting that she loved the course because “it was design-theory, learning styles, and differentiated learning and online education coming to life.” She used several different methods for describing how she basically took a “pick and choose” approach to the content. Alex utilized the Stream pathway as a guiding point as she often branched off into the connectivist Garden modality. She noted being new to online teaching and use HumanMOOC to learn more about teaching her own online course.

Similar to Alex, Avery indicated that “I participated in both modalities equally.” Most of Avery’s responses seemed to indicate that to be so. However, she did indicate that the Garden gained a little more of her attention due to the fact that “I had more ownership over the questions.” Avery described her time in HumanMOOC as a great experience that was “fun,”
“educational,” and “interactive.” Avery reflected extensively on listening as participation in HumanMOOC, especially since she viewed most of her in participation in the Stream as purely listening. Avery viewed the Garden as a place to contribute questions (especially bigger picture type questions) as well as to connect with others asking questions. She also looked at the Stream as a place to observe how others responded to the competencies, especially because the course competencies focused on the Community of Inquiry framework. Avery frequently mentioned interest in learning more about this framework. Avery noted how she appreciated the ability to direct her own learning in the Garden pathway. When asked to dig more into her experiences with self-regulated learning, she had to briefly research the term. She ultimately determined that she practiced a good level of self-regulation learning, but it was not clear to her exactly what that looked like because of the complex nature of her course activities (“I think I do that but it's not in this clean cut sort of way”). Avery also liked the idea of the Neutral Zone, but sees it as technically part of the student-directed Garden modality. In contrast to earlier interviewees, Avery displays how complex some participants become as they begin to engage with both modalities. This level of complexity is not always possible in courses that offer just one modality for the entire course.

When asked about pathways, Cameron indicated preference for instructivism, but then stated “I found myself in this course much more in the student centered Garden.” Cameron displayed specific knowledge of what happened in both modalities. Cameron pointed out that her goal in HumanMOOC was not to “finish” as much as to talk about topics she is interested in with an “invisible or background guidance of the more formal course.” Even though she likes structure, she enjoyed finding ways to interact with others in the less structured Garden pathway. Cameron also enjoyed the interactions of the Google Hangouts and social media activities and
noted that following people on social media services like Twitter was a bit more difficult than it should have been. Cameron also wanted to follow some of the work that other learners posted in the Canvas forums, but found those forums too chaotic for her liking. Therefore, she was similar to Avery in that she had a complex relationship between the two modalities.

Profiles Summary

Overall, these seventeen participants provide a sense of how complex the issue of modality choice in learning design can be. This would seem to lend support to the idea that learners need the option to create their own pathway through the course, since designing specific pathways for so many learner preferences and needs would be very difficult. Many of the issues identified in the responses were technical in nature, while others highlighted design problems that need to be addressed. Inflexible technology solutions can be an impediment to learner choice, so the places where participants identified issues should be noted as places where design or technology can be improved by adding more flexibility.

Additionally, these profile examinations paint a picture of how difficult it is to classify and describe learners’ choices through a customizable pathways course. At the present moment, technology is not robust enough to track activity across multiple technology solutions, such as learning management systems, social media, personal websites, and all of the different tools utilized in the course. However, someday this may be possible, with such tracking possibly shedding light on the intriguing pathways that learners chose when given the freedom to do so. For now, this research must primarily focus on the learner’s descriptions themselves. The profile descriptions above highlight the extreme diversity that exists among the learners. However, as will be discussed in Chapter 5, this diversity may lend support to the overall idea of a customizable pathways model.
Interview Question Coding

The qualitative interview process involved asking a series of ten questions, with follow-up questions as needed. The responses to these questions were investigated through content analysis to code for categories and themes. The categories that emerged are explained below.

Overall Course Experiences

The first question asked participants: “Can you tell me about your overall experience in HumanMOOC?” Four categories were identified in the responses to this question: (1) *The course was a positive experience that was beneficial in many ways*, (2) *interactive social media aspects of the course were productive*, (3) *learners encountered design and technical difficulties*, and (4) *learners were looking for practical application to work*. The first category was supported by statements such as “It was a great experience overall. It was fun” (Avery), “I really enjoyed participating in this MOOC” (Emery), and “I want to take it again and start from the beginning. I learned so much” (Alex). The second category was supported by statements such as “I found the discussions and assignments done by others very helpful to my learning” (Carter), “enjoyed the Garden approach much more than I expected” (Reese) and “I met a ton of cool people” (Avery). The third category was supported by statements such as “the content I found overly simple and poor” (Carter), “I have found it a little difficult at times” (Casey), and “I tried with the Canvas but found it a bit overwhelming” (Reese, referring to navigation and search problems with the Canvas LMS). The fourth category was supported by statements such as “I have been looking for ways to beef up ideas for online course development” (Emery) and “it offered new knowledge that will help enhance my skills” (Jessie). Table 14 details the coding and category development for question 1.
Table 14

*Code and Category Development for Question 1*

<table>
<thead>
<tr>
<th>Codes</th>
<th>Total</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive experience</td>
<td>17</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>found course design favorable</td>
<td>9</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>favorable new connections</td>
<td>7</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>learned from others</td>
<td>6</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>looking for new ideas for own work</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>learned a lot</td>
<td>4</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>course content beneficial</td>
<td>4</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>content was poor</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>confusing structure</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>facilitated connections</td>
<td>3</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>learned new tech tool</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>re-taking course</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>learned practical applications</td>
<td>3</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>participated outside LMS</td>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fun</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>encouragement from others</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>reasonable workload</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>became more comfortable with tech</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>responsive teachers</td>
<td>1</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>active discussion boards</td>
<td>1</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>content led to other content</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>learning was not linear</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wanted to explore further after course ends</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>not intending to complete</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>looking for interactions</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>frustrating in a productive way</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>occasionally difficult</td>
<td>1</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>not same experience across devices</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Not offered at the best time</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>relevant</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>did not like LMS</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>enjoyed videos</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>liked summaries in design</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>liked modular, chunked approach</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>joined late</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>will re-take in the future</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note: Total column lists the number statements that fit into each category. Categories are as follows:

(1) The course was a positive experience that was beneficial in many ways
(2) interactive social media aspects of the course were productive
(3) learners encountered design and technical difficulties
(4) learners were looking for practical application to work

These categories would seem to indicate that most learners were satisfied with the overall idea and experience of choosing their own pathways. The participants took the course looking for design ideas that they could apply to their courses and found ideas that were helpful. Additionally, the Garden aspects that allowed for interaction were also beneficial, meaning that these elements had importance to many. However, the design still has limitations that should be addressed in order to address concerns with technology and design.

Therefore, the importance of these findings are that customizable modality design has some value to learners as long as the course is well-designed with user-friendly technology and real-life applicability to the learner’s work context. Interactive social elements should be included for those that choose those modalities. Additionally, content simplicity should be addressed for the more advanced learners, possibly in the form of links to more advanced content or activities.

Self-Described Course Pathway

The second question asked participants: “At several points in the course, you were given a choice of the learning modality to participate in (instructor-led Stream or student-centered Garden). How would you describe your overall pathway through those choices over the duration of the course?” Three categories were identified in the responses to this question: (1) learners wanted customizable, social options to mix pathways; (2) learners wanted linear, time manageable guidance through a pathway; and (3) technical or design difficulties affected
pathway choice. The first category was supported by statements such as “I was much appreciative of student-centered Garden…this afforded me the opportunity to structure and time my own learning paths” (Jessie), “I swam in the Stream and I picked and chose from the Garden” (Alex), “my learning path was so organic that I don't really remember where my journey started and where it ended” (Jordan), and “I went back and forth between the Garden and the Stream” (Landry). The second category was supported by statements such as “I was seeking a linear sequence so I chose the Stream” (Blake), “I very much enjoyed the instructor-led Stream but haven't participated much in discussions with others” (Charlie), and “due to time constraints I followed the instructor led Stream for all of my assignments” (Emery). The third category was supported by statements such as “after a while, I quit Stream path and continued to Garden path… it was too static” (Taylor), “I crossed into the Garden just a bit when I got a little confused with the Stream” (Parker), and “I tried really hard to use Canvas… I found it really impossible to use though… after the second week, I stopped even trying to use Canvas, which significantly reduced the number of people I had the opportunity to meet” (Jamie). Table 15 details the coding and category development for question 2.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Total</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>participated in connectivism</td>
<td>11</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mostly the stream</td>
<td>6</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both modalities whole course</td>
<td>5</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Found LMS difficult to navigate and utilize</td>
<td>5</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Did not like how LMS was utilized by learners</td>
<td>5</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>leaning towards connectivism</td>
<td>4</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confused and not sure what to do</td>
<td>4</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Discovered new content / ideas in stream</td>
<td>4</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only the stream</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>paid attention to instructivism</td>
<td>3</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
 listening as form of participation & 3 & x  
Didn't see stream as instructivist & 3 & x  
Both modalities at beginning & 2 & x & x  
garden pathway & 2 & x  
quit instructivism and went connectivist & 2 & x  
Preferred option better suited for & 2 & x  
Interacted with other learners & 2 & x  
Time constraints limited garden & 2 & x  
interacted with others asking questions & 1 & x  
wanted to ask bigger questions & 1 & x  
interested in course design & 1 & x & x  
views instructivism as safer & 1 & x  
Would be active if others were active in stream & 1 & x  
switched to garden when stream was confusing & 1 & x & x  
Paid attention to options in garden & 1 & x  
learning path organic and hard to describe & 1 & x  
Had fun & 1 &  
Liked that both paths were available & 1 & x  
Wanted linear sequence & 1 & x  
Liked creating own pathway & 1 & x  
Not looking to interact & 1 & x  

**Note:** Total column lists the number statements that fit into each category. Categories are as follows:

1. learners wanted customizable, social options to mix pathways  
2. learners wanted linear, time manageable guidance through a pathway  
3. technical or design difficulties affected pathway choice  

The first two categories at first glance would seem to be contradictory. However, they probably both speak to how participants have differing desires for power dynamics in the same course. Those that want social connectivist options that they control exist within the same course as those that want the instructor to control their learning content. This would lend support to the idea that learners need to be able to create their own pathway through course content, in contrast with having one modality pathway forced on all learners. However, the technical and design
issues still persists in this question, therefore improving those choices is still an important aspect to consider.

Therefore, the importance of these findings is realizing that learners with vastly different power dynamic preferences exist within courses, and they have strong preferences for their preferred learning modality. Some like to mix modalities, others like to stick with one. Allowing the learner to choose their modality is a possible solution to empowering more learners.

**Rationale for Pathway Choice**

The third question asked participants: “What was your rationale for using the pathway(s) that you choose?” Three categories emerged: (1) **participants wanted specific types of interactions with other learners**, (2) **the Stream offered easier, more manageable path**, and (3) **learners appreciated customizable ownership choices**. The first category was supported by statements such as “I was in the Garden because of the mutual communications, actively changing conversations, fast knowledge flow and interesting people” (Taylor), “I was not looking for peer interaction” (Blake), and “lots of conversations and public engagement” (Reese). The second category was supported by statements such as “the rationale for choosing this path was largely one made in consideration of time to complete the assignments” (Emery), “I feel that the Stream is a good way to learn the basics” (Hayden), and “it fit with the time I had to be in the course” (Reagan). The third category was supported by statements such as “I went through the course like I was shopping at a grocery store...choosing what products appealed to me to meet the needs of the projects I needed to complete” (Alex) and “I like the idea of choices…. I appreciate the organizers' acceptance and tolerance of those that went back and forth” (Landry). Table 16 details the coding and category development for question 3.
### Table 16

**Code and Category Development for Question 3**

<table>
<thead>
<tr>
<th>Codes</th>
<th>Totals</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive peer interactions in the Garden</td>
<td>6</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose stream due to time constraints</td>
<td>6</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Likes choices</td>
<td>4</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Liked ownership of Garden</td>
<td>3</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chose stream due to lack of tech skills</td>
<td>3</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Garden could build network for work</td>
<td>3</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Wanted to observe interactions in Stream</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Wanted to see what other learners did in Stream</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Used garden to go beyond stream content/activities</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Create own network in Garden</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Easier to follow guided Stream path</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Noted that middle is popular aphthway</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chose Stream because of lack of knowledge in topic</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Could get to know others in Garden</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Used Stream just for needed content</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Pick and choose parts of each pathway based on personal needs</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Stream is a place to listen</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wanted to understand stream</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paid more attention to Garden</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not fully understand Garden</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stream sometimes useful</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liked that teachers allowed learners to go back and forth</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stream good for basic understanding</td>
<td>1</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Could avoid interactions in Stream</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LMS too chaotic</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoyed artifacts in Garden</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Confused by pathway choice</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Started in Stream and stuck with it</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Could set own objectives in Garden</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Little instructor presence in garden</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Garden more like social club than course</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Note:** Total column lists the number statements that fit into each category. Categories are as follows:

1. participants wanted specific types of interactions with other learners
2. the Stream offered easier, more manageable path
(3) learners appreciated customizable ownership choices

In terms of SRL and power, these categories seem to indicate that many learners want control over their learning experience so that they can regulate how and when they learn. Many of those that still preferred the Stream path were also aware of the choice that they were able to make to take that path. The first category and second category are technically opposite of each other on the power spectrum, but combined together they illustrate how diverse learners can choose different pathways through content. This feeds into and relates with the third category, where participants expressed appreciation over the ability to make choices and ultimately retain power over their learning pathway.

Again, those wishing to explore this learning design should consider what these results mean for their educational context. Will there be learners that want to follow the instructor with minimal social aspects mixed together with those that want to connect with others? Is there a way to foster both modalities in a way that moves all learners towards competency in a given topic or module? What issues identified in the codes above could help or hinder specific learners when allowing that choice? These questions should be considered in order to ensure that the design of choices enhances rather than hinders self-regulation in the learning process.

Rationale Against Pathway Choice

The fourth question is connected to the third question, by asking a similar question from a different angle. The fourth question asked participants: “What was your rationale for not utilizing a different pathway?” Three categories were identified in the responses to this question: (1) learners did not understand or have interest in other pathway, (2) learners just preferred chosen pathway, and (3) learners encountered technical or design difficulties. The first category was supported by statements such as “I did not entirely understand the concept of the Garden”
(Parker), “I was totally confused by this and didn't know how to proceed or use it” (Carter), and “I wasn't interested in a lot of interaction” (Reagan). The second category was supported by statements such as “I would rather say that the decision on the different partway was made not in favor of it unconsciously” (Charlie), “I enjoy structure” (Blake), and “I felt that I needed what was offered in the instructor-led Stream” (Jordan). The third category was supported by statements such as “I tried to use Canvas but it was impossible for me to use it to meet my goal of meeting new people” (Jamie), “I do not like too many choices for learning” (Blake), and “I cannot find a proper explanation about different pathways I could choose” (Charlie). Table 17 details the coding and category development for question 4.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Totals</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMS unsatisfactory</td>
<td>4</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Course structure design inadequate</td>
<td>4</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Focused on Stream due to time constraints</td>
<td>3</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Not tech savvy enough for Garden</td>
<td>3</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Stream different than Garden</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Did not understand Garden enough to be comfortable</td>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not aware of pathway choices</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Not interested in Garden social interactions</td>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Didn't want 3rd or 4th pathway</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tried Stream</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Stream was not fun</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Badges in Stream not motivating</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Certificates in Stream might have motivated</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>No one pathway is best</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Liked adaptability with both choices</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Garden will be more suitable after more experience</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not like choices in Garden</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Prefers structure of Stream</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Likes artifacts produced in Garden</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
The categories for this question seem to lend support to what has been previously identified in other questions: learners have specific interests in how they regulate their learning. The nuance that these categories bring to the results is that participants were mostly aware of what they wanted and stuck with those choices. In the areas where they did not understand the pathway they did not choose, much of that had to deal with not understanding or desiring the social aspect of the Garden approach, or finding the Stream technology unsatisfactory.

What these results mean for the educational field is that many learners are aware of the power structure that they want in their learning experience, and will choose that structure because they want it (rather than because they do not understand the other one). Sometimes, educators feel learners prefer either instructivism or connectivism because they simply don’t understand the framework that they do not prefer, but that may not always be the case. However, there are some that truly do not understand certain frameworks such as connectivism, so determining which learners have a preference and which truly need help understanding a different framework is key to helping those that need guidance, while not forcing others into a modality that they simply just do not prefer.
Course Content Design Factors

The fifth question asked participants: “Did the course content design factor into the pathway(s) you choose? Why is that so?” Three categories were identified in the responses to this question: (1) *pathway choice was based on factors external to design*, (2) *technical or design problems affected pathways choice*, and (3) *the design of content helped pathway choices*. The first category was supported by statements such as “it was not about the course content” (Taylor) and “for my particular situation, I choose the pathway regardless of the design…. My pathway choice is entirely based on my knowledge on the subject at hand, not because of the pathway design” (Hayden). The second category was supported by statements such as “I wonder if the design of having things due weekly impacted my ability to perhaps explore more of the Garden path” (Emery) and “I could not locate the Stream assignments” (Blake). The third category was supported by statements such as “yes, it was easiest for me to just go through the course page by page” (Reagan), “I would say ‘yes’ because I felt I needed to have guidance and criteria” (Parker), and “yes because the course content provided the needed guidance which enabled me fully appreciate the concepts dealt with” (Jessie). Table 18 details the coding and category development for question 5.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Totals</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No influence of content design</td>
<td>6</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Based choice on what learner wanted</td>
<td>6</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Poor tool design influenced pathway choice</td>
<td>5</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Probably did</td>
<td>3</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pathway choice would have been the same with different topic</td>
<td>3</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Good design of pathways helped</td>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pathway choice based on learner's knowledge</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
More scaffolding needed to get into Garden
Pathways needed permeability
Needed centralized hub with all resources
Did not know about pathway options
Good design helped guide
Teachers not active in Garden
Design made learner think about new things
Interested in course topic
Not about course topic
Pre-existing choices were what learner wanted
Pre-existing choices took all allotted course time
More time needed to get into Garden
Garden pathway about more/different options
Needed problem-based learning to get into Garden
Tasks in Garden should have been different
Needed more open deadlines for Garden
Needed group work in garden to push outside comfort zone
Social design helped encourage interactions
Confused by pathways choice
Content was only in LMS
Design helped learner choose different parts of different pathways
Will get around to Garden tasks on own

<table>
<thead>
<tr>
<th>Statements</th>
<th>Count</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>More scaffolding needed to get into Garden</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Pathways needed permeability</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Needed centralized hub with all resources</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Did not know about pathway options</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Good design helped guide</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Teachers not active in Garden</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Design made learner think about new things</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Interested in course topic</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Not about course topic</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Pre-existing choices were what learner wanted</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Pre-existing choices took all allotted course time</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>More time needed to get into Garden</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Garden pathway about more/different options</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Needed problem-based learning to get into Garden</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Tasks in Garden should have been different</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Needed more open deadlines for Garden</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Needed group work in garden to push outside comfort zone</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Social design helped encourage interactions</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Confused by pathways choice</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Content was only in LMS</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Design helped learner choose different parts of different pathways</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Will get around to Garden tasks on own</td>
<td>1</td>
<td>X</td>
</tr>
</tbody>
</table>

*Note:* Total column lists the number statements that fit into each category. Categories are as follows:

1. pathway choice was based on factors external to design
2. technical or design problems affected pathways choice
3. the design of content helped pathway choices

The results of the coding for question five also seem to be contradictory to one another. These contradictions again highlight the diverse results that can occur when learners are given control.
over learning modalities and power dynamics. Different learners will identify different aspects that can contradict each other. While this conundrum lends support to the overall idea of a customizable modality pathway design, it opens up a large number of serious design issues and considerations for course designers.

Those that wish to create a customizable modality pathway course will need to take these diverse considerations into account when designing a course. Good design or technology choices can help learners, bad design or technology choices can hinder learners, and some learners will make choices based on external technical issues (such as time constraints) regardless of the choices the designer makes. The goal will be to diminish technical or design problems with clear explanations and guidance, while not placing any requirements in the design that will hinder those with external issues. These hindering requirements could come from the designer’s personal power preferences sneaking into the design, so formative review of course design from various viewpoints could prove helpful in dealing with these issues.

Course Activity Design Factors

The sixth question is connected to the fifth question, by asking a similar question from a different angle. The sixth question asked participants: “Did the course activity design factor into the pathway(s) you choose? Why is that so? ” Three categories were identified in the responses to this question: (1) perceived positive design benefits encouraged choice, (2) personal preferences and choices affected pathway, and (3) negative design or technical factors affected choice. The first category was supported by statements such as “it also encouraged me to do some things that I have not been very good about incorporating and keeping up with in the past” (Landry), “of course, that is also because both pathways were equally well designed” (Hayden), and “by offering certain information the course made me read or think more about different
things” (Charlie). The second category was supported by statements such as “for my particular situation, I choose the pathway regardless of the design… My pathway choice is entirely based on my knowledge on the subject at hand, not because of the pathway design” (Hayden) and “my goal in joining the class was to gain knowledge to design my own online class” (Alex). The third category was supported by statements such as “the fact that those doing the Stream were using the forums as a way to share their work, made it difficult for me to interact with, because the format of forums makes it difficult for me to ‘converse’” (Cameron), “it was more about not having the option of an alternate pathway available to me at the start of opening the courseware” (Casey), and “I did not find the activities especially useful or relevant, and since people were not posting activities to their blogs” (Jamie). Table 19 details the coding and category development for question 6.

<p>| Table 19 |
| Code and Category Development for Question 6 |
| Codes | Totals | Category 1 | Category 2 | Category 3 |
| Yes | 4 | X |
| Somewhat | 2 |
| No | 2 | X |
| Chose what is best for application at job | 2 | X |
| Chose pathway regardless of design | 2 | X |
| New to topic | 2 | X |
| Hard to interact in forums in Stream | 2 | X |
| Other pathway option not available | 2 | X |
| Course expanded thinking maybe social interactions more fruitful in garden | 1 | X |
| Not about activities, but personal choices | 1 | X |
| Prefers clear structure | 1 | X |
| Helped rekindle previous skills | 1 | X |</p>
<table>
<thead>
<tr>
<th>Interaction</th>
<th>Count</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactions encouraged resilience</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Structured path more beneficial</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Felt both pathways were equally designed</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Would try garden if stream gets difficult</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Looked at all options</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Stream activities deemed appropriate</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>People did not use blogs</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Confused by design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Participated in activities</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Activities tested new knowledge</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Observer in most activities</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Not interested in doing extra work</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Total column lists the number of statements that fit into each category. Categories are as follows:*

(1) perceived positive design benefits encouraged choice  
(2) personal preferences and choices affected pathway  
(3) negative design or technical factors affected choice

As with the last question, the categories in question six also present seemingly conflicting results from the participants that actually lend support to the course design strategy. However, the results are also slightly different from question five in that they seem to focus more on positive and negative benefits of the design, while still falling into the same pattern of some being helped by activity design, some being hindered by activity design issues, and others relying more on external issues such as personal preferences and choice. This reliance on personal preferences additionally lends support to the higher SRL scores observed in the data.

What this means for course designers is that learners seem to perceive activities differently than content. Whereas the results of question five revealed a more straightforward focus on content helping or hindering, the results of question six seem to focus more on perceived benefits and preferences. This may indicate that learners see a slightly different role of
content and activities when they make pathway choices. Content may be more of a passive aspect while activities have a more active role in their choices. Designers could use this information to focus activities in the benefit they provide for learners more than what information or skills those activities connect to.

**Self-Described SRL Experiences**

The seventh question asked participants: “Considering your responses to the Self-Regulated Learning (SRL) survey, how would you describe your experiences with SRL in this course?” Four categories were identified in the responses to this question: (1) *the course/pathways design encouraged self-regulation*, (2) *learners’ self-regulation was independent of design*, (3) *learners demonstrated non-self-regulation attributes independent of design*, and (4) *design and technical issues affected self-regulation*. The first category was supported by statements such as “the clear weekly objectives, the flexibility in choosing a pathway, and the bite-sized content made it much easier to execute self-regulated learning” (Hayden), “I would say that I was strongly self-regulated my way through the course, and felt like I could (which does speak to the course design)” (Cameron), and “I was motivated by excellent content provided in the course” (Alex). The second category was supported by statements such as “I sometimes watched the great view in the Garden, rested and enjoyed the moment... in some cases, I was the gardener, planting seeds, watering trees and tasting apples” (Taylor), “I think I stayed true to my own learning style and needs throughout the course” (Emery), and “I was certainly happier learning from people on Twitter” (Jamie). The third category was supported by statements such as “I am a procrastinator at heart... I work better under pressure” (Landry) and “being the holiday time I actually struggled with it a little this time round” (Casey). The fourth category was supported by statements such as “I felt there were a lot
of tasks to complete in a short time frame” (Casey) and “I did have a few accessibility issues (lack of Internet and computer access) in the middle of the course which did NOT help” (Landry). Table 20 details the coding and category development for question 7.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Totals</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design of course helps SRL</td>
<td>6</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Considers self high SRL</td>
<td>4</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Created content to provoke interaction</td>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course connected to work</td>
<td>2</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gave new perspective on education</td>
<td>2</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Did pretty good</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure of what SRL is</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessing one's self</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SRL Not Planned in advance</td>
<td>1</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Unplanned if working for self</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aware of takeaways from course</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wants to write more</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wants to listen more</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wants to meet people</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interacted with people</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lurker for general content</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joined subgroups when interested</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributed in order to understand</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enriching discussions</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes sat back and observed</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes jumped in and created</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-motivated learning</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wanted to learn LMS tool</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tried new stuff to learn LMS</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tried new tech</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usually procrastinates</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procrastinated in this course</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work better under pressure</td>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility issues</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stayed in stream, but still very SRL</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stayed true to personal needs</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to complete course and apply</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usually regulates time well</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-regulated through course</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Links SRL to Garden</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confused by design</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Holidays made SRL difficult</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not enough time for tasks</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revealing</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Could customize learning path</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provides alternatives for learners</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surprised at high SRL</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attributes SRL to Twitter</td>
<td>1</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Total column lists the number statements that fit into each category. Categories are as follows:

(1) the course/pathways design encouraged self-regulation
(2) learners’ self-regulation was independent of design
(3) learners demonstrated non-self-regulation attributes independent of design
(4) design and technical issues affected self-regulation

The categories for this question also continue the patterns established by the previous questions, but this time related to SRL. This would indicate that there is continuing support for learners taking advantage of the choices afforded in the course design, but the design and technical issues needing to be addressed. Many of those issues seem to revolve around learners needing more time to learn about the choices and choose one. Additionally, it seems that some learners need more guidance in learning new tools or modalities. Designers that wish to take a customizable modality approach to learning design will need to consider time constraints and scaffolding, as well as the additional time scaffolding will take. The results from this question demonstrate how
few learners are completely self-regulated, and therefore even those with high levels of SRL will still possibly need design considerations to take that into account.

Relationship Between Pathway, Content Design, and SRL

The eighth question asked participants: “How would you describe the relationship between your pathway choice, the course content design, and self-regulation?” Three categories were identified in the responses to this question: (1) content/pathways design affected SRL positively, (2) external factors influenced pathway choice and SRL, and (3) design factors negatively impacted SRL. The first category was supported by statements such as “I liked the flexibility of being able to adapt the pathway to the content, which made it easier to complete the assignments” (Landry), “I stayed on the Stream path because it was more structured and I knew that I could easily complete the tasks that I encountered in the time that I allotted to work on the course work” (Emery), and “my self-regulation was affected because the Stream made it easy and efficient to be self-regulated” (Blake). The second category was supported by statements such as “I would say that my pathway choice was a result of pursuing my own goal (meeting people)” (Jamie), “I chose to just go straight through the content as outlined and it worked very well” (Reagan), and “The variety of choices provided in the course allowed me to experience online learning from many perspectives” (Alex). The third category was supported by statements such as “I would say that there were lots of mini hurdles... trying to complete all of the takes in different areas...was tricky” (Casey) and “The fact that those doing the stream were using the forums as a way to share their work, made it difficult for me to interact with” (Cameron). Table 21 details the coding and category development for question 8.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Totals</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
</table>

Table 21

Code and Category Development for Question 8
<table>
<thead>
<tr>
<th>Design influenced pathway choice</th>
<th>5</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream linear design helped SRL</td>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>Focused on own learning goals</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Flexibility of design helped SRL</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Stream made completion possible</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Offering course at another time might have helped</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Design helped to experience many perspectives</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Interest in topic led to SRL in Stream</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Desire to question led to SRL in Garden</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>SRL allows to individualize education</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>SRL based on newness to online</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Design had no effect on pathway</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Chose Stream, but still SRL</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Stream design increased efficiency</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Pathway choice due to meeting own goals</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Felt personal pathway choice at odds with course design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Confused by course design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Several mini-hurdles</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Multiple tools made completion tricky</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Unable to complete in allotted time</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Pathway consistent with design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Pathway choice at odds with SRL</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Unable to meet self-selected goals</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Inadequate application of SRL</td>
<td>1</td>
<td>X</td>
</tr>
</tbody>
</table>

*Note: Total column lists the number statements that fit into each category. Categories are as follows:

(1) content/pathways design affected SRL positively  
(2) external factors influenced pathway choice and SRL  
(3) design factors negatively impacted SRL

The results for question eight continue the categories identified in question seven. Interviewees were able to identify a few more areas where they fell short of their self-perceived levels of SRL*
than in previous questions, which lends further support to the idea that even those with high SRL fail to regulate fully at all times. This might seem obvious, but should be noted by course designers that would be tempted to not take highly self-regulated learners into account when designing a complex customizable modality pathways course.

Relationship Between Pathway, Activity Design, and SRL

The ninth question is connected to the eighth question, by asking a similar question from a different angle. The ninth question asked participants: “How would you describe the relationship between your pathway choice, the course activity design, and self-regulation?” Three categories were identified in the responses to this question: (1) activity/pathways design affected SRL positively, (2) non-design factors influenced pathway choice and SRL, and (3) learner sees content and activities as same. The first category was supported by statements such as “the flexibility was helpful” (Landry), “I was able to quickly self-regulate due to the design and ease of the pathway” (Blake), and “in the Garden I chose to pay attention and to speak because I created the activities and so I was more vested in them” (Avery). The second category was supported by statements such as “the activities were not really relevant to my goals so I did not pursue them” (Jamie), “I actually feel like a student making up excuses” (Casey), and “for the Stream I chose to pay attention because the activities were interesting” (Avery). The third category was supported by statements such as “I don't think I see the content that separate from the activity design…. The course topics and the activities are intertwined for me” (Parker) and “the answer is the same because the activity is a part of the content” (Charlie). Table 22 details the coding and category development for question 9.

<table>
<thead>
<tr>
<th>Code and Category Development for Question 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codes</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

129
<table>
<thead>
<tr>
<th>Pathways design helpful</th>
<th>7</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough time to complete</td>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>Content and activities intertwined</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Flexibility of design very helpful</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Activity design influenced pathway choice</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Course design allowed learner to experience many different perspectives</td>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>Paid attention in Stream because of personal interest</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Paid attention in Garden because created own activities</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Chose SRL in Garden because of desire to control activities</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Unaware of content, saw activities as content</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Activities led to application of knowledge</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Focused more on activities</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>SRL is about engagement</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Flexibility of design led to choose Garden</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Liked flexibility of design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Pathways choice independent of design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Stream allowed to complete based on time constraints</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Seeking concise directions in Stream</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Stream activities not relevant to goals</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Garden activities interesting</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Confused by course design</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Discrepancies between design &amp; pathway choice attributed to poor SRL</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Wanted linear pathway</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>Stream worked well</td>
<td>1</td>
<td>X</td>
</tr>
</tbody>
</table>

**Note:** Total column lists the number statements that fit into each category. Categories are as follows:

1. activity/pathways design affected SRL positively
2. non-design factors influenced pathway choice and SRL
3. learner sees content and activities as same
These results continue the same emerging themes touched on in the previous questions, with the added category that learners see content and activities as the same concept. This was in response to being asked slightly different questions to explore if there are any differences between content and activity, so this category could simply be a result of that repetition in questioning. The categories for questions five and six also noted a possible difference between content and activities, but nothing that would have created a concern for course designers.

The first two categories seem to indicate that learners viewed the course design as having a positive effect on SRL, while still maintaining that external factors such as personal choice influenced their choices. As with other categories, this also could mean that course designers will need to take into account non-design related issues when creating pathway choices. Additionally, when performing summative evaluation, designers will need to find ways to determine what those external factors are, and how they specifically might impact design considerations. Evaluation that simply focuses on learning outcomes or design feedback might miss these issues if not properly designed.

**Miscellaneous Thoughts Regarding Course**

The tenth question asked participants: “What else would you like to share that would be related to these questions?” Five categories were identified in the responses to this question: (1) learners had a positive course/design experience, (2) different tool/design choices would have improved experience, (3) problems or lack of awareness of tools affected experience, (4) learners see neutral zone as a good idea, but mostly did not use it, and (5) personal preferences factored into learning experience. The first category was supported by statements such as “thanks for a great MOOC experience” (Avery), “overall, this was an excellent course” (Landry), “I felt like it was design-theory, learning styles, and differentiated learning and online education
coming to life” (Alex), and “I think the variety in the activity bank was one of the best features of the course” (Landry). The second category was supported by statements such as “that might have been different if there were quizzes built in after the content” (Parker), “I would suggest having a drop down menu labeled Stream and one for Garden” (Blake), and “I would like to see the course offered over six (6) weeks rather than four (4)” (Casey). The third category was supported by statements such as “I ran in to a few snags with submission of assignments if I chose the Garden path” (Landry), “In the Garden path, I found the ‘friending’ or ‘following’ people confusing” (Cameron), and “if it wasn't a menu item or something I applied in an assignment, my visual- and kinesthetic-oriented mind didn't catch it” (Parker). The fourth category was supported by statements such as “as for the Neutral Zone I love the idea and I think it helps to get people to think about this as a continuum rather than a dichotomy” (Avery), “I might have used it and not realized” (Parker), and “to be honest I had to go back into the course to see what exactly the neutral path was…but looking at it now, I think it is probably a good scaffolding piece for those who are unsure what to do when moving towards a more unstructured path” (Emery). The fifth category was supported by statements such as “I skimmed the articles, watched the videos, but was more anxious to ‘create’ and ‘engage’ than to read the content in detail” (Parker), “I like the idea of adding to a discussion but I never have enjoyed reading group discussions even though it's an integral part of the course I teach and design” (Blake), and “I probably would not have participated in the class if I had known it was this type of experiment, but I am glad I blundered into it anyway” (Jamie). Table 23 details the coding and category development for question 10.

<table>
<thead>
<tr>
<th>Codes</th>
<th>Totals</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
<th>Category 5</th>
</tr>
</thead>
</table>

Table 23

*Code and Category Development for Question 10*
| Problems turning in assignments in Garden | 4 | X |
| Barely used NZ | 3 | X |
| More guidance for onboarding might help | 2 | X |
| Variety in Activity Bank best feature | 2 | X |
| Not aware of NZ | 2 | X |
| Concerns with time needed to complete | 2 | X |
| Surprised that instructors could be neutral about Stream | 2 | X |
| Would have liked longer course | 2 | X |
| Great MOOC experience | 1 | X |
| Plans to take again | 1 | X |
| Likes idea of Neutral Zone | 1 | X |
| Neutral Zone gets people thinking theory | 1 | X |
| Not sure how NZ differs from Garden | 1 | X |
| Didn't use NZ | 1 | X |
| Stuck with topics in Stream | 1 | X |
| Preferred activities to content | 1 | X |
| Preferred to be active rather than passive | 1 | X |
| Quizzes might have changed pathway choice | 1 | X |
| New tools can affect course engagement | 1 | X |
| Didn't figure out NZ | 1 | X |
| Didn't notice things if they weren't eye-catching | 1 | X |
| Excellent course | 1 | X |
| Responsive instructors | 1 | X |
| Lack of accessibility hindered exploration | 1 | X |
| Mixed Stream and Garden | 1 | X |
| NZ probably good for scaffolding | 1 | X |
| Enjoyed the course | 1 | X |
| Took away interesting ideas | 1 | X |
| Not a fan of group discussions | 1 | X |
| Wants drop down menu labeled Stream and Garden | 1 | X |
| Wants share buttons | 1 | X |
| Not interested in reading other student's work | 1 | X |
| Found connections in Garden confusing | 1 | X |
| Wants easier way to connect in Garden | 1 | X |
| Loved Google Hangouts | 1 | X |
| Wouldn't have taken course if had known it was experiment | 1 | X |
| Glad to have taken it | 1 | X |
| Found course confusing | 1 | X |
| Liked different tools | 1 | 1 |
| Design brought theories to life | 1 | X |
| Good design | 1 | X |
| Loved the course | 1 | X |
| Found links to videos in G+ | 1 | X |

**Note:** Total column lists the number statements that fit into each category. Categories are as follows:

1. learners had a positive course/design experience
2. different tool/design choices would have improved experience
3. problems or lack of awareness of tools affected experience
4. learners see neutral zone as a good idea, but mostly did not use it
5. personal preferences factored into learning experience

The results from the final miscellaneous catch-all question ended up being very diverse, but also very helpful with more practical ideas. Interviewees shared thoughts on how to make improvements, even though some of those focused on ideas that would remove choice from other learners. However, things like drop-down menus and customizable interface options are
interesting changes to consider as the technology supporting modality choices evolves.

Additionally, several learners noted awareness of tools (like the Neutral Zone) as an area for improvement. Featuring links to various tools and areas of the course more prominently could possibly help with these issues.

As with the other questions, many of these categories point towards the importance of allowing learners to explore their personal preferences and modality choices within a course. This ties to an emerging analysis theme of learners appreciating the ability to make choices over power dynamics that underlie these choices. Even if learners make the choice to follow the instructivist path, the important aspect is that they chose this path rather than having it forced upon them. This is the probably the greatest concept to take away from this study: learners appreciate the choice, even if there are still design and technical issues to work out.

Interview Themes

The preceding categories were analyzed for similarities and synthesized into emerging themes. The two themes that were identified were “participants desired an overall learning experience that was tailored to personal learning preferences” and “technical and design limitations can create barriers in the learning experience.” A few categories did not fit into either of these themes, but did not form a cohesive theme of their own. Table 24 details how the overall themes were derived from the analysis categories.

<table>
<thead>
<tr>
<th>Table 24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theme Development for all Questions</strong></td>
</tr>
<tr>
<td>Categories</td>
</tr>
<tr>
<td>Positive experience that was beneficial in many ways</td>
</tr>
<tr>
<td>Social learning was productive</td>
</tr>
<tr>
<td>Looking for practical application to work</td>
</tr>
<tr>
<td>Design and technical difficulties</td>
</tr>
</tbody>
</table>
Wanted linear, time manageable guidance | X
Wanted customizable, social options | X
Technical or design difficulties affected choice | X
Wanted specific types of interactions with other learners | X
Appreciated Customizable Ownership Choices | X
Stream Offered Easier, Manageable Path | X
Did not understand or have interest in other pathway | X
Just preferred chosen pathway | X
Technical or design difficulties | X
Design of Content Helped Pathway Choices | X
Pathway choice based on factors external to design | X
Technical or design problems affected pathways choice | X
Perceived positive design benefits encouraged choice | X
Personal preferences and choices affected pathway | X
Negative design or technical factors affected choice | X
Learner had SRL Independent of design
Course/pathways design helped encourage SRL | X
Design and technical issues affected SRL | X
Demonstrated non-SRL attributes independent of design
Content/pathways design affected SRL positively | X
External factors influenced pathway choice and SRL
Design factors negatively impacted SRL | X
Activity/pathways design affected SRL positively | X
External factors influenced pathway choice and SRL
Sees content and activities as same
Neutral Zone good idea, but unused
Positive course experience/design
Different tool/design choices would have improved experience | X
Problems or lack of awareness of tools affected experience | X
Personal preferences factored into learning experience | X

*Note:* Themes are as follows:

1. participants desired an overall learning experience that was tailored to personal learning preferences
2. technical and design limitations can create barriers in the learning experience

The first theme encompasses learners that both enjoyed the ability to choose their own modality as well as those that did not care about the modality choice option, but still benefitted from having their preferred modality present. Some also expressed suggestions for ways to improve choices. While some suggestions were positive and others negative, both sides still
pointed to the idea that participants wanted modality choices. These suggestions were meant as a way to improve those choices. This theme would support the idea that learners enjoy the ability to personalize their own customizable pathway, even if they are not aware of their ability to make that choice. However, the suggestions that many made as well as some comments about the design choices not helping their choices would indicate that the customizable pathways design model still needs research and improvement, an idea that is supported in the second theme.

The second theme encompasses both technical problems with the Stream and Garden user interfaces, as well as problems with design choices made by the instructors. Several learners found the Canvas user interface to be confusing. This probably indicates that learners needed an easier to navigate learning management system for the Stream modality, as the course discussion forums were crowded with questions asking where to find certain resources. The customizable modality pathway design was also a new paradigm for many to consider, so the added stress of figuring out the Canvas interface could have added to the discomfort. This indicates that future offerings of this course design methodology should look for simpler, more user-friendly content or learning management systems for offering the Stream modality. Additionally, the scaffolding into the Garden could be more extensive to help the learners that expressed confusion with that modality.

Research Questions

The current study investigated three research questions and six sub-questions to address learners’ experiences of self-regulated learning in MOOCs that relate to the learning design of
MOOCs. Each question is restated below and content analysis results related to each question are explored.

Research Question 1: *What are the attributes of the MOOC learners’ pathway choices through the course content and activities?*

The learners’ pathway choices tend to be specific to several individual learner factors. Based on the participant pathway profiles and interview themes, the learners’ choices can be based on a number of things. These include personal preferences, personal learning theory leanings, time constraints, confusion with the design and/or tools, desire for a specific learning experience for the specific course, well-designed pathway choices, personal desires for specific social interactions (or lack thereof), or an ever changing mixture of any of these factors on any specific day. The idea that less regulated or experienced learners will choose an instructor-guided path and that more regulated or experienced learners will choose a student-centered path is not well supported by the analysis. In fact, most learners tended to mix various aspects of the Stream and Garden together, some in a linear fashion and others in a non-linear fashion. The main attributes seem to be individualized, not conforming to many recognizable patterns, and connected to many factors internal and external to the course design and purpose.

Research Question 2: *What are MOOC learners’ experiences in the customizable learning pathways? To what extent are their pathways related to the course designs?*

In general, many learners appeared to have a positive experience in the customizable modality pathways design, though many were also confused by the design and tools utilized. The main design feature that had been added to help learners with choices was the Neutral Zone. Most interviewees did not notice or use this feature, but when asked about the idea, those that
were asked seemed to view it as a good idea. Many of the learners did not seem to be impacted by the course design, but many others were. These impacts are explained in the sub-questions.

**Research Sub-Question 2.1: What are MOOC learners’ patterns in choosing the customizable learning pathways?**

The general learning pathway patterns seemed to be that learners: 1) chose one modality and stuck with that modality through the entire course, 2) created a linear mixture of both pathways for the entire course, 3) created a nonlinear mix of both modalities for the entire course, 4) chose one modality at the beginning and then switched to the other when the original choice became difficult or confusing, 5) chose one modality at the beginning and then switched to the other when the original choice became boring, or 6) utilized both pathways interchangeably through the entire course. Several interviewees chose the Stream path and stuck with it for the entire course. A few did the same with the Garden. However, there were few complete single modality choices as most people did look into the other modality at least once. However, these brief glances were not enough to affect the pathway choice. Also, a few participants did try to utilize both modalities the whole time. While most did not accomplish that fully, some came fairly close. The majority seem to have a mixture of two modalities that was not fully both modalities the entire course, but enough to be considered beyond simply being a single modality for the majority of the course. In reality, there are not definitive lines between patterns two through five above – those are general estimates based on all of the data collected. These results connect to the first theme in support of participants desiring customizable learning choices.

**Research Sub-Question 2.2: Are there any relationships between learner modality patterns and the course design? If so, why?**
Learner modality patterns appear to sometimes have a relationship to course design, and sometimes do not. Many learners seemed to choose modality patterns based on personal reasons. Others indicated that the design of the course helped in the modality choices they made. Still others found the design confusing and felt this hindered their choices. Sometimes, this confusion was connected to problems with the tools or tool interface, but for a few learners, the course design did seem to affect modality patterns. All of these scenarios connect to both themes that emerged from the analysis, in that learners preferred making choices but had issues that affected choices. Those that were affected negatively by design issues seemed to desire having the course designed in manner that would have been more to their personal learning preferences. But in general, the ability to choose modality patterns in relation to the course design seemed to either not affect pathways choices at all, or tended to help learners chose an individualized pathway.

Research Sub-Question 2.3: Are there relationships between learner modality patterns and the course activity design? If so, why?

Many learners did not see a difference between content and activities in the course design. Those that did see a difference still had the same reactions to the activity design as they did the content design, so the analysis for sub-question 2 generally applies here as well. The one difference was that those that attempted the Garden pathway and looked at the activity bank seemed to be very appreciative of the choices this design feature offered. Again, the results strongly connect back to the emergent themes of learners desiring choice but running into issues that need to be addressed.

Research Question 3: Are there any relationships between learners’ self-regulation experiences and the course designs in the customizable modality course?
In general, most interviewees seemed to think they had high levels of self-regulation and the survey responses would seem to support their conclusions. This is to be expected in a course where learners scored on the higher end of the SRL scale. Additionally, HumanMOOC attracted a very high number of participants with graduate degrees, which is another demographic that would score higher on SRL scales. Within the context of the course, those that had higher SRL scores fared just as well overall as those that had lower SRL. However, those that did experience the most confusion were at the lower range of SRL scores for this course. This was not true for everyone on the lower end of the scale, as some learners like Jordan were near the lowest in the course but still expressed no confusion with the course overall. These factors highlight the diverse nature of the participants that can participate in a course.

*Research Sub-Question 3.1: What are the MOOC learners’ experiences in terms of their self-regulation?*

Some of the interviewees seemed to be confused about what self-regulation is and had to look it up. Others were focused on certain aspects of self-regulated learning. While most did think they had high self-regulation, some discussed being affected by external factors – such as time constraints, procrastination, and technical difficulties – that learners with high self-regulation tend to not be affected by. For example, Emery stated “I was excited to see both streams that were available to me as a participant. Sadly due to time constraints I followed the instructor led stream for all of my assignments.” Landry stated that “I am a procrastinator at heart.... I can't say I was any better here.” Both Landry and Emery scored high on the SRL scale. However, Casey, who scored on the lower range of the SRL spectrum for this course, pointed towards time constraints, confusion with some tools such as Flipboard, and confusion with the pathway choices as external factors that her course experience. While Casey stated that “usually
I am fine with SRL,” this contrast may indicate that some have a higher view of their self-regulation abilities than they actually possess. However, in the end there was little relationship between self-regulation scores and demographic, statistical, and exploratory analysis.

Research Sub-Question 3.2: What do learners see as the relationship between their pathway choice, the course content design and self-regulation?

Most learners saw their self-regulation as a key to being able to complete their pathway choices. This seemed to hold true in either the Garden or the Stream modalities. Those that took advantage of both modalities tended to express an appreciation of the ability to pick and choose modalities. Those that wanted to focus on the Stream also seemed to appreciate the design choices that allowed them to focus on the linear-ness of the pathway without interruptions from the Garden. These learners seemed to think that the course content design helped them to self-regulate by focusing, in comparison to those that mixed pathways felt the design helped them to pick and choose. There were also a few outliers that wanted a mixture of both modalities to exist more throughout the entire design of the course. They also seemed to feel that their self-regulation was impacted to some extent by not having these design factors. However, all of these results still tie back into the two themes identified in the analysis, in that learners preferred having choices, but still had some factors impacted by design.

Research Sub-Question 3.3: What do learners see as the relationship between their pathway choice, the course activity design and self-regulation?

Again, most learners did not see a difference between content and activities, or they saw the two as too intertwined to matter. Therefore, these results would again be related to the previous question, with the exception again being the Activity Bank. Once again, those that attempted the Garden pathway and looked at the Activity Bank were very appreciative of the
choices this design feature offered. For example, Landry stated “I think the variety in the activity bank was one of the best features of the course” and Emery felt that aspects like the Activity Bank and the Neutral Zone served as a “good scaffolding piece for those who are unsure what to do when moving towards a more unstructured path”

Summary

In summary, the quantitative survey findings did not reveal significant correlations between the SRL results and any demographic factors. Exploratory analysis based on some pathway profile data and Coh-Metrix language analysis yielded interesting correlations and some surprising non-correlations for future exploration. The interviewee pathway profiles revealed an incredibly diverse list of individualized pathways through the HumanMOOC content and activities. Content analysis on the interview responses produced possible answers for the research questions. These answers include that there are some positive relationships between SRL, course design, and customizable pathways choices, but also some negative ones. Chapter five covers an overall summary of the study, discussion of the answers to the research questions, implications of the results, and recommendations for further research.
CHAPTER 5
DISCUSSION

Chapter Five begins with a restatement of the purpose of the study, research questions, methods, and major findings. Following this section is a discussion of the content analysis themes and answers to the research questions. Finally, this paper concludes with a discussion of the implications of this study for the educational technology field, as well as recommendations for further research.

Purpose of the Study

This study investigated learners’ experiences of self-regulated learning in a customizable modalities MOOC that relate to the learning design of the MOOC. The intent of this study was to explore a gap identified in the literature encompassing the relationship between the instructional design of MOOCs and self-regulated learning, examined through the lens of a customizable modality learning design. This customizable modality design contains an instructor-led pathway and a connectivist pathway. Learners are free to choose either pathway, both pathways, or to move back and forth between pathways as they desire. The goal of utilizing this course design was to allow learners complete freedom to personalize their learning experience, thus removing forced instructor preferences on all learners.

The sample consisted of 67 MOOC participants voluntarily enrolled in a course designed for adult learners. These learners first self-selected to complete the quantitative SRL in Massive Open Online Courses survey. Data collected from this survey was analyzed for correlations between SRL and various demographic factors. Those that completed the survey were invited to complete a qualitative written online interview. A total of 17 participants completed that
interview. The content of these interview responses were then coded for emerging themes and ratings on certain continuums. They were also analyzed through Coh-Metrix for specific language indices. The results of the indices and continuums were then examined for possible correlations.

Connection to Literature Review

As discussed in the literature review, the customizable modality pathway design model is one instructional design method that can help balance power dynamic concerns that arise from designing courses with one learning pathway. The research questions for this study were written to explore learner’s experiences with modality choices. The lens of self-regulated learning was also identified in the literature review, therefore the research questions reflect the need for self-regulated learning in course design. Additionally, since customizable modality pathway design is a newer idea, the framework of instructional design was identified as a foundational step in new learning paradigms in the literature review. This framework is represented in the research questions’ focus on instructional design elements such as content and activities.

Due to the emerging nature of customizable modality pathways design a qualitative research design was chosen. The literature review explored how power dynamics lead to a variety of epistemological constructs for designing a course. This variety introduces a complexity that is currently difficult to capture in one technology tool, making pure quantitative measurement difficult. Therefore, an interview process was chosen as the main focus of the study in order to dig into learners’ experiences in their own words. This qualitative design was augmented by a series of quantitative instruments chosen to provide additional insights into
aspects of the participants’ self-regulated learning levels and word choices in their interview responses.

In order to examine the interview responses from different angles, etic coding, Coh-Metrix analysis, and researcher-determined rankings were all chosen as methods to analyze the qualitative data. Etic coding was selected based on the literature review identifying a lack of understanding of the customizable modality pathway design methodology. Coh-Metrix analysis was determined to be a good method to connect the participant responses to quantifiable measurements for future studies. Additionally, the differences between instructivism and connectivism as well as the differences that could arise between choosing one modality or two modalities as outlined in the literature review identified a need to rank the interviewees on a continuum between each set of opposing ideas in order to determine where each participant ranked on those factors.

Research Questions

Three research questions and six sub-questions were used to explore the relationship between self-regulated learning and customizable pathways instructional design. These questions concerned participants’ self-described pathways, the relationship between the design and content or activities, and the role of self-regulated learning in the course. Each question is restated below and followed by a discussion of the results.

Research Question 1: What are the attributes of the MOOC learners’ pathway choices through the course content and activities?

The first research question sought to explore the attributes of the modality/pathway choices that learners chose as they progressed through HumanMOOC. The main analysis seemed
to indicate that the attributes of the pathways choices are individualized, not conforming to many recognizable patterns, and connected to many factors internal and external to the curse design and purpose. This is supported by both of the analysis themes of learners appreciating the choices that the design allowed, but encountering design and technical difficulties along the way. This is actually what the customizable pathways course design method is designed to do: allow learners to create a truly individual pathway through the course, and then change that as they see fit by placing control of the learning power dynamic into the hands of the learner.

However, one issue that the analysis ran into was that many participants could not explain their pathway, or they described it in ways that did not always line up with their overall descriptions of their course experiences. This is one of the difficulties of the pathways design: getting an accurate picture of how learners progress through the course. Those that strictly follow the instructor-led pathway are easy to track. However, those that mix in anything from the student-centered Garden are much harder to track. Additionally, their ability to self-regulate through these choices are another factor that affects the pathway they choose.

Therefore, creating a list of specific pathway models is difficult and inexact at best. This study identified six general pathways choice categories, but many of those blend together. This means there could be six pathway models that learners followed, or three, or twenty or hundreds. Future investigation of this design model, as well as improvements in technology, may change the way designers view pathway choices. Additionally, training learners how to self-regulate and customize their pathway could help to improve the ability to discern specific pathway models.

What is fairly certain from the results is that many participants benefited from the choices they could make. Most interviewees at some point discussed some factor that was greatly enhanced by being able to choose their learning modality. Some participants were directly aware
of those benefits, while others did not seem to express any direct awareness of those benefits. Ultimately, while designers might be tempted to find ways to highlight these benefits so that all learners are aware of them, good design should always fade into the background while learners focus on learning. The challenge with this design is to identify ways to fix the issues that participants have identified with the design, while keeping the parts that helped learners to benefit from the ability to customize their learning experience.

Research Question 2: *What are MOOC learners’ experiences in the customizable learning pathways? To what extent are their pathways related to the course designs?* Research question 2 sub-questions were:

1. *What are MOOC learners’ patterns in choosing the customizable learning pathways?*
2. *Are there any relationships between learner modality patterns and the course design? If so, why?*
3. *Are there relationships between learner modality patterns and the course activity design? If so, why?*

The second research question sought to explore learners’ self-selected patterns in the customizable pathways design, and the relationship between those choices and the course content and activity design. In general, the course design seemed to help many, but also appeared to not help others, while a few more even did not think that the design affected them at all. The general learner modality patterns seemed to be: 1) chose one modality and stuck with that modality through the entire course, 2) created a linear mixture of both pathways for the entire course, 3) created a nonlinear mix of both modalities for the entire course, 4) chose one modality at the beginning and then switched to the other when the original choice became difficult or confusing,
5) chose one modality at the beginning and then switched to the other when the original choice became boring, or 6) utilized both pathways in an integrated manner through the entire course.

Again, analysis seems to lend support to the idea that when given the choice over modality power dynamics, learners will take diverse, individualized pathways through the course. This connects to the first themes of learners appreciating the ability to make those choices. For those that are convinced of the pathway that they need to take, the design of the content and activities do not appear to affect their progress. However, there were a few participants that indicated confusion with the design. So this would appear to indicate that the design concept of customizable pathways is on the right track, but still has room for improvement.

However, some of the comments from participants highlighted the contradictory nature of offering choices to all learners. Many participants indicated appreciation for the fact that they could focus on the linear Stream pathway without interruptions from social interaction in the Garden. Others indicated that they wished the Stream and Garden were more “permeable,” allowing learners to see both options at the same time. The question becomes: which learner gets their desires in the final course design? These ideas cannot really coexist at the same time for all learners. Or perhaps new technology needs to be developed to make this possible?

Another interesting result is that some learners saw content and activities as separate factors, while others saw them as one part of the overall design. Those that focused more on one pathway seemed to see content and activities as the same thing, while those that would try to combine both pathways tended to see them as separate concepts. The problem is, when designing for a customizable modality pathways course, content and activities need to be looked at as separate concepts in order to design pathways that can be interchanged. Maybe these issues
caused some participants to see the design as helpful, while others saw it as confusing or even unnoticeable? Those that saw the design as helpful might have done so simply because they like to pick and choose, while those that saw it as a hindrance simply wanted more coherence between the content and activities.

One other interesting finding to discuss is how some participants felt hindered by the interface and or design of the technology, most notably the learning management system utilized in HumanMOOC. Some of the technology in the course was very inflexible. The fact that many participants noted this could be a sign that the flexibility of the tools is more important that coherence or lack of coherence between content and activities. A case could be made for using more flexible technology tools where they exist, or, where they don’t exist, inventing new ones. The general discussion later in this chapter will dig deeper into what these results could mean for the future of educational technology. However, the relatively high SRL scores from all participants would have seemed to indicate that most learners could overcome those limitations. SRL tends to be studied in courses that have one pathway choice for the entire course, so it may be the case that a new paradigm of SRL needs to be applied to contexts like HumanMOOC where learners are in more control of power dynamics. In general, these issues lend support to the second theme of design and technically difficulties affecting learners in various ways.

Research Question 3: Are there any relationships between learners’ self-regulation experiences and the course designs in the customizable modality course? Research question 3 sub-questions were:

1. What are the MOOC learners’ experiences in terms of their self-regulation?
2. What do learners see as the relationship between their pathway choice, the course content design and self-regulation?
3. **What do learners see as the relationship between their pathway choice, the course activity design and self-regulation?**

The third research question sought to understand the relationship between participants’ self-regulation experiences and the customizable modality learning design. As with the pathways that participants chose, self-regulated learning had a complicated relationship with the learning pathways design. Some participants seemed to note a connection between the course design and self-regulated learning, others noted no apparent connection. However, determining whether or not participants’ self-assessment of their self-regulation levels is accurate is problematic. Scores on the *SRL in Massive Open Online Courses* were generally on the higher end of the scale. However, self-regulation is more nuanced than a number. Several of the participants indicated that they saw self-regulated learning as either something a learner does or doesn’t have. This lack of understanding of the complexities of SRL probably means that more sophisticated means of determining self-regulation levels than self-reported interviews should be utilized to obtain more accurate determination. However, the survey responses did yield interesting results.

Many learners saw their own assumed high level of self-regulation as key to completing the pathway they chose. This seemed to hold true across the entire range of actual self-regulation scores. This could be indicative of the idea that learners’ perceived self-regulation abilities can help learners navigate the customizable pathways design with more success. Designers possibly may need to design activities and content in a manner that enhances learner’s self-perceived levels of self-regulation. At the very least, designers should consider how to teach about self-regulation as part of any course that allows learners to take more control over power dynamics and modality choices.
Additionally, several participants indicated time management issues affected their ability to choose pathways or complete personal learning objectives. Navigating a customizable pathways design might take more time for learners that are not accustomed to making so many power choices. Many learners are used to being told exactly what to do for the entire duration of a course. Designers that wish to utilize customizable pathways course design should probably take into account that making choices does not come easily for those that are not used to making them, thereby meaning that extra time is necessary to navigate the options.

The issue of how some participants viewed their self-regulation levels also has other possible implications. Almost all participants labeled themselves as highly self-regulated learners, and the quantitative scores seemed to confirm that most are on the high end of the scale. But many also indicated that they had trouble with issues related to self-regulation, like time management and motivation. Many participants seemed to be motivated by the ability to make pathways choices (theme one), and did not express any concern with motivation or time management. Maybe while working to decrease the presence of the design itself, designers can work toward highlighting the benefits of making the choices, but with a focus on motivational issues and not the course design. Ultimately, the goal of this study was to determine if something could be gleaned from the more highly self-regulated learners and utilized to help those with lower levels of self-regulation. This aspect seems to be one of those factors: motivation can possibly be gained towards self-regulation by increasing excitement over individualized power dynamic choices in a customizable pathways course design, leading to higher levels of self-perceived self-regulated learning levels. This possible explanation of the results will be explored more in the next section.
Discussion

Several possible explanations for the results of this study have been touched on in the previous discussion of the research questions. However, many of these ideas need to be pulled together in a comprehensive discussion of the relationship between self-regulated learning and customizable pathways design. Some learners did not seem to indicate SRL being affected by the customizable pathways design, which could indicate that the design was implemented well enough to not be noticeable by them. Seeing that other learners indicated that the design actually helped them to self-regulate and complete their learning goals, it could be the case that these learners were just more aware of the design and were able to identify its effect, where the others were not aware of the design and were unable to identify its effect. Either way, the learners that indicated confusion should also be discussed more in depth. Based on the two themes, the real issues to explore are how to increase learner control over choices while dealing with design and technical limitations that hinder.

Meeting Many Needs in One Course

Some of the participants indicated confusion over course design elements, and even a few desired to see different designs or tools to alleviate those confusions. As discussed earlier, some of these desires were contradictory. For example, some of the learners were glad that they could avoid any interaction with the social aspects of the course, while others wanted to see social aspects implemented across every course space.

In a typical course, the instructor controls the power dynamics and would usually pick which option of these two that all learners would have. In a customizable pathways course, that power choice is supposed to be left to the learner. Where technology falls short in allowing this choice, however, the instructors would have to step back in and make that choice. For
HumanMOOC, the choice was made to keep power modality choices completely segregated. The technology simply did not exist to allow learners to choose their level of integration of pathways. However, there was a design element that attempt to create a space for modality integration. The Neutral Zone was designed as a space for participants to see both modality options at any time, and then give learners the power to choose which one to follow. This first version of the Neutral Zone was a simple content and link repository. Most learners did not seem to notice it, but when asked about it, many saw the potential value in this design decision. Some even noted that it could be a good space to help learners integrate modalities as desired, or to separate modalities as desired. Others also noted that the Neutral Zone could be a good place to help learners scaffold into a pathway that is more complex than they are accustomed to.

All of these are good ideas for the future of the Neutral Zone development. This study would seem to indicate that the Neutral Zone does not need to be a static content container whatsoever. The design of the Neutral Zone should grant learners the power to customize not just their pathway choice, but the way they experience their pathway choices as well. Learners that want more integration of the two pathways can choose to go in that direction, and those that want a separation between the two can go in that direction. One interviewee (Blake) suggested “having a drop down menu labeled Stream and one for Garden” so learners could customize how they were interfacing with the content and activities. This one statement could potentially point towards a possible explanation for so many results: learners not only needed to customize their pathway, but also needed to customize their experience of their chosen pathways as well. This solution would add to the first theme of learners appreciating choice, while also possibly addressing the second theme of design and technical difficulties.

*Possible Implications from Coh-Metrix*
But what does it mean to be able to customize their experience? Some might desire more coherence between content and activities, while others might not. Some might desire more permeability between modalities, others might not. Those issues have been explored already. But the possibilities could go beyond this. The exploratory analysis of the language utilized in the interviews might hold another key. As the interviewees became more connectivist, they tended to utilize both modalities more and also started using more concrete terms that were easier to connect with images to describe their experience in HumanMOOC. While these results are still exploratory and very unclear, could it be that those that utilize a more multi-modal connectivist-leaning approach also need to have more a concrete and imagable descriptions of what they do? The Garden and Stream metaphors seemed to be more appreciated by those that utilized more than one pathway. But what if learners could actually choose a different metaphor for their experience of a customizable pathways course? What if they could change the level of concreteness and imagability they experience in the course to suit their personal needs?

Technology is not really that far away from providing these possibilities. Facebook already changes which posts each user views based on various algorithms. What if future studies could determine exactly which learners prefer more abstract concepts and which ones prefer more concrete ones, and then change the learner’s instructions and feedback accordingly? What if the Neutral Zone could simply have Coh-Metrix plugged into it on the backend, helping to update each individual learner’s pathway experience specifically for them? This may be an idea that is down the road a bit, but it is also one that can be seen as a direct result of the implications discovered in both themes of this study. Again, this solution could add to the first theme of learners appreciating choice, while also possibly addressing the second theme of design and technical difficulties.
Increasing Perceived Self-Regulation Levels

One of the aspects noted in the analysis was that many learners had high levels of self-perceived SRL, even though their scores varied on the *SRL in Massive Open Online Courses*. This variance was still within the higher range of the instrument, so it could be that everyone in this course really did have higher ranges of self-regulated learning. However, the participants did seem to have better experiences due to the perception that they had high levels of self-regulated learning. Would participants have even been aware of self-regulation if the survey was not administered at the beginning of the class? Regardless, most probably would not have been too aware of their own levels. Did raising awareness of SRL in the first place help aspects of SRL like motivation? That could be one possible explanation of the study results.

Designers could take this in mind when creating customizable modality pathway courses. The increased cognitive load of considering options and making choices could be balanced by helping learners become more aware of their need to self-regulate. Or, in addition to that, designers could create opportunities to increase learners’ self-perceived levels of self-regulation. After learners make certain pathway choices, they could be met with reminders or content that points out the importance of making that choice, how their choice was a good one to make, and how it shows they are taking control of their learning goals.

Basically, the idea would be to provide some built in encouragement specific to pathway choices that motivates and builds confidence in making choices. Of course, this would need to be specific to each modality, and maybe even individualized by data analysis. Additionally, learners could be encouraged to increase their own mindfulness of their thinking and emotions as they proceed through the course. Therefore, the idea could be that not only do learners need to be able to take on more power by customizing their learning pathway and customizing their learning
experience, but they also need customized encouragement and validation of their pathway choices. With the extra stress of having to make decisions on what modality choices to make, maybe some extra validation that their choice is a good one could go a long way to increasing motivation and self-regulation? The basic idea of the customizable pathways learning design is that all pathway choices are good choices, but what is the contrasting effect of decades’ worth of learners hearing in other contexts that they are doing the wrong thing? What kind of stressful mindset does being told to follow one pathway in courses all the time cause? What really is the effect of removing these stressors and replacing them with the stressors of power choice? Even if future research does not support the idea that higher self-perceived levels of self-regulation is helpful in navigating customizable pathways course design, some added validation and support is sure to help most learners with motivation and regulation. As with the last two discussion sections, this solution has the possibility to add to the first theme of learners appreciating choice, while also possibly addressing the second theme of design and technical difficulties.

Decreasing Confusion

One of the most consistent problems noted by the smaller subset of interviewees that experienced some issue was confusion with choices, tool interfaces, or design. Related to this are those that did not notice some tools or even the general idea of choosing pathways. Part of these problems stemmed from participants not understanding the layout of the learning management system utilized for HumanMOOC (Canvas). This tool offers up two menu lists on the left side of the page once a learner enters a class, and these are not in any specific linear order. This layout might have been too chaotic and overwhelming for some learners, especially those accustomed to other learning management systems such as Blackboard. This stressful chaos could have easily carried over into other areas of the course by individual learners.
Several of the design elements of HumanMOOC were designed to help alleviate this problem. The Neutral Zone was designed as a place for simple, straightforward instructions focusing only on that week’s activities. Clicking on various links would bring up more details about pathways, content, activities, and so on. While true neutrality is difficult to obtain in technology design, the goal of the Neutral Zone was not as much to create a technology-neutral zone as much as to create a neutralized understanding of the modality choices in the learners’ mind. If learners could have been directed to this zone as the central hub of HumanMOOC, how might that have changed the outcomes in this study? The current design of most courses is to place learners on the front page of the one technology chosen to service the course (usually the LMS), a design that places power in the hands of the instructor. Getting learners to make choices outside of the LMS then becomes a difficult process of pulling them out of an environment that they may have just become accustomed to. If true learner power choice is to be enabled, courses will need to have a neutral space as a hub rather than a specific tool associated with just one of those choices.

Unfortunately, since learners had to be directed to the front page of HumanMOOC within Canvas, many did not make it outside of that environment before they had the chance to avoid being confronted by the Canvas user interface. Some learners found that interface to be overwhelming or confusing, so their experience of the course design was biased from the beginning. Again, this points to the need for a tool-free area such as the Neutral Zone to serve as splash page for a customizable modality pathway course.

However, other learners found the layout of Canvas to be easy to understand and navigate. Maybe the idea of a “one-size-fits-all” layout is an unobtainable myth. Many tools have given users the ability to try different “themes” for the content, and even the ability to drag and
drop different interface elements as desired on the screen. What if the Neutral Zone could do that as well? What if, from the first moment a learner begins a course, they are presented with a few simple questions about the parts of the interface they want to see, the visual design they want the interface to take on, and where they want the chosen elements to go? This would seem to support the first analysis theme of learner’s appreciating choice. So it could be the case that not only do learners seem to need power to customize learning pathways, learning experiences, and encouragement / validation of their pathway choices, but they also seem to need power to customize technology interfaces in order to reduce the confusion that can accompany new tools or too many tool choices. This approach would require a high level of interface design, user testing, and research just to create a system that works well and is simple and intuitive for the learner – not to mention the development that would need to go into creating a back-end interface that allows any course designer to design content in this manner. However, once feasible, this solution could be a step towards possibly addressing the second theme of design and technical difficulties.

Implications for Education

Assuming that the findings and discussion from this study are plausible, the task ahead for those working on customizable modality pathways design is complex. Creating customizable learning experiences, customizable encouragement / validation of pathway choices, and customizable interfaces in order to support customizable modality pathways course design is no small task. Technology currently exists to support many of the ideas discussed in this chapter, but pulling these technologies together in a manner that maximizes power dynamics control for individual learners will take a massive amount of research, investigation of options, user
interface design, and end-user testing. Additionally, once a good system for supporting customizable layer design is in place, the hard work begins.

This “hard work” is the paradigm shift that would be necessary in untold numbers of practitioners that are used to controlling the decisions in designing a single pathway, one-size-fits-all-or-else course. So many courses are designed by the instructor in charge with clear objectives, clear steps to achieve those objectives, and clear content to consume as part of those steps. Those aspects can still stay in place as one of the pathway choices in a pathways course. So the charge is really not to change people’s chosen epistemology, but to expand their willingness to embrace others within the same course.

Additionally, more open assessment systems based on competencies rather than objectives will need to gain more in-roads into educational practice. In reality, the idea that objectives are actually objective and unbiased assessment methods is somewhat of a mirage. Some learners work hard to achieve objectives, while others get lucky and guess enough correct answers on the test and “pass” even though they didn’t really know enough to achieve the passing score. Releasing the laser focus on standardized tests and allowing customizable competencies to take root will be a difficult task, but ultimately more representative of what is happening with objectives (that many do not want to admit).

Chapter two of this study explored the various power dynamics at play in education today. Customizable modality pathways design is not as much about eliminating power dynamics, as much as exposing the power dynamics that exist, thereby giving learners the option to pick the ones that they want at any given moment. This shift in mindset away from power struggles to power choices will no doubt have deep reaching impacts on educational systems that are mostly accustomed to one (rarely changing) power dynamic. Instead of this shift towards
Once this trade-off is made at a grass roots level, impressive results are possible. As more learners are able to create truly individualized pathways through course content, fewer will be able to complain about education being pointless or boring. Some common issues concerning education could possibly be alleviated, such as complaints about learners being treated like they are less than human. Specific learning experiences could expand to different contexts that they do not normally reach, thereby include those from different sociocultural situations. Leaners could take more control of their learning, helping them to become life-long learners that are focused more on “how to learn” than on memorizing facts and ideas that they will be assessed on one time and most likely soon forget.

Suggestions for Further Research

Based upon the findings discussed in this chapter, several recommendations for further research are proposed. These recommendations include: investigating different tools, exploring language relationships, developing new instruments, and interface design exploration. These recommendations are discussed in more detail below.

Investigating Different Tools

Because HumanMOOC had previously been administered in the Canvas learning management system, the version of HumanMOOC investigated in this study was also offered in Canvas. Other customizable pathways courses such as DALMOOC have been offered through the EdX system. Both of these systems have specific user interface design choices that work for
some users, but not for others due to interface complexities. Future research could look into other learning management systems, or even content management systems like WordPress or Drupal to see if systems like those work better for more learners. Additionally, customizable pathways courses have leaned heavily on Twitter and blogs for the student-centered connectivist pathway. Many other social media and learning tools exist. Several of these could be researched for their effects on the customizable pathways experience.

Exploring Language Relationships

While the Coh-Metrix investigation in this study was just exploratory, the results indicated that there could be some connections between learner choices and the language they use to explain those choices. This possible correlation could lead to potential connections between the way designers explain their designs, to how learners experience the content and instructions in their courses. Designers tend to think of writing content and instructions as something that is either well-executed or not, but this line of research could reveal that there are different ways to change the language experience in courses based on individual preferences. If this is so, then this research could potentially lead to the development of new systems and ways of thinking about learning experience design.

Developing New Instruments

The continuums that were utilized in the exploratory research were basically ratings system based on the researcher’s expertise in the emerging field of learning pathways design. While they probably reflect a fairly accurate representation of the levels they attempted to rate from the interview responses, a need exists to fully develop and validate “Instructor-Centered/Student-Centered” and “One Modality/Two Modality” scales in order to research customizable pathways more fully. The work in this study cannot really be seen as scale
development as much as research organization, but it does have the potential to become full-blown research scales.

Interface Design Research

As new tools are developed to support customizable learning pathways, experiences, and validation, these will be accompanied by various interface choices. These interfaces will need to be researched with real people connected to eye motion detectors, heart rate monitors, and other sensory devices in order to detect what learners are thinking as they customize so many parts of their learning experiences. Additionally, extensive interviews will need to be conducted in order to gain greater qualitative understanding of what learners are experiencing as they make choices.

Conclusions

The findings reported in this study are often contradictory and vague. Such is the nature of looking into true individualized learning. Individual learners are diverse, unique, and difficult to fit into boxes. In many ways, the scattered results presented here are an indication that the customizable modality pathways design is on the right track. If too many learners lined up on too many factors, there would be no need for customization. However, the results of this study appear to support the idea that learners need the ability to customize their learning experiences. This is evident in the first analysis theme of “participants desired an overall learning experience that was tailored to personal learning preferences.” However, the second analysis theme of “technical and design limitations can create barriers in the learning experience” points to the need to continue research and development on the overall idea of modality power choices. Ultimately, the goal of customizable modality pathway design is to “humanize” online education more, by returning power back to individual learners so they can self-regulate through their own
personalized pathway. Instead of losing learners in a sea of data, computer algorithms, learning at massive scale, and dehumanizing tools, courses could become places where each individual human becomes a unique person fully able to control their own learning experiences.
APPENDIX A

SRL IN MASSIVE OPEN ONLINE COURSES SURVEY
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:** Self-Regulated Learning in MOOCS: Exploring Relationship Between Self-Regulated Learning and Customizable Learning Pathways

**Student Investigator:** Matt Crosslin, University of North Texas (UNT) Department of Learning Technologies. **Supervising Investigator:** Dr. Lin Lin.

**Purpose of the Study:** You are being asked to participate in a research study which examines self-regulated learning and instructional design in online courses. We are conducting a research project on participant experiences in the Winter 2015 Humanizing Online Instruction MOOC.

**Study Procedures:** Data collection will consist of self-regulated learning (SRL) patterns from one online survey and one structured individual interview. The structured individual interview will be conducted by the researchers for up to thirty participants. As a participant in this study you will be asked to:

1) Complete the online SRL in Massive Open Online Courses survey. This survey should take 15 minutes to complete, and the results may give you insight into your own levels of SRL.

2) Up to 30 participants that complete the SRL survey will be contacted for one follow-up structured interview. Participation in the interview will last approximately 30--45 minutes. This interview will take place via the Skype web-conferencing tool or an online form. Participants will need either: 1) a computer with a stable broadband Internet connection and web-cam/microphone
(for Skype) or 2) an Android/Apple smartphone with free Skype mobile app. In this interview we will ask you some questions about your experience in the Winter 2015 HumanMOOC.

For the Skype interview sessions, the interview conversation will be recorded. After the interview, the recording will be transcribed, which means they will be typed exactly as they were recorded, word-for-word, by the researcher. The recording will be kept with the transcription for potential future research. For online form entries, information will securely reside in Qualtrics. The recording, transcription, and online form submission will not be used for any future research purposes not described here.

**Foreseeable Risks:** There are minimal discomforts or risks associated with this study. The only immediate risk to you would be loss of confidentiality, but we will do everything possible to maintain your confidential information. If that is the case, then let us know and we will take notes instead.

If you wish to discuss the information above or any other risks you may experience, you may ask questions now or call the Principal Investigator listed on the front page of this form.

**Benefits to the Subjects or Others:** Given the still-maturing state of open online courses, examination of data and self-regulated learning can inform future design models that provide open learning opportunities to potentially large amounts of people. Themes derived from this study will open new avenues for research. There will also be future offering of this MOOC format and learned lessons can assist with course revisions to better address learner needs and outcomes.

**Compensation for Participants:** There is no compensation for participation.
**Procedures for Maintaining Confidentiality of Research Records:** If in the unlikely event it becomes necessary for the Institutional Review Board to review your research records, then The University of North Texas will protect the confidentiality of those records to the extent permitted by law. Your research records will not be released without your consent unless required by law or a court order. The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

Skype interview sessions will be digitally recorded. All digital files will be coded, so that no personally identifying information is visible on them. The digital files will be kept in a secure place. The digital files will be heard or viewed only for research purposes by the investigators. The files will be retained for possible future analysis. Confidentiality will be protected by not including any identifying information in the data. Pseudonyms will be used to name subjects anonymously. The confidentiality of your individual information will be maintained in any publications or presentations regarding this study.

**Questions about the Study:** If you have any questions about the study, you may contact Matt Crosslin at MatthewCrosslin@my.unt.edu or Dr. Lin Lin at Lin.Lin@unt.edu.

**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 (940) 565-4643 with any questions regarding the rights of research subjects.

**Research Participants’ Rights:**
Your selection below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Matt Crosslin 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.
- Your decision whether to participate or to withdraw from the study will have no effect on your grade or standing in this course.
- 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.
- Your participation in this online survey involves risks to confidentiality similar to a person’s everyday use of the Internet.”

Yes

By selecting below, you certify that you are over 18 and not currently incarcerated.

Yes

Please type in your first and last name:

Please type in today’s date:
Thank you for agreeing to take part in this study. This questionnaire takes the form of a number of statements (32, arranged in three groups) to which you are asked to respond by choosing from a number of options on a scale. The first group of statements relate to your participation in the HumanMOOC that began on December 7, 2015. The second and third groups relate to your learning behavior more generally, in your personal or professional life.

Please make a response to every statement (incomplete responses will significantly compromise the validity of this study). At the end of each page you are invited to make a comment on the preceding statements. Use this space to highlight any issue you have, which you think will help us understand your responses. We will be able to explore specific issues in the interviews.

Additional, we would like to collect some basic demographic statistics in the form below, but these are optional.

The questionnaire should take you around 15 minutes to complete. Thanks very much for your time and input.

- How old are you?
  - 18-25
  - 26-34
  - 35-54
  - 55-64
  - 65 or over

- What is your primary language (i.e., the one you speak most of the time)?
  - English
o Spanish
o Chinese
o French
o German
o Dutch
o Japanese
o Hebrew
o Swedish
o Other (specify)

- Please indicate the highest level of education completed.
  o High School or equivalent
  o Vocational/Technical School (2 year)
  o Some College
  o College Graduate (4 year)
  o Master's Degree (MS)
  o Doctoral Degree (PhD)
  o Professional Degree (MD, JD, etc.)
  o Other

- What is your gender?
  o Female
  o Male

- What is your race?
  o White/Caucasian
- African American
- Hispanic
- Asian
- Native American
- Pacific Islander
- Other

- Where are you located?
  - Africa
  - Antarctica
  - Asia
  - Oceania (Australia, New Zealand, etc.)
  - Europe
  - USA
  - Canada
  - Mexico
  - Central America
  - South America
  - Middle East
  - West Indies

- Which of the following categories best describes the industry you primarily work in?
  - Agriculture, Forestry, Fishing and Hunting
  - Legal Services
  - Arts, Entertainment, and Recreation
• Utilities
• Homemaker
• Government and Public Administration
• Computer and Electronics Manufacturing
• Religious
• Scientific or Technical Services
• Wholesale
• Mining
• Military
• Transportation and Warehousing
• Construction
• Trained Professional
• Software
• Retail
• Skilled Laborer
• Broadcasting
• Publishing
• Consultant
• Real Estate, Rental and Leasing
• Telecommunications
• Temporary Employee
• Primary/Secondary (K-12) Education
• Information Services and Data Processing
• Researcher
• Health Care and Social Assistance
• Finance and Insurance
• Self-employed/Partner
• Hotel and Food Services
• College, University, and Adult Education
• Other (specify)

When responding to these statements, please consider your participation in the current HumanMOOC.

• I am aware of the learning strategies I use when I participate in this MOOC
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I analyze the usefulness of strategies I use while I participate in this MOOC
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I am confident I can understand the most complex material and concepts in this MOOC
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I have control over how well I learn in this MOOC
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I value MOOC course material that really challenges me so I can learn new things
  0-Never 1-Occasionally 2-Most of the time 3-Always

• When learning in this MOOC, I try to relate the material to what I already know
  0-Never 1-Occasionally 2-Most of the time 3-Always
• I try to relate ideas in this MOOC to those in other learning activities I have undertaken (including as part of my work projects)

0-Never 1-Occasionally 2-Most of the time 3-Always

• In this MOOC, I pull together information from different sources, such as presentations, readings, and discussions

0-Never 1-Occasionally 2-Most of the time 3-Always

• In this MOOC I make notes (blog posts, summaries, personal notes, outlines, diagrams, or tables etc.) to help me organize MOOC content and my thoughts.

0-Never 1-Occasionally 2-Most of the time 3-Always

• When a theory, interpretation or conclusion is presented in this MOOC, I try to decide if there is good supporting evidence

0-Never 1-Occasionally 2-Most of the time 3-Always

• Whenever I read or hear an assertion or conclusion in this MOOC, I think about possible alternatives

0-Never 1-Occasionally 2-Most of the time 3-Always

• I share my questions/problems about MOOC content with the others in this MOOC

0-Never 1-Occasionally 2-Most of the time 3-Always

• Do you have any comment on these questions or how you answered them?

When responding to these statements, please consider your general learning behaviour, in your personal or professional life.

• I set short-term (daily or weekly) goals for myself in order to direct my learning activities

0-Never 1-Occasionally 2-Most of the time 3-Always
- I set long-term (monthly or annual) goals for myself in order to direct my learning activities
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I set goals that present me with a challenge or go beyond what I have already achieved
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I set realistic deadlines for reaching my goals.
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I find it easy to prioritize my goals
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I think about what I really need to learn before I begin a learning task
  0-Never 1-Occasionally 2-Most of the time 3-Always
- When planning my learning, I try to use strategies that have worked in the past
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I use specific strategies for different types of things I want to learn
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I know when each strategy I use will be most effective
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I am good at identifying learning opportunities for myself
  0-Never 1-Occasionally 2-Most of the time 3-Always
- Learning that I undertake is in line with my career plans.
  0-Never 1-Occasionally 2-Most of the time 3-Always
- I set my own standards for my learning
  0-Never 1-Occasionally 2-Most of the time 3-Always
• Do you have any comment on these questions or how you answered them?

When responding to these statements, please consider your general learning behavior, in your personal or professional life.

• If I want to undertake a learning activity, I will make it happen, no matter what
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I am good at organizing information.
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I am good at organizing my time to best accomplish my goals
  0-Never 1-Occasionally 2-Most of the time 3-Always

• During learning, I ask myself if I am meeting my goals.
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I ask myself how well I accomplished my goals once I’m finished learning
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I understand my intellectual strengths and weaknesses
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I re-evaluate my assumptions when I get confused
  0-Never 1-Occasionally 2-Most of the time 3-Always

• I reappraise my experiences so that I can learn from them.
  0-Never 1-Occasionally 2-Most of the time 3-Always

• Do you have any comment on these questions or how you answered them?
APPENDIX B

PERMISSION TO USE SRL IN MASSIVE OPEN ONLINE COURSES INSTRUMENT
Survey Instrument: SRL in Massive Open Online Courses

Version 2  21.08.2013, 05:48 (GMT) by Colin Milligan, Anoush Margaryan, Allison Littlejohn

This survey instrument, building on the work of Zimmerman, Pintrich and others provides a measure of an individual's SRL disposition.

The instrument was used in the SRL-MOOC study exploring self-regulated learning in Massive Open Online Courses (MOOCs) conducted by the Caledonian Academy in 2012. The results of the study are written up in:


The instrument can be freely used and adapted (with attribution).

References

APPENDIX C

INTERVIEW QUESTIONS
**Study:** Self-Regulated Learning in MOOCS: Exploring Relationship Between Self-Regulated Learning and Customizable Learning Pathways

Researcher introduces self, discusses with participant purpose of study, and reviews the voluntary and informed consent forms the participant has already completed.

Structured Interview Questions:

11. Can you tell me about your overall experience in HumanMOOC?

12. At several points in the course, you were given a choice of the learning modality to participate in (instructor-led or student-centered). How would you describe your overall pathway through those choices over the duration of the course?

13. What was your rationale for using the pathway that you choose?

14. What was your rationale for not utilizing a different pathway?

15. Did the course content design factor into the pathway you choose? Why is that so?

16. Did the course activity design factor into the pathway you choose? Why is that so?

17. Considering the results of your Self-Regulated Learning (SRL) survey, how would you describe your experiences with SRL in this course?

18. How would you describe the relationship between your pathway choice, the course content design, and self-regulation?

19. How would you describe the relationship between your pathway choice, the course activity design, and self-regulation?

20. What else would you like to share that would be related to these questions?
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