2018-09-17

Using Design-Based Research to Design a miniMOOC For Faculty Development On Quality Graduate Supervision

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Graduate Supervision

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

GRADUATE PROGRAM IN EDUCATIONAL RESEARCH

CALGARY, ALBERTA

SEPTEMBER, 2018

Abstract

Graduate supervision is a complex relationship and learning process developed between students and supervisors. Professors invest many years in developing expertise and experience in their research disciplines and in their teaching. However, for many academic faculty, graduate supervision is a practice they develop just in time and on the job when they accept graduate students to supervise. Research points to the importance of the graduate supervisor in students' timely completion of their degrees. However, there is a gap in educational research on how to best support graduate supervisors in developing effective supervision practices even though the same research emphasizes the importance of offering such learning supports to faculty members. As higher education institutions are called upon to provide quality faculty development opportunities focused on developing effective graduate supervision practices, there is a need for applied research on designs and methods for graduate supervision development that are effective.

This design-based research focused on the design, implementation and evaluation of a flexible and innovative faculty development approach to quality graduate supervision using a miniMOOC. Drawing on theoretical insights from connectivism theory, learning communities, and constructivism, this study was informed by relevant educational theory and research and resulted in a six module miniMOOC that was implemented at a large research university during a Winter semester. Twenty-three faculty members from across disciplines participated in the Quality Graduate Supervision miniMOOC and fifteen completed all six modules. Collection of data on the design and development of the QGS miniMOOC, the implementation of the learning environment, and the local impact, inform the study findings. Outcome of the research include theoretical insights, evidence of local impact, and the development of design principles and a design framework for faculty development MOOCs. Overall, evidence was gathered that

graduate supervisors can benefit from intentional faculty development as they develop their supervision practices and competencies.

Findings from this design based research study suggest that faculty members are willing to participate in faculty development when the learning opportunities are flexible, accessible and tailored to their learning goals and needs. Findings also suggest that in the MOOC learning environment, there are four design elements needed to develop successful faculty development opportunities: 1) relevant topics and resources, 2) high quality videos, 3) discussion forums' design and facilitation, and 4) effective user interface design. The flexibility of the miniMOOC format and the accessibility of the D2L learning environment in this study were found to be contributing factors to the success of the miniMOOC learning environment for faculty members' development of graduate supervision practices. Furthermore, the formation of a learning community in online faculty development is significant to the success of the learning experience. The findings, design principles and implications contributed to the body of knowledge available on faculty development design and development, in graduate supervision practices and in the use of MOOC for faculty development.

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CHAPTER ONE: INTRODUCTION

The complexity and sheer amount of academic work expected in the professoriate increases the pressure on faculty members to be productive and demonstrate excellence in all aspects of their research, teaching and contributions to service. Faculty members are pressured to keep up to date with the latest technology, improve how they teach, and increase the quality of students' learning experiences (Brancato, 2003). Supervising graduate students is an important component of faculty member's teaching responsibilities, and an area that needs more focus and support. Graduate supervision "can be one of the most rewarding, and challenging, responsibilities of a faculty member" (University of Calgary, 2014, p. 1). Developing the skills of graduate supervisors is very important as the graduate supervisor plays a vital role in the success of graduate students (Bloom, Propst Cuevas, Hall, & Evans, 2007). One factor that contributes to the dropout of doctoral students in Canada is insufficient or ineffective supervision (Erichsen, Bolliger, & Halupa, 2014; Skarakis-Doyle & McIntyre, 2008). Institutions are called upon to help graduate supervisors to enhance their skills in graduate supervision by offering faculty development in this area (Taylor & McQuiggan, 2008). However, given their diverse priorities for balancing research, teaching and service commitments, and their demanding schedules, it can be a challenge to gather faculty members together for faculty development seminars and workshops focused on teaching and graduate supervision (Erichsen et al., 2014; Taylor & McQuiggan, 2008).

Even though many institutions offer faculty development opportunities and programs for faculty, many faculty members do not take advantage of these opportunities and do not participate in them. The lack of time, the high volume of faculty work, and logistical issues such

as the times and locations of sessions, the real or perceived lack of recognition or financial awards for teaching, and a general lack of direction from institutions, summarize a few of the reasons why faculty members may choose not participate in professional development that is offered in their institutions, according to a study conducted by Taylor and McQuiggan (2008). Furthermore, Skeff and colleagues (1997) revealed barriers that can discourage participation in faculty development programs that focus on teaching improvement, including, "attitudes and misconceptions of teachers; insufficient support from the institution, and a lack of convincing research on the benefits of teaching improvement methods" (p. 56-57). A successful faculty development program needs to address limited faculty time, the availability and the accessibility of these programs and offer faculty development that is relevant and tailored to the needs of the faculty members (Taylor & McQuiggan, 2008).

Massive Open Online Courses (MOOCs) may provide the flexible and accessible learning environment and solution needed for faculty members to continue to develop experience and expertise both as online teachers and as graduate supervisors. MOOCs are defined as "an online course with the option of free and open registration, a publicly-shared curriculum, and open-ended outcomes. MOOCs integrate social networking, accessible online resources, and are facilitated by leading practitioners in the field of study" (McAuley, Stewart, Siemens & Cormier, 2010, p.10). The idea of using MOOCs to provide faculty development opportunities has been recommended by a number of educational researchers (Annabi & Wilkins, 2016; Bond, 2013; Chang et al., 2016; Fini, 2009; Waite et al., 2013). Fini (2009) indicated that most people attend MOOCs for professional development reasons. Bond (2013) claimed that "MOOCs offer opportunities for publishing and peer review, multi- platform communication, and reciprocal teaching and mentoring, blurring the line between professional development and professional

practice" (p. 31). Given the flexible design options for MOOCs, this type of learning

environment can ease issues of accessibility and limited time for faculty as it is the participant

who determines the amount and scheduling of time they dedicate for learning in the online

environment (Bond, 2013). Annabi and Wilkins (2016) found that the majority of instructors

they interviewed agreed that MOOCs can be used effectively for faculty development purposes.

This study conducted by Annabi and Wilkins (2016) was conducted at international branches of

universities in the United Arab Emirates, in order to gather the diverse attitudes and opinions of

faculty members toward offering faculty development MOOCs at both main and branch

institutions. The NMC Horizon Report Higher Education Edition (2014) described how MOOCs

may also provide a solution for graduate students seeking professional development

opportunities:

> Average university tuition is already steep (and rising), along with the costs of student
>
> housing and travel to and from physical campuses; MOOCs present an appealing
>
> alternative, especially for graduates who are already in the workforce and looking for
>
> fast-track professional development opportunities (Johnson, Adams Becker, Estrada &
>
> Freeman, 2014, p. 27).

In a major survey of Coursera's learners, a survey was sent to approximately 780,000

participants in 212 countries who had completed a Coursera MOOC course as of December

2014; 51,954 learners responded to the survey. The survey data showed that 52% of respondents

reported the main reason they took a MOOC was to build their career by enhancing or improving

their current jobs, or to find new ones (Zhenghao, Alcorn, Christensen, Eriksson, Koller, &

Emanuel, 2015). Furthermore, 72% of survey respondents benefited in their career by taking the

MOOC and another 61% reported educational benefits (Zhenghao et al., 2015). Results such as

these indicate that MOOCs can provide accessible professional development opportunities and can also have benefits for those who engage in the professional development.

A University can use MOOCs to engage large communities of learners across fields of study, which can help in the cultivation of cross-disciplinary learning communities among faculty members and or students. Learning communities are believed to be a very important factor in the success of faculty development (Taylor & McQuiggan, 2008). MOOCs as a learning environment can be easily accessible any-time and anywhere, which can help busy faculty members to attend faculty development opportunities that are designed and offered through this type of learning environment. Online delivery may also be helpful in reducing the cost of faculty development in the longer term as one MOOC can be used to engage faculty members from several university campuses. Moreover, MOOCs can be designed to offer the conditions for connectedness and the collaboration needed for gaining knowledge and engaging in meaningful learning experiences about graduate supervision with academic faculty colleagues. All of these reasons are why MOOCs may be suitable and beneficial for offering faculty development. However, few studies have examined the benefits experienced by faculty members who use a MOOC for faculty development (Chang et al., 2016; Mori & Ractliffe, 2016; Stephens & Jones, 2014; Waite, Mackness, Roberts, & Lovegrove, 2013).

Statement of the Problem

Faculty members need ongoing support for quality teaching, research and graduate supervision. It is assumed that the provision of faculty development opportunities that focus on quality graduate supervision is important and will result in improvements; however, little is known about how to best support graduate supervisors in ongoing development and little research has been done to evaluate the outcomes. According to Dangel and Tanguay (2014),

"there is conceptual and empirical literature that points to the need for quality supervision; however, there is less information on how to best support supervisors in their work" (p. 4). Manathunga (2010) suggested also that researchers should focus on investigating the form of educational development that can assist experienced supervisors as well to continue reflecting and modifying their practices. Halse (2011) highlighted that there is an emphasis recently in institutions to provide professional developments for graduate supervisors. Even though many institutions offer different faculty development opportunities, many faculty members who need this support do not usually attend these faculty development sessions (Taylor & McQuiggan, 2008). On the other hand, a MOOC designed to offer faculty development in graduate supervision may offer a suitable and flexible learning environment that attracts faculty to engage and contribute to such a learning opportunity. Given the scant research on faculty development for graduate supervision, and also the paucity of research on how to design and evaluate a faculty development MOOC that may help support faculty members in their graduate supervision, there is a clear need for the present research.

My research was designed to examine the potential of MOOCs as an accessible and flexible learning environment to support ongoing faculty development in the area of graduate supervision. Using a design-based research methodology, my study evaluated the design and implementation of a miniMOOC to support faculty development in quality graduate supervision at a large research intensive university in Western Canada. As part of this design-based research project, an exploration into the necessary components of faculty development to support graduate supervisors was carried out to inform the design of this Quality Graduate Supervision miniMOOC closed pilot. The outcomes and results of the study are of interest to faculty development experts, faculty members who are interested in quality graduate supervision, senior

leadership in higher education and to those who are interested in online program development using MOOCs.

Educational Technology Context for Educational Research

Educational technology was defined by the Association for Educational Communications and Technology (AECT) as: "…. the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Januszewski & Molenda, 2008, p. 1). This research study is positioned in the context of educational technology and contributed to the field for three reasons. First, this study aimed to improve the learning of faculty members and their skills as graduate supervisors using a technology enabled learning environment. The relationship between graduate supervisors and their students plays a significant role in enhancing the students' experience, which can lead to a greater number of students finishing their degrees and not dropping out (Manathunga, 2010; Skarakis-Doyle & McIntyre, 2008). This connection between enhancing the skills of graduate supervisors and the success of their students make it a legitimate reason and endeavor to contribute research findings on how universities can provide faculty development opportunities for quality graduate supervision. Furthermore, research on faculty development is one of the domains in the field of educational technology. Second, designing a miniMOOC using a design-based research methodology for faculty development ensured that this research was positioned in the heart of the field of educational technology. According to Herrington, McKenney, Reeves and Oliver (2007), "Future progress in improving teaching and learning through technology can be realized through design-based research as an alternative model for inquiry in the field of educational technology" (p. 2). The field of educational technology needed more research using new approaches such as design-based research more than it needed traditional empirical research

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in controlled settings (Reeves, 2006). The reason, according to Bowler and Large (2008), is that DBR "combines research, design, and practice into one process, resulting in usable products that are supported by a theoretical framework" (p. 39). Reeves (2006) also supports the use of DBR in applied contexts for this educational research methodology's iterative and continual approach to theory informed and design based improvements to practice. On the other hand, "in traditional empirical predictive research, a new technique or device is put to the test in a controlled environment" (p. 35) which rarely reflects the complexity in authentic environments and experiences. Furthermore, this study was carried out in an authentic and complex, naturalistic setting with faculty members from across disciplines who were interested in faculty development on graduate supervision. Researchers in more traditional empirical research rarely engage in the design process or their participation is limited while participation in DBR is implemented into all stages of the research (Amiel & Reeves, 2008). My study adds to the body of available knowledge and research in the field of educational technology through the use of design-based research in investigating the miniMOOC as a faculty development opportunity for faculty members who aim to enhance their graduate supervision skills. Third, this study investigates: 1) the use of an innovation in higher education, 2) an issue in graduate supervision, and 3) the design, development and evaluation of an intervention to enhance the skills of graduate supervisors in supervision. This study addressed the need to provide faculty development on quality graduate supervision and examined a new opportunity for faculty development while applying design-based research and these acknowledgments make the study contributed to the field of educational technology.

Research Questions

The research study employed elements of connectivism, learning community, and

constructivist learning theories in the conceptual framework. In alignment with stages of design-based research, the study posed the following three primary research questions:

1. What design elements are necessary in the development of a Quality Graduate Supervision miniMOOC? [design]

2. What scaffolding and support is necessary for faculty members to effectively use the Quality Graduate Supervision miniMOOC? [implementation]

3. In what ways can a Quality Graduate Supervision miniMOOC support and benefit faculty members in their ongoing development of their graduate supervision practices? [evaluation]

Significance of the Study

It was anticipated that this research would be significant for four reasons. First, there are gaps in the available research that examines the effectiveness of using the MOOC format for faculty development, and little is known about how to best support faculty members in developing their graduate supervision practices. It was expected that outcomes and findings from this study could add to the available research on faculty development with this examination of how to design faculty development using a miniMOOC to support faculty members' development in the area of graduate supervision. The design of the learning environment was informed by theoretical insights from connectivism, learning communities, and constructivism. It was expected that the findings could serve a dual role in increasing awareness and understanding of the importance of supporting graduate supervisors in carrying out their roles and in the importance of quality graduate supervision for every graduate student. Second, the results of this study are expected to be relevant and useful for faculty members, senior leadership and administration, faculty development providers, MOOC developers and scholars who are

interested in the effective design of MOOCs as a flexible and accessible design for learning. Third, the results have the potential to inform universities in the design, implementation, and evaluation of faculty development programs, and in doing so, both the understanding of MOOCs and their ability to provide quality faculty development programs may be enhanced. Fourth, through this research study, a design team designed, implemented and evaluated the first faculty development miniMOOC provided by the University of Calgary and this Quality Graduate Supervision miniMOOC has the potential to be expanded, iterated, and\or redesigned in the future for a broader provincial, national and/or international audience based on this closed pilot test.

Definitions of Key Terms

> **MOOCS.** A Massive Open Online Course (MOOC) is a "course aiming at large-scale interactive participation and open access via the web. MOOC differs from OCW [Open Course Ware] and OER [Open Educational Resources] in that it opens up opportunities for learners to participate in learning activities, rather than making resources or courseware openly available" (Littlejohn, 2013, p. 2).

> **Faculty development.** Faculty Professional development or (faculty development) is defined as an attempt "… designed to improve faculty performance in all aspects of their professional lives – as scholars, advisers, academic leaders, and contributors to institutional decisions" (Nelson (1983) as cited in Camblin & Steger, 2000, p. 2). Since

the focus of this research is on faculty members, the term (faculty development) was used more to describe faculty professional development.

Graduate supervision. Graduate supervision is defined as "a unique and multifaceted form of pedagogy" (Skarakis-Doyle & McIntyre, 2008, p. 1). A graduate supervisor is a faculty member who should

…act both as a general academic mentor, with emphasis on guidance, instruction, and encouragement of scholarship and research, and as a judge of the student's performance. Because of their own involvement in research and related professional activities, supervisors should provide professional guidance and research stimulation to their students. A fundamental duty of the Supervisor is to impart to the student the skills necessary to plan and conduct original research (University of Calgary, 2009, p. 2).

Effective supervisor. According to Skarakis-Doyle and McIntyre the effective supervisor "is one who can identify students' learning styles, their strengths and weaknesses, while employing a repertoire of skills for working effectively within this range of differences" (2008, p. 12).

Organization of the Dissertation

This dissertation, which is a detailed report based on my design-based research study, is organized into six chapters as follows:

- Chapter 1: Introduction
- Chapter 2: Review of the literature
- Chapter 3: Design of the study
- Chapter 4: Implementation of intervention
- Chapter 5: Discussions

- Chapter 6: Recommendations and Conclusions

Summary

  This introductory chapter served to outline the doctoral research study and provides an overview of the research problem. This introduction positioned the research study in the field of educational technology, presented the research questions, and also stated why this research study is significant, followed by definitions of key terms. In the next chapter, a review of the available literature is presented that examines in detail the key topics regarding MOOCs, faculty development and graduate supervision.

CHAPTER TWO: REVIEW OF THE LITERATURE

Introduction

The literature review summarizes key ideas related to the research problem in three main

sections: Massive Open Online Courses (MOOCs), faculty development, and, in particular, the

characteristics of an excellent graduate supervisor. The literature reviewed in each section

provides an overview of the topic and summarizes empirical findings about the phenomena.

Based on the literature review, a conceptual framework based on major theoretical findings of

the three interrelated topics of the research are presented.

Massive Open Online Courses

McAuley et al. (2010) define Massive Open Online Courses as "an online course with the

option of free and open registration, a publicly-shared curriculum, and open-ended outcomes.

MOOCs integrate social networking, accessible online resources, and are facilitated by leading

practitioners in the field of study" (p.10). Haggard et al. (2013) define MOOCs based on

description, history, and function. Descriptively, a typical MOOC course ranges from 4 - 10

weeks of learning activities, followed by a final week to produce a piece of work. Students are

expected to spend two - six hours a week on the course (Haggard et al., 2013). Learning

materials and resources remain accessible even after the MOOC finishes. Even though the

number of students who register for a MOOC can reach into the thousands, the actual number of

students who complete and obtain the certificate is usually lower (Haggard et al., 2013).

Furthermore, MOOCs are defined as:

> planned learning experiences within non-formal, digital educational settings, used to
>
> facilitate learning at scale. In computer-mediated (networked) settings, as is the context
>
> of our research, learning is observed as a dynamic and complex process. Learning,

involves student interactions with other students, teachers, and content (Joksimović et al, 2017, p. 47).

From a historical perspective, the growth of MOOCs is similar to the movement for Open Education Resources (OER), and prior to that, the pioneering experiments in distance learning technology; a MOOC "is an evolution of previous experiments in open education and online learning" (Haggard et al., 2013, p. 10). Knowing the history behind MOOCs is important for three reasons:

…first, these origins may reveal that the MOOC is, or is not, a genuine educational innovation. Second, if the innovations emerging from MOOCs are connected to the other recent learning practices, the benefits of MOOC formats will be widely shared. Third, the history of distance learning shows earlier cycles of online innovation and popularity which have not ended happily (Haggard et al., 2013, p. 10).

One example of a less than happy ending in technology is what occurred after the start of the dotcom phenomena. Many commercial projects were created, such as Fathom, AllLearn, Universitas 21, and others; all of these have since either ended or moved away from their original goals. MOOCs might eventually go through the same decline or evolution (Haggard et al., 2013). Functionally, what makes a MOOC different from other types of online learning is that "… no professional academic time…is allocated to guiding or supporting individual learners. Some aspects of some MOOCs are now charge-bearing…and this trend is spreading as MOOCs begin to offer accredited learning" (Haggard et al., 2013, p. 10). Furthermore, MOOC pioneer George Siemens argued that learning is achieved when it is based on the concept of network-directed learning, more than on the concept of self-directed learning, a concept he calls "incomplete" (Siemens, 2011). Furthermore, Siemens (2011) argued that in MOOCs the social,

technological and informational networks influence the learning more than the individual sense-making.

The first time the term Massive Open Online Course appeared was in a course on "Connectivism and Connective Knowledge", by George Siemens, Stephen Downes, and Dave Cornier in 2008. Downes explained the reason behind the naming of the course was, "because of its size, Connectivism and Connective Knowledge is being called a massive open online course" (2008, para. 3). The enrolment in this first MOOC reached 2200 participants. The course was not the first online course with high enrolment, nor was it the first course that offered credit online. The uniqueness of this course was the combination of three elements: "its large size, its openness, and it's for-credit status" (Downes, 2008, para. 3).

MOOCs have evolved in a short time and have taken on different characteristics and categories. At least seven different approaches and categories have emerged for MOOCs: cMOOC, xMOOC, pMOOC, hMOOC, mMOOC, aMOOC and MOOClative (Haavind & Sistek-Chandler, 2015). cMOOCs are built on connected and collaborative learning and the idea of connecting individuals with the same interests in one course to exchange ideas. cMOOCs are designed to adopt new pedagogies, different from those used in traditional classrooms (Yuan & Powell, 2013). xMOOCs are based on shared pedagogical models adopted among different institutions, and are usually structured according to the instructional method of watching video presentations and taking quizzes and/or tests (Yuan & Powell, 2013). Rodriguez (2012) compares multiple case studies of MOOCs and classifies them as cMOOCs and AI-Stanford-type courses (xMOOCs). Rodriguez found that xMOOCs, with the cognitive-behaviourist approach, dominate the MOOCs offered and have an individualist learning approach. Conversely,

cMOOCs, which use a connectivist approach to support a social learning approach, ae less prevalent (Rodriquez, 2012).

The third category of MOOCs are the Project MOOC or (pMOOC), which is a combination of the cMOOC and the xMOOC. The main idea in pMOOC is for learners to design a project and then peers review the project in the MOOC. The requirement for completing such a MOOC is to review other peers' projects (Haavind & Sistek-Chandler, 2015). The fourth MOOC category is the hybrid MOOC (hMOOC) in which there is a combination of the face-to-face learning approach and learning in a massive open online environment, as defining this type of MOOC (Haavind & Sistek-Chandler, 2015). The Open University used this MOOC approach by starting first with the face-to-face approach then moving their students to the online xMOOC or cMOOC (Haavind & Sistek-Chandler, 2015). The fifth category is the mini-MOOC or (mMOOC) where the MOOC is designed to support open access, but is limited in participation to less than 500 participants. The sixth category, which is still emerging, is the adaptive MOOC or (aMOOC) where the instructor and assistants make changes to the design of the MOOC and change the original plan as required during the offering of the MOOC. The last category found in the literature is the MOOClative in which this type of MOOC has some similarity with MOOCs but do not quite fit the characteristics of MOOCs. Moessinger, in her blog, described her MOOClative as "online educational recourses that have a lot in common with MOOCs but do not quite fit the MOOC frame because they are either not massive, not entirely free, not really a complete course" (Moessinger Blog, 2013, pp. 10). The following figure shows how the growth in MOOCs has evolved over the last six years:

CLASS CENTRAL

Growth of MOOCs
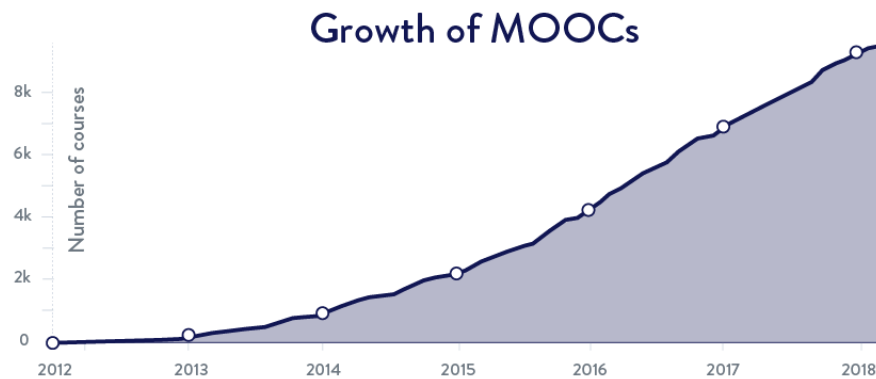
By the Numbers: MOOCs in 2017

Figure 1. **MOOCs Growth (Shah, 2018).**

Since the first MOOC was offered by Siemens, Downes, and Cornier in 2008, MOOCs have gained the attention and interest of educators and educational developers in higher education. The number of MOOCs offered in higher education increased from approximately 100 courses in 2012 to more than 1200 courses in 2013 (Shah, 2013). As of January, 2018, the number of MOOCs offered was estimated to be more than 9,400 MOOCs with over 800 universities around the world having offered at least one MOOC (Shah, 2018). This number shows a rapid growth in the number of MOOCs offered since 2015 as there were around 2000 MOOCs available in 2015 (Class Central, 2015).

The *New York Times* called 2012 "the year of the MOOC", due to the high number of elite universities partnering with MOOC provider, Coursera, the foundation of edX, and the expansion of Udacity (Pappano, 2012). The fascination of higher education with MOOCs is related in part to a MOOC's capacity for large enrollment numbers that can reach hundreds of thousands of participants. Stanford University's MOOC, "Artificial Intelligence", reached 160,000 participants in 2011 and EdX's first official MOOC, "Circuits and Electronics", attracted more than 154,763 participants in 2012 (Liyanagunawardena, Adams & Williams,

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2013; Breslow et al., 2013). MOOCs tend to attract participants for the openness of its resources, social network, and the flexibility in design. Since participation is voluntary, participants choose their method of participation based on their preference and interest in the topic (Liyanagunawardena et al., 2013). Yuan and Powell (2013) add that the interest in MOOCs is also, in part, because of "MOOCs promise to offer flexibility, affordable access and fast-track completion at a low cost for whoever is interested in learning" (p. 5). In an exploratory content analysis, Zawacki-Richter, Bozkurt, Alturki and Aldraiweesh (2018) analyzed 362 empirical articles that were published in peer-reviewed journals from 2008 to 2015 to identify key themes and topics of research associated with MOOCs. The researchers used content analysis and concept maps in their analysis, and found that the concept, in this case 'courses', was mentioned most often in titles and abstracts of articles (100%), then the theme Massive Open Online Courses (83%), learners (23%), design (10%), analysis (9%), future (7%), and universities (6%) (Zawacki-Richter, Bozkurt, Alturki & Aldraiweesh, 2018). Four themes emerged from analyzing the research content areas in the MOOC literature: "(a) the potential and challenges of MOOCs for universities; (b) MOOC platforms; (c) learners and content in MOOCs; and (d) the quality of MOOCs and instructional design issues" (p. 247). Many of these MOOC content areas were discussed in this literature review.

Many MOOC providers have emerged since the start of the phenomenon; however, five providers tend to have dominated the field: first, Coursera, the international co-operative partnerships of more than 60 institutions led by Stanford University with 30 million users. Second, edX, founded by Massachusetts Institute of Technology and Harvard with 14 million users. Third, XuetangX, the Chinese largest online platform with 9.3 million users. Fourth, Udacity, also founded by Stanford University, and more than 30 global educational institutions

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with 8 million users. Fifth, FutureLearn, the UK online platform with 7.1 million users (Liyanagunawardena et al., 2013; Shah, 2018). Furthermore, there are additional MOOC providers around the world, such as Canvas and NovoED in the US, Open2Study in Australia, iversity in Germany, Rwaq in Saudi Arabia, and Edraak in Jordan. Rwaq was founded by two Saudi entrepreneurs in 2013; the only platform built from scratch to cater for the needs of the Arabic-speaking audience. Rwaq claims to be the "only fully-native and fully-Arabic learning hub for Arabic-speakers worldwide, with content from Arab professors across the Arab World" (Macleod, Haywood, Woodgate & Alkhatnai, 2015, p. 61). Rwaq offers courses from different disciplines, including medicine, engineering, sciences, social sciences, religion, computer science, languages and arts. Six hundred thousand participants are enrolled in the 355 courses that Rwaq currently offers (Hamamou, 2017). The University of Edinburgh is interested in collaborating with non- English speaking platforms, sharing research findings, and possibly creating joint MOOCs (Macleod et al., 2015). On the other hand, Edraak took another approach to offering MOOCs; Queen Rania Foundation for Education and Development partnered with edX instead of building their platform to provide an Arabicized version of its platform for the Arabic-speaking audience (Macleod et al., 2015). Edraak platform have more than one million uses or as Edraak called them "learners" which makes Edraak the largest Arabic online platform (Hamamou, 2017).

Despite the enduring enthusiasm surrounding MOOCs and what this approach to online learning can provide to learning and learners, there are some educators who think "the innovation of MOOCs are the victory of packaging over content" and that MOOCs are disruptive to higher education (Haggard et al., 2013, p. 4). The debate is covered in more detail later in the literature review. The next section summarizes the empirical findings and research on MOOCs in

recent literature that focuses on MOOC's impact on higher education, in general, then on the impact on institutions and learners. Finally, the literature focuses on the implementation of MOOCs in higher education.

Findings of MOOC Research

  MOOC's impact on higher education. A big debate regarding MOOCs' impact on higher education is the idea that MOOCs will change higher education. Hill (2012) argued that in order for MOOCs to transform Higher Education, they need to achieve the following goals:

  1. Develop business models to make MOOCs self-sustaining,

  2. Deliver acceptable evidence of completion, such as credentials or badges,

  3. Provide higher motivation for students to assure higher completion rates, and

  4. Provide ways to authenticate student identity.

  Haggard et al. (2013) stated that after more experimentation, MOOCs will reach a form of maturity. At that time MOOCs will mature toward being a significant and properly "standard element of credentialed University education, exploiting new pedagogical models, discovering revenue and lowering costs" (p. 5). Yuan and Powell (2013) pointed out that MOOCs are already experiencing issues regarding pedagogy, quality, completion rate, sustainability, and awarding credit; these issues need to be addressed and investigated. As the debate continues, many educators have concluded that, "massive open online courses will not fundamentally reshape higher education, nor will they disappear altogether" (Kolowich, 2014, p.1). Furthermore, "MOOCs will not replace teaching. However, MOOCs can improve instruction and provide access to learners around the world, those who desire education the most" (Matkin, 2013, p. 2). A key benefit of a MOOC is accessibility for the intended learners.

  In a more recent opinion on this debate, George Siemens argued that the promise that

MOOCs will transform higher education failed to arrive (Bonk, Lee, Reeves & Reynolds, 2015). The MOOCs trend reflected the need in societies to change as the knowledge and the learning needs of individuals have changed tremendously. Siemens explains that MOOCs were a response to the need for training and education and were never on higher education and that what drove the development of MOOCs were the same need for the development of information access tools such as Google search and Wikipedia. Siemens argues that learners were looking for other forms of development rather than regular university or college courses and that MOOCs were the answer. He concludes that MOOCs have influenced higher education but have not transformed it (Bonk et al., 2015).

MOOC's impact on educational institutions. One of the key issues impacting institutions who aim to establish MOOCs is institutional readiness for this innovation. EDUCAUSE executive briefing (2012) highlighted three important questions that institutions, who want to adopt MOOCs, should answer before proceeding: 1) what are the institution's motives to invest in MOOCs, 2) how do MOOCs fit into their e-learning strategy, and 3) what is the institution's capacity to support MOOCs?

MOOCs require several types of support. Even if the courses are self-hosted by the institution, the MOOCs require technical (e.g., editing, graphic, design), instructional, and library (e.g., copyright, resources) support. MOOCs require funding and a dedicated team of faculty members who are willing to devote their time and effort for the MOOC to succeed (EDUCAUSE, 2012). Lombardi (2013) reported that Duke administrators, faculty and staff asked similar questions as administration explored their institution's readiness for collaboration with Coursera to offer MOOCs in 2012. The following questions were generated:

How well does the Coursera model of partnership and pedagogy align with the

University's distinctive strengths and strategic academic goals? Did it represent a sustainable model for advancing open education as a social good? Would the partnership with Coursera generate new data that might improve teaching and learning, both on campus and online? (Lombardi, 2013, p. 240)

Duke University's administrators, faculty and staff discussed their reasons for offering MOOCs and agreed that MOOCs would encourage faculty members to be innovative in their teaching strategies, which aligned with the institution's goals and strategies. MOOCs also opened an opportunity for faculty to become known and connect with alumni, which also aligned with Duke's signature strengths as the university supported "(1) internationalization; (2) knowledge in service of society; and (3) interdisciplinary studies" (Lombardi, 2013, p. 241). After Duke University's agreement to partner with Coursera, the university started their first series of MOOCs in Fall 2012.

According to Hollands and Tirthali (2014), in their report on the expectations and realities of MOOCs, the main goals for institutions that offer MOOCs are, 1) extending the reach of institutions, 2) access to education and 3) building and maintaining institutional brands. In their study, Hollands and Tirthali (2014) used a qualitative method and interviewed 83 people from 62 institutions about MOOCs. Interviewers identified six goals of institutions that offer MOOCs and they are, in order:

extending the reach of the institution and access to education; building and maintaining brand; improving economics by lowering costs or increasing revenues; improving educational outcomes for both MOOC participants and on-campus students; innovation in teaching and learning; and conducting research on teaching and learning. (Hollands & Tirthali, 2014, p. 49)

The cost of a MOOC can vary from university to university, depending primarily on the amount of media included and the quality of video production. The average cost of producing an online course with 10 hours of finished video is $43,344 US (Hollands & Tirthali, 2014). Of course, the cost of offering the same MOOC is lower in subsequent offerings than the initial cost of the production for a first-time MOOC and becomes lower each time the university offers that MOOC (Hollands & Tirthali, 2014). MOOCs can be used to lower the cost of using University facilities. For example, universities could incorporate virtual laboratories in MOOCs to reduce the cost of on-campus laboratory use, as Bacow, the President Emeritus at Tufts University suggested when interviewed by Hollands and Tirthali (2014). Motives, strategy and capacity are some of the key issues regarding the readiness of institutions to adopt or offer MOOCs.

MOOC's impact on learners. One of the first issues identified along with the popularity of MOOCs is the relatively high student dropout rate. Even though the number of students who enroll in a MOOC can be very high, early findings indicate that the dropout rate can also be high. Kolowich (2013) noted that, "massive open online courses have gained renown among academics for their impressive enrolment figures and, conversely, their unimpressive completion rates" (pp.1). One MOOC team found that the average completion rate for MOOCs is below 13% (Onah, Sinclair & Boyatt, 2014). Even though the MOOC completion rates seems like a big issue in MOOCs, some researchers (e.g. Kizilcec, Piech & Schneider, 2013; Devlin, 2013; Onah et al., 2014) argue that the success of MOOCs should not be viewed solely in this way, and that statistics do not provide a complete view of the whole situation.

Researchers (e.g. Onah et al., 2014; Yang, Sinha, Adamson, and Rose 2013) argue that factors beyond completion rates need to be considered when assessing the value and potential benefits of MOOCs. For example, Yang et al. (2013) discovered, while studying Coursera's

MOOCs, that one reason for high participant drop out is the MOOC's failure to provide the necessary social environment for participants. Yang et al. (2013) use a statistical technique, called a survival model, to further understand participant patterns as the students come to the MOOC in different cohorts. The exploratory analysis shows that student attrition can be predicted based on their behavior in the discussion forum and that the higher engagement in the discussion forum is linked with the higher completion rates. The research also showed that participants who join the MOOC after the start time are more likely to drop out since they fail to form social connections or community in the same way that participants do who join at the beginning of the MOOC (Yang et al., 2013).

Participants in MOOCs appear to need social engagement and emotional support in order to have conducive and sustained engagement during their learning experience and to remain active in the community, particularly when participants don't start MOOCs at the same time. To better understand how to improve and support participation in MOOCs, Onah et al. (2014) examined the influence of offering support to participants in MOOCs. University of Warwick offers Computing For Teachers MOOC (CfT) to support teachers introducing computing content to students as part of the requirement in U.K schools. The MOOC was designed with two equal modes; "'traditional' MOOC mode with peer support, and 'supported' mode with a real time, tutored programming lab" (p.1). More than 550 teachers registered for the MOOC and 30 teachers registered for the paid or "supported" mode. The analysis of the MOOC was simple; researchers took a snapshot of the data at one point during the MOOC to compare participant engagement in all modes. Then, the researchers compared the differences in participation in the two modes using basic comparison. No further information was given in the paper regarding their methods. Onah et al. (2014) found that even participants classified as dropouts (because

they were not doing the necessary components to get the certificate), didn't actually drop out of the MOOC; they were simply finishing the MOOC at their own pace. Another finding revealed that the students enrolled in the supported mode had the highest completion rate for the quizzes and, more surprisingly, the supported students didn't make use of the real-time tutorial sessions or the tutor-monitored forum. The conclusion is that the payment of the supported mode wasn't the reason for the commitment; rather it appears that those students were highly motivated from the beginning.

Researchers were interested to measure dropout differently instead of measuring dropout when participants of MOOCs do not finish the MOOC. In a study conducted by Ye et al. (2015), they defined dropout as the participants who access less than 10% of the materials in the MOOC. On the other hand, Vu et al. (2015) considered participants as dropout students when they stop participating in learning activities and assessments which included participation in the forum and their quiz grades.

In order to understand the impact of MOOCs on learners, research was reviewed on participant interaction in the MOOC. Kizilcec et al. (2013) studied participant interaction and types of engagement in three computer science MOOCs in order to identify how course designers can support all types of learners and to better understand the reasons behind participant disengagement in MOOCs. Data related to demographics and learner intention was collected through a survey at the start of the course. Data related to geographic location was collected using IP addresses. Data related to the overall experience was collected using a post-course survey. Researchers then applied a learning analytics methodology to find out how students interact in the MOOC, and also applied clustering techniques to identify subpopulations among participant levels of engagement. Kizilcec et al. (2013) identify four high-level prototypical

engagement trajectories (completing, auditing, disengaging, and sampling). The researchers identified the trajectories through analyzing factors of demographic information, geographic location of participants, participant intention for enrolment, and activity in the course forum. The majority of participants in the three MOOCs were full-time employers, and graduate and undergraduate learners. In general, most of the participants were from technology-related industries. The researchers found that Auditing learners had relatively high experience in two of the three MOOCs and their experience was similar to the Completing learners. The researchers suggest supporting Auditing learners by identifying them at the beginning of the MOOC through self-reporting. Then, researchers can encourage them to focus on watching videos, for example, rather than sending them reminders of assignments or quizzes. Conversely, Disengaging and Sampling learners were found to have a lower level of experience, overall. According to the survey by Kizilcec et al. (2013), participants identified three reasons that affected their engagement: personal commitments, work conflict, and course workload. The researchers also found that participants in the HS-level course (high school level content) were mostly completing learners and it also has the most Completing learners of the other two courses (the UG-level and the GS-level). The researchers believe that this is due to the level of content and the kind of in-videos exercises the courses contain. The HG-level offers short videos with programming challenges that are fun and rewarding, while the other courses tend to have videos that feature multiple choice questions (Kizilcec et al., 2013).

Breslow et al. (2013) studied learners in edX's first MOOC, entitled "Circuits and Electronics" (6.002), which is a requirement for undergraduate majors in the Department of Electronic Engineering and Computer Science. This MOOC ran for 14 weeks in 2012. The data collected by multidisciplinary researchers includes:

the IP addresses of all enrolled students; clickstream data that recorded each of the 230

million interactions the students had with the platform; scores on homework assignments,

labs, and exams; student and teaching staff posts on a discussion forum; and the results of

a survey sent to the 6.002x students at the end of the course. (Breslow et al., 2013, p. 14)

Analysis of the data was done in two stages. The first stage investigated "how the

certificate earners allocated their time and attention over the course among the various course

components" (p. 14). The second stage was dedicated to investigating the question of "who were

the students who enrolled in 6.002x, and what factors related to their level of success in the

course?" (p. 17). After analyzing data generated from that MOOC, Breslow et al. (2013) found

that the learners are diverse in their intentions for enrolling in the MOOC and in their

background, whether it is age, gender, or country of origin. Data revealed that students who

acknowledged on the survey that they "worked offline with anyone on the MITx material" or

with "someone who teaches or has expertise in this area," earned three or more grades higher

than students who worked by themselves. The finding suggests, "that collaborating with another

person, whether novice or expert, strengthens learning" (p.20).

To understand participant behavior in progressing through MOOCs, Perna et al. (2014)

studied 16 first-generation MOOCs offered by the University of Pennsylvania through Coursera.

The courses were offered and completed from 2012-2013. The completion rate across all the

MOOCs was 12 %, whether the researchers measured it by accessing the first lecture, attempting

the first quiz, or receiving a final grade of 80% or higher. The data was collected by Coursera

and stored in the IT department at the University of Pennsylvania. The first analysis of the data

was descriptive followed by a more extensive analysis. The researchers divided the participants

into two categories: 1) starters (who start the MOOC at the same time it was offered or no more

that one week later) and 2) registrants (who start the MOOC at any time from the MOOC start date until two months after the MOOC ends), and then analyzed the two categories of participants' interaction with the material. In the 16 MOOCs, there was a total of 710,385 registrants and 541,576 starters. Perna et al. (2014) found that most of the participants accessed the MOOC content in sequential order, as set by the instructor. Researchers also found that drop out can be predicted if students registered, but didn't access the first lecture. Another significant milestone is that the number of participants who attempted the first quiz was higher than the number of participants who accessed the first lecture; suggesting that participants who attempt the first quiz are more likely to complete the MOOC, and could be a key predictor for which students will complete the MOOC.

Implementation of MOOCs in Higher Education

In a relatively short period of time, MOOCs have become integrated into higher education and educational institutions with faculty members implementing MOOCs in different ways. From wrapping MOOCs around existing campus courses, to using MOOCs as a platform for multi-institutional collaboration, to using MOOCs for faculty professional development, it appears that MOOCs can offer flexible designs that fit the needs and goals of institutions. The following section examines three key uses for MOOCs in higher education: 1) for blended learning, 2) to facilitate multi-institutional relationships, and 3) for professional development.

Using MOOCs for blended learning. The blended learning format uses traditional face-to-face courses accompanied by MOOCs on the same topic. Bruff, et al. (2013) examine how the Stanford University Machine Learning MOOC was integrated into a graduate course in machine learning at Vanderbilt University in Fall, 2012. In addition to campus lectures, students were required to enroll and register in the MOOC, take quizzes, complete the assignment, and watch

the videos. The researchers used a case study approach and collected their data through focus

groups during the first weeks of the semester, an evaluation form in the middle of the course, and

a post-course survey after the semester ended. The analysis was done qualitatively with 10

participants (Bruff et al., 2013).

There was some challenge in the coupling of the graduate machine learning course and

the MOOC, as some of the content that was covered in the course was not covered in the MOOC.

Students reviewed the blended format positively and indicated their belief that the MOOC had

some advantages over the traditional course format, such as being more flexible and accessible

than the traditional course. On the other hand, students had some concerns about the coupling of

online and in-class components for this particular course. For example, some of the materials

covered in class did not align with the materials covered in the MOOC which students found

confusing. Findings from the study also showed that all of the students in the blended learning

course completed the integrated MOOC (Bruff et al., 2013).

Using MOOCs to facilitate multi-institutional relationships. MOOCs can facilitate

relationships between institutions and present opportunities for collaboration among institutions

by exchanging materials and courses. According to Hollands and Tirthali (2014), "a number of

cross-institutional collaborations have already been formed to offer online courses, including

MOOCs" (p. 164). The authors added, "many interviewees expected more cross-institutional

collaboration to share resources and expertise, and to spread costs that could not be borne by a

single institution" (p. 164). According to Kjeldstad (2016), the main reason many institutions are

looking for collaboration with other institutions in developing, offering and analyzing MOOCs is to enhance educational standards of each of these institutions.

Faculty members at different universities often want to share their courses, content and materials; MOOCs provide this opportunity. The Humanities, Arts, Science and Technology Alliance and Collaboratory, or HASTAC, organized a MOOC with Duke University, entitled "History and future of (mostly) higher education", that was offered simultaneously on campus at Duke University, Stanford University, and the University of California, Santa Barbara (Hollands & Tirthali, 2014). The collaboration provided an exciting opportunity for students to learn from influential educators and exchange ideas and knowledge with professors from across institutions. The MOOC offered reading materials, discussions and interviews for participants. The MOOC was offered in January 2014. Another example is the collaboration between University of Maryland and Vanderbilt University. The University of Maryland provided a MOOC that they developed and then Vanderbilt University followed it with a second MOOC that they developed. The second MOOC was offered by Vanderbilt University in January 2014. Students interested in the subject take the two MOOCs in sequence (Hollands & Tirthali, 2014). Douglas Schmidt, a professor at Vanderbilt University and one of the MOOC facilitators describes the collaboration as "creating such an opportunity for Vanderbilt and University of Maryland students alone would be incredibly complex in a traditional environment. With the MOOC platform, not only is it possible, it will now be available to learners globally" (according to Moran, 2013, pp. 4).

Furthermore, the Vanderbilt University Center for Teaching is joining a multi-institution project offered by the National Science Foundation to create two MOOCs on evidence-based teaching practices for future STEM (science, technology, engineering, and mathematics) faculty. The three-year collaboration project among six institutions and the National Science Foundation

had a budget of $750,000 (Bruff, 2014a). The MOOCs target current and future faculty members

with the goal to support and enable them to create inquiry-based projects and incorporate them

into their courses (Hoyal, 2014). The first MOOC started on October 2014 and it ran over seven

weeks. One of the unique aspects that this MOOC incorporated is the MOOC-supported learning

communities. The MOOC facilitators encouraged the formation of local learning communities

among MOOC participants and beyond the typical MOOCs' communities. MOOC facilitators

are going to provide discussion questions and activities for those who sign up to form a

community in their institution and in return, these learning communities are going to share

highlights from their discussions, send representative to the virtual office hours to meet with the

MOOC facilitators, can upload materials into the MOOC and suggest new topics and share their

opinions and perspectives into the global community to enrich the learning community (Bruff,

2014b). The examples show the potential of MOOCs as a collaborative platform between

institutions and faculty members to increase the flexible exchange of materials, ideas, and

expertise.

Several studies reported that there are some barriers that could challenge institutions

when they collaborate with other institutions in developing and implementing MOOCs such as

the lack of strategies for implementing MOOCs in institutions (Santos, Punie, & Muñoz, 2016)

and the funding issues and "the fear of losing control over finances when the identity-building

authority is divided among several institutions" (Nortvig & Christiansen, 2017, p. 3). However,

several recommendations emerged from MOOC's providers such as developing shared strategies

and visions for all collaborators in MOOCs, sustainable financial model and developing scalable

technologies to use it in MOOCs (Santos et al., 2016).

Using MOOCs for professional development. There are many studies that describe how MOOCs have been adopted in education for professional development to enable K-12 teachers, students, and staff to benefit from the open and flexible learning environment (Bolkan, 2014; Kleiman, Wolf & Frye, 2013; Misra, 2018). However, there are few studies on the use of MOOCs for faculty development opportunities in higher education (Chang et al., 2016; Mori & Ractliffe, 2016; Stephens & Jones, 2014; Waite et al., 2013).

In a study conducted by Mori and Ractliffe (2016) at Hartpury University to examine the use of MOOCs format for professional development for academic staff at the university. The researchers invited 65 faculty members to volunteer to participate in a MOOC on blended learning and 10 faculty accepted the invitation. The MOOC was offered over five weeks and a focus group was conducted to collect data during the MOOC in week three and then an interview with six participants was done at the end of the MOOC. Researchers used an interpretive social constructionist approach as the research methodology and analyzed the data using grounded theory system of open, axial and selective coding.

Mori and Ractliffe (2016) found that participants appreciated the MOOC format and it was specific to their professional development needs and it was seen as better than attending a regular face-to-face professional development. Five of 10 participants felt that the discussion in the discussion board was superficial and didn't add to the body of knowledge the way that they wanted. One reason researchers found for this unsatisfactory outcome was the timing of the discussion board; participants had limited time to participate in the discussion before having to move on to the next subject. Time restrictions meant that sometimes participants moved to the next subject without receiving any responses to their posts.

Portland Community College developed an activity-based MOOC through D2L on web accessibility for educators that targets teachers from K-12. The professional development opportunity addressed teacher concerns about web accessibility issues in their online classes (Bolkan, 2014). Registration reached 1,500 participants and their experience is considered successful based on testimonies from participants. The participants describe the MOOC as the best professional development opportunity they have had and point out how the instructor had a strong presence in the MOOC. The college offered a new MOOC on the same topic on March 2015, however registration was limited to 500 participants (Dahl, 2015). At the time of writing, there is no available peer-reviewed paper on this second MOOC experience.

MOOC-Ed is a professional development course developed by Friday Institute for Educational Innovation at North Carolina State University in partnership with the Alliance for Excellent Education (Kleiman et al., 2013). The focus is on "Digital Learning Transition" and is designed specifically to provide K-12 educators with a learning opportunity that is structured, flexible, and addresses their needs. Participants report that the MOOC-Ed provided them with valuable lessons that helped them in their professional career. The total registration of the MOOC-Ed reached 2,665 participants in the K-12 sector, with most of the participants having more than 10 years of experience (Kleiman et al., 2013). Kleiman et.al conclude by explaining the need for this type of professional development:

> The need for large-scale educator professional development is clear, but the funding available to meet this critical need is limited and has been declining in many states and districts. Current professional development approaches are costly, often ineffective, and unable to reach all educators. New approaches are required that embody the principles of effective professional development that are scalable, accessible, sustainable, and cost-

effective. (2013, p.8)

In 2013, the SJSU School of Library and Information Science at University of Wisconsin-Madison offered a MOOC on the Hyperlinked Library (HL). This professional development MOOC was based on a previous course offered on-campus and followed the same model as the on-campus course, but with updated material and defined as: "an open, participatory institution that welcomes user input and creativity. It is built on human connections and conversations" (Stephens & Collins, 2007 as cited in Stephens & Jones, 2014, p. 348). The MOOC has ten modules over a 12-week semester and offers a certificate of completion for participants. The researchers used pre- and post-MOOC surveys designed to collect qualitative and quantitative data (Stephens & Jones, 2014). Registrations in the HL MOOC reached 363 students from around the world.

In the post-MOOC survey, 45% of the participants thought that MOOC would aid their professional development and their life-long learning. In the post-MOOC survey, the researchers found that most participants still believed the "MOOC would provide a convenient learning opportunity" (Stephens & Jones, 2014, 349). Convenience refers to time, duration of the course, online accessibility, portability, and cost. They also found that 61% of the participants agreed that they learned new knowledge, ideas, and trends during the MOOC. Furthermore, of 55% of participants reported that they appreciated the variety of viewpoints offered by instructors, content and guest lectures. Stephens and Jones (2014) also found that 35% of participants noted that the MOOC expanded their professional network of peers, because of its diverse community. Conversely, 12 % of the participants suggest reducing the course time and workload, or give more time to "catch up" on the material (Stephens & Jones, 2014).

Waite, Mackness, Roberts, and Lovegrove (2013) studied the perception of novices and

experienced learners towards MOOCs and the factors that appear to trigger active participation. The theoretical framework used in the development of their MOOC was based on three theories: constructivism, connectivism, and Communities of Practice (CoP). The methodology was a case study and data was collected using mixed methods, which came from a course evaluation questionnaire, focus group interviews, individual interviews, thematic analysis of blogs, and a survey questionnaire. The MOOC, entitled "First Steps in Learning and Teaching in Higher Education" (FSLT12), targeted first-time faculty members and people moving into higher education from other sectors, and also provided an opportunity for experienced faculty members to participate in the MOOC. The number of participants in FSLT12 was found to be higher than the equivalent face-to-face course, with 206 participants, and was also found to be more diverse, with participants from more than 24 countries around the world. Waite, et al (2013) found that at the beginning of the MOOC experience, new faculty members were overwhelmed by the multiple channels, technical issues, and the new learning environment. Based on the focus group and survey, it was suggested to the MOOC facilitators "that a core group of experienced volunteers could take responsibility for supporting individual groups within a cohort of novices, moderate back channels and build community at a micro level" (Waite et al., 2013, p. 208). Conversely, the experienced participants were impressed with the interaction between participants and facilitators, and by the valuable exchange of ideas. The experienced participants tended to use their experience to identify and choose their method of interaction in the MOOC (Waite et al., 2013).

Lighthouse is a set of projects that focused on professional development for computer science instructors that were offered successfully face-to-face for eight years. The designs were based on an identified need for a more flexible and reachable approaches to professional

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development based on a needs assessment survey. Survey results influenced the decision to offer the course online and the Lighthouse MOOC was developed. The project was developed for a community college computer science faculty in edX (Chang et al., 2016). Chang et al. (2016) investigated "the theoretical link between motivation and learning outcomes in the context of a MOOC learning environment created for a specific goal" (p.1). The survey was sent to all community college computer instructors and fifty responses were received. The survey measured the instructors' interests in professional development, their prior experiences, and their interests in online learning. The design of the Lighthouse MOOC used the Community of Practice (CoP) model to enhance online learning and Keller's ARCS motivational design model to enhance the learner motivation that lead to better learning outcomes and the content of the MOOC was based on the face-to face version of the course. Chang et al (2016) found that 65.3% of faculty members reported that getting a certificate for attending a faculty development is important while 34.7% reported that it is not important. Faculty members also reported that the preferred delivery methods of professional development were the online professional development and then followed by the face-to-face professional development and that 90% of the faculty members did have some prior online professional development experiences.

Since MOOCs are a relatively new technology enabled learning experience over the past decade, the available literature provides a limited understanding on some aspects of MOOCs. For example, there is limited research literature available on the advantages and the challenges of using MOOCs for faculty development of academic faculty in higher education.

This leads to the next section of the literature review, which examines faculty development definitions, the necessity of faculty development, findings of faculty development

key research, and then in specific, the literature examines graduate supervision, as this is the topic of the faculty development MOOC in the present study.

Faculty Development

Overview. Faculty Professional development or (faculty development) is defined as an attempt "… designed to improve faculty performance in all aspects of their professional lives – as scholars, advisers, academic leaders, and contributors to institutional decisions" (Nelson, 1983, p. 70). Riegle (1987) described different phrases and descriptors used with the term faculty development:

1. Instructional development: focuses on developing the skills of faculty members, including instructional technology, courses, and curricula.

2. Professional development: focuses on the development of faculty in their professional roles.

3. Organization development: focuses on the needs and organization of institutions.

4. Career development: focuses on career improvement.

5. Personal development: focuses on developing personal skills of faculty members (p. 54).

The focus of professional development programs has changed over time from being an "advancement of subject matter competence and the mastery of one's own discipline as it related to teaching" to be focused also on faculty wellness, opportunities for personal growth and career enhancement (Camblin & Steger, 2000, p. 3). Institutions are called upon to offer training and support for faculty and students any time when these institutions introduce new technology or adopt new teaching methods for learning and teaching (Gregory & Salmon, 2013). It is also argued that teaching and learning is strongly tied to the personality and identity of the person, so any changes in teaching also involve changes in personal beliefs (Crebbin, 1997 as cited in

Gregory & Salmon, 2013).

Necessity of faculty development. Faculty members need on-going faculty development to accommodate the rapid change in technology, contemporary learning theories, and to utilize best practices when teaching students (Brancato, 2003; Mundy, Kupczynski, Ellis, & Salgado, 2011). Professors are experienced in their field of interest, but they are not usually as experienced as teachers who know the newest pedagogy and teaching methods that utilize technology (Mundy et al., 2011). According to Mundy et al. (2011), "faculty members are finding it increasingly difficult to keep abreast not just of discipline-specific knowledge but also of teaching innovations" (p. 61). There is also pressure on educational institutions and faculty members to adjust to social, organizational, and student demands that require improvements in the way they teach and to increase the quality of student learning experiences. All of these competing demands require institutions to provide quality professional development for faculty members (Brancato, 2003). Both new and experienced faculty need ongoing, continuous professional development opportunities, especially since many professors "teach the way they were taught" and tend to rely on lectures as their primary teaching method, rather than designing for collaborative learning and problem based teaching approaches (Mundy et al., 2011). Faculty members often supervise the way that they were supervised, which may perpetuate good approaches to supervision or it may result in poor strategies being used with the next generation of graduate students (Bloom et al., 2007).

Fink (2003) argued that higher education institutions "need to give serious attention to their role in supporting faculty change" (p. 61). Faculty members are required to design and deliver courses, are required to be up-to-date with technology, and to assure the quality of their educational programs. Increasingly, faculty members are expected to teach blended and fully

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online courses and few of them experienced these learning environments as students. As such, institutions need to focus on professional development (Herman, 2012). One benefit of professional development is that it connects faculty members with the institution's basic aims, broader mission, goals, and challenges, all of which promote institutions as learning organizations (Brancato, 2003). Another benefit of cross-faculty professional development is the connection among faculty members and teaching peers across disciplines, which can result in sharing and co-development of effective teaching strategies and designs for rich learning experiences.

Key Findings of Professional Development Research

Professional development is an important factor in the success of higher education (Mundy et al., 2011). It is important to note that professional development must be strongly tied to the institution's strategic vision (Camblin & Steger, 2000). Some examples show that changes in the professional development model in an institution also change the way the institution functions (Camblin & Steger, 2000). Swinburne University of Technology in Melbourne, Australia established a 2020 vision for the university that includes a strong emphasis on developing skills of faculty, staff, and students who are teaching and studying just online or in a blended environment (Gregory & Salmon, 2013). The researchers argued their approach, in the case study, is applicable to any institution that seeks to develop an online professional development course based on institutional requirements. Gregory and Salmon (2013) used a well-established course (e-moderating) that has been offered online for over 10 years, through a company called All Things in Moderation Ltd (ATIMOD), to draw upon and design a course for professional development at Swinburne University of Technology. They used the intervention and feedback framework to guide the implementation of the course (Gregory & Salmon, 2013).

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The project was implemented in five phases and was offered four times during these phases. In the first phase, the researchers identified the problem and challenges, explored existing knowledge and concepts and secured commitment and resources for the courses. The second to fifth phases all followed the same stages: first, the focus was on preparing the course and the staff member; second, delivering the actual course at Swinburne LMS and reviewing the prototype; and finally, evaluating each course before offering the next one. The first course had 14 participants, with 10 completing the course. The second course was four weeks and had 16 participants, with 11 completing the course. The third course was offered by the university with no help from ATIMOD, with 15 participants and only 8 completing the course. Before the last course, the provider took their time to evaluate and reflect on the previous offerings and made important changes. They extended the time of the course from four weeks to five weeks to ensure sufficient time for participant engagement. To ensure that participants get recognition on their developmental activities, the providers requested approval from the participants' managers, lowering the attrition rate. Third, they allowed over-enrollment in the course, so that if some participants dropped out, the others still get a dynamic experience (Gregory & Salmon, 2013). Gregory and Salmon (2013) findings from their study of a well-established course (e-moderating) over time and through multiple iterations yielded a framework and research process that can transfer and translate to other higher education institutions.

Collaboration among faculty members is very important and should be supported when designing and offering faculty development programs (Hill, Kim & Lagueux, 2007). The success of any collaboration among faculty members depends on having a sense of ownership over the process and the outcome of their efforts in these professional development (Hill et al., 2007). To support faculty members in taking ownership over their learning process and to feel connected to

the learning environment, faculty members should be involved in the design process for the faculty development programs, which can be done by taking into consideration what do they want and need for their learning. Faculty development programs and training will attract greater participation and have more relevance if it focuses on what faculty members want and need in the faculty development opportunities. According to Taylor and McQuiggan (2008), "when faculty request professional development, we should provide exactly what they need precisely when they need it" (p.34). They found that faculty want professional development opportunities that are flexible, available anytime, and can be taken anywhere as online professional development and that they prefer informal learning opportunities (Taylor & McQuiggan, 2008).

Another important point to consider is that the collaboration, discussions and peer observations among faculty members in professional development programs are not for evaluation as this is not the purpose of these activities. The purpose is to create safe and trusting learning environments for faculty members which can lead to strong and productive, and possibly sustained, learning communities. Learning communities are believed to be a very important factor in the success of faculty development (Taylor & McQuiggan, 2008).

As discussed earlier, faculty development programs should be aligned with the institutional vision, goals, and strategies as well as be designed with a focus on what the faculty members actually need and want in any institution. Another point noted is the importance of checking if the offer of a MOOC in any institution is going to be tied to the institution's vision. These two points were taken into consideration while designing the faculty development miniMOOC in this study.

Graduate Supervision in Higher Education

Overview. New approaches to faculty development focus more on contemporary approaches, such as expanding personal awareness of issues related to research, strengthening relationships among colleagues, supporting institutional missions, and developing faculty and institutional ability to adopt new and emerging information (Camblin & Steger, 2000). One of the important and contemporary faculty development topics is that of developing quality of graduate supervision practices. Graduate supervision in higher education is identified as "a complex pedagogical practice. It is a partnership between an experienced and an aspiring scholar which shifts over the number of years it takes for the research to be done and the thesis to be written" (Kamler & Thomson, 2014, p. 1). Supervising graduate students "can be one of the most rewarding, and challenging, responsibilities of a faculty member" (University of Calgary, 2014, p. 1). The roles and responsibilities of graduate supervisors varies when supervising graduate students and these roles include being a "guide to friend and critic, and everything in between" (Määttä, 2015, p 185). Furthermore, Skarakis-Doyle and McIntyre identified the effective supervisor as the "one who can identify students' learning styles, their strengths and weaknesses, while employing a repertoire of skills for working effectively within this range of differences" (2008, p. 12). Määttä (2015) identified 10 elements of caring supervision, which are: 1) Caring supervision is a sensitive interaction, 2) The emphases of a caring supervision changes during the process, 3) A caring supervisor does not hold back compliments and appreciation, 4) A caring supervisor motivates students to write, 5) Caring supervision clarifies the requirement of PhD research, 6) A caring supervisor teaches time management, 7) A caring supervisor helps students to tolerate uncertainty and criticism, 8) A caring supervisor monitors the fulfillment of the

quality criteria of a doctoral thesis, 9) A caring supervisor provides many kinds of feedback, and, 10) Caring supervision provides suggestions and options.

There are many factors that contribute to the complexity of graduate supervision (Alharbi & Jacobsen, 2016a). Walker and Thomson (2010) explained that the diversity of the students' needs can cause some challenges to supervisors. First, from supervising full-time students to part-time, and domestic students to international students, they all have different requirements and need different kinds of support (Walker & Thomson, 2010). Second, the diversity of the students' programs can contribute to the complexity of graduate supervision since supervisors might be supervising students in course-based programs, thesis-based programs, online programs and/or in blended programs. Supervisors need to be aware of all the different requirements, procedures and timelines for each program with a consideration of the student's specific needs and abilities (Walker & Thomson, 2010). Third, the diversity of the programs might also require different models of supervision. Supervising students in a group-based apprenticeship supervision model where it is common that supervisors carry out bench science with their students in laboratories can be very complex. Supervisors usually supervise different generations in labs from doctoral student to master's and post-doctoral scholars and this model of supervision is common in in the Natural Sciences and Engineering Research Council of Canada (NSERC) and Canadian Institutes of Health Research (CIHR) disciplines (Chiappetta & Watt, 2011). Another example of a different model of supervision is the individual apprenticeship model where the supervision might be experienced as a form of coaching or mentorship that carried out in one-on-one, project-based studies, and/or in applied field settings. This model of supervision is common in the Social Sciences and Humanities Research Council (SSHRC) disciplines (Chiappetta & Watt, 2011). Managing multiple responsibilities at the same time along with

supervising students such as talking up their research, writing grant applications, teaching and knowledge mobilizations are also factors that contribute to the complexity of supervision (Alharbi & Jacobsen, 2016a).

Research and institutional interest in studying graduate supervision and the relationship between supervisors and their students has increased recently due to "the political pressure to increase the number of doctoral degrees awarded" (Skarakis-Doyle & McIntyre, 2008, p. 1). The attrition rate of doctoral students in Canada has been estimated to range from 30-50 percent of students depending on the discipline, and the number of years a doctoral student can take to finish a doctoral degree has increased (Minister of Education, Recreation and Sports (MERS), 2013; Skarakis-Doyle & McIntyre, 2008). Even though the supervisor's relationship with the student is not the only reason for observed rates of attrition and lengthy time to completion, it does play a big role of the successful doctorate experience (Skarakis-Doyle & McIntyre, 2008). Graduate students need and deserve high quality graduate supervision and often graduate supervisors do not know how best to support their graduate students (Bloom et al., 2007). Institutions should provide training and support to graduate supervisors to help them to develop their supervision skills (Bloom et al., 2007).

Research Findings of Graduate Supervision

There are many factors that contribute to a successful graduate supervision experience. Skarakis-Doyle and McIntyre (2008) indicated that communication and explaining expectations are the most important factors in building a successful relationship between supervisor and graduate student. Furthermore, understanding the cultural differences between supervisors and students, as well as balancing responsibilities and personalities of both student and supervisor

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goals - all of these factors contribute to the successful graduate supervision experience (Skarakis-Doyle & McIntyre, 2008).

Egan, Stockley, Brouwer, Tripp, and Stechyson (2009) studied the supervisory characteristics and their effects on supervisor satisfaction ratings at a mid-sized Canadian university, based on student surveys from 1996 - 2005. Participants consist of 1335 graduate students; 284 PhD students and 1051 Master students, with 189 being international students, 1125 domestic students, and 21 not stating their citizenship status. The researchers categorized the students based on their discipline: "hard applied" (e.g. engineering, health science, law), "hard pure" (e.g. physics, mathematics, economics), "soft applied" (e.g. commerce, education, geography), and "soft pure" (e.g. English, history, linguistics). Upon submitting their thesis and completing their degree requirements, students were given an exit survey to complete (Egan et al., 2009).

Egan et al. (2009) found that the overall students' satisfaction rate of their supervision was relatively high. Contrary to researcher expectations, they found no significant differences between the students from 'hard" or 'soft' disciplines in their satisfaction with their supervisors' willingness to spend time with them; they did find that the international students rated their experience higher than the domestic students. Regarding the allocation of supervisory time, there was a result implying that students in "soft" disciplines use their time with their supervisors more than students in "hard" disciplines. Conversely, the difference between international student satisfaction with their allocated supervisory time was 9% while it was 5% in domestic students, suggesting the importance of time allocated to supervision to their overall satisfaction with their supervisors (Egan et al., 2009).

Erichsen, Bolliger and Halupa (2014) agreed that graduate supervision can be time

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consuming and difficult. Erichsen et al. (2014) studied doctoral student perceptions in three

blended and online formats. The study involved 295 doctoral students admitted into online or

blended programs at three US universities in 2011. Data was collected using questionnaires with

qualitative and quantitative questions. At the time of the survey, students were at various stages

of their doctoral degrees; from writing their dissertation, taking their coursework, or recently

graduated. The researchers found that 63% of the students were satisfied with their supervisors

and stated that they wouldn't choose another advisor if given the option. Participants reported the

least satisfactory aspects of the supervisory relationship as the following:

> Lack of communication/ response/feedback on the part of the supervisor; the distance
>
> between the student and the supervisor; lack of direction provided by the advisor; lack of
>
> connection and/or personal relationship with the supervisor; the supervisor was
>
> unsupportive; difficulties related to changing supervisors; needed more time from
>
> advisor; and, finally, the supervisor did not actually read drafts. The lack of professional
>
> development and mentoring were also noted (Erichsen et al., 2014, p. 329).

Participants suggested effective strategies that doctoral students in an online or blended

environment can use to improve their learning experience: communicating with classmates,

asking questions, familiarity with the available recourses and the online library, setting goals,

using good technology, rewarding themselves on achievements, finding a good place to work,

and finally, self-discipline (Erichsen et al., 2014).

Designing faculty development programs for graduate supervisors need specific features

and strategies in order to attract and benefit them. Manathunga (2010) suggested curriculum

design features and pedagogical strategies for the design of supervisor educational development

programs. The first important thing to be noted is the role of the facilitator of these trainings or

programs. The facilitator should play the role of the facilitator/participant, which can eliminate the unequal power relation that the role might give to the facilitator. In other words, the role of facilitating a supervisor educational development programs for other faculty members gives a sense that the facilitator is going to develop the skills of other colleagues. However, when the facilitator adopts the role of the participant along with the facilitator role that opens opportunity for all to question supervision pedagogy. Manathunga (2010) explained how she approached this role:

> A bit like a musical conductor, I orchestrate an ensemble of activities, speakers, reflective moments, discussion and debate. I provide a structure, a space and stimulus, but I do not provide the music. This is provided by the participants (and by my contributions to debates as a fellow participant). I think that adopting this facilitator/participant positioning is fundamental to achieving the kind of critical transcultural exchange that is important in supervisor educational development. (p.79)

There are other curriculum design features that might create space and effective supervisor development programs such as, designing the educational development in a setting of interdisciplinary setting. It is important to expose supervisors to wide variety of disciplinary-based supervision approaches. According to Manathunga (2010), "You are also then in a better position to reaffirm some of your existing practices or to create innovative, transcultural blends of supervisory strategies" (p. 80). Concurrently, in order to have a positive experience for both the graduate student and the supervisor, institutions are encouraged to consider offering educational development sessions for students on how to manage your supervisor and what is expected from you. The learning opportunities for students and faculty should be offered separately as creating a safe space and trusted for both parties is very important. Moreover,

Manathunga suggests offering these supervisor educational developments with a mix of new graduate supervisors and experienced ones. This blend would be helpful in two ways, the new supervisor benefits from the listening to the perspectives and the stories of the experienced supervisors and the experienced supervisors have the chance to think of their supervision practices in new ways. These supervisor educational development opportunities should be designed as well to provide different kind of experiences and settings and not rely on sharing resources and "superficial tips and tricks, which have been linked with the 'training' approach to supervisor educational development" (Manathunga, 2010, p. 81). Regarding the method of delivery, blended learning which includes online and face-to-face sessions is an effective way of offering supervisor educational development according to Manathunga (2010).

This section of the literature review provided an overview of key concepts that are important to this study. The literature reviewed provided an overview of MOOCs, professional development and graduate supervision while providing empirical findings from studies on those concepts. The section that follows provides the conceptual framework for my doctoral study, an examination of the theories supporting the design of the QGS miniMOOC and outlines the need for further research.

Conceptual Framework

Personal interest. My interest in MOOCs started with the emergence of this new technology trend and as I was researching topics to do with MOOCs during my doctoral courses. Furthermore, I became more interested in investigating specifically how a MOOC might be used as an alternative solution to faculty development workshops and seminars after The University of Calgary switched its learning management system LMS from Blackboard to Desire to Learn (D2L) in 2014. The university offered ongoing training workshops on campus and one-on-one

support teams to ease the transition from one learning management system LMS to another. Furthermore, the university offered video tutorials and instruction through the University's website for faculty members, staff, and students during a two-phase implementation period of the new LMS. Even though the transition from Blackboard to D2L was successful through the multiple faculty development sessions that accommodated the numerous faculty abilities and availability, it was also costly and time consuming. My observations of the transition from Blackboard to D2L have led me to suggest that the use of MOOCs as a learning environment for faculty development may be a good approach where institutions can gather a large number of diverse faculty members around a specific topic of interest and encourage them to form a learning community and collaborate while they have the accessibility and availability of this online learning environment.

Introducing a new technology or product to any university requires extensive faculty preparation and support (Gregory & Salmon, 2013). Developing professional skills, teaching innovations, and instructional skills requires ongoing faulty development and universities should focus more on offering quality faculty development (Brancato, 2003; Herman, 2012; Mundy et al., 2011). Studies confirmed that even the universities that offer faculty development programs tend to have low faculty participation (Taylor & McQuiggan, 2008). Skeff et al. (1997) and Taylor and McQuiggan (2008) investigated the reasons for low faculty attendance in faculty development and the most frequent reasons are associated with timing and location. I contend that it is important to try to experiment with new delivery methods to encourage faculty to attend and benefit from faculty development and to create suitable solutions that universities can adapt as part of their overall faculty development programs. This design-based doctoral research thus has two areas of focus: 1) Examining how learning theory and current research can inform the

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design and development of a miniMOOC to support faculty development in the area of graduate supervision, and 2) implement and evaluate the Quality Graduate Supervision miniMOOC for faculty development at the University of Calgary.

Guiding assumptions and beliefs. One of the assumptions that underlined this study was that by designing and offering a miniMOOC that engages diverse faculty members in ongoing faculty development and improvement of their graduate supervision skills will be as good as or better than face-to-face seminars or workshops given the accessibility and flexibility of this online learning approach. Two, it was assumed that the flexibility and availability of the miniMOOC learning environment would be appealing to faculty members and that they would engage in this learning experience and would have positive experience in this learning environment. A third assumption was that by forming a learning community among diverse faculty members from across disciplines, that this miniMOOC approach to faculty development would be effective. The effectiveness of the miniMOOC was to be determined based on the experience of participants in the QGS miniMOOC and also based on the successful implementation of the DBR process.

The structure of a MOOC can allow for a massive number of participants at one time, reducing the cost of offering multiple sessions on the same topic at different times. Furthermore, collaboration and interaction between participants serves to enrich the experience and creates support in the learning community. Developing a learning community for faculty development is essential for success (Taylor & McQuiggan, 2008). This QGS miniMOOC focused on quality graduate supervision for three reasons; first, there is a need to offer more support for faculty members in this area (Bloom et al., 2007; Dangel & Tanguay, 2014; Erichsen et al., 2014; Manathunga, 2010). Faculty members need to develop and enhance their graduate supervision

skills, especially since their level of expertise in supervising students may vary according to rank, years of service and number of students supervised (Bloom et al., 2007).

The second reason was that the design of the QGS miniMOOC is aligned with two goals of the University of Calgary's Eye's High vision: 1) to focus on innovative teaching and learning, 2) to promote the inter-institutional and inter-disciplinary collaboration and internationalization. The design and the offer of professional development opportunities in universities must be strongly tied to the institution strategic vision (Camblin & Steger, 2000).

The third reason this study focused on graduate supervision was that there was 'fertile ground' for such research; there is a visible reward structure for graduate supervision at the University of Calgary, which is an important component in the success of faculty development. The lack of recognition from institutions may be a factor that discourages faculty from participating in faculty development (McQuiggan, 2008). The Werklund School of Education at the University of Calgary established a recognition award for distinguished graduate supervisors in 2014; the University of Calgary introduced a Teaching and Learning award for Graduate Supervision in 2014; the Faculty of Graduate Studies introduced the Great Supervisors Awards in 2014, along with hosting a Great Supervisors' week. The University of Calgary places importance on providing quality graduate supervision and encourages faculty development in this area. For example, the Faculty of Graduate Studies at the University of Calgary established a program called "My Supervisor Skills" to support graduate supervisors by offering different workshops. Dave Hansen, Assistant Dean for Graduate Supervision and the lead of the program explained, "we want to recognize and support the work that our faculty members put into delivering high quality graduate supervision, and make it possible for them to take that further" (UToday, 2015, pp.5).

It was anticipated that a number of faculty members would be motivated to take part in this initiative given that the QGS miniMOOC is aligned with the University of Calgary's Eyes High vision for quality teaching. Further, there is an established reward structure for faculty members who are identified as excellent graduate supervisors. Both of these assumptions were borne out according to the number of participants who eventually participated in the QGS miniMOOC. Providing support at the institution, along with visible recognition through awards for quality supervision, helped to contribute to a culture at the University of Calgary that initially embraced the QGS miniMOOC. The design of the QGS miniMOOC in this study was guided by three learning theories: connectivism, learning community, and constructivism.
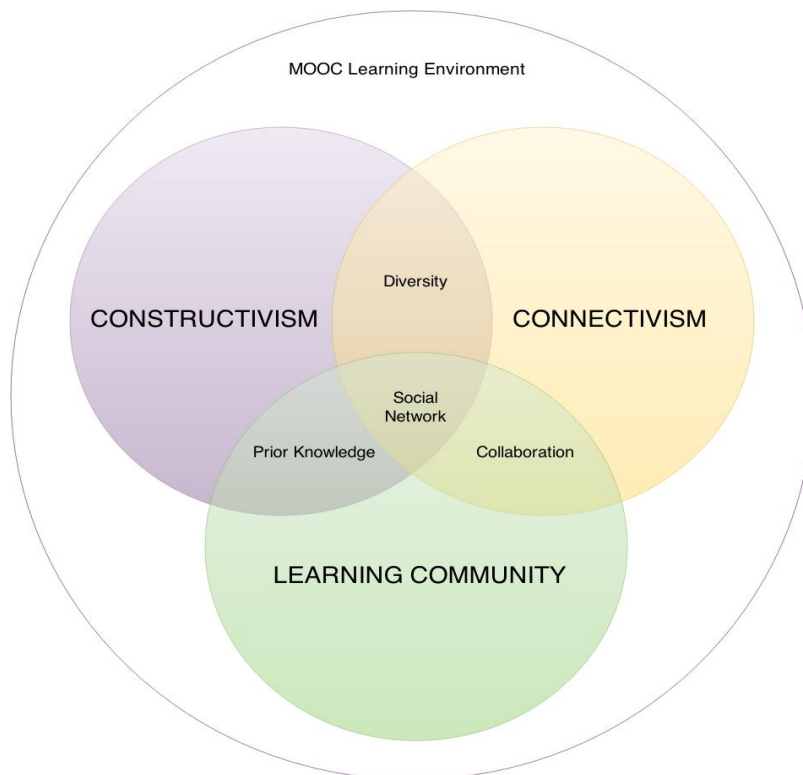
Figure 2. **Conceptual Framework for the Quality Graduate Supervision miniMOOC**

The QGS miniMOOC was designed to be a hub experience that emphasized discussion, communication, and networking with other learners; the notion of learning with and from others is one of the focuses of connectivism theory. Siemens (2006) emphasized the idea that "instead of knowledge residing only in the mind of an individual, knowledge resides in the distributed manner across a network" (p.8). The design of the miniMOOC supported the creation of a learning community. Forming a learning community is essential to acquire learning in faculty development programs (Taylor & McQuiggan, 2008). A program that supports the formation of a learning community will promote reflection, validate what faculty members already know, help them to construct a foundation for future interaction, and will offer collaborative experiences (Layne, Froyd, Morgan & Kenimer, 2002). Further, the design of the MOOC employed elements of constructivism that emphasize the importance of social interaction, networking, collaboration, and the role of culture in learning (Applefield, Huber & Moallem, 2001). Further discussion and examination of the learning theories that informed the conceptual framework for the design of the QGS miniMOOC is provided next.

Learning Theories Supporting the miniMOOC Design

The theoretical perspectives used to frame the study are connectivism theory, learning community, and constructivism. Each of these theoretical perspectives is discussed, and the conceptual framework that informs the development of the MOOC is described.

Connectivism. Connectivism is the learning theory that informed design of the first cMOOC, "Connectivism and Connected Knowledge 2008" (CCK08) (Downes, 2008). According to Siemens, "connectivism is the integration of principles explored by chaos, network,

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complexity and self-organization theories" (Siemens, 2005). The design of cMOOCs is based on the new pedagogy with the principles of connectivism that Siemens lists as:

- Learning and knowledge rests in diversity of opinions.

- Learning is a process of connecting specialized nodes or information sources.

- Learning may reside in non-human appliances.

- Capacity to know more is more critical than what is currently known.

- Nurturing and maintaining connections is needed to facilitate continual learning.

- Ability to see connections between fields, ideas, and concepts is a core skill.

- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.

- Decision-making is itself a learning process. (Siemens, 2005, p. 4)

Connectivists (Downes, 2008; Kop, 2011; Siemens, 2005) argue that in educational organizations, learning should not happen in a single learning environment; rather, knowledge should be available through the web and learners engage with the materials and the available sources and with other learners in order to gain knowledge. Connectivists also argue that learning organizations should not support the idea that knowledge must be transferred from educator to learner; instead, learning should be active and engaging (Kop, 2011). Connectivists support the idea that learning is enhanced when the design of the environment contains four types of activities:

1. aggregation: read, watch, or play with different available resources;

2. relation: reflect or relate to what learners read, listen, or watch;

3. creation: learners create something (i.e., blog or discussion thread) and post it on any service on the Internet after reflecting and making sense of the material;

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4. sharing: learners can share their creations with others in the network. (Kop, 2011)

The design of the Quality Graduate Supervision miniMOOC drawn upon the principles of connectivism. For example, the QGS miniMOOC integrated multiple sources of knowledge such as posting videos of expert supervisors, providing textual materials and a discussion forum spaces in which faculty could discuss, engage and reflect on ideas. The miniMOOC emphasized the idea that learning and knowledge rests in the diversity of experiences and knowledge of participants by opening the learning environment to diverse perspectives and discussions. Even though this miniMOOC targeted faculty members, graduate supervisors and post-doctoral scholars at the University of Calgary in the first instance, the goal is to make subsequent offerings more massive and open to anyone from anywhere who is interested in the graduate supervision topics to engage and enrich the discussions and the experience of the MOOC. Furthermore, the QGS miniMOOC incorporates different types of activities that enhance the learning according to the connectivists (Downes, 2008; Kop, 2011; Siemens, 2005). The QGS miniMOOC offers participants an aggregation of multimedia materials and resources to engage with as mentioned before and it offers participants a chance to reflect on what they have learned by discussing their own personal experiences with other participants. The miniMOOC also supported the creation of new materials and sharing these with other participants and learners through the discussion board. An example of this type of participation was, "describe a time when …", that helps participants to connect their experiences to a graduate supervision topic under study. A detailed description of the design and development process for the QGS miniMOOC is available in Chapter 4.

Learning community. A learning community is defined as "a general sense of connection, belonging, and comfort that develops over time among members of a group who

share purpose or commitment to a common goal" (Conrad, 2005, p. 2). In more detail, Cox (2004) defined the learning community as a "group of members who engage in an active, collaborative, year-long program with a curriculum about enhancing teaching and learning" (p. 8). Furthermore, "these groups can be topic-based, built around a chosen shared topic, or cohort-based, built around a specific group of people" as for example, junior faculty members (Holmes & Kozlowski, 2014). Learning communities in higher education started to be used in designing collaborative learning environments (Tennant, McMullen & Kaczynski, 2010). Collaborative learning environments can improve both teaching and learning for instructors and students (Swanson & Kayler, 2010). Researchers suggested using collaborative learning environments to build effective faculty professional development programs to assist faculty in their teaching, guiding, and advising (White, 2014; Yagodzinski, 2012). Forming an online learning community requires a sense of connectedness between the learners and instructors in that community who share the same interests, values, and expectations (Rovai, 2002).

Yagodzinski (2012) designed a faculty development online course using the Creating Online Learning Communities for Adults (COLCA) instructional design (ID) theory. The course focused on Web 2.0 tools and techniques. The researcher used "formative research" as her research method, which is used to inform and expand the knowledge on instructional design (ID) theory (Yagodzinski, 2012). The researcher's data collection methods included course documents, observation, e-mails, and participant interviews. The theory was implemented in two faculty development courses offered consecutively with a duration of eight weeks each. The first faculty development course had fifteen faculty members at the beginning and only six participants finished the course. Twenty participants registered for the second course and only

eight completed it, even though it was extended by two weeks to accommodate busy faculty and to give them more time to work on learning tasks.

Yagodzinski (2012) suggested stating the time required in each weekly module before starting the course, along with an explanation of how forming a community of learners requires active participation by all participants. According to Yagodzinski (2012), "because learning activities in this environment require participation, collaboration, and active dialogue, learners must be willing to allot sufficient time to actively engage with the course content and their peers" (p. 76). Yagodzinski (2012) found that the dropout rate in the courses affected forming a learning community among participants and affected the participation in the weekly activities and discussions. Learning materials were summarized and sent to participants via e-mail and the researcher found, based on interviews, using an alternative way of communication would be more effective, for example, using a recorded summary. The researcher also suggested using an activity that involves assigning participants to lead a discussion or facilitate an online lesson (Yagodzinski, 2012).

Glowacki-Dudka and Brown (2007) studied faculty member perceptions, their overall experience in the faculty learning community, and their reasons for participating in structured and unstructured learning communities. According to Glowacki-Dudka and Brown (2007), the faculty learning community "take[s] place in a variety of university settings for professional development, for personal connections with peers, and for opportunities to interact across disciplines and colleges to address issues pertaining to teaching and learning" (p. 29)

The researchers used an online survey that requires closed and open-ended questions for data collection. 173 participants completed the survey, 65% of them had PhDs while 29% had Master's, and 6% were still working on their graduate degrees (Glowacki-Dudka & Brown,

2007). Glowacki-Dudka and Brown (2007) found that 70% of the faculty members who participated in a structured learning community, participated because they wanted to talk with colleagues about teaching and 86% of faculty members participated in the unstructured learning community for the same reason, indicating the importance of peer mentoring and support in faculty professional development. One important difference in participation was that the structured learning community focused on professional development, while the unstructured learning community focused on both personal and professional development (Glowacki-Dudka & Brown, 2007, p. 38).

Yagodzinski (2012) argued that over the past years, there are several studies that examined the effect of using learning communities that focused on enhancing faculty members' teaching and learning (faculty learning community) (Glowacki-Dudka & Brown, 2007). According to Yagodzinski (2012), there are several studies focused also on examining the creation of an online learning community. On the other hand, there are fewer studies that examine the effects of using the learning community to support faculty members in the development of research (research learning community) (Holmes & Kozlowski, 2014) or in the development of quality graduate supervision (Yagodzinski, 2012). These studies added to the body of knowledge on the benefits and the effects of using learning communities in teaching and learning, online learning environments and faculty research but little is known on the effects and the benefits of forming learning community to support faculty members in activities such as graduate supervision.

In the development of the QGS miniMOOC, elements of the learning community were incorporated to inform the design of the miniMOOC. The miniMOOC supported the formation of a learning community in that it offered a space for participants to collaborate in different

ways. In addition to an instructor, a facilitator for the weekly discussions was assigned in order to keep the dialogue going and to encourage the participants to participate in the discussions and summarize the main ideas.

Constructivism. The evolution of constructivism in the 1960s and 1970s has been informed by the early work of John Dewey, Lev Vygotsky, and Jean Piaget. The perspectives of constructivists on learning has become quite influential and respected in the past twenty years (Applefield et al., 2001). Constructivists argued that learner knowledge formation is a result of making sense of meanings in which learners are involved in a process of constructing individual understanding based on their own experiences. Constructivists suggest that there are four important characteristics that influence all learning: "1) learners construct their own learning; 2) the dependence of new learning on students' existing understanding; 3) the critical role of social interaction; 4) the necessity of authentic learning tasks for meaningful learning" (Applefield et al., 2001, p. 8).

Prawat (1992) stressed that "while there are several interpretations of what [constructivist] theory means, most agree that it involves a dramatic change in the focus of teaching, putting the students' own efforts to understand at the center of the educational enterprise" (as cited in Applefield et al., 2001, p. 8). While learners construct their own knowledge, the significance of constructivism is to understand how the information is presented to learners and how to support them in the process (Applefield et al., 2001). The role of instructor in a constructivist learning environments is to facilitate, guide, and advise the learner who is at the center of the learning (Ally, 2004). Social constructivism emphasizes the importance of collaboration in learning, social exchange, as well as the impact of culture on learning (Applefield et al., 2001). Furthermore, social constructivism is defined as the process of

constructing knowledge rather than acquiring knowledge and that the instructor is to support the

construction of knowledge rather than communicating or delivering the knowledge (Duffy &

Cunningham, 1996).

Huang (2002) summarized the instructional principles of constructivism that influenced

the design of learning and teaching online learning:

- Interactive learning: constructivists believe that learners learn through
  collaboration with others and can't learn in isolation, thereby creating interactivity
  in learning. Interactive learning motivates and stimulates learners.

- Collaborative learning: an important aspect of the social constructivism that
  supports collaboration in online learning. Instructors should focus on reflections
  and social discussions.

- Facilitated learning: the role of the instructor in constructivism is to guide and
  support learners, while monitoring the quality of learning, so the learners have
  more choices in how they want to facilitate their own learning with others.
  Learning environment should be safe for all learners.

- Authentic learning: emphasizes the idea that learning should be authentic and
  takes into consideration learner experiences. For learning to be authentic and
  meaningful, learners can be involved in the design of the course (objectives,
  grades and/or teaching materials).

- Learner-centered learning: constructivism stresses the "ownership of learning
  process by the learners, experiential learning and a problem-solving approach to
  learning" (Huang, 2002, p. 34).

- High quality learning: applying the constructivism principles to the online

    learning environment gives learners greater freedom in learning and supports

    critical thinking skills (Huang, 2002).

The design of the QGS miniMOOC drew upon the principles of constructivism. For example, the learning experience was authentic and based on needs and wants from the literature and from faculty members, and was of value to participants as the participants were encouraged to expand the collection of ideas and materials provided in the miniMOOC by adding their perspectives, more resources and literature. The first questionnaire that was sent to faculty members before starting the design of the QGS miniMOOC took into consideration what faculty wants to enhance and learn about in this miniMOOC. This assured that faculty members had some input into the objectives of this QGS miniMOOC. The role of the instructor was based on constructivism which was to guide, advise and facilitate learning in the miniMOOC, but to not be the center of the learning. The design of the miniMOOC also took into consideration the prior knowledge of faculty members and encouraged them to express their personal knowledge in supervising graduate students. This practice was influential to other faculty members especially given that six faculty members who received the Faculty of Graduate Studies Great Supervisors Award were invited to engage in the QGS miniMOOC as expert supervisors to enrich and facilitate learning in the miniMOOC.

Summary of Literature Review

The literature review investigated the MOOC as a new technology trend. The literature review started with an overview of MOOCs and the impact of MOOCs on higher education, educational institutions and on learners. Then, the review explored uses of the MOOC in higher education and within that section investigated the use of the MOOC for faculty development.

After that, the literature explored faculty development by starting with an overview on the topic and then the necessity of faculty development and then, exploring some key research findings of professional development research. This area of literature review led to an exploration of graduate supervision with an overview of graduate supervision and some key research findings on the impacts of graduate supervision. The last part of the literature review examined the conceptual framework for the research and the learning theories that informed the design of the QGS miniMOOC.

CHAPTER THREE: RESEARCH DESIGN

In this chapter, I describe Design-Based Research (DBR), provide a rationale for using this educational research methodology and summarize some of the limitations of the DBR approach. Then, I describe the participants, the setting of the study and the nature of collaboration in the design. I also explain the context of the research and the data collection methods that were used in each of the three core phases of DBR. Furthermore, I explain in detail the analysis process, the trustworthiness of the study findings and the delimitations and limitations of the study. Finally, I explain the ethical considerations in this design based research.

Description of Design-Based Research

Wang and Hannafin (2005) defined Design-Based Research (DBR) as "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories" (pp. 6–7). Amiel and Reeves (2008) explained that "the outcomes of design-based research are a set of design principles or guidelines derived empirically and richly described, which can be implemented by others interested in studying similar settings and concerns" (p. 35).

Five main characteristics distinguish DBR from other research methods. DBR is: 1) pragmatic, 2) grounded, 3) interactive, iterative, and flexible, 4) integrative, and 5) contextual. Follow is an explanation of DBR's characteristics compared to characteristics of this research:

1) Pragmatic - DBR strongly ties the development of theory to the development of practice while offering new possibilities. In this research, the use of DBR informed the design and evaluation of a faculty development miniMOOC focused on quality graduate supervision and the research was tied strongly to the three theories were used to frame the research.

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2) Grounded - "Design is theory-driven and grounded in relevant research, theory, and practice" (Wang & Hannafin, 2005, p.7). DBR is grounded in real-world settings and participants interact with each other in this design setting. This research is grounded in a real-world setting as the research was conducted at the University of Calgary and the research was informed by three learning theories: connectivism, learning community, and constructivism and by feedback from participants and practitioners in the field.

3) Interactive, iterative, and flexible - Designers work with participants in the design processes, which are iterative. This present research was interactive as the designer worked closely with a design team, who provided feedback on each step of the design, and who worked with participants during implementation of the miniMOOC as well. This research was iterative and data informed the changes and issues that emerged during cycles of the research. The research was flexible and changed in response to local conditions and emergent issues.

4) Integrative - DBR uses different methods and obtains data from varied resources to ensure "objectivity, validity and applicability" (Wang & Hannafin, 2005, p.10). This study collected data from multiple sources at each stage of the research, for example faculty questionnaires, GPDs questionnaire, participants and discussion moderators' activities in QGS miniMOOC, pre-and post-miniMOOC questionnaire and interviews with participants and discussion moderators, to ensure the objectivity, validity and applicability of the findings.

5) Contextual - As the research evolves, the initial plan can be changed and modified during the process to address any emerging issues and all changes should be documented (Wang & Hannafin, 2005). In this research, both initial and ongoing plans have changed during

each phase of the research. The time-line for the research suggested in the proposal had to change in response to issues that emerged during the ongoing research. Some of the changes were based on feedback from a design team member, a suggestion of a participant or a challenge that was faced during the research. Changes were documented with data collection and in the written report.

DBR is increasingly popular in educational research as it has the potential to bridge the gap between theory and practice (Wang & Hannafin, 2005). The theory developed in DBR usually serves a specific purpose or is developed for a specific area; however, the theory needs to be general enough to be valid when applied in different contexts (Bakker & Van Eerde, 2015). Another reason for the popularity of DBR in education is that the outcomes of DBR typically produce educational products, while also examining how these products can be used in educational settings (McKenney & Reeves, 2013). McKenney and Reeves (2012) added that "educational design research uses theory, along with empirical findings, craft wisdom, inspiration, and experience as inputs to create interventions that solve real problems" (p. 4). Furthermore, the outcomes of DBR do not get measured or judged solely through the research process, but also by the innovativeness and usefulness of the results for local practices (Bakker & Van Eerde, 2015). DBR can have immediate, positive local impact for the participants of the research as well as contribute design principles and theoretical insights that can translate to other participants, contexts and settings.

There are numerous ways of conducting DBR in education. The present study followed the generic design offered by McKenney and Reeves (2012), who suggested three core phases for conducting design-based research:

(1) Analysis and exploration,

(2) Design and construction, and

(3) Evaluation and reflection.

Rationale for Using Design-Based Research

The first rationale for using DBR as a methodology in this study was based on its primary goal to connect educational technology research with real-world problems. DBR emphasized the iterative process of research that can evaluate any innovation, while refining this innovation and generating design principles that can be applied in other situations (Amiel & Reeves, 2008). Amiel and Reeves (2008) argued "that design-based research provides an innovative proposal for research on innovation and education" (p. 30). Jacobsen (2014) explained that another goal of DBR in many research projects "is to develop design propositions or theories that can inform the development of innovative interventions by others" (p. 18). In this research, I designed a faculty development opportunity that focused on improving graduate supervision skills in a real-world setting with participants and practitioners from a variety of research disciplines.

The second rationale for choosing DBR was that "design-based research integrates the development of solutions to practical problems in learning environments with the identification of reusable design principles" (Herrington et al., 2007, p. 2). In order to find a learning solution to support faculty members in the area of graduate supervision, the use of DBR seemed the perfect fit. In this research study, the solution was to design and offer a faculty development miniMOOC that focused on quality graduate supervision. The DBR process helped me in forming, designing, and refining the intervention, then evaluating it while establishing the approach and insights to apply this example to similar situations in the future. One outcome of this research study was the establishment of a set of design principles that can be applied in practice by other faculty development providers and educational researchers.

Moreover, DBR values the engagement of participants and practitioners in the process of the research study more than other research methodologies, which made DBR a strong fit for this study (Bakker & Van Eerde, 2015). Participants and practitioners were engaged throughout each step of the study, from the development of the research and the evaluation of the innovation in practice to the reporting of findings. This involvement of practitioners on the design team allowed the researcher to gain in-depth insight of the phenomena from people who were directly involved in the practice.

Limitations of DBR Methodology

While DBR was considered a good fit for this research, it is also important to acknowledge potential limitations of this research approach. The first limitation that may occur when conducting research using DBR is the lack of time or funding to carry out a long-term research study with multiple iterations (Anderson & Shattuck, 2012). This study was compelling enough to attract seed funding from the Faculty of Graduate Studies for development and a first iteration, for which the researchers are grateful. As Anderson and Shattuck (2012) explained, "one of the challenges of DBR studies is that the iterative nature can exceed the resources or the time available to researchers or funding bodies" (p. 21). The development of theories requires long-term commitment and multiple iterations, which may be a challenge for some researchers. According to Amiel and Reeves (2008), "while the ultimate objective is the development of theory, this might only occur after long-term engagement and multiple design investigations" (p. 35). In this particular study, the intention was to study one macro-cycle of analysis, design, and evaluation, and to yield useful and important results, impact practice and generate design principles from local practice; in subsequent chapters the researcher will describe how these goals were met. However, while this study offers insights within the theoretical framework, and

contributes design principles, it is expected that it will take multiple iterations to generate repeated insights to inform the theory and to refine the design principles. Thus, additional funding will be needed to carry on this research.

Another challenge when conducting design-based research can be the productivity and sustainability of collaboration with participants. Since DBR is usually a long-term commitment, it can be a challenge for researchers and practitioners to maintain a strong productive partnership. Most successful collaborations occur when the research is conducted in the same setting as the participants over a long period of time (Design-Based Research Collective, 2003). Fortunately, this challenge did not emerge as a barrier or issue in this research study as the design team was very productive and responded and provided feedback within a sufficient time frame. The collaboration with participants was also productive since the research was done over three design phases and in each phase, the collaboration was with a different population of participants depending on the research activity.

Participants, Setting, and Collaboration

Participants for the study were drawn primarily from academic faculty at the University of Calgary. The degree and type of participation varied depending on the research activities. The supervisory committee included three faculty members from the University of Calgary, all of whom brought research expertise and supervisory experience that contributed to the overall design. Second, a questionnaire was sent to all graduate supervisors at the University of Calgary through the Faculty of Graduate Studies via an email link on behalf of the researcher. The questionnaire was sent during Phase 1 in order to better understand the types of faculty development that graduate supervisors usually participate in, the topics that they need or want to learn about in graduate supervision and to establish communication (convenience sampling).

Third, graduate program directors were invited to participate in an online questionnaire to better understand the phenomena (convenience sampling). Fourth, participants were drawn from faculty members who registered for the Quality Graduate Supervision miniMOOC. A pre-miniMOOC questionnaire was sent to all registered participants (convenience sampling). Furthermore, participants were drawn from the participants and discussion moderators' activities in the QGS miniMOOC. Additional, a post-miniMOOC questionnaire was sent to all participants of the Quality Graduate Supervision miniMOOC (convenience sampling). Finally, participants of the QGS miniMOOC, discussion moderators, and the instructor of the miniMOOC were approached for an interview about their learning experiences in the QGS miniMOOC.

Research Context and Data Collection

This DBR study can be implemented over a long period of time and iterated frequently; however, for the purpose of this doctoral research, the study was implemented with a single iteration of the DBR macro-cycle. The research used a mixed methods approach to data collection and analysis. Design-based research is pragmatic and can employ any research approach, whether qualitative, quantitative, or a mixed methods approach (MacDonald, 2008; Migiro & Magangi, 2011). Researchers argue that the best approach to use for data collection and analysis data with DBR is a mixed method approach because it can increase the validity, objectivity, and reliability of the ongoing research (Design-Based Research Collective, 2003; McKenney & Reeves, 2012; Wang & Hannafin, 2005). Furthermore, Stringer (2008) explained that "...the use of multiple sources [of data] diminishes the possibility that one perspective alone will shape the course or determine the outcomes of investigation. ...This triangulation of data will add depth and rigor to the research process" (p. 55).

A three-phase research plan for the development and implementation of the intervention

was developed in order to manage the process of the DBR over several months: Phase 1) the analysis and exploration of the problem; Phase 2) design and construction of a solution; and Phase 3) evaluation and reflection (McKenney & Reeves, 2012). In the following section, a brief explanation of the context and process that was followed in each of the three core phases and the data collection methods is presented. Further explanation is provided in Chapter 4 of the three core phases.

Phase 1 (Analysis and exploration). In the analysis phase, the research problem was refined, the extant literature reviewed, and the conceptual framework improved. The design team was established in phase one to explore the problem further and included: 1) a faculty member with expertise from the Faculty of Graduate Studies who oversees the "My Supervisor Skills" faculty development program, 2) one faculty member with expertise in online learning and faculty development and, 3) one faculty member with expertise in DBR and learning technologies. The members of the design team served also as doctoral supervisory committee members. After successfully passing the candidacy examination and obtaining the ethics approval, the researcher sent an open and close-ended questionnaire to all graduate supervisors at the University of Calgary.

Faculty Questionnaire. The questions on the faculty questionnaire were designed specifically for this research to gain insight into a) the types of faculty development that graduate supervisors usually participate in, b) the supervisors' expectations and experiences with faculty development opportunities, and c) the topics that they feel are most important to discuss in faculty development workshops on graduate supervision. The questionnaire contained 14 questions, with the first seven questions structured as select-response type questions and the remaining seven as open-ended questions. Descriptive analysis was used to synthesize and

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present select response findings from the first part of the questionnaire. Textual responses to the

seven open-ended questions were analyzed thematically using content analysis. The faculty

questionnaire was designed using an online survey tool that was easy to use, secure, and could be

sent directly to faculty e-mail addresses. The Faculty of Graduate Studies sent the questionnaire

on my behalf via an e-mail link. A reminder notification to complete the questionnaire was sent

two weeks after the original request. The questionnaire is provided in Appendix A.

Graduate Program Directors Questionnaire. A second questionnaire was sent directly to

graduate program directors (GPDs) at the University of Calgary. GPDs work closely with

graduate supervisors and students in their program area. The goal of surveying GPDs was to

further understand the phenomena of graduate supervision and to help identify potential topics,

areas of need, and issues for the miniMOOC's modules. The GPD questionnaire had 12

questions; the first five questions were structured, close-ended questions and the remaining seven

were open-ended questions. Descriptive analysis was used to analyze the demographic questions

from the questionnaire and the open-ended questions were analyzed thematically. The

questionnaire is available in Appendix B.

By the end of phase one, the design team had met multiple times to discuss the research

plan and progress, share and discuss the result of the online questionnaires, and provide feedback

on the DBR process.

Phase 2 (Design and construction). The second phase was dedicated to designing and

developing the Quality Graduate Supervision miniMOOC within a learning management system.

The researcher divided the process of this phase into four main tasks: 1) Planning and designing

draft; 2) Development of videos; 3) Building of materials and resources in the learning

management system, Desire 2 Learn (D2L); and 4) The implementation process of the QGS

miniMOOC and it will be further explained in chapter 4. The researcher sent a pre-miniMOOC questionnaire to all registered participants via e-mail.

Pre-miniMOOC Questionnaire. The pre-miniMOOC questionnaire had six select-response type questions that were analyzed using descriptive analysis and four open-ended questions that were analyzed thematically using content analysis. Questionnaire collected data on participants' intentions of attending the QGS miniMOOC, their expectations, demographic, gender, level of study, and position. The questionnaire is available in Appendix E.

Phase 3 (Evaluation and reflection). In this phase, the researcher collected data using a post-miniMOOC questionnaire, observations of participants and discussion moderator's activities in the QGS miniMOOC and interviews with participants, discussion moderators, and the instructor.

Post-miniMOOC Questionnaire. The post-miniMOOC questionnaire was sent to all registered participants in the QGS miniMOOC and 12 responses were received. The questionnaire included eight select-response type questions that were analyzed using descriptive analysis and 17 open-ended questions that were examined thematically using content analysis. The questionnaire collected information about participant experience and satisfaction of the QGS miniMOOC and what worked and what needed improvement in the QGS miniMOOC. The post-miniMOOC questionnaire is provided in Appendix F.

Participants and Discussion Moderator's Activities in the QGS miniMOOC. The researcher analyzed participants and discussion moderators' activities in the QGS miniMOOC, which included looking into their: 1) logins and completion data, 2) video segments, and 3) participation in the discussion forums. I used the build-in analytics tool in D2L to analyze the quantitative data "log-ins and completion data". I also used the build-in analytics in Vimeo to

analyze the quantitative data of the videos. In the analysis of the discussion forums, I used

qualitative thematic analysis of content. More details on the findings are presented in Chapter 4.

     Interviews. Interviews were carried out to collect data from seven participants, four

discussion moderators and the instructor. The data was analyzed using content analysis and it

was analyzed using QSR NVivo 11 Software. The interview questions used with participants are

provided in Appendix G and the interview questions for the discussion moderators in Appendix

H. A summary of the data sources, sample, and methods of analysis are in Table 1.

Table 1. *Summary of data sources, methods, and analysis*

Data Sources	Sample	Method\Tool (draft)	Method of Analysis
Faculty questionnaire	Convenience sampling: N= 60 faculty members at the University of Calgary	Electronic questionnaire (*appendix A*)	- Qualitative thematic analysis of content - Descriptive analysis for the qualitative analysis
GPDs questionnaire	Convenience sampling: N= 4 graduate program directors at the University of Calgary	Electronic questionnaire (*appendix B*)	- Qualitative thematic analysis of content - Descriptive analysis for the qualitative analysis
Pre-miniMOOC questionnaire	Convenience sampling: N= 14 QGS miniMOOC's participants	Electronic questionnaire (*appendix E*)	- Qualitative thematic analysis of content - Descriptive analysis for the qualitative analysis
Participants and discussion moderators' activities in QGS miniMOOC	Convenience sampling: N= 14 QGS miniMOOC's participants and discussion moderators	- Logins and completion data	- Build-in analytics tool in D2L was used to analyze the quantitative data
		-Video segments	- Build-in analytics in Vimeo was used to analyze the quantitative data
		- Discussion forums	- Qualitative thematic analysis of content
Post-miniMOOC questionnaire	Convenience sampling: N= 12 QGS miniMOOC's participants	Electronic questionnaire (*appendix F)*	- Qualitative thematic analysis of content - Descriptive analysis for the qualitative analysis

Interviews	Convenience sampling: N= 16 QGS miniMOOC's participants, discussion moderators and the instructor	(*appendix* G and H)	- Qualitative thematic analysis of content using QSR NVivo 11 Software

The researcher also documented the research processes and progress throughout each phase. The purpose of documenting the processes and progress of the DBR were: 1) to gain a deeper understanding of the phenomena, 2) to capture and document design decisions, actions and changes, 3) to strengthen the trustworthiness and credibility of this research study, and 4) to organize the research study. Documentation is a rich source of data (Creswell, 2012). Documentation in DBR "can be used to appraise components of the intervention… or to gain insight into its results" (McKenney & Reeves, 2012, p. 139). Documentation included: 1) note-taking by the researcher in meetings with the design team, reviewers, and the supervisor, 2) recording changes in the research design, 3) recording challenges faced in the development of the intervention and, 4) documenting design decisions. A report on the research processes is presented in Chapter 4. The long-term goal of this design, beyond this doctoral research, is to offer multiple iterations of the Quality Graduate Supervision MOOC and have this learning opportunity opened and available massively to all interested academic faculty, as presented in Figure 3. This QGS miniMOOC was called mini as this first offering was a closed pilot with a limited number of participants for the purpose of conducting the first cycle of research. This step was important so the design could be developed, tested and iterated before the next phase in which it would be opened to a broader community. MiniMOOC is a commonly accepted term for MOOCs that have less than 500 participants (Moessinger Blog, 2013).
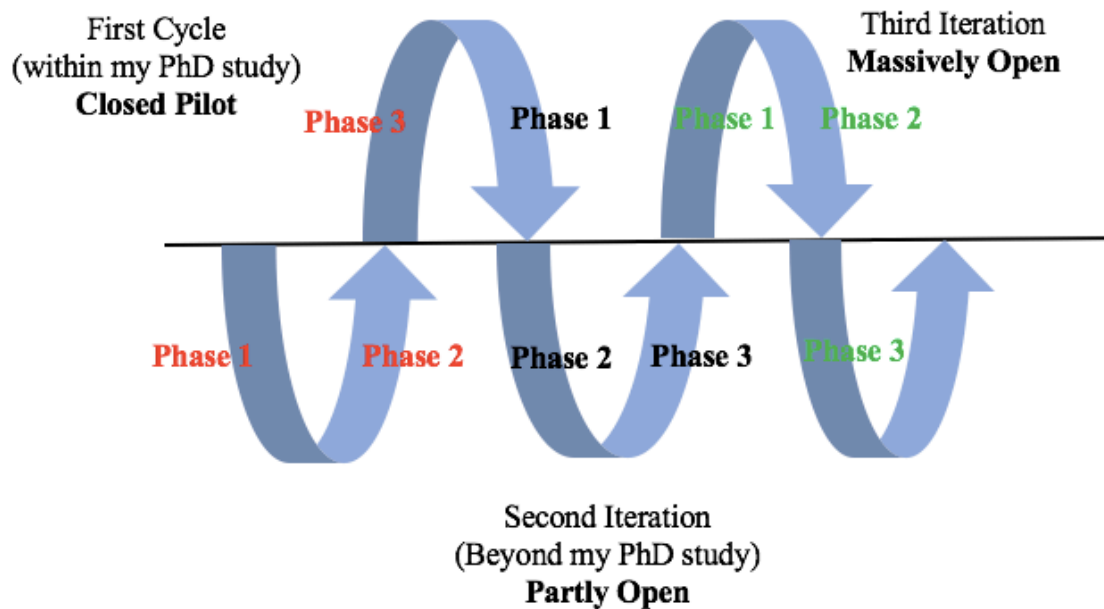
Figure 3. **DBR Iterations and long-term vision for the Quality Graduate Supervision MOOC**

Data Analysis

The approach to data analysis in this study aligns with the research methodology and was guided by DBR principles (Wang & Hannafin, 2005). The process was based on the types of data collected (Herrington et al., 2007). Qualitative data generated from questionnaires, discussion forums, and interviews were analyzed using thematic analysis of content. Thematic analysis refers to "the process of analyzing data according to commonalities, relationships, and differences across a data set. The word 'thematic' relates to the aim of searching for aggregated themes within data" (Gibson & Brown, 2009, p. 127). The analyzed data generated from interviews was uploaded to QSR NVivo Software. The computer assisted qualitative data analysis software was helpful to organize, store, analyze, and code the qualitative data. Coding means "to create a category that is used to describe a general feature of data; a category that

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pertains to a range of data examples" (Gibson & Brown, 2009, p. 129). Additionally, NVivo software helped "enhance validity and transparency" (Fournier, Kop & Durand, 2014, p. 6). According to Creswell (2012), "content analysis starts with a sample of texts (the units), defines the unit of analysis and the categories to be used for the analysis, reviews the text in order to code them and place them into categories, and then counts and logs the occurrences of words, codes and categories" (p. 564).

The quantitative data generated from the questionnaires were analyzed using basic descriptive statistics and the data was reported using frequencies and percentages (Cohen, Manion & Morrison, 2011). Where appropriate, the data was presented using graphics and charts.

In analyzing the qualitative data, I conducted first-level coding on each set of data as I collected them. First, I read each set of data individually and highlighted phrases or sentences that made sense to the topic being discussed. I color-coded these sentences so I could easily compare other coded sentences under the same color. This selective method was helpful in reducing texts and paragraphs (Miles & Huberman, 1994). Figure 4 is a sample of the first-level coding of a question from the faculty questionnaire.

Theme	Codes	Frequency counts	Of total number of responses
Reasons why it is not important	No added information from structured workshops	2	3.9%
	Learning from peers is better/mentorship	3	5.8%
	If it is early in the career, it would be helpful	1	1.9%
Reasons why it is Important/very important	Keep up with new information and process of supervision	8	15.6%
	Improve skills/career development/personal skills	7	13.7%
	Early in the career (new faculty)	5	9.8%
	Opportunity to learn from peers	4	7.8%
	No enough time	2	3.9%

Figure 4. **Sample of First-Level Coding**

I then conducted a second-level coding where I categorized the themes and counted the frequency and percentage of the appearance. I included direct quotes under each code to ensure the consistency of the codes. The third-level of coding was completed when I recorded the findings of the research. I went back to the codes that I created and reviewed the themes to check if I could get more codes or different codes. For most of the data, I received the same results as the first time. I repeated this process for each set of data that required content analysis. For the first two sets of data (the faculty questionnaire and the GPD questionnaire), I did not merge the themes because I wanted to show the findings of each set individually to inform the design of the QGS miniMOOC and the process of the research.

What I did differently in the analysis of the interview data was that I cleaned up the data first and then uploaded it into NVivo 11 software. I looked into each participant's responses individually. I created the codes by producing nodes and added all the sentences that could be included under this node. By moving from participant to participant, I was able to have firmer nodes. I repeated the process with the discussion moderators. I then compared the codes for both the participants and the discussion moderators. Next, I wanted to merge the themes of the interviews and the post-miniMOOC questionnaire in order to evaluate the design of the miniMOOC. I created a table in a word document for the purpose of organizing the data and comparing it. This table included the (themes, codes, where this code was found "questionnaire participant, interview participant or discussion moderator" and sub-codes). I added direct quotes from the data in the sub-codes. The table helped merge the data and showcase the strong themes. I used thematic map to help in examining relationships between themes and codes as it is illustrated in Chapter 4.

Trustworthiness of the Study

Enhancing both the validity and reliability in a research study is an important concern. According to Bakker and Van Eerde (2015), "validity concerns whether we really measure what we intend to measure. Reliability is about independence of the researcher" (p. 450). For this study, I triangulated multiple sources of data during the research to enhance the validity and credibility of the findings, specifically the internal validity. I collected data through questionnaires, participants' activities during the QGS miniMOOC (including data from discussion forums), and interviews. Patton (1990) pointed out that the use of multiple sources of data in research help to "validate and crosscheck findings" (p. 244). Conversely, the Design-Based Research Collective (2003) argued that "methods that document processes of enactment

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provide critical evidence to establish warrants for claims about why outcomes occurred" (p. 7).

The external validity can be ensured if the principles generated from the study can be applied to another similar situation as "a sign of successful generalization" and I can report that relevance and transferability is likely the case in this research (Bakker & Van Eerde, 2015, p. 452). I verified the content validity of the instruments used in this study (questionnaires and interview questions) by pilot testing with a sample group of faculty members. I sent the questionnaires and the interview questions to my committee members; this was an important step as I altered and refined these instruments based on their feedback (Creswell, 2012).

To further ensure the internal reliability of the research findings, I reported every step of the research to my supervisor and to the committee members. I was also looking for regular feedback from the miniMOOC design team to confirm the accuracy of the DBR process. I also documented the research process, changes in the research, and design decisions to create transparency, validity of the findings, and ensure the internal reliability. The documentation of the research process is reported in detail in chapter 4 as part of the design and construction phase and the implementation process of the research. I used peer examination to ensure the external reliability of data collection, analysis, and documentation of the research process and peer examination was provided by my supervisor as she was involved in all aspects of the research (Bakker & Van Eerde, 2015).

Achieving objectivity in DBR is a challenging matter; the researcher must be fully involved in all aspects of the research (Barab & Squire, 2004). Some researchers believe that the involvement of researchers in the study, with their biases and insights, is the best research tool (Anderson & Shattuck, 2012). As the researcher of this study, I do not claim that bias was removed completely, but I certainly attempted to balance the fine line between bias and

objectivity.

Limitations and Delimitations

This research study relied on findings from one macro-cycle of the DBR; therefore, the findings contributed to design principles, and generated theoretical insights, but may not be developed enough to fully impact the development or expansion of theory. Throughout the study, the researcher received rich insight into the design of intervention and implementation process that impacted the practice of faculty participants at the University of Calgary. That being said, this research study cannot be generalized to include all faculty members at all universities, or even at this one university; however, this is not the intention of a design based research study. The design principles that are generated from this study are meant to inform other practices and be applied to similar design, implementation and evaluation situations. Since the research was a closed pilot, this forced a limitation—as evident by the number of participants, and the implementation context. Furthermore, the total number of participants in the miniMOOC from whom data could be collected for the study was also affected as not all of the participants chose to provide consent to be part of this study.

The involvement of the researcher in all aspects of the study and the various roles (educator, designer, and researcher) that I played also posed a limitation. To address the potential for researcher bias, I discussed and critiqued each phase and stage of the study with my supervisory committee to benefit from peer examination. This study was delimited to investigate a QGS miniMOOC that will be designed for this purpose. The population of this research was faculty members at the University of Calgary and the number of participants was determined based on the number of participants registered for the QGS miniMOOC.

Ethical Considerations

The researcher obtained consent from the University of Calgary's Conjoint Faculties Research Ethics Board in order to conduct this research study. Before starting the online survey participants of the questionnaire were informed of the study, purpose, and the kind of data to be collected. Participants in the interview signed a consent form that included the purpose of the study, type of information collected, and their right to withdraw from the study at any point. The researcher did not collect personal information from participants, nor was this type of information required for the purposes of the research. I also obtained consent forms and media releases from all expert supervisors as their videos were part of the learning materials in the QGS miniMOOC. The chapter that follows includes detailed descriptions of each stage of the three DBR core phases in this study: 1) analysis and exploration, 2) design and construction, and 3) evaluation and reflection. It also includes an analysis of data from each phase of this design based research.

CHAPTER FOUR: IMPLEMENTATION OF INTERVENTION

The following sections include detailed descriptions of each phase of the three DBR core phases in this study: 1) analysis and exploration, 2) design and construction, and 3) evaluation and reflection. All three phases of this design-based research (DBR) project, including the implementation of the intervention, was completed over one macro-cycle. The analysis and exploration phase was completed over one micro-cycle. The design and construction phase took place over eight meso-cycles. A meso-cycle consists of two different tasks carried out in an iterative manner (design and construct, then evaluation and reflection) and each one of these actions is called a micro-cycle (McKenney & Reeves, 2012). As will be described in a section that follows, there were 16 micro-cycles in the design and construction phase. The design and construction phase was divided into four main tasks: a) planning and designing drafts of the modules, b) development of videos, c) building of the course materials in Desire 2 Learn (D2L), and d) implementing of the intervention. The planning and design of draft modules took place over four meso-cycles, which consisted of eight micro-cycles of designing and constructing, and then evaluating and reflecting on the work by seeking feedback. The development of videos took place over one meso-cycle and two micro-cycles, building the course material in D2L took place over two meso-cycles, which consisted of four micro-cycles, and implementing the miniMOOC with participants to test the intervention took place over one meso-cycle, which consisted of two micro-cycles. The evaluation and reflection phase was completed in one micro-cycle, which consisted of collecting empirical findings and reflecting on the results. McKenney and Reeves (2012) explained that the evaluation phase "refer[s] to the

Analysis and Exploration Phase	Design and Construction Phase																Evaluation and Reflection Phase
Jan 2015-Aug 2016	Planning and Designing Drafts Sep 20 –Jan 25								Development of Videos Nov 25-Jan 19			Building of D2L Dec 2-Feb 25				Implement of Intervention Feb14-Apr 14		Evaluate Apr 14-Aug 24
	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Design and Construct	Evaluate and Reflect	Evaluate and Reflect
Micro-Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro -Cycle	Micro-Cycle
	Meso-Cycle		Meso-Cycle		Meso-Cycle		Meso-Cycle		Meso-Cycle		Meso-Cycle		Meso-Cycle		Meso-Cycle		
	Macro-Cycle																

Figure 5. **The Phases of Design-Based Research in the Quality Graduate Supervision miniMOOC and the Process of the Design. Adapted from McKenney & Reeves, 2012.**

empirical testing that is done with a design…evaluation may pertain to testing conducted on or through an intervention" (p. 9). Figure 5 shows each of the phases and iterative cycles of DBR used in this study. Next, an examination into the analysis and exploration phase which includes: a) an introduction, b) data analysis, c) findings of this phase, and d) challenges and recommendations.

Analysis and Exploration Phase

Drawing upon literature on design based research (DBR), "the analysis and exploration phase constitutes one (empirical) micro-cycle… it includes problem identification and diagnosis" (McKenney & Reeves, 2012, p. 8), as was the case in this study. The analysis and exploration phase in this study started with a series of meetings with the research design team. Given the primary goal of the miniMOOC, the research design team included a faculty member from the Faculty of Graduate Studies who holds expertise in graduate supervision policy and practice; this faculty member is also responsible for the "My Supervisor Skills" program at the University of Calgary. Given the approach to online learning, the team also included two faculty members who have expertise in a) educational technology, b) faculty development, and c) design-based research. The members of the research design team served as the supervisory committee that supported the doctoral researcher in a) discussing the research problem, b) identifying needs and goals for the intervention, and c) identifying available resources and support at the university for faculty members in the area of graduate supervision. Furthermore, insights and recommendations from past researchers (Amiel & Reeves, 2008; McKenney & Reeves, 2012) in this area state that the analysis and exploration phase begins with communicating with the practitioners in the field before creating the research goals and research questions; each member of the research design team is an experienced graduate supervisor.

In the study, early discussions and meetings with the research design team helped the researcher in a) identifying the research problem, b) composing the research questions, c) conducting a critical literature review, and d) refining the conceptual framework, as presented in Chapters 2 and 3. After approval of the research proposal and the candidacy exam, and obtaining the ethical approval for the research, two questionnaires were sent to faculty members at the University of Calgary as part of the analysis and exploration phase. One questionnaire was sent to all graduate supervisors at the University of Calgary and a different questionnaire was sent to all Graduate Program Directors (GPDs) at the University. The rationale for including graduate supervisors at this stage of the research was to understand the phenomena better and to assist me, as the researcher, in understanding the complexity of graduate supervision practices. Data provided by the graduate supervisors assisted me with understanding the types of additional support needed with regard to graduate supervision and the types of professional development opportunities they preferred to attend. The information obtained was used to inform the design of a customized intervention to meet the needs of graduate supervisors. The GPDs were included in this study because they work closely with graduate supervisors and students in their program areas, and I anticipated that their insights would expand my understanding of the phenomena. Responses from the GPDs included shedding light on a) the issues they usually face in their roles as GPDs, b) the kinds of support they offer to graduate supervisors, and c) potential topics to include in the miniMOOC. The next section contains a detailed discussion of a) the two questionnaires, b) the analysis of the data, and c) how the findings from the two questionnaires informed the design and development phase of the current research.

Faculty Members' Questionnaire. During the analysis phase of the study, the Faculty of Graduate Studies staff sent an electronic link to the faculty questionnaire via email on my behalf

to all graduate supervisors at the University of Calgary. The analysis of data from the questionnaire influenced the design and development of the six topics/modules of the QGS miniMOOC, along with the analysis of the GPDs questionnaire responses, as reported in subsequent sections of this dissertation. The purpose of the questionnaire was to discover faculty expectations of professional development workshops—what they want to learn and where they required additional support in regards to graduate supervision practices. The faculty questionnaire also collected qualitative and quantitative data.

Questionnaire participants. The faculty questionnaire was sent to 1,219 graduate supervisors and 60 responses were received from faculty, who represent 10 university faculties out of 12. Five participants did not specify their home faculty. The questionnaire was distributed in April 2016, so the number of graduate supervisors that received the invitation to the questionnaire is based on the number of graduate supervisors at that time. In this questionnaire, each question had a different number of responses and the calculation of the percentage for each question is based on the total number of responses for that particular question.

Out of the 60 faculty members who responded to the questionnaire, a) 20 (33%) responses came from professors, b) 24 (40%) from associate professors, c) 14 (23%) from assistant professors, d) one (1.6%) professor emeritus, and e) one (1.6%) adjunct professor. This response distribution shows that the majority of the faculty participants were middle to more advanced in their career experience and that fewer of the participants were early career academics. Of the respondents, a) 11 (18%) graduate supervisors had 1-5 years of experience as faculty members, b) 12 (20%) graduate supervisors had 5-10 years of experience, c) 10 (17%) graduate supervisors had 10-15 years of experience, d) 18 (30%) graduate supervisors had 15-20 years of experience, and e) nine (15%) graduate supervisors had over 20 years of experience as

faculty members. This result indicates that the majority of the participants (62%) had been faculty members for more than 10 years. Table 2 is a summary for these responses to these two demographic questions.

Table 2. *Summary of the Faculty Members' Demographic Questions*

Row labels	Professor	Associate Professor	Assistant Professor	Other — Adjunct Professor	Other — Professor Emeritus	Grand total	Percentage
Cumming School of Medicine	5	9	5			19	31.67%
Faculty of Arts	5	5	2			12	20.00%
Faculty of Kinesiology			2			2	3.33%
Faculty of Nursing		1	2			3	5.00%
Faculty of Science	3	3			1	7	11.67%
Faculty of Social Work	1					1	1.67%
Faculty of Veterinary Medicine	1	2	1			4	6.67%
Haskayne School of Business		1				1	1.67%
Schulich School of Engineering	1			1		2	3.33%
Werklund School of Education	2	1	1			4	6.67%
Did not state	2	2	1			5	8.33%
Grand total	20	24	14	1	1	60	100.00%
Proportion	33.33%	40.00%	23.33%	1.67%	1.67%	100.00%	

Of the 60 graduate supervisors who responded to the faculty questionnaire, a) 10 (16.7%) reported that they had 1-5 years of experience as graduate supervisors, b) 20 (33%) had 5-10 years of experience, c) 10 (16.7%) had 10-15 years of experience, and d) 20 (33%) had over 15 years of experience. Figure 6 summarizes questionnaire participants' years of experience as graduate supervisors.
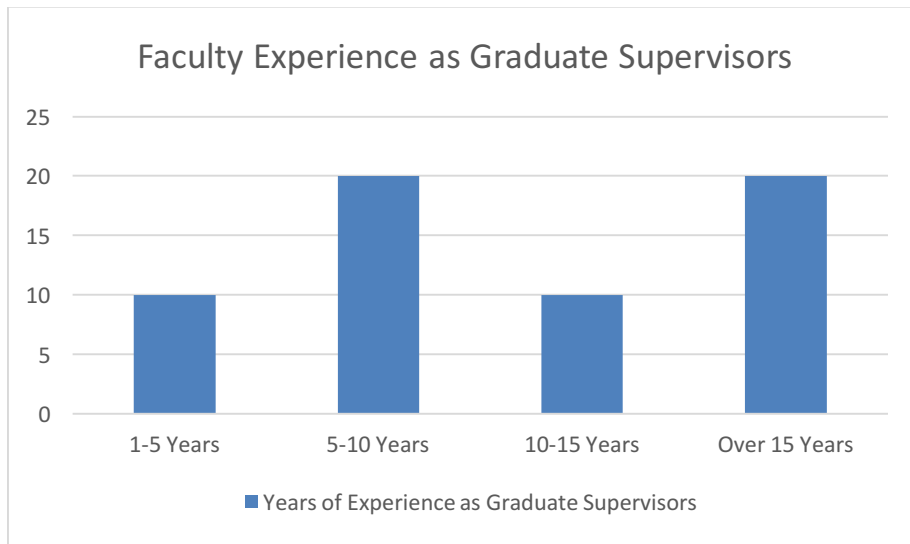
Figure 6. **Questionnaire Participants' Years of Experience as Graduate Supervisors**

Graduate supervisors were also asked to rate their level of expertise as graduate supervisors: a) 10 (17%) graduate supervisors rated themselves as Expert, b) 33 (55%) rated themselves as Experienced, c) 16 (27%) rated themselves as Beginner/Emerging, and d) one (2%) rated him/herself as a Novice. Figure 7 shows questionnaire participants' self-rating as graduate supervisors.
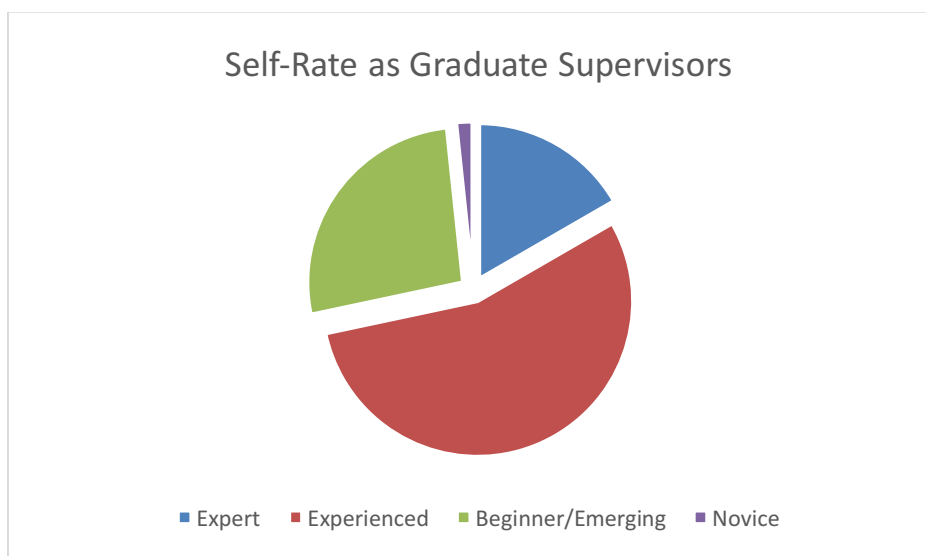
Figure 7. **Questionnaire Participants' Self-Rated as Graduate Supervisors**

Responses to the demographic questions on the faculty survey showed that the majority of the questionnaire participants identified themselves in the following ways:

- were advanced in their career as professors and associate professors 44 (73%),

- had been in a faculty position for more than 10 years 30 (50%),

- were experienced in graduate supervision 33 (55%), and

- had engaged in faculty development workshops or seminars at the university 50 (83%).

University Workshops and Seminars. The majority of the participants who responded to the questionnaire 50 (83%) reported that they had engaged in different types of faculty development, seminars, or workshops at the university, while the remaining 10 respondents (17%) reported that they had not engaged in any type of faculty development at the university. This result is important and suggests that many of these graduate supervisors take part in faculty development, and may believe it is essential for developing their skills.

To explore the graduate supervisors' perspective and experience with the available faculty development workshops and seminars and to determine if there is a need for offering faculty development opportunities online like MOOCs for example, participants were asked about the university's workshops and specifically on their availability and accessibility. Seven (14%) reported that the availability of workshops in the university is adequate. However, seven (14%) of the participants indicated that the availability of workshops is limited. Some participants explained that they wanted workshops to be offered more often at different times or as one of the graduate supervisors wrote, "workshops need to be offered more frequently, especially during 'down time' as in in-between semesters". Another participant stated that

workshops should be offered more on other campuses as most of the availability is on the main campus. These statements about availability of workshops suggests that online offerings may be a solution to increasing availability and accessibility of professional learning opportunities.

Regards to the accessibility of the university's workshops, seven (14%) reported that the accessibility is good. However, nine (17%) reported accessibility issues as they were not able to attend workshops because of their busy schedule and three (6%) indicated they usually not able to attend offered workshops because of the short notice of these workshops and difficulty fitting them into their schedule. This response suggests there is an appetite for offering online faculty development as "anytime, anywhere" access can address any accessibility or availability issues. The range and types of responses speak to the importance of offering faculty development opportunities that are easy to access and to participate in, such as those offered online. These responses also highlight the importance of announcing faculty development opportunities early enough so that faculty members have ample time to fit these workshops into their schedules.

Graduate Supervision. The results of the responses to the question on the value of workshops on graduate supervision is that these views contribute to a better understanding of how some graduate supervisors think, their attitudes are toward attending workshops on graduate supervision, and their concerns about graduate supervision. Understanding graduate supervisors who will be benefiting from the intervention and design it according to their needs is very important. According to McKenney and Reeves (2012), "Understanding the concerns of those who will use interventions created through educational design research is essential to shape both design and implementation" (p. 174).

Participants were asked whether they had participated in graduate supervision workshops/seminars, and 35 (58%) indicated that they had, while another 25 (42%) indicated

that they had not participated in such workshops. Even though 25 participants (42%) didn't participate in workshops on graduate supervision, nine of these participants (15%) stated that it is "very important" to attend workshops on graduate supervision, 23 (38%) indicated it is "important", and 18 (30%) believed it is "somehow important". Only eight (13%) respondents indicated that these workshops are not important and two (3%) don't know if it is important or not. Three possible reasons for this mismatch in belief and action are that the university does not offer enough workshops on graduate supervision, or that the ones offered are not scheduled at times that are conducive to faculty attendance, or the topics are not considered relevant.

To explore this data further, I analyzed the open-ended responses for common themes. Five themes have emerged from the participants' perspectives and attitudes toward attending workshops on graduate supervision: a) gaining information, b) learning from peers/ mentors, c) benefit new faculty, d) improve their supervisory skills and e) finding time to attend.

With regards to gaining information, while eight (16%) of participants expressed their belief that attending workshops on graduate supervision is important to keep up with new information and the process of supervision. One participant stated, "the rules and regulations keep changing and to be fair to students, you need to stay up to date." However, two (4%) participants assumed that this kind of workshops did not include much information for them.

The theme, learning from peers/mentors, summarizes responses from four (8%) participants who indicated that workshops on graduate supervision are an opportunity to learn from expert peers. According to one participant, "I strongly believe in mentorship and learning from peers as it is more personal and applicable." Another participant reported, "It is quite useful to hear from other faculty regarding their experiences and approaches in dealing with graduate students as there is no one clear universal solution." However, seven

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(14%) participants indicated that mentoring and learning from peers outside of structured workshops is better. Overall, in addition to individual participant's responses about the importance of workshop attendance, 11 (22%) participants agreed that the ideal way of learning about graduate supervision was by a) mentorship, b) learning from peers and, c) from experienced supervisors. This notion is important to the study because it influenced the decision- making process for the design of the miniMOOC. Since the faculty questionnaire respondents stated that this type of support was appreciated, expert graduate supervisors who had won awards in supervision were included in the design of the miniMOOC.

With regards to the benefit new faculty theme, eight (16%) participants indicated that workshops on graduate supervision can benefit new faculty and new graduate supervisors. One participant stated that workshops on graduate supervision is, "important early in career; less so with more experience." Another participant stated, "I am a novice supervisor. Workshops would help me understand the required processes, how to support students and how to work with difficult students."

Improve their supervisory skills theme was derived from nine (18%) participants who indicated that attending workshops on gradate supervision would improve their supervisory skills/ personal skills. According to one participant, "If I am to do the best job possible for my graduate students, it is imperative that I continue to seek out and/or take advantage of opportunities to improve my skills. I feel strongly that this should not just be the case for new supervisors but all supervisors." Furthermore, four (8%) participants indicated that supervisory skills depend on the social skills of the supervisors and/or on their skills in managing people and that workshops may not be the way to enhance these skills. According to one participant, "I'm

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not sure workshops and seminars will be able to help with this, often the underlying problem is just the faculty members' poor social skills, or as Leonard Hoffsteader calls it 'academic personality disorder'."

A theme of finding the time to attend was distilled from four (8%) participants who specifically mentioned that they usually do not find the time to attend workshops on graduate supervision. Finally, the responses to the open-ended questions suggest that participants were generally open to attending workshops on gradate supervision and prefer to learn in an environment with other experts and peers which can be done by involving expert supervisors in the workshops on graduate supervision.

With regard to the topics that a miniMOOC on Quality Graduate Supervision might include, 44 participants responded to this question and the responses revealed several themes. Preliminary analysis of the responses for this survey question was published in *Proceedings of the 39th Annual Convention of the Association for Educational Communications & Technology* (Alharbi & Jacobsen, 2016b). These themes are summarized in Table 3:

Table 3. *Top Topics for Quality Graduate Supervision miniMOOC Based on Participants'*
Responses

Topics	Selected Quotations from Participants' Responses [quotes sic]	Number/Percentage (of total number of responses)
Motivate/support your students	Learning how to motivate and restore confidence to struggling but otherwise fine students is very important	11 (25%)
Conflict resolution	The most important aspects to cover are how to deal with problem cases, which come in many different varieties. The trickiest ones are those cases which [sic] fall into the "poor performance" to "borderline unacceptable" category but below what is more straightforward like academic or non-academic misconduct.	9 (20%)
Best supervision practices/orientation on supervision	Do's and don'ts of graduate supervision (where to draw the line, when to throw in the towel, etc.)	6 (14%)
Preparing students for candidacy/to be an independent researcher	How to encourage the transition from "student" to "independent researcher"	6 (14%)
Help students with time management/work-life balance	Time management, work life balance. Most successful professors don't know much about most of these topics.	6 (14%)
Student/supervisor relationship/effective communication	• Contextual supervisory relationship • Managing supervisor expectations	5 (11%)
Updated information on supervision and where to find it	• Where to find the information quickly • Administrative procedures, the mass of new paperwork required over the years	3 (7%)
Cultural differences	Supervising graduate students in the era of "internationalization"	3 (7%)
How supervisors choose their students	How to increase the odds of hiring a grad student that is a good fit	3 (7%)
Trends in student behavior and learning	Supervisory strategies for different types of students	3 (7%)

The responses to this question influenced the decisions about the development of

main topics in the QGS miniMOOC (along with topics suggested by the GPDs). More

explanation about the choices of topics included in the QGS miniMOOC is available in the recommendations for the design of this intervention.

Graduate Program Directors' (GPD) Questionnaire. During the same time that the faculty members' questionnaire was sent, the Faculty of Graduate Studies at the University of Calgary sent another email on my behalf. This time, the email was sent to all GPDs and contained the questionnaire that was framed for this group. The GPD questionnaire was designed to further understand the phenomena of graduate supervision and areas of need and issues for the miniMOOC modules.

Questionnaire participants. The GPD questionnaire was sent to 78 Graduate Program Directors and four responses were received (n=4); respondents were from three faculties out of the twelve at the University. The university faculties represented are: a) One participant was from the Faculty of Arts, b) Two participants were from the Cumming School of Medicine, and c) One participant was from the Faculty of Nursing. Two participants stated they had 5-10 years of experience as graduate supervisors and two had 10-15 years of experience as graduate supervisors. Three rated themselves as experienced supervisors and one participant rated him/herself as a beginner/emergent supervisor. Three participants had been graduate program directors for 1-5 years and one participant had been in the position for less than a year.

Challenges and Support for Graduate Supervisors. Many themes emerged as the top learning needs that new graduate supervisors need to learn about, according to the participants (n=4). These learning needs were mentioned: a) three participants stated that supervisors needed to know how to keep students on track during their studies and how to support them, b) two mentioned that supervisors needed to learn their program's policies and procedures, and c) two also stated that supervisors needed to learn how to manage difficult situations. Furthermore, the

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respondents stated these thoughts: a) one participant indicated that learning about graduate supervisors' best practices was important, b) one indicated that graduate supervisors should learn about methods to provide constructive criticism, c) one participant indicated supervisors should learn about the different resources available for students in the university, and d) one participant stated that learning about student/supervisor relationships was one of the learning needs for new graduate supervisors. The results from GPDs match quite closely with topics that graduate supervisors' self-reported as learning needs for graduate supervision.

With regard to the top three supervision problems or issues that GPDs deal with, two participants stated that the most common issue was students' failure to progress in their programs of study and the reasons for this lack of progress varied from a) a deficiency in students' background, b) to absenteeism of student, or c) to long delays in meeting deadline of assigned work to failure in achieving their program's requirements. Another top issue identified by two participants was student-supervisor relationship conflict, including personality conflicts between student and supervisor. The third of these issues, also reported by two participants, was that unsupportive supervisors could be an issue. An unsupportive supervisor might not be available for meetings or would provide only minimal useful feedback on a student's work. According to one participant, this situation might take the form of "Faculty who are disciplinary and NOT supportive and who find it difficult to meet the student where they are and build the necessary scholarship skills." An overall summary of the responses to this question is presented in Table 4.

Table 4. *Common Issues and Problems in Graduate Supervision from Graduate Program Directors' Perspectives*

Potential Supervision Problems	Number of Participants (n=4)	Reasons
Student failure to progress in program	2	• Deficiency in students' backgrounds • Absenteeism of student • long delays and not meeting the deadlines of assigned work • Failure in achieving program's requirements.
Student-supervisor relationship conflict	2	• Personality conflicts between student and supervisor
Unsupportive supervisors	2	• Supervisor not available for meetings • Minimal useful feedback on student's work
Note. Table Adapted from (Alharbi & Jacobsen, 2016b).		

When the GPDs were asked if they spent more time with new or experienced supervisors to address their supervision needs, to my surprise, two participants stated that they spent more time with experienced supervisors, while two participants stated that they spent about the same time with both new and experienced supervisors. Regarding the question on the ways new and experienced supervisors' needs were the same and how they were different, one participant said that they were the same in their need for understanding procedures and policies. The differences noted on this question were divided into new supervisors and experienced supervisors. For new supervisors, two participants reported that new supervisors needed more guidance as they lacked practical experience and one participant added that they were usually eager and relational even though they lack experience. According to this participant, "new supervisors are usually eager and relational and have a good rapport but don't have the pragmatic experience to keep the student focused and on track." On the other hand, for experienced supervisors, two participants stated they needed to strengthen their supervisory practices. According to one participant,

"experienced supervisors need a way to reflect on what works and what doesn't with their supervisory practices and find constructive ways to strengthen their supervision." Furthermore, two participants stated that experienced supervisors were usually busy and students' needs were low on their priority list. According to one participant: "Often, experienced supervisors seem to have an 'old' view of 'student-for-hire-for-cheap,' rather than viewing the student as having his/her own learning and professional development needs." These findings from GPDs indicated that even experienced graduate supervisors need support in supervision and sometimes they may need it as much as new supervisors do. This result also showed that lengthy experience in supervision was not always an indicator of quality or excellence in supervision. Table 5, which is adapted from Alharbi and Jacobsen (2016b), summarizes the participants' responses on the top topics reported most frequently in the questionnaire responses pertaining to skills that all graduate supervisors need to learn to help them in the supervision of graduate students.

Table 5. *Top Topics Needed for Graduate Supervisor Professional Development, based on Graduate Program Directors' Questionnaire Responses*

Topics	Numbers of Participants (n=4)
Motivation/support for students	3
Selection of students	2
Information on program guidelines and procedures	2
Strategies for working with diverse students	1
Conflict resolution	1
Student/supervisor relationship	1

All of the suggested topics were considered and included in some way in the QGS miniMOOC, either as topics or as sub-topics in a module. The results from the GPD questionnaire echoed the suggested topics received from graduate supervisors in the faculty

questionnaire and confirmed that these topics should be included in the QGS miniMOOC. More explanation on the topics included in the QGS miniMOOC is available in the following section.

Recommendations for the Design of the QGS miniMOOC. In the analysis and exploration phase of the design and development of the QGS miniMOOC intervention, several recommendations and decisions were made based on the analysis of the two questionnaire responses. The first important recommendation was the delineation of several topics that would form the QGS miniMOOC. The decision was made to include six topics with associated sub-topics to cover most of the areas of interest and importance to the graduate supervisors. The six main topics included in the QGS miniMOOC are in Table 6:

Table 6. *The Topics of the Six-Modules in the QGS miniMOOC*

Modules	Topic
Module 1	Introduction to Graduate Supervision
Module 2	Best Supervision Practices
Module 3	Relationship Building
Module 4	Mentoring New Researchers
Module 5	Anticipating and Addressing Challenges
Module 6	Promoting Excellence and Wellness in Graduate Education

Another recommendation for the design of the QGS miniMOOC based on the analysis of the two questionnaires was to invite well-known award winning graduate supervisors to be part of the miniMOOC design, as some of the supervisors (22%) indicated a reason for them to attend workshops was to learn with, and from, experienced peers and supervisors. Further explanation of the process in recruiting the expert supervisors and how their insight was used in the design of the miniMOOC is explained in a subsequent section on the design and construction phase.

An additional recommendation to consider when scheduling the QGS miniMOOC was to announce the opportunity to engage in the miniMOOC early enough, since the late

announcement of workshops was one of the barriers that graduate supervisors mentioned for
attending these workshops, along with faculty members finding the time to attend workshops in a
busy schedule.

After exploring the problem and identifying a solution based on the extensive review of
the literature, communicating with practitioners and experts in the field, and the analysis of data
from two faculty questionnaires, the researcher moved forward to the design and construction
phase. The following section is a description of this phase.

Design and Construction Phase

As mentioned earlier in the introduction of the "implementation of the intervention", the
design and construction phase took place over eight meso-cycles which consist of 16 micro-
cycles, as seen in Figure 8.
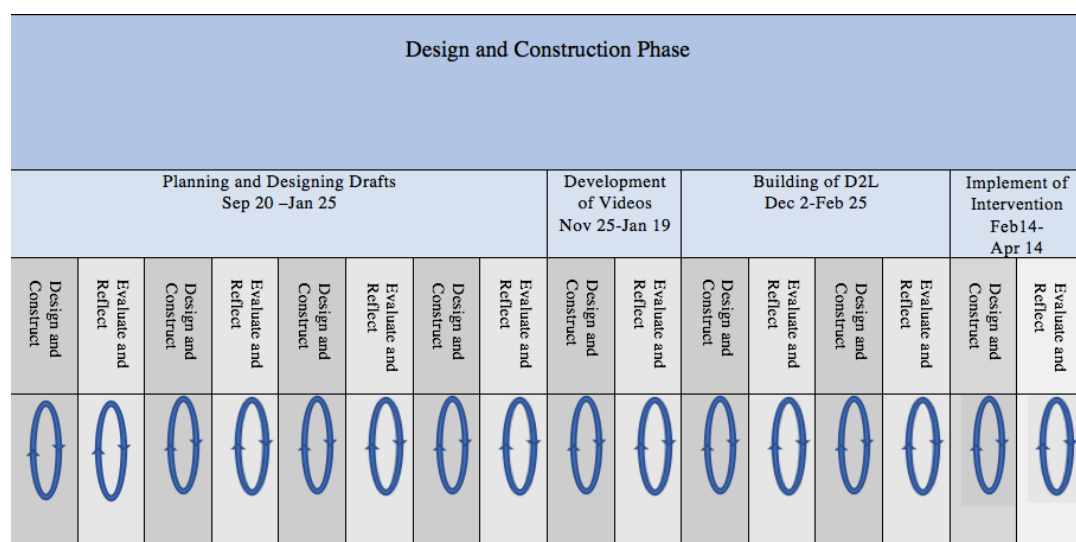
Figure 8. **The Design and Construction Phase of the Design-Based Research in the Quality Graduate Supervision miniMOOC**

The design and construction phase took approximately six months, excluding the implementation of the intervention which took around two months. Reporting on this phase is divided into four main sections to clarify and explain the process and the main tasks in detail: 1) Planning and designing draft: the planning and designing drafts took place over four meso-cycle, which include eight micro-cycles; 2) Development of videos: the development of videos took place over one meso-cycle and two micro-cycles; 3) Building of the materials in the Learning Management System (LMS), D2L: the building of the materials in D2L took place over two meso-cycles, which include four micro-cycles; and 4) Implementation of the intervention: the implementation of the intervention took place over one meso-cycle and two micro-cycles.

Planning and Designing Draft. After finalizing the topics and the sub-topics of the QGS miniMOOC, I started planning and constructing the design drafts. The design draft is the document that described in detail all of the design elements that were to be included in the QGS miniMOOC. The design draft showed in detail what would be included in each module of the miniMOOC—from the number of videos of expert supervisors in each module to the list of references and resources included in the six modules of the miniMOOC. Each of the six modules included an overview, learning objectives, resources, videos of expert supervisors and a discussion forum. The design team co-developed questions and prompts—which aligned with reflection questions in each module's discussion forum—for the expert supervisors to answer during the video interviews. A summary of the design elements and components implemented in the QGS miniMOOC are presented in Table 7.

Table 7. *Design Components Implemented in the QGS miniMOOC*

Design Components	Design and Construction
Overview and Learning Objectives	o An introduction was developed for each topic of the QGS miniMOOC along with weekly learning objectives.
Expert Supervisors' Videos	o A series of interview questions were developed in relation to each module topic to provide a guide for filming the expert supervisors. o Expert supervisors included three males and three females from such disciplines as psychology, biochemistry, medicine, education, counselling psychology and nursing.
Discussion Board	o Questions and prompts posted in each module's discussion forum aligned with the questions asked of the expert supervisors in the videos. o Discussion moderators were involved in guiding, promoting and summarizing discussion each week.
Resources	o Resources and content were collected from the Faculty of Graduate Studies at the University of Calgary and from other online sources. o Resources and content was aligned with the weekly topics in the QGS miniMOOC.
Note. Table Adopted from (Alharbi & Jacobsen, 2017b).	

The design draft was developed and refined through four meso-cycles until it was finalized. Table 8 shows the process of designing, refining and editing the design draft through multiple iterations and based on feedback from different experts in the field.

Table 8. *The Process of Designing, Refining and Editing the Design Draft*

(Researcher) Design and Construct Drafts	Experts Provided Feedback	Evaluation and Feedback	Meso Cycles
Draft 1 ⟶	Supervisor ⟶	Draft 2	Meso (1)
Draft 2 ⟶	Committee Members ⟶	Draft 3	Meso (2)
Draft 3	Instructional Designer / Supervisory Group ⟶	Draft 4	Meso (3)
Draft 4 ⟶	Supervisor ⟶	Draft 5	Meso (4)

The first design draft was sent to the academic supervisor for feedback. After refining the design based on the feedback, the second draft was sent to the supervisory committee members for more feedback. The draft was then edited based on the additional feedback and was presented to an instructional designer who works at the Taylor Institute for Teaching and Learning for more feedback. The instructional designer provided some useful feedback on writing the objectives and the flow of the design. Around the same time, the draft was also presented to the Quality Supervision Working Group in the School of Education, which consisted of seven faculty members who were focused on quality supervision practices. The feedback provided by the instructional designer and the supervisory group was taken into consideration, and a new draft was prepared and sent for final revision to the academic supervisor. The design draft for the six modules in the miniMOOC was completed over four months from September 20, 2016 - January 25, 2017. A sample of the design draft for the QGS miniMOOC is provided in Appendix C.

Development of Videos. Informed by the data on learning from mentors and expert peers, a pedagogical decision was made to include videos of expert supervisors in the miniMOOC. The first challenge was to attract funding for both the development of the miniMOOC and for the production of high quality, expert videos. A supervisory development grant was provided by the Faculty of Graduate Studies which enabled us to hire a professional videographer and editor to capture, edit and create the videos for the QGS miniMOOC. The decision was made to recruit expert graduate supervisors, who had been recognized by peers and/or students for excellence, to be in the videos (Alharbi & Jacobsen, 2018). An invitation was sent to several graduate supervisors who have won Faculty of Graduate Studies GREAT Supervisor awards and faculty-level Distinguished Supervision Awards. Six expert supervisors accepted the invitation to become involved with the miniMOOC production; three male faculty members and three female faculty members from such disciplines as psychology, biochemistry, medicine, education and nursing. The video interviews were conducted at the university; the videographer set up a room to capture high quality video and sound. The total studio time for the production of the raw videos was 212.10 minutes. A set of 18 pre-developed questions aligned with the modules were used to guide the interviews with expert supervisors; the questions also served to prompt the supervisors to reflect on their practices and express the diverse qualities, experiences and expertise that each of them hold about graduate supervision (Alharbi & Jacobsen, 2018). The list of interview questions is provided in Appendix D. Each supervisor was asked questions related to all six modules and each video interview took approximately one hour. As the researcher, I reviewed the raw footage and used the time stamps to identify specific clips that I wanted to use in the individual video segments. The videographer used the information provided about time stamps to create the videos for each module. The raw video was

professionally edited and the final video was presented to include the perspectives of three expert supervisors for each of the questions. The supervisors' responses to each question were reviewed and the ones that were selected for the final videos were based on two considerations: 1) how informative was the answer, and 2) how diverse were the supervisors' responses to the guided questions. Clips used in the composite expert videos were selected based on the commitment to include multiple perspectives on each question, to present graduate supervision as diverse and varied, to represent different disciplinary practices and points of view, and to convey the rich and different supervision styles the six experts contributed for each question in each module. The goal was to disrupt notions that there was one right answer or one right approach to quality graduate supervision. For example, in Module 5, a composite expert video on "what are the signs that a graduate student may be struggling, either with program demands or a personal concern? What steps do you take to support students who are struggling?" was posted along with two other composite expert videos related to this module's topic. Another video on the course homepage combines perspectives from all six expert supervisors on what is most satisfying about being a graduate supervisor. Faculty members who watch the videos are exposed to different answers and perspectives in each video. An example of the homepage is available in Figure 8 in the following section. The final production was eighteen high quality videos for the six modules, an introductory video that was posted on the homepage, and a promotional video that was used for recruitment. Each video ranges from 2-6 minutes and the total time for these videos was 74.55 minutes. The timeframe for producing and editing the videos took approximately two months from November 25, 2016 - January 19, 2017.

Building of the Materials in LMS (Desire 2 Learn). The build using the learning management system (LMS) took approximately two months from Dec. 1, 2016 - Feb. 25, 2017.

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For this stage of the development process, I attended two one-on-one consultation sessions with Werklund School of Education' technology coaches to learn more about LMS and to overcome some of the challenges that I faced when designing the webpages and uploading the materials to D2L. One of the early challenges that I faced was the limited space allowed by the university for uploading videos to D2L. The solution for that was to upload the videos to a host website (Vimeo) and then implement the links of the videos in D2L's course shell. Some of the funding that we received for development was used to purchase a premier license in the host website. The reasons for the host website was to extend the storage so that it can accommodate the size of the videos and to extend the privacy features based on our needs for this project.

Moving the design draft from being a draft in a document to D2L and implementing all the design elements was quite challenging and time consuming. The build-in templates available by the university needed many alterations to reflect the design I had in mind for the miniMOOC's homepage as it is the first page that participants see when they login. On the homepage, I first visualized where all the design elements should be, then built it, revised it, altered it and changed some of the features based on the design, and customize it to look like standard MOOC. In the homepage, a café forum was also included to help participants ask both general questions and those that may not fit under any of the modules' forums. Under content, an overview page of the QGS miniMOOC was created and was followed by "meet the miniMOOC team" page, where I introduced the research design team and the expert supervisors who participated in the miniMOOC's videos. For the six modules, I altered the template for the first module and then used it as a guide for the rest of the modules. All the modules followed one order, "introduction, videos, resources and discussion forum". Lastly, I created an original logo specifically designed for the miniMOOC.

After building the material and uploading the documents in D2L, my academic supervisor and supervisory committee members reviewed the course shell and gave feedback on how to improve it and what could be changed. As a result of the review and discussion of the modules, a decision was made to invite the expert supervisors to be discussion moderators in the QGS miniMOOC.

After refining the design of the D2L, a second review was done by three expert faculty members who were recruited because they have each won awards for their online teaching. The experts were given access to the miniMOOC and a set of questions to answer prior to the review meeting. They provided notes and/or feedback on the overall design of the QGS miniMOOC and each module. Table 9 illustrates the questions provided to the experts for their feedback and review of the QGS miniMOOC and modules.

Table 9. *The Quality Graduate Supervision miniMOOC Reviewer's Questions*

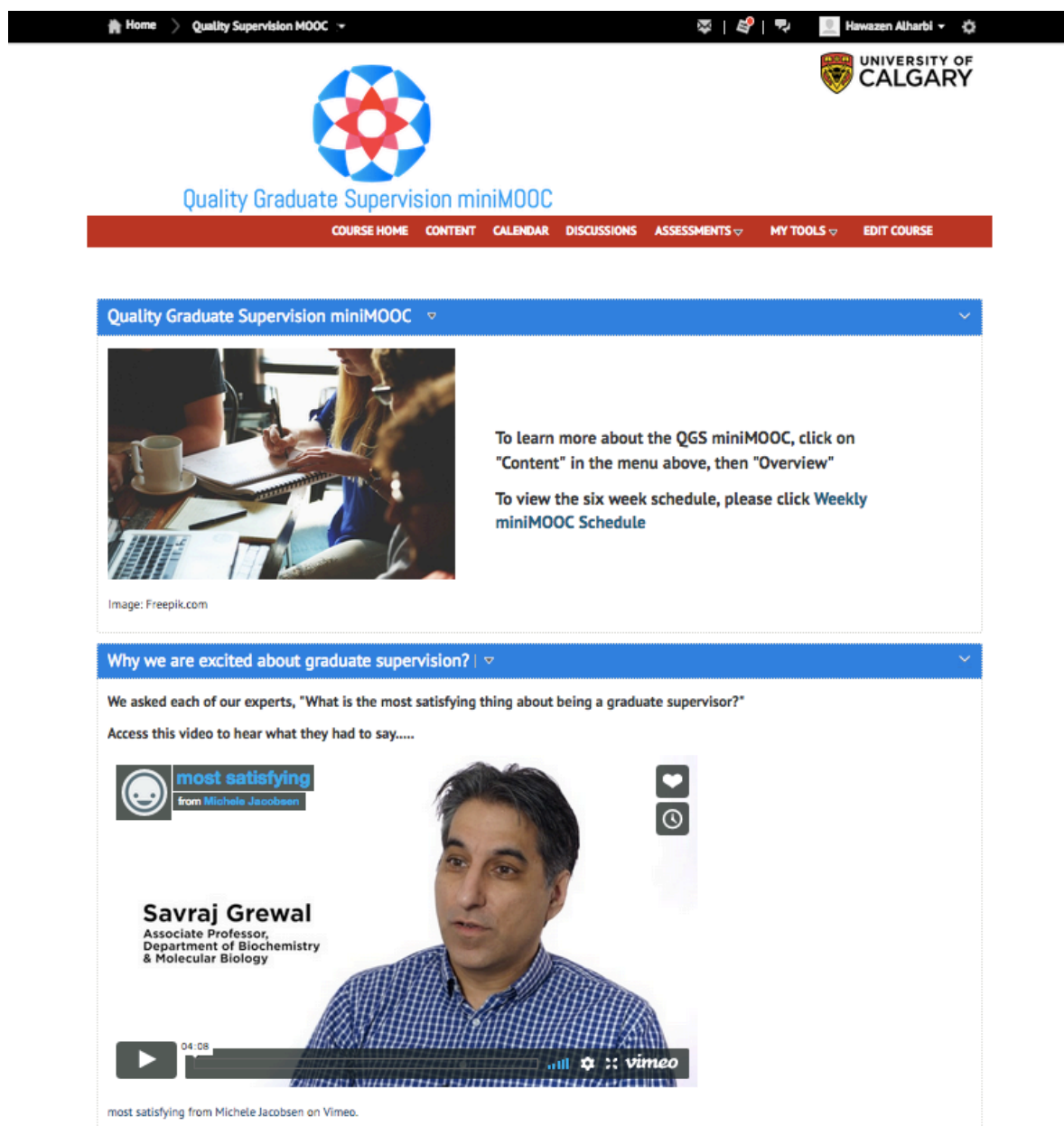| **Overall miniMOOC Design** |
| --- |
| What is your overall feedback on the look and "feel" for the six modules? Do the colors, icons and graphics make sense given the content? Is it clear what you are being asked to do in each module? Are the directions for navigating the miniMOOC clear and easy to understand? How might these be improved? Please comment on the standard videos, resources, and discussion design for each module. Is it clear what faculty members are being asked to do for the "portfolio task"? Do you recommend closing each module's discussion board after the weekend and opening the next module's discussion for the following week? Why or why not? |
| **Question for Module 1- 6** |
| |

- Is it clear what you are being asked to do in this module?
- Does the topic introduction make sense? Would you add or remove anything from the topic introduction?
- Are the videos easy to access and view?
- What is most valuable about the videos? What might you change about the videos?
- Are there resources or links that you would add to this module?
- Comment on the questions that have been chosen to guide the discussion forums. Would you suggest any changes?

The reviewers gave constructive feedback on the design and on each module. Most of the comments were very positive and applauded the design. One reviewer wrote, "I like how the modules are set-up in a similar format sequence to module 1." Another reviewer wrote, "the introductions "to the modules" are clear. I would not add any further text or information." One reviewer commented on the videos and added suggestions:

The videos are easy to access and high quality audio/visual. Is there a way to add subtitle for accessibility? It would be helpful to have a transcript of the video available. I might prefer to review the text instead of watching/listening to the video

Another reviewer also commented on the videos and she stated, "videos nice length, great content-feels personal, clean look, relevant strategies from the supervisors." One of most important comments and feedback received on the design was the flow and the navigation of the course. Two of the reviewers suggested adding more clarification on the homepage to explain clearly to participants where to go from there and what you should do next. Another reviewer suggested using brighter colors for the banner and the course logo, and selecting a maximum of three colors for both designs. These comments, along with a few other minor changes were addressed after the meeting. Figure 9 is a screenshot of the approved QGS miniMOOC

homepage. It includes the upper part of the homepage and a video on "what is the most satisfying thing about being a graduate supervisor". The video reflects the perspectives of all six expert supervisors on graduate supervision. The decision to include such video was made after the videos for all the modules were developed. The expert supervisors' response to this question seemed perfect to be included as an introduction to the course.

Figure 9. **Screenshot of the Home Page of the Quality Graduate Supervision miniMOOC.**

Figure 10 is an overview of Module 2 which includes an introduction to the topic, objectives of the module and direction on what participants are expected to do during the week. The menu to the left includes a table of contents where participants can access videos, resources and discussion boards to each module.

Figure 10. **Overview of Module 2 "Best Supervisors' Practices"**

When participants click on the videos for example, it leads them to the three videos

associated with each module and a short description as shown in Figure 11.

Figure 11. **Screenshot of the Videos of Module 2**

When participants click on any of the three videos available in each module, it leads them

to a page of that specific video in the same course as the videos are uploaded in the course shell.

Figure 12. **A Screenshot of One of the Videos in Module 2**

Implementation of the intervention. Before implementing the intervention and offering

the QGS miniMOOC, there were many processes that needed to be completed. In this pre-

implementation period, I prepared all the required materials for the miniMOOC launch. I

designed an advertising poster that was distributed across campus to reach as many participants

as possible. Around the same time, an invitation email was sent on my behalf to all graduate

supervisors in the Faculty of Graduate Studies at the University of Calgary. The invitation email

included an advertising video that was developed specifically for this purpose. The invitation to

register for the QGS miniMOOC was accepted by 23 graduate supervisors and post-doctoral

scholars from the following 11 departments / faculties: computer science, education, political

science, medicine, veterinary medicine, sociology, art, engineering, physics and astronomy, nursing, and physiology and pharmacology. The QGS miniMOOC was launched via three orientation sessions. Two of these orientations were on campus and one was offered online. The number of participants who attended the on-campus orientations was nine participants. The number of participants who attended the online orientation was five participants from the University of Calgary campus in Qatar. Each orientation introduced the QGS miniMOOC, presented the research and how graduate supervisors can get involved, and provided a brief demo of the course (Alharbi & Jacobsen, 2018). Each orientation was presented by the researcher, with the supervisor in attendance who played the role of the instructor of the QGS miniMOOC. The brief demo of the course was provided to show participants how to login, navigate the course material and select different modules. Participants were provided with binders that included: an overview of the six modules, the FGS Supervisor Handbook produced by the Faculty of Graduate Studies, a collection of resources available in the course and a copy of the orientation presentation slides. Two participants could not attend the orientation sessions because of a time conflict. Therefore, the researcher offered a one-on-one session in their office. However, 16 participants out of 23 attended an orientation session. It was later noticed during data analysis after the miniMOOC was completed, that most of the participants who attended an orientation session actually completed the QGS miniMOOC, which echoes Yang et al's (2013) research on the importance of orientation and beginning at the scheduled start time of a MOOC. A more thorough explanation will be provided in the evaluation phase of the miniMOOC.

An instructional guide was specifically developed for the discussion moderators in this QGS miniMOOC. This guide included different ways to moderate an online discussion; each

moderator chose the approach that worked best for his or her interaction style. The guide also included starting points for moderators who facilitated discussions in the miniMOOC forums.

The QGS miniMOOC ran from March 6-April 14, 2017, with extensions for several faculty who requested more time to complete the modules. Data was collected from the pre-miniMOOC questionnaire during the implementation of the intervention to understand the participants of the QGS miniMOOC and their intentions of enrolling to the QGS miniMOOC. The following section will provide findings from this source of data.

Pre-miniMOOC questionnaire. This questionnaire was designed to gather information from the graduate supervisors who signed up for the QGS miniMOOC and to understand their intention and expectations of participating in the miniMOOC. This short questionnaire included six select-response type questions that were analyzed using descriptive analysis and four open-ended questions that were analyzed thematically using content analysis.

Questionnaire participants. This questionnaire was sent to all 23 graduate supervisors who signed up for the QGS miniMOOC—14 responses were received. Out of the 14 participants in this questionnaire, a) seven (50%) were associate professors, b) three (21%) were assistant professors, c) three (21%) were post-doctoral scholars and, d) one (7%) was an instructor. Of the participants, a) two (15%) participants were from Werklund School of Education, b) two (15%) participants were from Faculty of Nursing, c) two (15%) participants were from Faculty of Arts, d) two (15%) participants were from Faculty of Science, e) two (15%) participants were from Cumming School of Medicine, f) two (15%) participants were from Faculty of Veterinary Medicine and j) one participant was from Schulich School of Engineering. Furthermore, participants rated their expertise as educators as follows: a) five (36%) participants rated themselves as intermediates, b) four (29%) participants as experts, c) four (29%) participants as

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beginners, and d) one participant (7%) as a novice. Regarding their familiarity with MOOCs, a) six (43%) participants have heard about MOOCs, but never enrolled, b) five (36%) participants were not familiar with MOOCs, and c) three (21%) participants read about MOOCs and enrolled in at least one MOOC before.

Reasons, expectations and goals of participants. Of the 14 responses, 11 (79%) participants stated their reason for enrolling in the QGS miniMOOC was to improve their graduate supervision skills. Other reasons for participants to enroll in the QGS miniMOOC were: a) two (14%) participants wanted to learn how to motivate their graduate students, b) two (14%) participants wanted to share their experiences with other supervisors, learn from them and reflect on their graduate supervision, and c) two (14%) wanted to enhance their lab management skills by better managing their graduate students in their labs. Regarding participants' expectations from the QGS miniMOOC, 10 participants reported that they expected to learn better supervision skills; three participants reported that they expected to learn how to better motivate their graduate students; three reported that they expected to learn from expert supervisors; one participant wanted to learn from experienced supervisors; and one participant expected to learn new resources on graduate supervision.

Out of the 14 participants in this questionnaire, 11 (79%) participants were planning from the beginning to finish all modules, while three (21%) participants were not quite sure. The participants' intention of finishing or not was made clear at the end of the miniMOOC as some participants sent emails to the instructor and apologized for not being able to complete the miniMOOC modules, while others requested more time to finish or dropped out completely.

The majority of the participants, seven, clearly stated that their goal of enrolling in this QGS miniMOOC was to become better supervisors. However, it was shown that the goal of the

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rest of the participants that it was related to becoming a better supervisor, but it was not explicitly stated. Instead, these participants mentioned words that implied it was their goal. For example: a) four participants would like to learn new skills in supervision and expand their experiences; b) two participants wanted to get new resources in supervision; c) two participants wanted to learn relevant philosophies in supervision; d) one participant wanted to learn from expert supervisors; and e) one wanted to create a network of support.

Regarding the participants' professional goals in two to five years, six participants explained that their goal is to progress in their research program and/or become independent researchers, for example, manage their own research team; three participants want to apply for full professor position; three participants want to be an expert in supervision; one participant wants to renew grant funds; one participant wants to lead a mentorship network of indigenous students, and one participant wants to provide more support to distant student learners.

Overall, the responses to this questionnaire showed that the majority (78.5%) of participants are very eager to learn about graduate supervision and were planning from the beginning to finish all the modules of this miniMOOC. In addition, six participants' professional goal for the long term is to progress in their research program and/or become independent researchers.

In the design and construction phase, I finalized the design of the QGS miniMOOC with experts in the field. This was done over many iterations, refinement of the design and the build of the course shell. The design and construction phase took approximately six months to be completed and two months to be implemented.

The Evaluation and Reflection Phase

In the evaluation and reflection phase, I collected data from multiple sources to evaluate the QGS miniMOOC and to answer the research questions. Data was collected from the participants and discussion moderators' activities in QGS miniMOOC, post-miniMOOC questionnaire and interviews with participants and discussion moderators.

Participants and Moderator's Activities in the QGS miniMOOC. Out of the 23 participants registered for this miniMOOC, 14 signed consent forms for me to analyze their participation activities in the QGS miniMOOC, which included looking into their: 1) logins and completion data, 2) video segments, and 3) participation in the discussion forums. The build-in analytics tool in D2L was used to analyze the quantitative data.

Logins and Completion Data. Twenty-three participants registered for the QGS miniMOOC, although eight registrants never logged in. Some of the registrants who never logged in apologized for being busy at that time. Fourteen participants signed consent forms for their data to be analyzed. In order for participants to complete the miniMOOC and get the completion certificates, they were expected to complete all six modules and in each module, they were expected to:

- watch the videos,

- review the resources,

- participate in the discussion forum, and

- reply to others in the discussion forum.

The initial time line for the QGS miniMOOC was from March 6-April 14, 2017. Eleven participants completed the miniMOOC during the six weeks, while four participants required an extension to complete the miniMOOC. The extended time was two additional weeks to April 30,

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2017. Two of the participants requested an extension to finish one to three modules; as a result, they completed the miniMOOC (Alharbi & Jacobsen, 2018). The other two participants did not request more time, one needed to finish two modules and the other stopped participating after Module 2, but they both completed on their own pace in the extended time. This showed that participants were quite motivated to complete the miniMOOC and go through all the modules, even without receiving the completion certificates. I was surprised to learn that three of the participants who finished on time continued to log in to read other participants' posts and respond in the discussion forums. One participant was still reading others' posts long after the extension date ended. The last time this participant logged in was May 4, 2017. Overall, 15 participants have completed the miniMOOC and received the completion certificates. 12 participants who signed the consent forms have completed the miniMOOC.

Video Segments. Data was generated about the videos from the built-in analytics on the Vimeo website. This data was collected based on views from Feb. 1-July 1, 2017. Table 10 provides details on video segments used in the QGS miniMOOC, total length of videos each week, total views of videos and the total minutes of videos viewed.

Table 10. *Video Segments for the QGS miniMOOC*

Video Segments	Number of Segments	Total Time (minutes)	Total Combined Views	Total Minutes Viewed
Promotional	1	2.10	45	95.33
Introduction	1	4.08	30	107.9
Module 1	3	7.09	73	190.11
Module 2	3	10.64	67	247.51
Module 3	3	13.73	66	316.08

Module 4	3	13.12	63	291.91
Module 5	3	12.22	67	281.08
Module 6	3	11.57	54	212.56
Total	20	74.55	465	1742.48

Note. Table adopted from Alharbi & Jacobsen (2018)

Videos from Module 3 about "relationship building" were the longest content videos viewed with a total of 316.08 viewing minutes. Videos from Module 1, "introduction to graduate supervision", were viewed the least with a total of 291.91 viewing minutes. What was surprising is that the videos continued to be viewed well after the QGS miniMOOC finished. There were 25 views between May and June. This may suggest that participants were interested in the videos and benefiting from watching them.

Participation in the Discussion Forums. In order to understand the participants' overall activities in the discussion forums, I collected and analyzed their participation in the six modules. The following three quantitative measures were used to measure the participants' participation in the miniMOOC: the number of threads created, the number of posts read, and the number of replies to posts per discussion forum in the six modules of the QGS miniMOOC (Mackey & Evans, 2011). The number of posts read in the first two modules were the highest, with 357 posts read in Module 1 and 331 posts read in Module 2. The total number of "threads created and posts replied" were 46 and 43. Module 3 had the lowest number of posts read, with only 227. However, the reason behind why is unclear, as the total number of "threads created and posts replied" was still considered high at 41 posts. In Modules 4, 5 and 6, the number of posts read was increasing gradually as there were 256, 266 and 280 posts read while the number of total

"threads created and posts replied" in Module 4 (40 posts) and Module 5 (40 posts) were considered the lowest in all the modules. In Module 6, there was a sharp increase in the total number of "threads created and posts replied", with 51 posts (Alharbi & Jacobsen, 2018).

These finding showed that participants were very comfortable in expressing their ideas by creating threads, posting responses and replying to posted responses from the beginning of the miniMOOC. As Figure 13 illustrates, although participation decreased in Modules 3 and 4, the number of participations by Module 6 significantly increased.
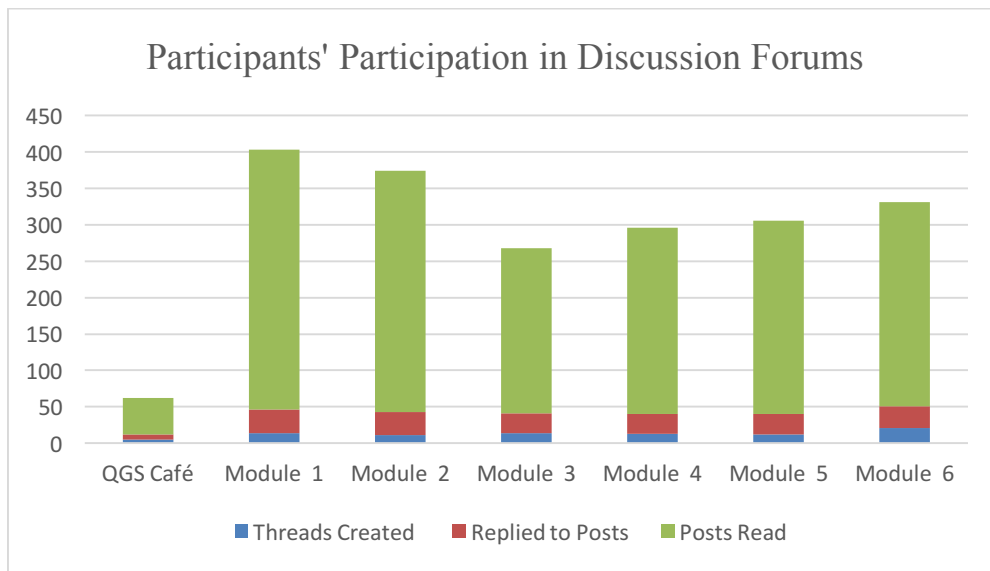
Figure 13. **Participants' Participation in Discussion Forums**

There were five discussion moderators—one of whom facilitated two discussion forums. I received consent forms from all five discussion moderators to analyze the data they produced. The role of the discussion moderators was to guide, advise and facilitate active and engaging discussion in the miniMOOC discussion forums; thus, I looked into the moderators' types of support. Three of the five discussion moderators introduced themselves at the beginning of the

week, which can be helpful in helping participants to get to know them from the beginning. The one moderator who facilitated two forums back-to-back did not re-introduced him/herself in the second week.

I identified three different types of posts that moderators used to interact with and support participants. Based on my findings, I noticed that the moderators' responses were supportive in nature and they provided support by: 1) expanded on participants' knowledge in the topic by confirming and adding more details and/or examples, 2) affirmed what the participants wrote in the discussion forums and 3) encouraged participants to continue posting and participating in the discussions (Alharbi & Jacobsen, 2017a). For example, one moderator supported a participant by confirming what the participant wrote in the discussion forum by stating, "you are so correct, the pace with each student is unique to them and their needs. Some seek more frequent contact at the beginning until they "find their wings" and can fly with more confidence." He also added more information to the post and providing examples.

Moderators were also affirmative in their responses to participants' posts. For example, one moderator wrote: "I was very excited to read about what you have done so far as a new supervisor." Additionally, moderators often posted responses that encouraged participants to continue the dialog and expand on the conversation.

Overall, discussion moderators were relatively active in the discussion forums—not overwhelming the discussions, but rather, taking part and providing participants with the opportunity to interact and respond to each other. I found that discussion moderators' posts were mostly to support and to encourage interaction among participants. One discussion moderator encouraged participants by posting questions, "what worked for you? Did you have a student that you couldn't motivate? Any thoughts on how you might have motivated them?" I

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also found that participants formed a learning community very quickly and from the beginning of the miniMOOC. The participation in Module 6 is one indicator that a learning community was formed among participants. Module 6 had the least amount of moderator interaction, yet participants continued to post, reply and feed into the discussion. Figure 14 shows the participants and the moderators' total posts.
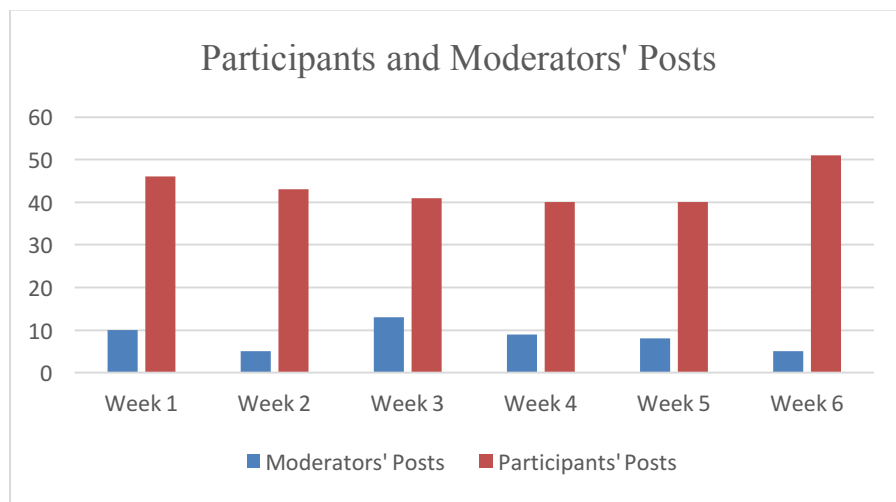
Figure 14. **Participants and Moderators' Posts in Discussion Forums**

Evidence from the analysis aligned with Palloff and Pratt's (2007) six indicators that an online learning community was formed and these six indicators are:

- Active interactions with both course content and other participants;

- Collaborative learning evident by students' interaction with each other;

- Socially-constructed knowledge through agreement or questioning of issues;

- Exchange of resources among students;

- Expression of support and encouragement between students; and

- Willingness to critically evaluate the work of others (p. 31).

As described in the video segments section, all - six modules had active interactions with the course content and participants. Furthermore, collaborative learning among participants was evident by the participants' replies to other participants' posts. Socially-structured knowledge was also apparent in participants' responses. An example was one participant's response agreeing to what the expert said in a video and connecting it to his practice. A participant noted, "I really appreciated Andrew's video—acknowledging that we will also have our buttons pushed/vulnerabilities highlighted by these supervisor/student relationships and processes". Then she added that she had perceived her own feelings of uncertainty about her skills as a deficit in her preparation as a supervisor but then she realized that this could be "part of [her] own process of growth and development and relating to the angst that students have when things go sideways in their research/progress".

Participants in the QGS miniMOOC have offered new resources to each other in the discussion forums and expressed encouragement and support to one another. One participant encouragingly replied to another, "I share your concern about making a mistake in guiding a student. The role of supervisor is a lot of responsibility. If I make a mistake, the student might fail his/her exams or waste time in the wrong path".

  All these indicators provided evidence that an online learning community was formed in the QGS miniMOOC.

Finally, even though this study did not focus on studying the content of the discussion forums' posts, I wanted to visualize the most commonly used 150 words in the discussion forums and this was also suggested by one of the participants. For this reason, I created a word cloud that was made from the most commonly used 150 words from the discussion boards using Nvivo. See Figure 15 below.

Figure 15. **The Most 150 Words Used in Discussion Forums' Posts over Six Weeks in the QGS miniMOOC**

Findings From the Post-miniMOOC Questionnaire and Interviews. The post-miniMOOC questionnaire was designed to collect information about participants' experiences in the QGS miniMOOC. The post-miniMOOC questionnaire included eight select-response type questions that were analyzed using descriptive analysis and 17 open-ended questions that were examined thematically using content analysis. The questionnaire was sent to all 23 graduate supervisors who signed up for the QGS miniMOOC—12 responses were received. Of the 12 participants in this questionnaire, a) three (25%) participants were from Werklund School of Education, b) three (25%) participants were from Cumming School of Medicine, c) two (16.7%) participants were from Faculty of Arts, d) two (16.7%) participants were from Faculty of Veterinary Medicine, e) one (8.3%) participant was from Schulich School of Engineering, f) and one (8.3%) participant was from Faculty of Nursing. On the other hand, interviews collected data from seven participants, four discussion moderators and the instructor. The data was analyzed

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using content analysis. Both sources of data provided insights; in some cases, the interviews provided richer and in-depth data, while in other cases, the questionnaire provided more comprehensive information. From the analysis of the data, five themes were identified: 1) design elements of the QGS miniMOOC; 2) support needed for participants of QGS miniMOOC; 3) the experiences in the QGS miniMOOC; 4) the impacts of the QGS miniMOOC on participants; and 5) recommendations for the QGS miniMOOC design. I used thematic map to help in examining relationships between themes and codes. Figure 16 illustrates the five themes and the sub-themes that were identified in the evaluation of the QGS miniMOOC.
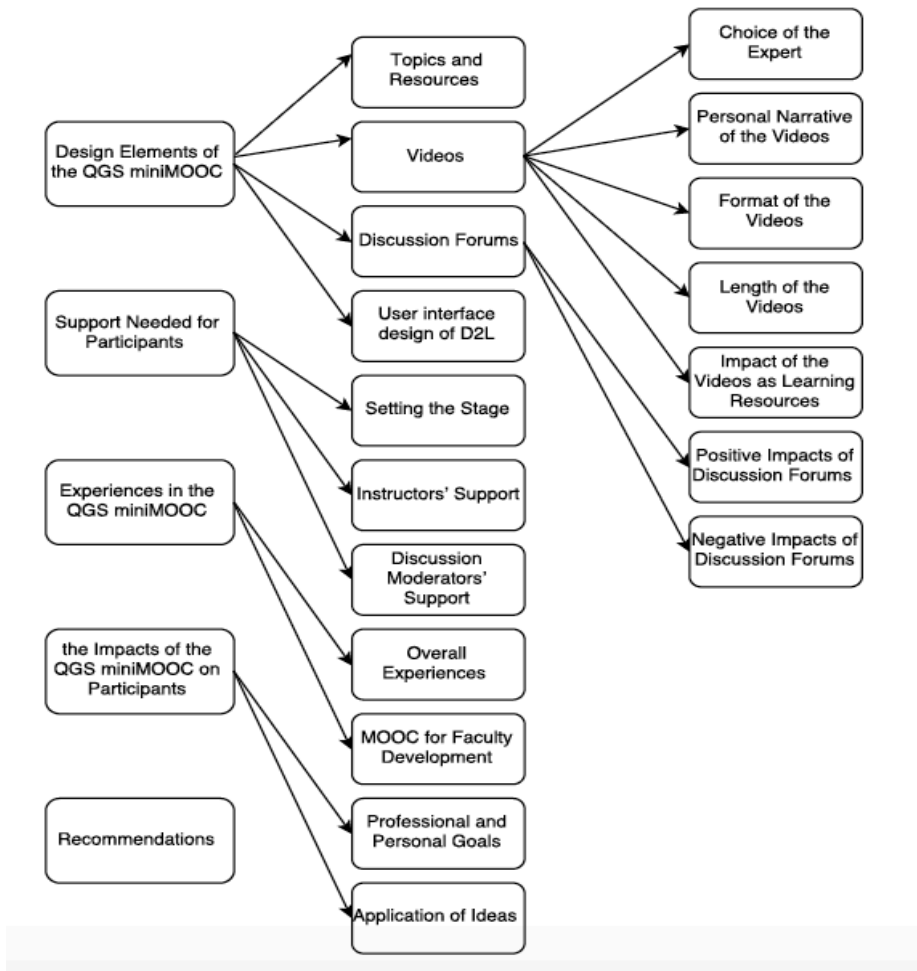
Figure 16. **Thematic Map of the Themes in QGS miniMOOC.**

Design elements of the QGS miniMOOC. Based on the data collected from the

interviews and the post-miniMOOC questionnaire, four design elements were evaluated: a)

Topics and resources; b) Videos; c) Discussion forums; and d) User interface design of D2L.

Topics and resources. Four interview participants (n=6) and three questionnaire

participants (n=12) stated that the choice of topics and resources collected and offered in the

QGS miniMOOC were very beneficial and helpful. Four questionnaire participants (33%)

reported that the most successful module was Module 5 (Anticipating and Addressing

Challenges). Module 1 (Introduction), Module 3 (Building relationship), and Module 4

(Mentoring New Researchers) were the second most successful modules (16.6%). Furthermore, two participants (16.6%) reported that all the modules were of good quality and were successful. It should be noted that the question about the most successful module was asked in the post-miniMOOC questionnaire and I didn't ask it in the interviews. If I had asked this question in the interviews, I may have gathered more evidence to support which one of the modules was the most successful. Module 5 was expected to be the participants' first choice based on their eagerness to learn about challenges from the beginning of the QGS miniMOOC. The participants expressed their interest in learning some techniques in dealing with difficult situations during the orientation session. Likewise, it was evident in the D2L built-in statistics as participants were checking this particular module from the beginning of the QGS miniMOOC. The other reason this module was successful was based on the scenarios that were added to the discussion forum. As one participant mentioned, it was "helpful to see strategies in action and get feedback."

Videos. Five sub-themes emerged from the data on the videos: 1) the choice of the expert; 2) the personal narrative of the videos; 3) the format of the videos; 4) the length of the videos; and 5) the impact of the videos as learning resources. Two participants and two discussion moderators reported in the interviews that the choice of experts in the videos was suitable. According to one participant, "the choice of the speaker was good, so that for me was the best element." A discussion moderator also noted, "I thought they were very well done. There was enough variety among speakers and perspectives." One participant and two discussion moderators reported as well that the personal nature of the narrative of the videos removed the online distance and made them feel connected. One participant stated, "I benefited most from the videos. The personal nature of those that you felt you were hearing from a real person and the, I

would say, the social presence." This participant added that "Whereas if they just wrote their comments in written form and then we read them, it wouldn't have had the same impact on me".

Four participants and four discussion moderators agreed in the interviews that the format of the videos was well done. They were satisfied by the choice of clips included in each video, the organization of the expert speakers and the high quality of the videos. One discussion moderator stated, "there was enough variety among speakers and perspectives. The speakers were quite clear so it's easy to understand the point they are trying to make and I thought you did a good job choosing the clips on the video."

The length of the videos was balanced and to the point according to two participants and one discussion moderator. The videos were the most beneficial learning resource in the QGS miniMOOC according to eight participants in the post-miniMOOC questionnaire. In the interviews, all five discussion moderators and two of the participants mentioned that the videos were valuable and were a key part of the learning process in the QGS miniMOOC. One participant stated, "they were a key part of my learning". Another participant mentioned that she benefited from the videos and took extensive notes and she stated, "I wish I could have downloaded the videos instead of just seeing them for that six weeks because it would be nice to refer to them or even use them… in meetings when there is a new supervisor coming".

Another moderator explained how the videos served two different purposes in the QGS miniMOOC:

> They were used in two very powerful ways. One was to share perspectives and knowledge and that attended to the great diversity that we can take up in our approaches in working with graduate students. But secondly, what I appreciated about the videos is that they prompted in quite a transparent way participants in the miniMOOC to dig

deeper, to reflect on their own questions and their own experiences, so the technology of

the videos weren't center stage. I think what they did was they really contributed to the

overall pedagogy of the whole purpose and design of the miniMOOC in ways that I think

technology should.

Discussion forums. The two sub-themes that emerged from analyzing the interviews and

post-miniMOOC questionnaire was: positive impacts of discussion forums and negative impacts

of discussion forums. The majority of the participants' perspectives in both the interviews and

the post-miniMOOC questionnaire on the discussion forums were very strong and positive. Six

participants in the post-miniMOOC questionnaire (n=12) explained that the discussion in the

forums provided new ideas from different perspectives. Two of the questionnaire participants

explained that it was a relief to "see others share the same challenges." Six of the questionnaire

participants also mentioned that the discussion helped in affirming and refining the ideas they

already had. Furthermore, two participants in the interviews (n=6) added that even reading the

posts of others and the dialogue and not participating as much was very helpful. According to

one participant:

> The feedback that you're giving as well as the feedback that you're getting actually
>
> creates this momentum and you feed off of each other and you're creating a dialogue even
>
> though it's static. And so even in going back, like, you know, not having been involved in
>
> those dynamics, but just being able to read the post, I could feel that power and I could
>
> see that that community was developing.

One participant explained that reading the posts in the discussion forums boosted her

confidence, while another participant stated that the way we designed the discussion forums was

helpful. On the other hand, three participants and one discussion moderator felt that the

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discussion forums were not very helpful. One participant felt confused and did not know who to respond to and another felt that he was just posting to fulfil the requirements. This participant stated, "I sometimes added to other's posts not because I really had something to say but because I want to fulfill the requirement." Furthermore, one participant did not think that the discussions were enough and that he would have benefited from longer dialogues. According to this participant, "the discussion itself was really… good but I was just disappointed that there was so little of it. It would have been nice to have more work." Additionally, one discussion moderator did not feel the connection with the participants because she came later and participants were already referring to points she did not know in the discussion forums. This discussion moderator stated, "people were referencing points that they came up earlier in the course. Although I've gone through and watched the videos, I hadn't read all the discussion boards every week. I didn't always know what they were talking about".

User interface design of D2L. Five participants in the interviews, eight questionnaire participants and four discussion moderators reported that the QGS miniMOOC was well-designed and D2L was easy to use, accessible, and flexible. One participant stated in the interview, "I have to compliment you on the design. I never experienced using D2L in such an easy way...It actually taught me to use some of the affordances of some of the tools that I never used."

However, three interview participants and three questionnaire participants reported navigation issues while using the discussion forums. One participant explained that sometimes she would read a post and it would still appear as unread. According to her, "it was a little hard for me to keep track of the new threads coming in and to access. But other than that, I thought I really, really appreciated all components of the course." A few participants and a discussion

moderator asked the instructor to help them post correctly in the discussion forums in the first module. Two questionnaire participants explained that they did not find D2L as a system in general to be easy to use.

Support needed for participants of QGS miniMOOC. There were three sub-themes that emerged from data analysis of the interviews and post-miniMOOC questionnaire: setting the stage, instructors' support, and discussion moderators' support.

Setting the stage. There were three orientation sessions that were completed either on-campus or online and a couple one-on-one orientation sessions to familiarize the participants with the QGS miniMOOC and the research. Six participants appreciated this opportunity and reported that they benefited from attending the orientation in different ways. One participant reported that the orientation helped introduce those in the course to each other and explain the process. Another participant stated that the orientation made a connection between the designers of the course and the participants and also stated that, "It was a good introduction to that and also to how the course would progress over time." Furthermore, the instructor explained that orientation helped set the participants up for success, as many of the attendees required less support afterwards. She added, "they got the chance to ask questions. I didn't get any follow-up questions from people that went to the orientation."

Instructors' support. The instructor supported participants in many ways. She introduced the weekly module by sending group emails to all participants, introduced the discussion moderator for the week, and outlined the learners' requirements. The instructor also responded to participants' emails and answered their inquiries specifically regarding navigation issues that some of them faced. The instructor explained that participants sent her private emails and she explained, "they didn't put something in D2L to say, "Hey, I need help." I think that may speak

to faculty's need to be independent. It may speak to their hesitance to appear that they don't know what they are doing."

Furthermore, the instructor sent email reminders to participants in the middle of the week so they did not fall behind; participants appreciated that. According to one participant, "I did find the emails reminding me of what to do each week to be very helpful to keep me on task."

Discussion moderators' support. Seven questionnaire participants (n=12) and two interview participants (n=7) explained that the support they received from the discussion moderators positively contributed to their learning experiences in the QGS miniMOOC. One participant elaborated that the discussion moderators sufficiently helped in expanding the conversations in the discussion forums. According to this participant, "like any good teacher, recognizing those teachable moments and expanding on them was important. I think sometimes redirecting a concern into a wider conversation helps us to understand the big picture."

However, six questionnaire participants and one interview participant stated that the discussion moderators did not significantly influence their learning. One participant explained that the discussion would be richer if moderators had participated more.

The experiences in the QGS miniMOOC. Two sub-themes emerged from the analysis of the participants' experiences in the QGS miniMOOC: overall experiences of the QGS miniMOOC and the use of MOOCs for faculty development. When participants were asked to describe their overall experience in the QGS miniMOOC, 11 questionnaire participants and six interview participants reported that they had a positive experience in the QGS miniMOOC. Six questionnaire participants noted that the QGS miniMOOC was informative and that they gained knowledge from it. As per one participant, "there were many additional tools and resources provided throughout, which were very helpful and I wish that these were available to me in the

past." Another participant recommended having the QGS miniMOOC as a requirement for supervisors in the university:

> I really think this should be something that FGS integrates when they do the supervisor workshops. I think that this is something all supervisors, regardless of the point in their career, they can benefit from. . . .Once you make it mandatory given that we all volunteered to participate in this, that to me, that delivers some message that there is a need. And when you identify it as a need for your own professional development or as, you know, one in to focus on that, then I think that you're gonna get a whole lot more out of a program.

Two interview participants and one questionnaire participant explained that they had adopted new techniques in supervision after participating in the QGS miniMOOC. Two other participants stated that the QGS miniMOOC confirmed what they had already knew in terms of supervision and one stated that it was a new learning opportunity to engage in and learn from. This participant acknowledge that the miniMOOC did engage her in a new area of learning and it was, "a benefit because of the ability to generate new thoughts and ideas as a result of seeing what other people were commenting on or resources that they shared. It was a nice way to develop a community of practice."

Furthermore, three participants stated that the flexibility of the QGS miniMOOC was one of the reasons that they believed this experience was successful, while four participants stated that the organization of the miniMOOC was the reason for their successful experience. Four of the discussion moderators mentioned that they had a positive experience in moderating the discussion in the QGS miniMOOC. One discussion moderator reported that this experience gave her new insights to graduate supervision: "I think hearing what the other supervisors said

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provided me with new insights about graduate supervision and reading what the participants took from the material, what they raised in the discussion board, that also provided some insights." Another discussion moderator explained that the QGS miniMOOC was successful because even though it was designed to be a formal learning environment with many elements, it felt like a space where there was no pressure to perform and that was what supervisors needed. According to her:

> I guess an example is when I think about the value of going to a conference. Yes, we sign up for a conference, we sign up to present papers, we sign up to attend sessions to listen to other people's papers. But sometimes, the most valuable moments of the conference are those spaces in between the sessions... It's in those spaces between those formally structured kinds of tasks. The miniMOOC to me, to use that in an analogy, the miniMOOC space was almost like those spaces provided in between conference sessions to have those kinds of conversations where people can ask questions. So it's formal in terms of its structure, but it feels like one can be quite spontaneous and a little less formal in terms of how they want to discuss something.

The instructor also explained how she learned a great deal from the miniMOOC and the various opinions of the participants. She stated that:

> I found I learned a great deal. I really appreciated how much people shared in the discussion groups and also the comments they made about the videos. Several of them in the discussions said that the video was helpful. Some of them even said, "I don't agree with what was in the video," which I thought was really honest and it was a good discussion.

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Furthermore, 11 questionnaire participants recommended the use of MOOCs for faculty development. Five of them explained that they liked the flexibility of the delivery. Another participant explained that the MOOC could be a good option for faculty development, but as he explained, "I think it depends on the quality of the content, how it is presented, and the commitment of others participating. We had a golden ratio for all these components working together."

The impacts of the QGS miniMOOC on participants. Two themes emerged from the analysis of the data: the impact of QGS miniMOOC on participants' professional and personal goals and the impact on their graduate supervision practices or their application of ideas. Three interview participants (n=6) stated that participating in the QGS miniMOOC provided them with self-awareness of their practices and approaches in supervision and it provided them with more context to understand their students' experiences, which was one of their personal goals. Another goal that this miniMOOC helped participants to achieve was to improve their ability/confidence to supervise. Four participants stated that they felt more confident to do so. Three participants stated that their goal was to get a faculty or leadership position at the university and participating in this miniMOOC would help them achieve that goal. One of the participants stated, "I feel I've ticked another box in my list of requirements (written or unwritten) to be a supervisor." Whereas, eleven questionnaire participants and seven interview participants reported that they will or have already applied some of the ideas gained from participating in this QGS miniMOOC.

Recommendations for the next QGS miniMOOC design. Eleven valuable recommendations for the design of the next QGS miniMOOC was received. One of the most important recommendations was to have a synchronous session once a month or toward the end of the miniMOOC or a synchronous panel session. Three interview participants and one

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questionnaire participant also encouraged the use of multimedia as an alternative form of communication. Another recommendation made by two questionnaire participants and one interview participant was to include more literature and papers in the resources section. One interview participant and one discussion moderator suggested to add a module on grant writing and/or writing for publications.

There were several recommendations that were suggested by one participant. Such as, adding a summary of all the posts at the end of each module, archiving the content after the course finishes, having the content as references, adding more scenarios and cases in conflict resolution, including GPDs as experts in the videos and inviting them as discussion moderators, and including the perspectives of graduate students in the modules. An example that was provided by one of the questionnaire participants to include students was to "provide a video clip on a student-supervisor interaction and ask the participants to respond on what worked, what could have improved etc.... Then the experts could provide their expert opinions on how they would have handled the situation." Finally, one participant suggested establishing a community of support with other graduate supervisors after the QGS miniMOOC finishes. According to this participant, we should "create a formalized supervisor interest group/community so we can continue having monthly or quarterly meetings to discuss challenges/successes going forward."

Summary

This chapter provided detailed descriptions of the three DBR core phases in this study: 1) analysis and exploration, 2) design and construction, and 3) evaluation and reflection. Furthermore, it also provided findings of the analysis and exploration phase and the evaluation and reflection phase. Data was collected from multiple sources for the data analysis, including pre-miniMOOC questionnaire, GPD questionnaire, from the participants and discussion

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moderators' activities in QGS miniMOOC, post-miniMOOC questionnaire and interviews with participants, discussion moderators and the instructor. Six participants reported that they benefited from the orientations of the QGS miniMOOC. Seventeen participants also reported that they had positive experience during the miniMOOC and eight participants benefited the most from the expert videos in the QGS miniMOOC. Discussions with the experts and other supervisors in the discussion forums found to be one of the important design elements in the QGS miniMOOC according to six participants. Furthermore, six participants stated that the QGS miniMOOC was informative and that they gained knowledge from it. Finally, 11 participants recommended the use of MOOCs for faculty development.

CHAPTER FIVE: DISCUSSION

In this chapter, I summarize the key findings from this design-based research by discussing and addressing in-depth the three primary research questions. I provide insight on the three components of the theoretical framework that informed the design of the QGS miniMOOC and discuss the findings that were highlighted during the analysis of data collected throughout this study. The research questions were as follows:

1. What design elements are necessary in the development of a Quality Graduate Supervision miniMOOC? [design]

2. What scaffolding and support is necessary for faculty members to effectively use the Quality Graduate Supervision miniMOOC? [implementation]

3. In what ways can a Quality Graduate Supervision miniMOOC support and benefit faculty members in their ongoing development of their graduate supervision practices? [evaluation]

Discussion of Major Findings

In the following three sections, I closely examine the major findings in this study that address each of the three research questions.

Design elements needed for the QGS miniMOOC. The first research question to address is, what design elements are necessary in the development of a Quality Graduate Supervision miniMOOC? There are four design elements that were determined to be important in the development of QGS miniMOOC, and were supported by and identified in the collected data: a) Meaningful topics and resources; b) Expert Videos; c) Discussion forums; and d) User

interface design of D2L. To address this question, I focus on the instructional design decisions that influenced the development of the design elements in the QGS miniMOOC.

The first design element that was highlighted in this miniMOOC is the choice of the topics. The participants in this study reported during interviews that the topics in the QGS miniMOOC were beneficial, meaningful and helpful for their professional learning. Part of the success in choosing meaningful topics to include in the QGS miniMOOC was because of the feedback from the research design team, the faculty members and graduate program directors, and the review team, who influenced the choice of the topics in various ways, including via responses to questionnaires. One of the questions asked of participants in the faculty questionnaire during the analysis phase was to identify topics that the QGS miniMOOC might include. Participants' interaction in the discussion forums was influenced by the different topics in the QGS miniMOOC. One discussion moderator stated that: "I think people were pretty active. I think some are more active than others in there and I think the topics sparked for creating discussion in some weeks more than other weeks…because sometimes it is topic-driven." The direct involvement of targeted participants in the design, via the research design team and review team, was one of the benefits of using DBR and it made the design more authentic (McKenney & Reeves, 2012). The resources that were included in the QGS miniMOOC were also considered beneficial and useful by participants. Three participants recommended adding more literature and research papers that were related to the same topics in the resource section, which is an idea that will inform the next stage of development. Earlier in the design phase, this specific idea was not welcomed by the Quality Supervision Working Group whose members suggested that additional reading materials might not be used and may

discourage participants from participating. Findings from this study suggest that faculty members do want to have access to more literature on quality supervision to inform their learning.

The expert videos were a successful design element included in the QGS miniMOOC. The decision to include videos of expert supervisors was influenced by the idea of having expert supervisors support cross-faculty professional development by mentoring other supervisors (Brancato, 2003). Engaging participants with multimedia resources and then inviting them to reflect on what they have watched is one of the principles of the connectivism theory (Kop, 2011). Connectivism encourages the engagement of multiple learning methods across the internet, for participants to reflect on what was watched and/or read, and also for the creation of new materials. In response to the survey during the analysis phase, faculty participants highlighted that the ideal way to learn about graduate supervision was through academic mentorship in their own discipline, learning about supervision from faculty peers, and from experienced supervisors from other disciplines. The notion of having experienced supervisors facilitate and participate as well in forms of faculty development programs on graduate supervision is also supported in the literature (Manathunga, 2010). Supervisors were chosen to be interviewed for the videos based on their demonstrated expertise in graduate supervision, as recognized through various awards and distinctions. Participants in the miniMOOC reported that the variety and diversity of perspectives and strategies in graduate supervision was beneficial for their learning. One participant stated, "There was enough variety among speakers and perspectives. The speakers were quite clear so it's easy to understand the point they are trying to make." Furthermore, participants highlighted that the narrative form of the videos created and enhanced social presence and added an authentic dimension to online learning. According to this

participant, "social presence added a real dimension to online learning and almost removed the distance of the online part of it. It's almost like face-to-face. That was for me the highlight".

Some participants and discussion moderators suggested that adding a synchronous session once a week or toward the end of the miniMOOC may have enhanced their learning experience further. Though the lack of synchronous sessions did not appear to affect the sense of connection among participants in the online environment, the addition of a scheduled weekly or monthly meeting may amplify the strength and value of the online learning community. From the findings, the participants reported they felt connected to the experts because the videos gave access to the advice and insights from these expert supervisors who shared some of the same concerns and had gone through some of the same issues that they were going through. Many of these experts were also involved in mentoring participants as discussion moderators. In the next phase of development, the addition of several synchronous sessions, perhaps with experts from the videos or with new expert graduate supervisors, will be considered as a way to continually strengthen the design of this online learning experience.

Another design element that was a highlight of the QGS miniMOOC experience was the weekly discussion forum. Participants reported that the discussions and dialogues created in the weekly discussion forums played a major role in the success of their learning experience. Tu (2004), explained that online discussion is important because "it promotes several types of thinking: critical thinking, high-order thinking, and constructive thinking" (p.53).

The discussion forums were designed to support the reflective practice approach—whereby participants are invited to reflect on their own practices after they have been exposed to different types of knowledge. The reflective practice approach is supported in the available literature as a best practice in designing faculty development programs focused on graduate

supervision (Manathunga, 2005). Participants emphasized several of the benefits of the

interactive conversations in the discussion forums: 1) writing about their own experiences, 2)

responding to ideas shared by others, 3) boosting their confidence, 4) affirming and confirming

ideas that they already had, 5) enhancing their graduate supervision skills, 6) creating a safe

environment for graduate supervisors to share concerns, and 7) contributing to the creation of a

learning community. One participant stated that participating in the QGS miniMOOC confirmed

the ideas that he already had about graduate supervision in a way that boosted his confidence.

This participant added, "Some of the best teachers bring out what you already actually know

intuitively. Some of the seeds were already in the ground and the miniMOOC watered them and

made the sun shine on them." Although the responses in the discussion boards did not all happen

at the same time and usually participants took time to respond to others, several participants

reported that they felt connected and that they benefited from the discussion. The pace of

dialogue over the week did not appear to be an issue with most of the participants as long as the

dialogue was continued. One participant stated:

> The feedback that you're giving as well as the feedback that you're getting actually
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> creates this momentum and you feed off of each other and you're creating a dialogue even
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> though it's static. And so even in going back, like, you know, not having been involved in
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> those dynamics, but just being able to read the post, I could feel that power and I could
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> see that that community was developing.

This finding appears to contrast what Mori and Ractliffe (2016) found in their study,

whereby participants reported they wanted to have live online discussions and get immediate

feedback and responses from others and they felt disconnected when this didn't happen. Another

finding from the present study suggests that having clear instructions in the discussion board and

structured questions to guide the discussions are very important for learning. One participant stated, "I thought that the questions each week were very well designed so that I could easily answer them and respond to them." This feedback is echoed in the literature as Tu (2004) emphasized the importance of empowering learners in online learning environments and to achieve that, instructors become the facilitators and their role is to give clear instruction for tasks while not making the instruction too rigid. Participants thus reported that they appreciated being exposed to new ideas, and also gained from affirmations that they were on track with their current graduate supervision practices.

Forming a learning community is an essential component in faculty development programs (Taylor & McQuiggan, 2008). Creating a safe space for faculty members to converse and discuss ideas with each other with no pressure is one of the important purposes for faculty development that focuses on graduate supervision. As Manathunga (2010) stated, "The key purpose of any form of supervisor educational development is to create a space where supervisors are able to break open this intensely private pedagogical relationship… for discussion, debate and critique" (p. 76). One participant added this model of mentorship is valuable and this learning opportunity is critical because, "it is about sharing experience and being able to get advice from other supervisors, find out how other people have addressed issues that you have, that everybody has in common as supervisors".

One discussion moderator stated, "so appreciative to hear different perspectives and to learn about different practices in the mentor-mentee relationship between a supervisor and a supervisee. I sensed almost a real feeling of relief and comfort." He explained that participants were appreciative when learning about graduate supervision from different perspectives and this

gave them more confident that they can bring their own style and personality into their graduate supervision practices.

With regards to the user interface design of D2L as a key design element, the usability of the miniMOOC and the user experience were examined. The miniMOOC was designed and then tested several times for usability to ensure a coherent flow in the design, ease of navigation and that all elements were accessible. Adding clear instructions in the modules was very important to ensure the consistency of the navigation. According to one of the faculty reviewers who provided feedback on the design before the miniMOOC was offered, "the introductions 'to the modules' are clear. I would not add any further text or information." The miniMOOC was designed to be easy to use and intuitive to navigate. The creation of different visual icons for each module enhanced the aesthetic appeal of the design and created visual representation for each topic in the miniMOOC. One reviewer stated that, "I like how the modules are set-up in a similar format sequence to module 1."

Regarding the user experience using the miniMOOC, the majority of the participants applauded the design and the majority had positive experience using it. Participants reported that the QGS miniMOOC was well-designed and that D2L was easy to use, accessible, and flexible. One participant stated, "I never had trouble loading the videos and everything looked 100% for me and I can't see any drawbacks whatsoever." One participant stated, "It was straightforward and I would say that the way that you organized D2L for the miniMOOC was really helpful." Another participant stated that D2L was "a key platform for this kind of experience." Participants stressed the importance of flexibility in this format of faculty development. One participant stated that flexibility of the miniMOOC was key for their learning: "The flexibility afforded by this method beat, hands down, attending an in-person 'day long workshop', for

example" (Alharbi & Jacobsen, 2018). Another participant stated, "The great thing about this course was that I could participate when it suited my schedule." This idea was also supported by faculty responses to the questionnaire, as well as in the literature as Taylor and McQuiggan (2008) found that faculty members expressed interest in flexible, anywhere, and anytime professional development. Manathunga (2005) stressed the importance of engaging supervisors in reflective practice about graduate pedagogy and not relying on one day workshops and/or administrative dialogues on supervision. The importance of ongoing faculty development was supported by survey findings that one-day workshops or sessions were not very helpful for those who needed longer mentorship and on-going support for graduate supervision.

Some participants mentioned that they faced a few navigation issues when they used D2L in the first week, for example, issues posting in the discussion forum in the first module and issues in moving from one video to another. One participant stated, "It wasn't hard to start any posts that was okay. It was just going back to read replies [that] was difficult." The instructor also mentioned that some of the participants needed individual support with navigating various tasks in the first week.

Scaffolding and support needed in the QGS miniMOOC. The second research question to be answered was: What scaffolding and support is necessary for faculty members to effectively use the Quality Graduate Supervision miniMOOC? The findings suggest there are three important scaffolding and supports that were needed for participants during the QGS miniMOOC: 1) setting the stage, 2) instructors' support and 3) discussion moderators' support.

The first important support offered to participants was setting the stage. Setting the stage included sending the invitation to participate in the QGS miniMOOC in a reasonable time. The invitation was sent around two months before the start date of the QGS miniMOOC to give

faculty ample time to consider adding it to their schedule. Early in this study, faculty members stated in the questionnaire that short notice for any professional development opportunity can discourage them from attending as they cannot fit it into their schedule or they are already booked. Similar to what Taylor & McQuiggan (2008) found in their study, short notice for faculty development opportunities is one of the reasons that discourages faculty members from attending. Along with the invitation, there was a short recruitment video that explained the purpose and duration of the miniMOOC along with some interesting facts about the course.

A second element of setting the stage was the orientation. Participants highlighted that attending the orientation session was beneficial as it allowed them to meet other participants who had signed up for the miniMOOC, to understand the process of the course and to learn how they could get involved in the research. It is noted that participants who attended the orientation sessions required less support with D2L and during the six -week course. One participant stated, "That was a very good moment to give an overall and to see what's going to be in the course. Without that first meeting, it [was] going to be hard to understand the matters that you want to pursue".

Furthermore, during orientation, each participant was provided with a binder containing a collection of resources on supervision procedures and policies that are also available on the university's website. Participants were also encouraged to add to their binders any resources from the miniMOOC or elsewhere that they felt were useful and applicable to them. The ready availability of information and resources in multiple places is very important as it provide easy access to these resources when needed. Walker and Thomson (2010) emphasized that graduate supervisors need to become aware of the procedures, policies and expectations of each program, be current with any changes in requirements and be ready and able to respond to students with

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different needs. One participant explained that she appreciated the idea of having the resources available in the binder as well as on the website, "The binder has been really helpful. It's there on my desk. I didn't add stuff in it yet, but it's going to stay on my desk so I can look up stuff when I need it."

The instructor was the second key support offered to participants of the QGS miniMOOC. The instructor's support involved sending regular email messages, introducing each weekly topic, introducing the discussion moderator of the week, outlining the learners' weekly requirements, and following up with status and reminders; in short, maintaining an instructor presence (Garrison & Vaughn, 2008). Faculty participants noted that the presence of the instructor was important and helpful. One participant stated, "I [found] the e-mails reminding me what to do each week to be very helpful to keep me on task." Furthermore, participants explained that the instructor provided much needed support with accessing parts of the miniMOOC, especially during the first module as some participants experienced navigation issues. One discussion moderator stated that the instructor's support was helpful even when the issue was very simple, "I did have trouble at the very beginning logging in and registering like how it was described in the instructions, and so I had to get the instructor to help me a little bit."

Based on findings from this study, it is clear that the role of instructor and the instructor's presence in the miniMOOC is important for learner success. The instructor serves to connect the learning objectives, the participants, the discussion moderators and the rich learning materials in the miniMOOC. The participants felt connected and they knew they had support when they needed it. One participant stated, "I didn't feel like I was alone at all." This idea of instructor presence is supported by Tu (2004), who explained that the instructor in online faculty development should play the role of the facilitator by guiding the participants and at the same

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time making sure not to give them a step by step instruction. Manathunga (2010) explained that the role of the instructor in faculty development opportunities on graduate supervision is to adopt the role of learner along with other faculty participants. Positioning oneself as a learner alongside others is helpful in decreasing unequal power relations that the role of instructor might give to them, especially since the instructor and participants are all faculty members. In the next offering of the QGS miniMOOC, the instructor could play a bigger role and could be involved more as a participant by asking questions and engaging more explicitly in the discussion.

The third support that was offered to participants was the involvement of the discussion moderators in the QGS miniMOOC. Discussion moderators were each provided with a handbook that was prepared specifically for this miniMOOC. This handbook included clear instructions and directions on what are expected from the discussion moderators in the discussions and examples on how to encourage participation and how to respond to participants. The discussion moderators supported participants by: 1) expanding on participants' knowledge in the topic by confirming and adding more details and/or examples, 2) affirming what the participants wrote in the discussion forums and 3) encouraging participants to continue posting and participating in the discussions (Alharbi & Jacobsen, 2017a). The interaction between discussion moderators and the participants varied depending on the module and participants' perspectives on each topic varied as well. One participant highlighted, "I think the most valuable [part] was probably when the moderator responded, but I did enjoy participating in the discussions with others."

On the other hand, some participants believed that the discussion moderators did not fully influence their learning in the QGS miniMOOC. This finding was also noticeable in the discussion forums' participations. The participation was active in Module 6 even when the

interaction between participants and the discussion moderator was observed to be limited that week.

There are three important supports and scaffolding needed for participants during the QGS miniMOOC that helped them in this learning experience: 1) setting the stage which include announcing the course early and introducing the course "the orientation", 2) instructors' support and 3) discussion moderators' support.

Ways that the QGS miniMOOC impacted graduate supervisors. The third research question that this study addressed was, in what ways can a Quality Graduate Supervision miniMOOC support and benefit faculty members in their ongoing development of their graduate supervision practices? In this study, the QGS miniMOOC was found to impact graduate supervisors in six different ways: 1) it helped them achieve some of their professional and personal goals, 2) it changed the way they approached supervision, 3) it gave them confidence in supervision, 4) it confirmed some of the ideas that they already had, 5) it enhanced their self-awareness and student-awareness on graduate supervision practices, and 6) it provided them with the necessary supervision training as many of the participants had received little to no training opportunities.

First, some participants noted that participating in the QGS miniMOOC helped them to achieve some of their professional and personal goals, as many of the participants took the course as a step in attaining a faculty position or leadership position. One participant stated, "I wish to move on to leadership in graduate education. Therefore, this was very helpful to me." Second, participants reported that participating in this QGS miniMOOC changed the way they approached supervision or as one participant described, "[It] changed my supervision vision."

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One participant highlighted how she changed the way she wanted to approach her new students after participating in one of the modules. She stated in the discussion forum that:

> This week's topic was very timely because my first graduate student (I am a new faculty member) contacted me asking for help as he prepared for his new program. I was actually in the middle of typing an e-mail to him that referenced the checklist when I watched the first video and decided to focus on building a relationship. I ended up taking the advice of our expert supervisors by asking him about his hobbies, housing, arrival date, and goals for this program.

Another participant expressed in the discussion forum that he will apply some of the strategies presented in the miniMOOC such as checking on the students' progress from time to time to make sure "that they are not at a stumbling point in their progress of their own research that I can help with getting over so that they can continue to progress".

Third, participants reported that participating in this QGS miniMOOC with others and discussing with them some supervision issues gave them the confidence needed to supervise graduate students. One participant stated in an interview, "I think it was having them [discussion moderators and other participants] respond and provide feedback boosted my confidence". He added that reading others' responses were they indicated that these are good ideas or those are not were good contribution to their learning.

Fourth, participants of the QGS miniMOOC noted that the course confirmed some of the ideas and practices that they had already known about graduate supervision. One participant stated, "I think in some ways it reassured me that some of the things that I do are okay." Another participant explained in a discussion forum that viewing the videos and reading everyone's posts enriched what he took away from this learning experience and added that, "at times the strategies

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and tips presented reinforced the ones I have adopted, and in other instances I was presented with alternative strategies that I will test in my own supervisory relationships". This participant added that it was equally important to read posts that "normalized feelings and experiences" that they have had over the years.

Fifth, participants reported that this experience helped them understand their graduate students better and provided them with self-awareness on their supervision practices. Cranton (1994) explained that, "Mentoring by master professors who serve in an advisory capacity for new faculty can increase their awareness of their strengths and weaknesses." One of the participants stated, "I feel I have more context for understanding my and the students' experiences." Another participant who will be working with his first graduate student soon explained that this miniMOOC made him think and ask questions he have never considered in supervision and he added that the most important lesson that resonated with him was the "importance of building a strong relationship" as this is the heart of building a good relationship with graduate students.

Finally, the QGS miniMOOC provided participants with some graduate supervision training, as many of the participants had received little to no previous training opportunities in this important teaching and mentorship role. One participant highlighted that he never got any training on graduate supervision and indicated how this opportunity to participate in the QGS miniMOOC provided him with much needed training. This participant stated:

> I've been doing this since 2001. You'd think I figured it out by now. But I realized that I never really had any mentorship and it's all been trial and error and mostly error. So it was really great to have people talk about just simple things that make the whole experience better.

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The faculty responses in post-miniMOOC questionnaire supported what the graduate program directors indicated in response to the pre-miniMOOC questionnaire. Faculty participants emphasized that graduate supervisors need support to learn how to best support their graduate students. Faculty want support on how to give students constructive feedback and how to keep students on track in their programs. The data from faculty participants in the miniMOOC supports the contention that graduate supervisors benefit from having professional learning opportunities on graduate supervision.

Furthermore, it was assumed at the beginning of the research that the design of this QGS miniMOOC would improve supervisors' competencies, that the online learning experience would be as good as face-to-face faculty development opportunities, and that supervisors would have positive learning experiences in community with their peers. Each of these assumptions appear to have been correct as the faculty participants have provided feedback and confirmation of their positive learning experiences, the impact on their own ideas and strategies for graduate supervision, and that they believed the format and design of the QGS miniMOOC was as good as the face-to-face opportunities. One participant highlighted that she participated in a video conference on graduate supervision when she first started teaching at the university that was not beneficial for her as participating in this QGS miniMOOC. She stated:

> I had a video conference from somebody from the university... and he just talked about different issues that can arise with graduate students and I didn't feel that I got anything out of that. No disrespect intended but I felt that doing this one here I learned. I was like a child thirsting for knowledge and I was bubbling every time I learned something because for me it was like 'oh I'm doing it right, oh I could do that too'. It was great.

Overall, participating in the QGS miniMOOC helped some faculty participants to achieve some of their professional and personal goals, changed their "supervision vision", gave them the confidence they needed in order to supervise graduate students, confirmed some of the ideas that they had about supervision, gave them more context to understand themselves as supervisors and their students and provided them with the faculty development on supervision that they needed.

Insights on the Theoretical Framework that Informed the Design

In this section, I summarize the theoretical insights that emerged through this design based research; theoretical insights are presented in alignment with the three elements of the theoretical framework that informed the design of the QGS miniMOOC. The development of theoretical understanding in design based research evolves from the empirical findings that emerge from the research and from consideration of their implications for the specific design being investigated (McKenney & Reeves, 2012). One of the important contributions of the design based research is the production of "powerful insights for participants, fed by data and enhanced by the mutual exchange among educational researchers and practitioners" (McKenney & Reeves, 2012, p. 30). The design of the QGS miniMOOC was informed by a theoretical framework that drew upon elements of three theories: 1) connectivism theory, 2) learning community, and 3) constructivism.

Connectivism theory. There are elements of the connectivism theory that informed the design of the QGS miniMOOC. According to Kop (2011), learning is enhanced when the learning environment is designed to have four types of connectivist activities: aggregation, relation, creating and sharing. For example, aggregation was supported for participants through combination of several design elements in the miniMOOC. Further, participants in the QGS miniMOOC were encouraged to engage in multiple activities and with multiple resources as they

read, reflected and wrote about the major topics in the miniMOOC, as they watched and discussed expert supervisor videos, and as they reviewed assembled resources from the university and other important sources. Relation activities were supported by designed opportunities for participants to reflect on what they have read and saw in the modules, posting written contributions to the discussion forum, to engage in weekly discussions on module topics with peers and discussants, and to exchange ideas about supervision. Creation and sharing activities were supported via questions aligned with module topics that invited participants to create new posts, invitations to respond to others and to ask questions, and by sharing new ideas with others. All of these connectivist activities combined contributed to a successful learning experience. One participant discussed how all the elements of the QGS miniMOOC contributed to his learning and how he benefited from it. He stated, "I appreciated how organized and informative the modules and accompanying resources were. The videos of expert supervisors were my favorite part of my weekly involvement, as was reading my fellow coursemates' postings on the discussion board." Designing the QGS miniMOOC while employing some elements of the connectivism theory along with the other theories of the theoretical framework appear to have contributed to successful online learning experiences for faculty. Designing the activities in the online learning environment using the four types of connectivist activities "aggregation, relation, creation and sharing" appear to have contributed to the success of the learning environment. Furthermore, the availability of diverse knowledge about graduate supervision, and in different forms across the network, also served to be important aspects of

connectivism theory that contributed positively to the design of the miniMOOC learning experience.

Learning community. Forming an online learning community requires a sense of connectedness between the learners and instructors in that community who share the same interests, values, and expectations (Rovai, 2002). In this study, participants of the QGS miniMOOC appeared to have formed connections with each other very quickly given their shared experiences with graduate supervision, either as a student or faculty member, and the similar questions they had with regards to their supervision practices. As evidenced in the discussion forums, participants opened themselves up early to share and discuss concerns and issues about graduate supervision. According to one participant,

> I found that there were others who had similar questions to mine … So, I learned then that it wasn't just me who didn't understand the entire process but everyone was in the same situation and it was good to be part of the community.

The previous quote also suggests that in order to build trust, that participants needed to believe that other supervisors have or have had similar questions and issues that they have with regards to their supervision practice. Establishing connections and sharing experience with near peers early in the discussion forum appeared to strengthen individuals' confidence in their role as a graduate supervisor and contributed to a sense of belonging to the community. An emerging sense of confidence and sense of belonging was in contrast to feelings that some individuals started with at the beginning of the miniMOOC. One participant highlighted that she felt like a failure before taking the miniMOOC because she believed her students were not progressing because of her faulty supervision. She stated, "part of my motivation for taking this course was that I was feeling like I was a bit of a failure, so that students not progressing was because of me

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or something like." However, taking part in the discussion about common issues that graduate students might face during their studies, and hearing stories from other supervisors about issues they have faced in situations similar to her own, and learning from ways that they acted or strategies they used to address issues, helped contribute to this faculty members' sense of relief and renewed confidence in her ability to supervise. She concluded, "so that actually made me feel a bit more confident."

The involvement of discussion moderators in the miniMOOC forums, each of whom is a recognized expert graduate supervisor, also contributed to faculty members' confidence and sense of belonging that was important for learning. One discussion moderator stated that, "all the prior communication that we had, prior to me stepping into that space as a discussion leader contributed a lot to my confidence in being able to navigate within that space. That was really important." The discussion moderator/expert supervisor that was involved in the miniMOOC prior to offering it as a reviewer and expert supervisor indicated that she felt grateful that she contributed her feedback on the design and that the things that needed attention were addressed before the launch of the miniMOOC. This made her connected to the miniMOOC space and felt included in a learning community. She explained, "it wasn't like I was stepping into the miniMOOC for the first time. I felt very included in that space. So when that week came up for me to facilitate the discussions, I was quite comfortable in that space".

Furthermore, one discussion moderator highlighted the importance of creating a safe learning community among participants. According to this discussion moderator, "I thought it was a really nice online learning community; [it was an] open and trusting environment where people were comfortable talking about graduate supervision" (Alharbi & Jacobsen, 2018, p. 23). Creating a safe environment for graduate supervisors to discuss and debate about their graduate

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supervision practices should be one of the main purposes of any faculty development program focused on graduate supervision development (Manathunga, 2010).

Layne et al. (2002) explained that any program that supports the formation of a learning community should promote reflections, validate what faculty members already know, help them construct a foundation for future interaction with other faculty members, and should support collaboration among participants of this program. Analysis of multiple data sources indicate that the theoretical aspects of a learning community were well supported in the design of the QGS miniMOOC. The online learning experience helped faculty participants to reflect on their practices, to validate what they already know, to collaborate with others in discussions, and to create new understandings about graduate supervision. One participant stated that participation in the QGS miniMOOC helped her to evaluate her supervision, to take a closure look at her practice and to reflect on her supervision in a way that worked well for her. Further, this participant stated that the miniMOOC learning environment supported her in being "open to ideas that others have suggested during the discussions, as well as the interviews and to the videos that were presented to us."

Finally, one participant highlighted the importance of creating a learning community among graduate supervisors; this participant stated, "Overall, building a community of developing supervisors, whether it is through the D2L miniMOOC experience or in another way, is critical and I believe needs to be something offered to all supervisors regardless of the stage in their career." Thus, developing a learning community for faculty development appears to be essential for the miniMOOC's success as a valued learning experience (Taylor & McQuiggan, 2008). Designing the QGS miniMOOC using elements of the learning community helped the learning experience to be successful. Theoretical insights that have emerged from this study that

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can help in developing learning communities on graduate supervision in online learning environments include: 1) a learning community can be established from the beginning of an online learning experience about graduate supervision when participants have opportunities to establish common ground through shared roles, interests, issues and concerns, 2) involving credible discussion moderators or facilitators in the design of the online learning experience can contribute to participants' sense of belonging in the learning community, 3) creating regular opportunities and spaces for graduate supervisors to reflect on and exchange ideas, and to discuss issues, are important elements of a learning community, and 4) designing online learning environments that promote reflections on practice, validate what supervisors already know, promote collaboration among graduate supervisors, and to create and share new understandings help to create a learning community focused on supervision.

Constructivism. Within constructivism, there are four important characteristics that influence all learning: "1) learners construct their own learning; 2) the dependence of new learning on students' existing understanding; 3) the critical role of social interaction; 4) the necessity of authentic learning tasks for meaningful learning" (Applefield et al., 2001, p. 8). In this study, the design of the QGS miniMOOC supported all four of these characteristics of learning and there was evidence that the elements of the constructivism theory helped to create successful learning experience among participants. For example, one participant noted how he constructed his own learning by reading and reflecting on the materials provided in the miniMOOC and posting in the discussion forums. He stated that, "I really appreciated the readings that were around the topics and saw that there was a progression to more problem-solving or idea sharing that evolved over the course of the course, so I appreciated all of those aspects." The idea that participants were able to build on their own perspectives and

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understanding of supervision while learning with and from others who brought ideas and experiences with supervision directly resonated in this study. One participant stated that this opportunity engaged him in a new area of learning and one of the benefits was "the ability to generate new thoughts and ideas as a result of seeing what other people were commenting on or resources that they shared". Another participant highlighted that both the interaction with the rich materials and the social interaction between and among participants, discussion moderators and the instructor helped create a unique and beneficial learning experience. Another participant stated, "I think it highlighted different approaches that people have taken that they found helpful. It helped to form a community of practice so that you felt that you were sharing with others that were in a similar situation."

There is an authentic element in bringing together colleagues, who are graduate supervisor with expertise and experiences from other departments or faculties on campus, to talk about their insights and perspectives on supervision via video interviews and having the opportunity as a participant to discuss with other colleagues and with expert supervisors (as discussants) the issues that they are facing in real-life. The QGS miniMOOC was designed, in part, on theories of authentic learning and these design choices helped to make the learning experience very engaging and relevant for participants. One participant noted the importance of the social interaction with others, "the role of conversing with others, even others in different disciplines helped to see what works across a range of situations. This was really helpful in contextualizing the broader picture of supervision experiences." Another participant noted how adding scenarios in Module 5 was helpful in stimulating ideas and thoughts about different situations. This participant stated,

I think my favorite aspects of it was actually the week where we had to read scenarios and then describe our potential response to them, because I think it's helpful to pre-plan or pre-consider how you might respond in a situation, so I think that was a good exercise to do that and it also generated ideas from others.

Theoretical insights have emerged from using constructivism as a lens on design of the miniMOOC in this study along with the other learning theories that were important to the development of the QGS miniMOOC and the success of the experience in this environment, such as: 1) participants were encouraged to construct their own understanding in this online learning environment, 2) each participant came with his/her own experiences with and perspective on graduate supervision; the design of the learning environment emphasized the importance of building on the supervisors' existing knowledge, 3) participants were encouraged to engage with the rich material and to interact socially with other participants, and 4) the learning materials and experiences in this learning environment were designed to be authentic. Each of theoretical insights emphasize that constructivism was an important consideration in the design and success of the miniMOOC learning experience.

Summary

This chapter provided a detailed description of the findings that addressed each of the study's three primary research questions. This chapter also provided insights on the theoretical framework that informed the design of the QGS miniMOOC, and the new theoretical insights that this study contributes to the literature. In the next chapter, I summarize the implications of this design based study for the design of MOOCs in higher education, the implications and findings for faculty development practice, for the design principles and the contributions that this study provided to knowledge of design based research. Recommendations are provided for the

next phase of the design, for design based research on miniMOOCs, and for faculty development

practice.

CHAPTER SIX: RECOMMENDATIONS AND CONCLUSIONS

In this chapter, a summary of the design-based research on the Quality Graduate Supervision miniMOOC for graduate supervisors at the University of Calgary is provided. Implications for the stage prior to the design of faculty development MOOCs, implications for the design of faculty development MOOCs (design principles), implications for the implementation of the intervention and implications for faculty development practices, are discussed. Finally, the limitations of this research, and the need for further research and the conclusion, are presented.

Summary of the Research

Graduate supervisors need to develop strong skills in graduate supervision as poor supervision is considered one of the important factors that contributes to the drop out of doctoral students in Canada (Erichsen et al., 2014; Skarakis-Doyle & McIntyre, 2008). The issue is that even when institutions offer faculty development, faculty members don't usually participate. Many reasons behind the lack of participation such as: faculty members' busy schedules, lack of time, volume and demanding nature of faculty work, logistical issues (for example, the times and locations of sessions), lack of recognition or financial awards for teaching, and lack of direction from the institution (Taylor & McQuiggan, 2008). My research set out to address these issues by: 1) designing an innovative solution for academic faculty development on Quality Graduate Supervision in an online learning environment in which flexibility and accessibility are key design elements, 2) examining the potential of using MOOCs to offer a flexible and accessible learning environment that can reach a wide audience, and 3) investigating how to best support graduate supervisors in their graduate supervision practices.

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The research was carried out over three phases of design-based research: 1) the analysis phase, 2) the design and construction phase, and 3) the evaluation and reflection phase. In the analysis phase, an extensive review of the literature informed the design draft for the QGS miniMOOC. Data collection using surveys with academic staff at the University of Calgary informed the development of topics. The goals of the literature review and data collection were twofold: one, to develop a deeper understanding of the phenomena from experts in the field, and two, to generate the most relevant topics for the QGS miniMOOC.

Findings from the faculty questionnaire suggested that in order to motivate faculty members to engage in faculty development opportunities, the learning environment should provide opportunities to learn: a) at different times, b) with diverse forms of engagement (online, face-to-face and/or blended), and c) with advance notice, with early announcements of the faculty development opportunity and schedule. Each of these design considerations can make it easier for faculty members to fit faculty development into their busy schedules. Furthermore, survey data revealed faculty members' diverse perspectives and goals for attending faculty development program focused on graduate supervision: a) to gain new knowledge, b) to learn from peers/mentors, c) to benefit new faculty members, d) to improve supervisory skills and e) the desire to find a time to attend. Also, faculty members reported the ideal ways to learn about graduate supervision included: a) mentorship, b) learning from peers and, c) learning from more experienced supervisors. Survey results helped to guide the design of the QGS miniMOOC and informed the instructional process for implementation. Findings from the GPD questionnaire also informed the design of the QGS miniMOOC as they suggested there are three learning priorities for every graduate supervisor: a) understand how to keep students on track and support them during their studies, b) understand their program's policies and procedures, and c) understand

how to manage and respond to difficult situations. Furthermore, the top three supervision problems or issues that GPDs deal with include:1) students' failure to progress in their programs of study, 2) student-supervisor relationship conflicts, including personality conflicts between student and supervisor, and 3) unsupportive supervisors who abandon or neglect their students. Reasons for students' failure to progress are complex, and can include a) deficiency in students' background or preparation, b) absenteeism, c) to long delays in meeting deadlines for assigned work, and/or d) failure to achieve program requirements. Based on the extensive literature review and the findings of both questionnaires, the topics of the QGS miniMOOC were finalized for the six modules: 1) introduction to graduate supervision, 2) best supervision practices, 3) relationship building, 4) mentoring new researchers, 5) anticipating and addressing challenges, and 6) promoting excellence and wellness in graduate education. Furthermore, the design was also influenced by a series of meetings with recognized experts in graduate supervision and online learning as research has recommended that design-based research includes communication with practitioners in the field (Amiel & Reeves, 2008; McKenney & Reeves, 2012). The analysis phase was done over one (empirical) micro-cycle.

In the design and construction phase, I continued developing the design draft of the QGS miniMOOC along with the support of the research design team while guided by three learning theories: connectivism, learning community, and constructivism. The design draft was developed and refined over four meso-cycles. At this phase, twenty composite videos of expert supervisors were developed to accompany the six modules. Video interviews with expert supervisors were captured and then these raw videos were edited and this process was done over one meso-cycle. Building the materials in D2L was done over two meso-cycles as I uploaded the videos to the website, designed the pages and made the website ready for launching (see Figure 5, Chapter 4).

During the implementation of the intervention, a poster advertised the miniMOOC which was sent along with an invitation video to all graduate supervisors at the university. Furthermore, binders were prepared for participants with resources considered important to graduate supervisors, such as the Supervisor Handbook produced by the Faculty of Graduate Studies and overview of the six modules. The idea was that participants collect resources related to graduate supervision in a ready to use format; the graduate supervision binders were distributed to all participants during the orientations. Several orientations for participants of the miniMOOC were held as part of the implementation: a) two face-to-face orientation sessions, b) one online session for faculty at University of Calgary Qatar campus, and c) two one-on-one orientations for faculty participants who were unable to participate in scheduled orientations due to conflicts in their schedule. The orientation sessions were helpful in creating a sense of community among participants of the miniMOOC and introduced the research. The implementation of the QGS miniMOOC was carried out over six weeks. The QGS miniMOOC included six modules on different topics related to graduate supervision, high quality videos that were designed for this learning experience, discussion forums, rich resources and learning materials. In order to understand participants' expectations and learning goals, a questionnaire was sent to all participants at the beginning of the QGS miniMOOC. The evaluation and reflection phase was done over one micro-cycle. Data was collected for the evaluation from participants and discussion moderators' activities in QGS miniMOOC, post-miniMOOC questionnaire and interviews with participants and discussion moderators. Twenty-three graduate supervisors signed up for the QGS miniMOOC. I analyzed the participants' activities in the discussion forums by looking into their: 1) log ins and completion data, 2) video segments, and 3)

participation in the discussion forums. Overall, 15 participants have completed the miniMOOC and received completion certificates.

Findings from this study indicated that this research was successful and impacted learners in many ways. Participants were interested in the expert videos, which contributed social presence and diverse perspectives and strategies, and reported many benefits from these rich learning resources. It was observed that participants were viewing the videos and coming back to these resources for up to two months after the miniMOOC has ended. Participants in the discussion forum were observed to express their ideas comfortably from the beginning of the miniMOOC as they were creating threads, posting responses and replying to posted responses. The participants' levels of interactivity and evidence of engagement also was one of the indicators that participants created a learning community in this miniMOOC. Other indicators included what Palloff and Pratt's (2007) identified as six indicators that an online community was formed: 1) participants actively interacted with the course content in the miniMOOC and with each other, 2) collaboration among participants was evident as well by the participants replying and responding to each other in the discussions, 3) participants socially-constructed their knowledge and this was evident in the participants' responses as they were expressing their disagreement and agreement with any of the experts' posts and adding to knowledge. Furthermore, 4) participants offered new resources to others, and 5) provided support, affirmations and advice to each other in the discussion forums, 6) the participants' willingness to provide constructive feedback and challenge each other's ideas. The formation of the learning community in online faculty development also suggested that the learning environment was considered safe and faculty were trusting of each other. This factor is important and was proven

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to be one of the important factors in the success of faculty development programs (Manathunga, 2010).

Another important finding was that faculty participants in online environment appeared to need three kind of supports: 1) setting the stage before the start of the course, 2) instructors' support, and 3) discussion moderators' support. Setting the stage was important as participants appreciated that the invitation was sent early and the orientation sessions. In this study, the discussion moderators were involved more in guiding, supporting and encouraging participants in this miniMOOC and this was basically what faculty participants needed. The instructor on the other hand, provided support by following up with the participants and sending individual and group emails. The support that the discussion moderators should provide in online faculty development is to guide participants while making sure not to give them one by one instructions or overwhelm the discussions (Tu, 2004). The flexibility of the miniMOOC format and the accessibility of the D2L was one of the reasons that this learning environment was successful and it was one of the reasons that the participants have participated in the miniMOOC. Finally, this learning experience impacted participants in their graduate supervision practices and the most important indicators were: 1) participants reported that the QGS miniMOOC provided them with self-awareness on their practices and helped them to understand their students, 2) strengthen their confidence and ability to supervise, 3) the most important indicator was that participants reported that they already applied or in the process of applying some of the ideas that they have learned in this learning experience.

Implications Prior to the Design of Faculty Development MOOCs

Based on the findings of this research, two important design considerations emerged that designers of faculty development MOOCs should enact prior to building the design solution in order to have successful learning experience for faculty members. First, it is important to build a design team of various experts and practitioners to investigate the needs of faculty members and to work with faculty to identify specific topics, skills or technology that need to be developed and can be offered in the MOOC. In the present study, the design team included members of the supervisory committee, expert supervisors, graduate program directors, and faculty members, all of whom provided either direct and/or indirect information that influenced the development of topics and resources that addressed identified learning needs. Second, it is important to know the needs and perspectives of intended learners; thus, in this study, it was important to survey faculty members before designing faculty development. The benefits of conducting surveys for faculty members are to ask them about their perspectives of the available faculty development programs, to evaluate and get insights into the current programs at institutions and to develop an understanding of how it can be improved. Furthermore, offering faculty development opportunities based on what faculty members want and need is important to encourage high rates of participation in faculty development programs.

Implications for Designing Faculty Development MOOCs (Design Principles)

This design-based research developed design principles that influenced the faculty development miniMOOC. In chapter five, I discussed the four design elements that are important for designing successful faculty development MOOCs. The four design elements briefly reviewed here are: topics and resources, videos, discussion forums' design and facilitations, user interface design.

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Topics and resources. First, topics presented in faculty development MOOCs should be developed based on identified needs of faculty members. A thorough literature review is important to establish what is known about graduate supervision and what graduate supervisors need to know to be effective as part of the analysis phase. Surveys can help in identifying the kinds of support that faculty members want and need, and the types of skills that graduate supervisors need to enhance. Second, along with the course content, resources should be available in online faculty development to support the course content. The resources include literature such as journal articles and documents that are related to the topics presented in the faculty development. Third, the design should not just rely on the expertise of the presenters of the faculty development to enrich the topics being discussed and it should encourage the use of different approaches to present the topics to faculty members. For example, the design should support the use of scenarios, case studies and the use of multimedia resources.

Videos. General implications have emerged from the development of the videos in this study and these implications include: First, high quality videos are important to the success of the MOOC and online learning experiences as these can contribute and enhance social presence in the learning experience. Second, videos that are offered in faculty development MOOCs should offer multiple perspectives from different speakers as it was evident that the exposure to different points of view and perspectives is valued by faculty members and the use of multimedia is appreciated as well. Third, videos presented in faculty development MOOCs as learning resources should be short videos that range from 2-5 minutes. Longer videos tend to have less viewing time than the shorter ones based on the findings in this study. Fourth, the questions that the designer asks participants during the video interviews have to be prepared carefully so that these invite considered responses and prompt the participants in faculty development MOOCs to

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think and reflect on their own practices. Participants valued hearing the experts reflect on what was most meaningful or most helpful or most satisfying about in their experience with graduate students and with graduate supervision. Fifth, the videos should not be the center of the faculty development MOOCs, but these resources should contribute to the learning experience along with other resources, enhance the learning community and contribute to the overall pedagogy and purpose of the MOOC.

Discussion forums' design and facilitation. Discussion forums contributed well to the overall learning experience in this miniMOOC and were an important design element. Design principles have emerged for the development of discussion forums for faculty development MOOCs and these implications are: First, questions that prompt the discussion in each discussion forum should be aligned with the questions asked of the expert supervisors in the videos to direct the discussions to the specific topic and to promote more in-depth dialogue. Second, the discussion forums should not be timed to conclude by the end of each module as faculty members might want to continue the discussions after the specific time of the module has ended. The opportunity for longer dialogues can encourage participants to engage with and benefit from many of their peers and the discussants. Participants reported they did not mind asynchronous interaction and that responses in the discussion forum did not happen immediately. From interviews, it became clear that even when participants did not contribute to the discussion, they still benefited from reading other participants' posts. Third, the presence of discussion moderators to offer support and encourage faculty members in ongoing discussion in the MOOCs is as important and it is valued as much as the instructor's presence in online learning experience. In the offering of this miniMOOC, the discussion moderators were experts from the videos or recognized expert graduate supervisors, and thus had high credibility among

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participants. Fourth, the notion of having expert faculty members facilitate and participate in the discussion with other faculty members is appreciated (Manathunga, 2010; Tu, 2004). Fifth, if the designer of the online learning experience wants to include different discussion moderator each week, it should be noted that a new discussion moderator is not introduced in the last week of the course as this might make the moderator feel disconnected and that others already formed community in the online learning experience. Sixth, developing clear expectations on the level of participation from the beginning of the faculty development MOOC for participants and discussion moderators is important and this could be done by creating a guide for participation in the discussion forums and by giving some examples. Seventh, the involvement of the discussion moderators in the process of the design of the faculty development MOOC was important for them as they developed very quickly a sense of connection to the learning community that was developed during the course (Alharbi & Jacobsen, 2017a). Eighth, the discussion forums should be designed to encourage faculty members to reflect on their practices and to encourage cross-disciplinary collaboration among faculty members in ways similar to what Tu (2004) has discussed.

User interface design. First, adding clear instructions and directions in the modules is very important to ensure the consistency and ease of the navigation. Second, the design of the learning experience should include different visual icons for each module to enhance the aesthetic appeal of the design and create visual representation or wayfinding for each topic. Third, the color scheme of the platform should be consistence of two to three colors. Fourth, technical support should be available for participants in the online learning environment to solve any navigation or technical issue they might face. Fifth, the design of the MOOC platform

should be reviewed for accessibility, for consistency of the design, and for navigation before offering the course.

Implications for the Implementation of the Intervention

Several implications have emerged from this research that can inform the process of implementation of MOOCs for faculty development. First, offering orientation sessions for participants prior to the start of the faculty development MOOC was found to be important to introduce the course and to meet the other participants, and encourage participation and completion. The orientation created opportunities for early connections among participants. It was found that there were higher completion rates among those who had attended an orientation, which echoes findings in the literature (Yang, et al., 2016) Second, it was helpful to provide physical binders with a collection of resources that aligned with online course materials and was valued by participants, allowed for easy access to the resources as needed, and also encouraged participants to add more resources that are important to them. The distribution of the binders can be done during the orientation sessions or as a combined PDF that participants print for themselves.

Implications for Faculty Development Practices

Based on findings from this study, several factors appear to encourage faculty members to participate in faculty development programs that designers should pay attention to when designing MOOC learning opportunities. First, the faculty development programs should be available and offered at different times of the year, so faculty members with different time preferences and availabilities can have access to them. This offering was in the Winter semester, and we would schedule it at least two weeks earlier next time so the miniMOOC does not overlap with exams at end of term. Second, the faculty development programs should be

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accessible in various forms (online, face-to-face or blended format) as the limited accessibility of the faculty development programs proven to be one of the most important reasons that discourage faculty members from participating in them. Third, announcing the schedule of the faculty development programs well in advance of the start date is important so that faculty members can arrange to fit the course in their busy schedule. Fourth, the design of the faculty development programs should support learning with and from mentors/ expert faculty as it was demonstrated in this study that these are the preferred learning methods in faculty development programs and similar to what Manathunga (2010) discussed. Fifth, it is important to encourage reflections on faculty members' practices along with the confirmation and the affirmation of their ideas as this is what they need sometimes.

Limitations of the Research

There were at least three limitations that emerged from this study. First, even though the current study produced important and relevant theoretical insights, informed and impacted local practice, and contributed to the development of principles to guide other MOOC design and implementation efforts, the small number of participants in several phases of this study is a limitation. For example, the sample size was good for the faculty questionnaire in the analysis phase, however, the number of GPDs who offered feedback was limited. It likely would have served the design and study better if more responses were received from a greater diversity of graduate program directors across disciplines and programs at the university. The graduate program directors are the first contact to be approached when a student or a supervisor need support and they have in-depth knowledge about the kinds of support that graduate supervisors might need and the issues that they might face in their supervision. Furthermore, the sample size of the post-miniMOOC questionnaire was also considered small. The number of participants in

the QGS miniMOOC was 23 participants and just under half responded. Furthermore, 60%, or 14 out of the 23 participants gave consent to analyze their activities in the QGS miniMOOC.

Second, the positive bias of the researcher needs to be considered as a factor in this study. As in most design based research, I was the investigator as well as the primary designer of the intervention, and thus was involved in all aspects of the research, which can be a positive aspect of the study. It is clear that the researcher was highly motivated to ensure that the QGS miniMOOC was a valuable learning experience for faculty members, which likely enhanced the quality of the design and increased the local impact. As the researcher, I intentionally attempted to minimize researcher bias in findings by (1) using multiple sources of data in the research, (2) proceeding through multiple phases of analysis, design and development, and (3) by using DBR as a research methodology. DBR is designed to have multiple iterations in each stage of the research as the researcher gathers feedback from practitioners and participants who are involved in the study. The many layers and types of feedback that were gathered in this research at each phase of the research was very important to minimize the bias of the researcher. Third, another possible limitation of this study is the inability to generalize study findings to other faculty development MOOCs. Since this study was conducted at one Canadian institution and that it was done over one implementation cycle, the results of this study cannot be generalized nor was this the purpose of this phase of the research. The purpose of the research, however, was not focused on generalizability as much as it was on designing and testing a solution for faculty development opportunities that are flexible and accessible for faculty members and to produce design principles that can be applied or translated in similar situations and in similar learning environments; these multiple goals were achieved. The further development and expansion of this research through subsequent iterations may serve to contribute generalizable findings of this

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research, further inform the theory, provide new theoretical insights, inform the design of faculty development MOOCs and improve graduate supervision practices. Subsequent designs can also focus on including specific research on the impact of this faculty development on student success, time of completion and their program experience.

Recommendations for the Next Phase of the Research

Based on findings and outcomes of this study, several recommendations are made to inform the next phase of design of the intervention and subsequent phases of implementation and evaluation. First, one recommendation is to add a synchronous session once a month or toward the end of the MOOC or a synchronous panel session (Alharbi & Jacobsen, 2017a). Second, encourage the use of the multimedia as a form of communication between participants and not just rely on the written form of communication. Third, add a module specifically on grant writing and/or writing for publications (Alharbi & Jacobsen, 2017a). Fourth, one of the important recommendations was to add the students' voice in the faculty development on graduate supervision and this can be done by interviewing graduate students to ask them about the things that they need support in during their graduate studies or to add scenarios that reflect the students' perspectives and ask the faculty participants to respond to these scenarios. Fourth, add a summary of all the posts in the discussion forums at the end of each module and archive the content after the course finishes. Fifth, involve the graduate program directors as discussion moderators as they have the proper expertise to discuss the topics of graduate supervision. Sixth, the March-April time frame that the QGS miniMOOC was offered in was acceptable, but it was recommended to offer it multiple times during the year so faculty members have bigger chance to participate in any of them. Furthermore, it was suggested to offer it in the middle of any semester since the beginning of the semester and the end of it are usually busy time for faculty

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members. Finally, after the recommended additional development of the QGS MOOC based on the findings from this study, it is recommended to carry out subsequent implementation and evaluation cycles, first with faculty from the present university and then with a massive and open population of faculty members from across multiple universities.

The Need for Further Research

This study addressed the gap in the available literature on how MOOCs may be used for faculty development, the advantages of using MOOCs for faculty development in the area of quality graduate supervision, and promising practices with regards to how to support graduate supervisors in enhancing their supervision practices. Most of the examples of using MOOCs for professional development are for teacher professional development (Bolkan, 2014; Kleiman et al., 2013; Misra, 2018). However, there are few studies available focused on the use of MOOCs for faculty development and the specific advantages of MOOCs for faculty learning (Chang et al., 2016; Mori & Ractliffe, 2016; Stephens & Jones, 2014; Waite et al., 2013).

This study addressed the need for further research on how to provide effective online professional development for faculty members, considering their limited time and demanding teaching, research and service workloads. According to Kleiman et al. (2013), "new approaches are required that embody the principles of effective professional development that are scalable, accessible, sustainable, and cost-effective" (p. 8). The area of quality supervision also needed further investigation and research on how faculty members can be supported in their graduate supervision practices (Manathunga, 2010). Dangel and Tanguay (2014) explained, "there is conceptual and empirical literature that points to the need for quality supervision; however, there is less information on how to best support supervisors in their work" (p. 4). Most of the research

done in the area of graduate supervision is focused on two main areas: 1) identifying the supervisory roles and their styles in supervision, and 2) the experience of graduate students with their supervisors (Egan et al., 2009; Erichsen et al., 2014). Very little research has been published in the area of faculty development to support graduate supervisors in enhancing and developing their supervision practices. This study adds to the available literature with the outcomes and findings from this investigation of the design, development and implementation of a faculty development miniMOOC, which was informed by connectivism, learning community, and constructivism, supported faculty members' development in the area of graduate supervision. Finally, even though this study added to the available literature, there are still a pressing need for further research in the areas of graduate supervision, faculty development design and development and the use of MOOCs for faculty development through further iterations and refinements of this design with gradually more expanded and more open offerings at the host university and across institutions.

Significant and Influence of the Research

This research was significance for many reasons. First, the QGS miniMOOC contributed findings in an understudied area of graduate supervision development. Second, the research led to unanticipated results; I had not anticipated that the learning experience would immediately benefit the practices of graduate supervisors who participated in the QGS miniMOOC. Faculty participants provided evidence that their participation in the miniMOOC impacted their graduate supervision practices, which was an exciting outcome given that the implementation of the intervention was only done over one cycle and in a closed pilot. Third, the research was significant because it led to a better understanding of the design of faculty development

programs and produced design principles that can be applied in similar situations and learning environments and can inform the development of MOOCs for faculty development.

Fourth, the research is significance because evidence of local impact is found in the increased interest in faculty development for quality graduate supervision and the specific content of the QGS miniMOOC: 1) one participant suggested making the QGS miniMOOC a professional learning requirement for all supervisors, 2) another participant proposed to have to the QGS miniMOOC offered specifically to the supervisors in his department, 3) one participant of the QGS miniMOOC asked for a PDF record of all the discussions that happened in the discussion forums for future reference, 4) two participants asked for the videos to be transformed into saved files for future reference, and 5) the researcher was also approached by a teaching and learning specialist from the Center for Teaching and Learning at the University of Calgary in Qatar asking for access to the miniMOOC to adopt some of the ideas for a face-to-face workshop on graduate supervision. The intervention demonstrated local impact on the researcher as it led me to understand the practices of graduate supervision better, which was welcomed learning. When I started designing the QGS miniMOOC, I thought I would gain a deeper understanding of what graduate supervisors need and want in faculty development programs on graduate supervision. However, what I did not expect was the opportunity to dig much deeper in the diverse practices of graduate supervision to understand these approaches better before designing the faculty development miniMOOC. The literature that I read, the questions that were developed for the videos, the interaction with expert supervisors and recording the videos, and learning from how each supervisor responded and how they explained their supervision practices, the questions developed for the discussion forums and the discussions of the

participants, all contributed to expanding my understanding of the phenomena and the complexity of graduate supervision.

Fifth, this research is significance because the use of design-based research in this closed trial helped in designing, developing, implementing, and evaluating a successful faculty development miniMOOC. Most of the common research methodologies tend to design the intervention first and then test it, while the DBR approach encourages the development of the design based on analysis of the need and empirical findings along with a strong review of the theory and extant literature. These steps helped me as the researcher to understand the phenomena and draft a strong initial design. Then, through multiple iterations during the design phase, based on feedback from practitioners and participants, the DBR process helped to shape and inform the development and strengthen the design before implementing and evaluating the design. The evaluation of the research then helped to inform the design and get immediate feedback on what worked and what aspects of the design needed further development. The DBR approach contributed to the development of design principles, and further elaborated on my understanding of the theories used in the design. Sixth, it is important to continue developing the QGS MOOC over multiple cycles of implementation and evaluation. The multiple cycles of implementations would help in the scalability of the research to include participants of many institutions in Canada and eventually open it world-wide as it was indicated in the MOOC vision (see Figure 3, Chapter 3). Sixth, this research is significant because it contributed theoretical insights from enacting a miniMOOC with regards to three learning theories: connectivism, learning community, and constructivism, as described in Chapter 6.

This study benefitted first, the faculty members who have participated in the miniMOOC, as well as those who have contributed to the development and teaching of the miniMOOC. The

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ultimate beneficiaries are expected to be graduate students, with the hope that as the quality of graduate supervision improves in this online community of practice, that the impact and outcomes of the professional learning will directly benefit students. This study provided some evidence that faculty members' participation on the miniMOOC benefitted students because graduate supervisors reported changes in their practice and also indicated that their graduate supervision practices have improved as a result of the experience.

Findings of this study can inform and benefit designers of faculty development in general and specifically faculty development on graduate supervision. This study will inform designers of MOOCs learning environments as well. Furthermore, the research community and the educational development community would benefit from the theoretical insights in this study, the findings on effective online instruction for faculty development, and the design principles.

Conclusion

The use of MOOC learning environments to offer faculty development for graduate supervision has been demonstrated to be a useful, relevant and acceptable way of offering faculty development. In the MOOC learning environment, there are four design elements that appear to be needed to design a successful faculty development: 1) relevant topics and resources, 2) high quality videos, 3) discussion forums' design and facilitations, and 4) effective user interface design. These design elements were refined to produce design principles. Furthermore, this study identified three levels of support that faculty members needed in the online faculty development in order to have successful learning experience: 1) setting the stage, 2) instructor's support, and 3) discussion moderator's support. This researcher hopes to continue to refine, implement and evaluate the MOOC over the next several years.

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Appendix A

Faculty Questionnaire

This survey will take about 5-10 minutes to complete. This questionnaire will not collect

personal or identifying information. There is no risk associated with your participation in this

survey. Once you hit "submit" button, this means that you provided your consent to participate in

this survey.

About the survey: this survey is intended to collect information on faculty members'

expectations of faculty development workshops and programs and what do they need more

support in.

1. What faculty are you working in?

_____

2. What is your position?

□ Instructor / Senior Instructor □ Assistant Professor □ Associate Professor □ Professor

□ Administrator □ Fellow □ Other

Other _____

3. In total, how many years of experience have you had as a faculty member?

□ 2-5 years □ 5-10 years □ 10-15 years □ 15-20 years □ over 20 years

4. In total, how many years of experience have you had as a graduate supervisor?

□ 2-5 years □ 5-10 years □ 10-15 years □ 15-20 years □ over 20 years

5. How would you rate yourself as a graduate supervisor?

□ Novice □ Beginner / Emerging □ Experienced □ Expert

6. Have you engaged in faculty development programs before at the University of Calgary?

□ Yes □ No

7. If yes to 6, please identify the areas of faculty development in which you have you taken

workshops or attended seminars?

□ Educational Development

□ Curriculum Development

□ Instructional Design

□ Technology Integration

□ Research methodology or techniques

8. Have you previously participated in a workshop on graduate supervisory skills?

□ Yes   □ No

9. In your opinion, how important is it to attend workshops on graduate supervisory skills in

order to enhance graduate supervision skills / competency?

□ Not important □ Somewhat important □ Important   □ Very important   □ Don't know

10. Please elaborate on your answer to 9:

_____

11. How do you describe your experience in taking on campus workshops at the university in

regards of the availability and the accessibility of these workshops?

_____

12.What areas of faculty development do you think you need more support in and what kind of

support do you need?

_____

13. In your opinion, how do you describe the ideal learning environment for faculty development

workshops that you would like to attend?

_____

14. Why do you want to enroll in workshops related to quality graduate supervision?

_____

15. What topics that you feel you want to learn more about regarding graduate supervision?

16. Do you think that you will be interested in participating in a MOOC that focus on graduate

supervision if you get the chance?

□ Yes   □ No

_____

Appendix B

Graduate Programs Directors Questionnaire

The questionnaire will take approximately 5-10 minutes to complete. The questionnaire will not

collect personal or identifying information. There is no risk associated with your participation in

the survey. Once you hit "submit" button, you provide your consent to participate in the survey.

About the survey: the survey is intended to collect information from the Graduate Programs

Directors regarding topics, issues and needs on how to better support faculty members in their

graduate supervision practices. The researcher will design a miniMOOC to support faculty

members in improving their graduate supervision skills and as part of the analysis phase; the

researcher is seeking the GPDs insights. Your participation is appreciated.

I agree to participate in the survey.

By completing this survey, you have given consent for the researcher to use your data as part of

the study

□ Yes   □ No

1. What faculty do you work in as a Graduate Program Director?

_____

2. In total, how many years of experience do you have as a faculty member?

 □ 2-5 years   □ 5-10 years   □ 10-15 years   □ 15-20 years   □ over 20 years

3. In total, how many years of experience have you had as a graduate supervisor?

 □ 2-5 years   □ 5-10 years   □ 10-15 years   □ 15-20 years   □ over 20 years

4. How would you rate yourself as a graduate supervisor?

 □ Novice   □ Beginner / Emerging   □   Experienced   □ Expert

5. How long have you been a Graduate Program Director?

 □ Less than a year   □ 1-5 years   □ 5-10 years   □ 10+ years

6. Given your experience as a GPD, what are the top three learning needs of new graduate supervisors?

_____

7. What are the top three supervision problems or issues that you deal with as a Graduate Program Director?

_____

8. What are typically the procedures in solving or addressing these problems?

_____

9. Who do you spend more time with to address supervision needs (new or experienced supervisors)?

_____

10. In your opinion, is the lack of training and/or support for graduate supervisors related to challenges or difficulties you have dealt with in graduate supervision?

_____

11. If you were to design 3 lessons that are required for all graduate supervisors, what would the topics be?

_____

12. What kind of faculty development do new supervisors need to be effective?

_____

Thank you for participating

Sample of the Design Draft for the QGS miniMOOC

<u>Page 5:</u>

<u>Module 2: Supervisors' Best Practices</u>

a. Topic Introduction:

There are 10 elements of caring supervision identified by Määttä (2015):

1- Caring supervision is a sensitive interaction

2- The emphases of a caring supervision changes during the process

3- A caring supervisor does not hold back compliments and appreciation

4- A caring supervisor motivates students to write

5- Caring supervision clarifies the requirement of PhD research

6- A caring supervisor teaches time management

7- A caring supervisor helps students to tolerate uncertainty and criticism

8- A caring supervisor monitors the fulfillment of the quality criteria of a doctoral thesis

9- A caring supervisor provides many kinds of feedback

10-Caring supervision provides suggestions and options, in addition to questions.

In this module, we will examine elements of effective and caring supervision and explore

graduate supervisors' best practices. In this module, you will review three (3) videos of award

winning "Great Supervisors" at the University of Calgary, who describe some of their best

supervision practices. You are encouraged and invited to add to this conversation in the

discussion forum and reply to at least one other participant's contribution.

Reference:

Määttä, K. (2015). A Good Supervisor-Ten Facts of Caring Supervision. *International Education*

Studies, *8*(9), 185.

b. Objectives of this Module:

- Identify elements of caring supervision
- Explore and discuss supervisors' best practices.
- Identify your degree program design and requirements

Directions for this week:

1- Watch the videos
2- Navigate the resources available in the resources' section
3- Do the task for this week and add it to the FGS Supervision Binder
4- Reply to the questions in the forum and respond to at least one participant.

c. Video:

Questions for the great supervisors:
- If you were mentoring a new supervisor, what are the top three recommendations you would make for best practices? Why are these your top three?

d. Resources:

- Graduate supervisors' best practices

http://grad.ucalgary.ca/files/grad/graduate_supervision_best_practices.pdf

- Graduate students' best practices

http://grad.ucalgary.ca/files/grad/graduate_student_best_practices.pdf

e. Task (1) for the Portfolio:

This is the first task for the Portfolio. Please follow the direction below.

Both the supervisor and the student have a responsibility to understand … (pull description from

student-supervisor checklist).

In developing your own best practice, you need to understand your degree program designs and

requirements.

- Now please gather the graduate program information and degree requirements from own

program and add them to your Portfolio.

f. Discussion Forum:

- Please add to the conversation on graduate supervisors' best practices based on your

experience.

- Guided response: Share up to three ideas you have gained from the resources and Great

  Supervisors that you can apply to your practice?

- Respond to others: Review what others have posted and respond to an idea that has

  relevance for you. Your challenge is to "build upon" and share an example, rather than

  just affirming. For example, I found your idea powerful because it aligns with my

  experience with…

Appendix D

Questions for Expert Supervisors' Video Interviews

1. Could you describe please your profile as a graduate supervisor?

2. What is the most satisfying about being a graduate supervisor?

3. What is a strategy or approach that works well for you as a graduate supervisor?

4. What is one thing that challenges you as a supervisor?

5. What do you still feel about your need to learn more about as being good supervisor?

6. To mentor a new supervisor, what are the top three recommendations that you would like to give for best practices and why?

7. How do you establish good communication from the beginning? For example, what does the first meeting with the student look like?

8. What are the ways in which you use the student-supervisor checklist in the meeting?

9. How do you create shared expectations for meetings, timelines and so on?

10. What is your process for supporting graduate students in writing their proposals?

11. What is your process for coaching graduate students in writing their thesis? and what steps do you take?

12. What advice do you offer for motivating and supporting graduate students to make timely progress in their degrees?

13. What are the signs that graduate students may be struggling either with program demands or personal concerns?

14. What steps do you take to support graduate students who are struggling?

15. When it comes to conflicts, what are some strategies you have used to prevent or minimize conflict with graduate students?

16. With regard to knowledge mobilization, what are the ways in which you support graduate students in presenting their work in conferences during publishing their work in journals?

17. What are the ways in which you support graduate students in applying for grants and scholarship awards?

18. What are the types of networking and development that you do for your graduate students?

Pre-miniMOOC Questionnaire

This survey will take about 5-10 minutes to complete. This survey will not collect personal or identifying information. There is no risk associated with your participation in this survey. Once you hit "submit" button, this means that you provided your consent to participate in this survey.

About the survey: this survey is intended to collect general information of the registered participants in the Quality Graduate Supervision miniMOOC, their intention of enrolling and what are their expectation. Your input is extremely valued.

1. Tell us about yourself. Are you?

□ Instructor / Senior Instructor □ Assistant Professor □ Associate Professor □ Professor

□ Administrator   □ Fellow   □ Other

2. If you are a faculty member, which institution are you affiliated with and in which faculty?

_____

3. I am…

□ Female   □ Male

4. What is the highest academic credential that you hold?

□ Master's   □ PhD   □ Other

Other_____

5. How would you rate yourself as an educator?

□ Novice   □ Beginner   □ Intermediate   □ Expert

6. Could you rate your familiarity with MOOCs?

□ not familiar   □ I heard about MOOCs, but never enrolled   □ I read about MOOCs and enrolled in at least one MOOC   □ I am a MOOC expert

7. Please identify 2 – 3 reasons why you enrolled in the Quality Graduate Supervision miniMOOC?

_____

8. What do you expect to learn from this miniMOOC?

_____

9. At this time, is it your plan to finish all activities in the miniMOOC?

_____

10. How will this miniMOOC help you meet your personal or professional goals?

_____

11. How many hours a week are you planning to spend on this miniMOOC?

_____

12. What are your professional development goals for the next two to five years?

_____

13. Do you have any comment that you would like to add?

_____

Thank you for participating

Appendix F

Post-miniMOOC Survey Questionnaire

This survey will take about 10-15 minutes to complete. This survey will not collect personal or identifying information. There is no risk associated with your participation in this survey. Once you hit "submit" button, this means that you provided your consent to participate in this survey.

About the survey: this survey is intended to collect information about the faculty members' experience in the Graduate Supervision miniMOOC. Your input is extremely valued.

1. What university you are affiliated with and in which faculty?

_____

2. Did you complete the Graduate Supervision miniMOOC?

□ Yes   □ No

3. If No, how many modules did you explore?

_____

4. How would you describe your experience in the Graduate Supervision miniMOOC?

_____

5. Which of the miniMOOC's modules was most successful in your opinion and why?

_____

6. How would you describe your participation in the miniMOOC?

□ I participated in all aspects of the miniMOOC (e.g. discussions, watched the videos, read the materials and integrated with other participants) □ I participated in some aspects of the miniMOOC   □ I just enrolled   □ I was an observer

7. Did you use any of the social media associated with the miniMOOC to exchange ideas and/or expand you knowledge?

□ Yes   □ No

8. Could you elaborate on that?

_____

9. How does the miniMOOC added to you as a supervisor?

_____

10. What aspects of the miniMOOC (e.g. time, accessibility, topics…etc.) do you think was the reason for you to participate?

_____

11. Do you think that using the miniMOOC as a form of faculty development has potential to be affective?

□ Yes □ No

12. Could you explain?

_____

13. How strongly do you agree or disagree with the following statement: The course materials (lectures, videos, documents) have a positive impact on my learning experience.

□ Strongly agree □ Somewhat agree □ Somewhat disagree □ Disagree

14. How strongly do you agree or disagree with the following statement: The course activities have a positive impact on my learning experience.

□ Strongly agree □ Somewhat agree □ Somewhat disagree □ Disagree

15. How many hours a week are you spending on this miniMOOC?

_____

16. In what ways has this course helped you meet your personal or professional goals?

_____

17. What do you think didn't work in the miniMOOC?

_____

18. What design elements or activities are most preserved as beneficial in the miniMOOC?

_____

19. What other recommendation would you give us to improve the miniMOOC?

_____

20. Would you mind being contacted for interview about this miniMOOC?

□ Yes □ No

If yes, could you provide your e-mail address?

_____

Few questions (adopted from "Learning to Learn Online" Survey Questions)

Appendix G

Interview Questions for Graduate Supervisors "participants"

1- Please describe your experience with teaching and or learning online. Was your experience in the QGS miniMOOC your first MOOC learning experience? Overall, how would you describe your learning experience in the QGS miniMOOC?

2- Were you able to attend orientation for the miniMOOC? If yes, did you find it helpful? If no, did you find the follow up support and binder helpful in getting you started in the miniMOOC?

3- In what ways did your participation in the QGS miniMOOC add to your learning as a graduate supervisor?

4- Were there elements of the QGS miniMOOC that you liked the best? Please elaborate on reasons why.

5- Are there elements of the QGS miniMOOC that are ineffective, or that you feel need to be changed or improved? Please elaborate on reasons why.

6- In what ways did you find using D2L to be a flexible and accessible way to engage in professional learning for the miniMOOC?

7- What, if any, drawbacks or usability issues are there to accessing the miniMOOC in D2L?

8- In what ways was offering the QGS miniMOOC online over six weeks a benefit or a drawback?

9- Was the "March-April" timeframe a good time for offering the QGS miniMOOC faculty development course? Given faculty members' busy schedules, are there better times during the year for offering the QGS miniMOOC?

10- In what ways were the interactions among graduate supervisors in the QGS miniMOOC discussions an important part of the learning experience?

11- In what ways did the discussion moderators influence or not influence your learning in the QGS miniMOOC?

12- Do you think that the use of the QGS miniMOOC for faculty development is an interesting option for offering faculty development opportunities?

13- Have you applied, or do you plan to apply, any of the new ideas from the QGS miniMOOC into your graduate supervision practice? If yes, what ideas have you applied, plan to apply?

14- If you were hired to lead the next iteration of the QGS miniMOOC design, what would you add or/and change?

Appendix H

Interview Questions for Discussion Moderators "Expert Supervisors"

1- Please describe your experience with teaching and or learning online. Was your experience in the QGS miniMOOC your first MOOC learning experience? Overall, how would you describe your experience in the QGS miniMOOC?

2- How do you describe your experience in moderating a discussion in QGS miniMOOC?

3- In what ways did serving as a discussant in the QGS miniMOOC give you insights into online faculty development? Into the design and usefulness of the miniMOOC? Into issues to do with graduate supervision?

4- In what ways did you find using D2L to be a flexible and accessible way to engage in professional learning?

5- Were there any accessibility issues that you have faced in D2L?

6- Did your engagement as a discussion moderator in the QGS miniMOOC add to your learning as a graduate supervisor?

7- Were there elements of the QGS miniMOOC that you liked the best? Please elaborate on reasons why.

8- Are there elements of the QGS miniMOOC that are ineffective, or that you feel need to be changed or improved? Please elaborate on reasons why.

9- In general, what observations do you have on the interactivity in discussion forum during the week you moderated?

10- If you were hired to lead the next iteration of the QGS miniMOOC design, what would you add or/and change?

Appendix I

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