TRANSFORMING SCIENCE TEACHING: RETHINKING ADJUNCT FACULTY PROFESSIONAL DEVELOPMENT PROGRAMS

by

LINDA B. PURVIS

(Under the Direction of Julie A. Luft)

ABSTRACT

Higher education has become increasingly dependent on adjunct faculty. Adjunct faculty members teach a heavy course load, but due to various reasons they are often on the outside of the latest teaching strategies via professional development programs (PDPs). With limited access to PDPs, they are often unfamiliar with current teaching strategies, such as those that emphasize active learning. This dissertation is composed of two manuscripts that contribute to the understanding of key features in designing adjunct PDPs that will inform them regarding current teaching strategies. The first manuscript is a literature review of PDPs that are designed to engage adjunct faculty and transform their teaching practices. Using key features from this critical review, a new PDP aimed to reach adjunct faculty is described. The second manuscript describes the implementation of a new program of PDP known as the Mentoring-Learning Community (MLC). The MLC was based upon two features from established PDPs, mentoring and learning communities. A transformative framework and a multimethod approach was used to investigate the MLC impact on adjunct faculty teaching views and practices. Both qualitative and quantitative data revealed that adjunct faculty can transform their teaching practices in a short time frame when placed in a conducive learning environment; however, the transformation is dependent on the willingness to learn and transform. The MLC provided a reference point for

adjunct faculty to learn, grow, and collaborate with other faculty members regarding teaching practices. This dissertation provides evidence that the MLC had a transformative impact in teaching practices for science adjunct faculty, indicating the program may assist in better equipping science adjunct faculty. This dissertation also provides further insight into the transformative learning process of adjunct faculty teaching practices, which had not been previously described. Finally, this study offers suggestions for continued work to improve PDP for adjunct faculty.

KEY WORDS: adjunct, professional development programs, learning communities, mentoring, teaching, transformation

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DEDICATION

For my family.

Of all the things I've done in my life, nothing brings me greater joy than my family. Having your support throughout this process has meant more than words could express. I dedicate this to you, especially my children Kaylee and Michael. I hope that seeing me overcome obstacles and be dedicated to reaching a goal inspires you to go after your dreams no matter how big, small, difficult, or seemingly impossible they appear. Dare to dream big dreams and then go after them! I love you.

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CHAPTER 1

INTRODUCTION

Professional development programs (PDPs) commonly serve as an avenue for educators and instructors in institutions of higher education to stay current in their teaching practices (e.g., Gibbs & Coffey, 2004; Pfund et al., 2009). Several different approaches can support the learning of instructors. For example, some programs target new faculty in specific disciplines, such as the Cottrell Scholars Program (Baker et al., 2014). This program provides new chemistry faculty members with instruction on how to enact student-centered learning environments and study the results of their instruction. Other programs target midlevel and senior faculty members by instituting a system of peer coaching (Huston & Weaver, 2008). In these programs, faculty members voluntarily work together to improve their instruction by watching each other teach and providing feedback about their instruction. Regardless of how the programs are configured, these PDPs have the goal of improving instructional faculty teaching to improve student learning.

PDPs have become more important in recent years, as new instructional approaches are being emphasized in undergraduate science courses (Kober, 2015). Based upon an expanding research base about student-learning, these programs emphasize instructional approaches that require students to actively construct their knowledge (see National Research Council [NRC], 2012). Often an active learning environment is a combination of a social constructivist view of learning and specific instructional strategies. Erol, Isdardi, Luft, Meyers, and Lemons (2015) portrayed an orientation toward active learning through a synthesis of the learning literature and provided a model of how students learn in groups as they interact with one another and the

instructor of the class. Their depiction of student learning was based on a social constructivist view, which recognizes the importance of prior knowledge, opportunities to revise and expand upon prior knowledge, and interactions as a mechanism to support the construction of knowledge (e.g., Bransford, Brown, & Cocking, 1999; Posner, Strike, Hewson, & Gertzog, 1982). The corresponding instructional strategies suggested ranged from simple approaches such as encouraging students to talk to one another (e.g., using think-pair-share), to more complex strategies that involve students working collaboratively over an extended period of time (e.g., group projects).

Unfortunately, not all instructors in institutions of higher education (IHEs) have access to PDPs. Notably missing from the pool of faculty who have an opportunity to attend PDPs are adjunct faculty (D'Avanzo 2013; Friedrichsen, Linke, & Barnett, 2016). Adjunct faculty are absent during PDPs for varied reasons. In some instances, they are hired to teach only one or two courses, therefore limiting their time on campus (Lyons, 2007). By having limited time on campus, adjunct faculty do not always hear about offerings of PDPs or they are not on campus during the times of the PDPs. In other instances, adjunct faculty may have a full schedule of courses that results in little remaining time outside of their instructional responsibilities. This type of instructional assignment is clearly time consuming in terms of planning, teaching, and assessment and leaves little time to attend PDPs (Flaherty, 2018; Lin, 2016).

In the sciences, adjunct faculty face additional challenges, as they are being asked to implement teaching strategies not heavily emphasized previously in undergraduate courses (American Association for the Advancement of Science [AAAS], 2011; NRC, 2012). These documents emphasize that science instruction should include various scientific approaches that include but are not limited to modeling, simulations, and computational and systems approaches.

For adjunct faculty, who may not have experienced this orientation toward science instruction, this task could be challenging.

Over the last several years, higher education has experienced a financial crisis that requires the enrollment of more students and less state funding (Lin, 2016). This new fiscal landscape has resulted in many changes on campuses, from community colleges to research-intensive universities. One of the more significant changes is the increased number of adjunct faculty. In fact, a recent study conducted by the American Association of University Professors indicated that 73% of all faculty positions are adjunct appointments (Flaherty, 2018; Lin, 2016). These faculty members provide a cost savings for the IHE in several ways. Adjunct faculty typically have contracts that are limited in teaching time and duration and do not have the costs of health care or retirement included in their contracts (Lin, 2016). Additionally, adjunct faculty are often used to teach large numbers of students, whether through teaching in large lecture halls or through teaching multiple sections of classes. Teaching numerous students brings increased revenue into the IHE (Leslie & Gappa, 2002). Also, faculty members who have only a teaching appointment are typically less expensive than faculty who have obligations associated with research, teaching, and service.

This dissertation sits in the confluence of the value of PDPs and the access to PDPs, in which an increasing population of adjunct faculty have limited access to participate. Without opportunities to learn about new instructional approaches, adjunct faculty will be limited in their ability to support student learning in science. This dissertation responds to this problem and suggests one approach that may contribute to the professional learning of adjunct faculty in the sciences.

Purpose of the Study

All instructors, regardless of their status within an IHE, should have access to the benefits of PDPs, such as learning about new teaching strategies. Unfortunately, adjunct faculty have not had opportunities to participate in PDPs as often as their full-time counterparts have, in part, due to their nontraditional schedules (Dailey-Hebert, Mandernach, Donnelli-Sallee, & Norris, 2014; Miles, 2017). In addition, administrators of higher education often do not recognize the need to ensure that adjunct faculty have professional learning opportunities (Dougherty, Rhoades, & Smith, 2016; Gadberry, 2005; Marshall, 2003), especially since they work with large numbers of students.

One of the largest groups of adjunct faculty is found in the science and health profession fields, where an increased number of students are pursuing careers (National Center for Educational Statistics, 2018). Science and health careers such as nursing, dental hygienists, dieticians, medical technicians, research technicians, and pharmacists are often career choices for many undergraduate students. In addition, the US Bureau of Labor Statistics reports that jobs in these areas are abundant and increasing in demand (Barrick & Bock, 2018). The adjunct faculty members who teach these courses are responsible for ensuring that their students develop the science knowledge and practices they will need in these and other potential career options.

In order to ensure that science students are learning, engaged, and retained, science faculty of all levels have been challenged to improve their teaching to include more active learning strategies (AAAS, 2011, NRC, 2012). To respond to this challenge, many universities have designated centers for teaching and learning on campus to provide PDPs to science faculty. These offerings are often designed with tenure-track faculty in mind, who may need to attend them to meet promotion guidelines. While adjunct faculty are often invited and welcomed to

attend, they often do not attend for many different reasons that are beyond their control (Miles, 2017).

This dissertation recognizes the important role that adjunct science faculty play in IHEs. It also recognizes the call for new forms of instruction in the sciences. In order to address these areas, this dissertation consists of two parts. First, it reviews research related to professional development programming for adjunct faculty. Through this review, features are identified that are important to the design of PDPs for adjunct faculty. These features are drawn together to create a potential PDP that can be used with adjunct faculty. Second, a PDP is enacted and studied in order to determine its potential impact on the learning and teaching of adjunct faculty. This study reveals that this proposed approach can help adjunct faculty in the sciences develop their instructional repertoire.

Dissertation Question

This dissertation is an outgrowth of the need for adjunct faculty in the sciences to have adequate access to PDPs. At a time when adjunct populations are increasingly being called upon to teach introductory science courses, administrators in IHEs must provide well-conceptualized PDPs to support their adjunct faculty (Gadberry, 2005). These PDPs can provide an atmosphere for learning new pedagogical teaching practices (e.g., active learning approaches) and can help create an environment for adjunct faculty to collaborate with other faculty members in their department or field.

Focusing on adjunct faculty is timely because of their increasing numbers. Identifying key features of a PDP that can support the learning of adjunct faculty is forward leaning because they are in need of different forms of professional learning experiences. The overarching

question that guided the work in this dissertation is as follows: What is a potential PDP for adjunct faculty that can impact their instruction?

In order to answer this question, a review of research was conducted to identify potential features of an adjunct PDP, and these features were used in a program that was studied with a small group of adjunct faculty. These two steps resulted in two different papers, which comprise this dissertation.

Implications of This Dissertation

The findings of this dissertation have implications for administrators and faculty in higher education. Administrators who have some oversight into the professional learning of faculty often consist of department chairs/heads, teacher and learning directors, or deans. These administrators should be concerned that all faculty membesr have opportunities for professional learning (Association for the Study of Higher Education, 2010). The results of both studies offer some initial guidance about how adjunct faculty in the sciences can be supported to improve their instruction. Overall, the core features to support faculty should be collaborative and mentoring oriented and should provide adequate feedback and foster a learning community. These features can be built into any PDP program that is embedded in adjunct faculty instructional practice.

This study offers some professional guidance for full-time and adjunct faculty. It suggests the importance of working with peers to build adjunct faculty practice. By working with other faculty, adjunct faculty can learn about new methods of instruction, contemplate the effectiveness of their instruction, and be connected to the teaching and learning environment. The study also reinforces the importance of experienced faculty members working with adjunct faculty, who are often assigned the largest classes.

Even though suggestions are associated with this study that can advance the instructional practice of adjunct faculty, this study is only a first examination of this process. The literature review is focused on a narrow band of research pertaining to adjunct learning in PDPs. A broader examination of faculty learning through PDPs may suggest additional features. In addition, the study of the Mentoring-Learning Community was conducted to evaluate the impact on adjunct faculty teaching practices. Certainly, future studies utilizing this program with more participants and in a different higher education context is important to complete. Although this study is limited in size and locale, it contributes to the literature about adjunct faculty learning to teach science in new ways. Future studies can build upon this work or use this work to determine alternative directions for program configuration.

Overview of Study

The purpose of this study was to determine and examine a potential way to support adjunct faculty. My attention was drawn to this topic because I have been an adjunct faculty member who often did not have access to sound PDPs. In contemplating a potential program, I engaged in two steps. First, I reviewed the literature surrounding adjunct faculty and their PDP experiences. This review indicated features important to incorporate into a PDP that could better support the learning and instructional practices of science adjunct faculty, specifically faculty in the biological sciences. Through this review of research, mentoring and learning communities were two PDP approaches that were shown to have a positive impact on adjunct faculty teaching. These separate approaches offered adjunct faculty the ability to connect with colleagues on campus and learn valuable pedagogies (Banasik & Dean, 2016; Grimes & White, 2015). However, no studies combined multiple PDP strategies and evaluated the resulting impact on adjunct faculty teaching practices.

This knowledge resulted in the second step, which involved designing and implementing a PDP for adjunct faculty. This program merged key features from two PDP strategies, mentoring and learning communities, into one cohesive PDP. This program, the Mentoring-Learning Community (MLC) was designed, implemented, and evaluated over the course of a semester at a regional teaching-focused university. In this environment, I conducted a study to understand how the program impacted the instruction of participating adjuncts. Data were collected regarding the instructional practices of participating adjunct faculty by utilizing the Classroom Observation Protocol for Undergraduate Science (COPUS; Smith, Jones, Gilbert, & Wieman, 2013). Interviews supplemented the observations to provide additional evidence of the teaching impact and experiences of the adjunct participants. The analysis of data was performed using a mixed method approach and was situated within a transformative learning framework. The results indicated that the MLC resulted in the adjunct faculty participants beginning to transform their teaching practices and thinking about learning new teaching practices.

Overview of Chapters

This dissertation is comprised of two manuscripts. This initial chapter provides the background for this dissertation. It points to the need to ensure that all faculty have opportunities to engage in PDPs, especially for the increasing population of adjunct faculty

Chapter 2 contains the manuscript titled "Rethinking Adjunct Faculty Professional Development Programs." This chapter reviews relevant literature surrounding professional development practices for adjunct faculty. The identified research is synthesized regarding ways to best support adjunct faculty with PDPs designed to meet their specific needs. From this synthesis, the MLC is proposed for potential study. This article will be submitted to the *Journal*

of Professional Development in Education, which publishes work specifically on K-20 professional development opportunities and experiences.

Chapter 3 is the manuscript titled "A Professional Development Program for Adjunct Science Faculty: The Mentoring-Learning Community (MLC)." This chapter is a report of the formal study of the MLC, a specifically designed PDP for adjunct faculty. This study investigated the impact of the MLC on adjunct faculty participants and was situated in a theoretical framing that assumed adjunct faculty members were transforming as professionals as they engaged in professional learning. To examine the change in teaching practices of the adjunct faculty throughout the MLC, we conducted classroom observations of the adjunct faculty participants. Additionally, interviews were conducted with the participants to capture any transformation in their views of teaching. This study provides preliminary evidence that PDPs configured specifically for adjunct faculty, such as the MLC, can ignite the process of transformation. This transformation can impact the instructional approaches used by adjunct faculty. This article will be submitted to *Community College Journal of Research and Practice,* which is a journal specializing in improving teaching practices in community colleges.

Chapter 4 concludes this dissertation by summarizing the major contributions from the two articles, synthesizing the findings, and offering implications and suggestions for future studies in this area. Following this chapter are the supporting documents important to this dissertation.

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CHAPTER 2

RETHINKING ADJUNCT FACULTY PROFESSIONAL DEVELOPMENT PROGRAMS

L.B.Purvis and J.A.Luft. To be submitted to *Journal of Professional Development in Education*

Abstract

Higher education has become increasingly dependent on adjunct faculty. Adjunct faculty members often teach multiple, large introductory courses and are frequently unfamiliar with the latest instructional strategies due to a lack of access to professional development programs. (PDPs). These programs can offer an opportunity for adjunct faculty members to learn how to include these new instructional methods in the classroom. Based on an analysis of PDP literature to best support adjunct faculty, the authors propose key features for PDPs designed to engage adjunct faculty in active learning teaching strategies. These features will aid adjunct faculty in learning about new instructional strategies, and potentially increase their connection to the entire faculty community on campus.

Keywords: adjunct faculty, professional development, learning communities, mentoring

Introduction

Institutions of higher education have become increasingly reliant on adjunct faculty. These faculty are often a nontenure-track faculty population that can include full or part-time faculty. Current estimates suggest that more than more than half of all faculty appointments in the United States are classified as 'adjunct faculty' (Eagan and Jaeger 2009, Curtis 2014). Community colleges and smaller universities are some of the most frequent employers of adjunct faculty because of their constrained budgets and fluctuating student numbers.

According to the Association for the Study of Higher Education (ASHE 2010), increasing the adjunct faculty is a common institutional response to the growing number of incoming undergraduates enrolling in entry-level classes. Adjunct faculty members are an attractive alternative for staffing because their contracts are more flexible in that they allow for variations in assigned duties, and they are less expensive than tenure-track faculty members because they often have reduced benefits or a lower salary (Lyons 2007). With student enrollment expected to continue to rise, the *Digest on Educational Studies* has suggested that hiring of adjunct faculty will increase (National Center for Education Statistics [NCES] 2011).

Professional development programs (PDPs) are one of the most commonly utilized methods by institutions to ensure that faculty members have current teaching pedagogies. While adjunct faculty members are responsible for a significant amount of instruction at some institutions, they often do not have access to the support provided to the full-time faculty (NCES 2011). A recent report from the Higher Education Research Institute (HERI) stated that one in five faculty members who teach remedial or introductory courses are not eligible for PDP opportunities focused on teaching (Stolzenburg *et al.* 2017). Given the population referenced,

these faculty members are likely adjuncts, as adjunct faculty are commonly utilized to teach introductory level courses (McCourt *et al*. 2017). The HERI report continues to say that faculty development opportunities are vital to the professional growth of faculty, and higher education administrators should consider making PDPs available to all faculty teaching such high demand courses.

In higher education, one academic area expanding dramatically is the sciences. Science fields serve as steppingstones to many health, engineering, pharmaceutical, and other allied positions. While science departments are experiencing exponential growth, they are also encountering a demand for more inquiry-based and active learning experiences for students. This push comes from many education research sources, including the National Research Council (NRC 2012) and the American Association for the Advancement of Science (AAAS 2011). These documents encourage the use of student-centered teaching practices in undergraduate science education. For example, these documents focus on incorporating science content in an engaging manner that allows students to actively construct their knowledge. In addition, these documents emphasize that science instruction should include various scientific approaches that include but are not limited to modeling, simulations, and collaborative learning. These education reforms also address the importance of ensuring faculty are equipped with resources and knowledge to engage in this manner in the classroom (AAAS 2011). Due to the limited number of PDPs designed to inform adjunct faculty regarding these new teaching reforms, they may struggle to incorporate these student-centered approaches into the classroom.

Background

On campuses across the United States, centers for teaching and learning have begun to provide more opportunities for faculty to engage in PDPs. While these offerings have increased, these opportunities are not always accessible for adjunct faculty due to their time constraints and teaching appointments (D'Avanzo 2013, Friedrichsen *et al*. 2016). PDPs should attend to the new reforms, be of ample duration, and be available to *all* faculty members (Brownell and Tanner 2012, Lysne and Miller 2015, Derting *et al.* 2016, Auerbach and Schussler 2017). Unfortunately, PDPs for those in higher education tend to consist of one-day workshops or short-term intervention programs designed for tenure-track faculty members who need the program for promotion qualifications (Ebert-May et al. 2015). Despite the high numbers of adjunct faculty involved in the delivery of important instruction, most institutions have not dedicated adequate time and resources to support adjunct faculty (Marshall 2003).

This paper responds to the need to consider how to best support adjunct faculty, in general, and adjunct faculty specifically in the sciences. Through a critical review of the PDP literature, we suggest several key features that aim to meet the needs of adjunct faculty, which can be further refined to address the unique instructional responsibilities of science adjunct faculty.

Review of Literature

Reviewing research that reports on adjunct faculty PDPs is important when considering how to design a program for science adjunct faculty members. Ideally, PDP research should demonstrate how the program is beneficial to the instructor's teaching practices (Lynse and Miller 2015, Rodesiler and McGuire 2015). Although many PDPs are conducted in many formats (Loucks-

Horsley et al. 2010), this review of the literature focuses on face-to-face PDPs, as previous surveys of adjunct faculty have consistently shown they desire to make connections and feel included in the campus atmosphere (Cooper 2011, Hurtado and Pryor 2012, Miles 2017).

To identify the studies in this review, the first author of this paper sought out peer-reviewed PDP literature on adjunct faculty that spanned the years of 2007-2017. PDP literature during this time that was focused on utilizing face-to-face models such as mentoring and learning communities framed the search criteria. These models were selected because previous surveys of adjunct faculty have indicated that they desired this type of interaction to feel connected to the university and department (Meixner *et al.* 2010, Miles 2017). Additionally, this time frame in which articles were included corresponded to the reform documents (i.e., AAAS 2011, NCR 2012), which charted a new path for science education. A five-year window on either side of these documents was used to capture emerging or responsive research. All empirical methods were accepted, which included qualitative, quantitative, and mixed method studies.

The review process involved a search for articles using databases including Ed Research Complete, Academic Search Complete, Psyc Info, and ERIC. The following search terms were used to locate relevant full-text articles: *part-time, professional development, adjunct, faculty,* and *higher education.* These terms yielded a wide variety of articles. To further clarify the scope of this search, we chose the terms *adjunct* and *professional development* as keywords to search abstracts or titles. This search yielded 120 articles, of which dissertations, duplicate articles, and presentations were excluded from the review. For consideration in this review, the study needed to include adjunct faculty or mention how the study tried to incorporate adjunct faculty. It should be noted that institutions use a variety of descriptors for the adjunct faculty population.

Therefore, studies that described *adjunct faculty, instructors, part-time* or *non-tenured faculty* as being included in the PDP described were considered for this study. This criterion allowed us to narrow our articles from 120 to 72.

Furthering the focus of our search, the first author continued to review the 72 articles by eliminating articles that mentioned or used online methods of PDP. Literature has shown that adjunct faculty members desire more connection with their peers via face-to-face interactions (Cooper 2011); therefore, we eliminated the studies that did not have the features of face-to-face interactions with adjunct faculty. However, we retained one paper (see Webb *et al.* 2013) because it combined online and face-to-face features.

The remaining pool of 48 studies was further refined by considering the quality of research, design, and alignment with the goal of gaining a better understanding of adjunct faculty PDPs. A rubric of examining these articles was established as a way to evaluate the research rigor and quality of the studies (see table 2.1). This review required that the studies report on ways to support adjunct faculty. If a PDP was studied it should have an appropriate and well-described design, report on the data collection and analysis process, and provide insight into the impacts the PDP provided adjuncts with some focus on how the PDP supported adjunct faculty in their learning. Through this analysis, 12 articles met the specifications identified as being high or medium on the rubric and were considered for this review as providing insights into the design of a PDP for adjunct faculty (see Table 2.2). Additionally, as the authors were interested in the implications that might be noted for science adjunct faculty, any studies pertaining specifically to science adjunct faculty or science instruction are denoted with a ** in table 2.1

After reviewing the 12 articles, it was noted that the studies fell into two distinct areas of focus regarding adjunct faculty support: Those two areas are supporting adjunct faculty in their learning and integrating adjunct faculty into a higher education environment. These articles were compared and contrasted to one another in order to determine potential themes. The following sections report on these themes.

Theme 1: How best to support adjunct faculty

Adjunct faculty desire instructional support and to be connected to the community

Hoyt et al. (2008) surveyed over 700 adjunct faculty regarding their job satisfaction. They developed an online survey instrument based on the 12 job satisfaction constructs detailed in their literature review using Herzberg's (1964) Two Factor theory. The Likert-scale survey utilized questions that covered the topics of teaching schedule, faculty support, recognition, and classroom facilities. The researchers used a regression analysis to analyze responses, which revealed several areas correlated with job satisfaction. Mentoring was one area that showed a positive association with job satisfaction. This result highlights the importance of mentor relationships for adjunct faculty. The survey also indicated that adjunct faculty desired PDPs focusing on teaching techniques, with an additional analysis indicating that experienced adjunct faculty wanted more ways to improve their instructional practice than did their less experienced peers.

Meixner *et al*. (2010) explored experiences of part-time faculty using a qualitative survey at a midsized public university. This survey study sought not only to examine experiences of part-time faculty but also to help the institution understand how it could better serve its adjunct faculty. Researchers made every effort to obtain as many responses as possible from adjunct

faculty members. For instance, they invited participants to a reception honoring their service, and participants were given an opportunity to complete the survey at the reception. Any faculty members who were unable to attend were emailed the survey to complete on their own time. The survey consisted of 31 ordinal, categorical, and open-ended questions eliciting information on the teaching experiences of part-time faculty at the university.

From the 85 adjunct responses, three core themes emerged: receiving outreach, navigating challenges, and developing skills. Regarding the first core theme, receiving outreach, participants mentioned their desire for more communication to increase their sense of connectedness in their department and throughout the university. Mentoring emerged as a subtheme in this area in that many participants expressed a desire for mentors to help them grow and become more connected to other instructors. In the theme of navigating challenges, there were subthemes on student engagement, assistance with navigating connections on campus, and feeling disconnected from the instructional environment. Across all these areas, a lack of training was frequently cited. Specifically, the adjunct faculty members did not feel like 'real' educators due to the lack of training. Finally, for developing skills, most respondents desired more training on applications such as technology, teaching strategies, and student motivation.

Webb *et al*. (2013) collected data from a PDP for adjunct faculty offered by the Dentistry and Education schools at a Canadian research-intensive university. These two schools collaborated to produce a supportive environment for their adjunct faculty by holding monthly cohort meetings to share teaching practices. The study focused on the separate cohorts of dentistry adjunct faculty (N = 13) and education department adjunct faculty (N = 11). Webb *et al*. (2013) interviewed and observed all participants on the nature and scope of their assessment

practices. The analysis of data revealed that adjunct faculty began to improve their instruction as they engaged in the PDP. Improvement was determined through an increase use of resource materials for active learning as collected by the researchers. In addition, the analyzed data indicated that the adjunct faculty formed connections with other faculty members within their cohorts that prevented professional isolation. Webb *et al*.'s (2013) PDP design included a few unique features. One element involved scheduling the meetings around their teaching assignments, while another element was the use of electronic communications that included email and an online web portal provided convenient access for all participants. These two features ensured that adjunct faculty were able to participate in the PDP and that they could have continued participation regardless of their location. Ultimately, the adjunct faculty benefited from the PDP, as demonstrated by the improvement of their teaching practices.

Owens *et al*. (2018) studied the transformation of a department-wide culture through a PDP for all faculty, including adjunct faculty, over a three-year period at a large urban comprehensive university. The voluntary program named Biology Faculty Explorations in Scientific Teaching (Biology FEST) was created to provide participating faculty with 100 hours of PD that aimed to enhance pedagogical expertise, support teaching change, engage faculty in discussions regarding assessment, and build an infrastructure to support comprehensive change. All biology faculty, regardless of rank, were invited to participate and were given a stipend. Fifty-five out of 62 total faculty participated, of which 20 were adjunct faculty.

The researchers collected three different forms of data: instructional materials used by the faculty members in their classroom, surveys of perceptions and motivation, and an analysis of the classroom engagement through an audio technology tool. The data revealed that as the PDP

continued the use of instructional materials by all participants increased. A checkout log monitored participants' use of the resource room for the duration of the PDP to evaluate if an increase of use was observed in correlation to their participation. The Decibel Analysis for Research in Teaching (DART) classroom noise analysis (Owens *et al*. 2018) revealed that classroom engagement increased over the duration of the PDP, indicating that most participants were utilizing active learning strategies. The perceptions and motivation survey results indicated that the faculty had a deeper sense of connectedness through their discussions of teaching with other participants. The motivation results also showed that adjunct faculty persisted in the PDP, because they desired to learn more about teaching as they observed changes in their classroom and they enjoyed being involved in a community environment.

An underlying design feature of this PDP program was the creation of a professional learning community, which are places 'where groups of instructors grapple with similar teaching challenges' and 'are key for promoting ongoing pedagogical growth' (Owens *et al*. 2018, p. 12). Seeking to create a collaborative atmosphere, the authors planned three years of activities in which the participants would meet and collaborate on developing engaging classroom activities.

Overall, these studies suggest that adjunct faculty value opportunities to engage with each other and with other faculty members. Some forms of this engagement included mentoring and participating in learning communities. The importance of mentoring during PDPs has been well-documented (Brownell and Tanner 2012, Grimes and White 2015). Learning communities are also not a new method of PDP (see Cox 2004, Furco and Moely 2012, Banasik and Dean 2016), with studies showing a positive impact on faculty participation and engagement when a collaborative learning community is in the design of the PDP (Grimes and White 2015). It was

also important that adjunct faculty members could participate in PDPs specifically tailored for their instructional needs. The adjunct-specific PDPs provided an opportunity to increase the engagement and participation of adjunct faculty, which cultivated a sense of collegiality and belonging.

Adjunct faculty need feedback

Ebert-May *et al.* (2011) analyzed teaching practices of a variety of faculty after participating in two different PDPs. These faculty members were tenured and nontenured and represented various institutions across the United States. The researchers utilized the reformed teaching observation protocol (RTOP) to analyze video recordings sent in by biology faculty after attending one of the two PDPs. They used the RTOP to determine (1) the degree of student-centered teaching approaches, (2) whether or not instructors' self-reported teaching practices matched the observation of their practice, and (3) what variables predicted active/non-active teaching practices. The authors also collected surveys and observations from two groups of PDP participants. Results indicated that a discrepancy existed between what the instructors believed they were doing in the classroom and what the video recordings revealed. The self-reported survey findings indicated that 89% of faculty believed they were using student-centered approaches. However, the researchers' RTOP data revealed that 75% of faculty still used lecture-based approaches. The authors suggested that lack of peer observation feedback to instructors may have been reflected in the discrepancy between the actual and perceived classroom practice. The researchers suggested timely feedback as a way to help instructors be more aware of their actual classroom practices and help them gain more confidence in integrating the PDP knowledge into teaching practices.

Diegel (2013) studied adjunct faculty perceptions of mentoring at a community college. The author interviewed fifteen adjunct faculty members along with three department chairs (Humanities, English, and Science) to investigate the perceived importance of mentorship for adjunct faculty in respective departments. Diegel transcribed and open-coded the interviews. The analysis revealed that participants valued having a mentor to connect with throughout the year. The adjunct faculty specifically mentioned that it helped their sense of inclusion in the department and feeling of connection to their colleagues. Adjunct faculty went on to mention that they would participate in PDP if it was offered during a time when they could meet. This study reinforces the value of mentors and the feedback they provide in the professional development of adjunct faculty.

Gormally *et al*. (2014) explored opportunities to provide feedback to all science instructors to encourage the adoption of active learning strategies. The article emphasized the importance of feedback or coaching rather than peer observation as a way to encourage adoption of learner-centered teaching practices. Feedback or coaching in this study was defined as providing advice from a mentor to a mentee as a means to improve future performance .The authors suggested that while professional development workshops have been shown to be beneficial for instructors, faculty members are likely to incorporate active learning strategies in the classroom when feedback is provided immediately after observation. In describing high-quality feedback, the authors provided some criteria, such as meeting before the observation to gain insight into the areas the instructor would like to improve and then meeting after the observation to provide immediate feedback, encouragement, and motivation. Providing solutions to any observed challenges will motivate and encourage the instructor to continue to improve

teaching strategies. The authors also noted that the feedback should be provided in private and be valuable to the improvement of teaching practices.

Overall, research on feedback suggests that mentors are vital to the growth and development of adjunct faculty. PDP participants, both adjunct and tenure-track, noted the importance of high quality, timely, and valuable feedback (Ebert-May *et al*. 2011, Gormally *et al.* 2014). Additional studies have identified feedback as a valuable part of any PDP (Lyons 2007, Loucks-Horsley *et al.* 2010, Brownell and Tanner 2012, Dailey-Hebert *et al.* 2014, Gormally *et al*. 2014). For adjunct faculty, feedback provided valuable information about their instruction and offered a way to improve their instruction (Diegel 2013).

Theme 2: How best to integrate adjunct faculty into the community

Adjunct faculty members need a mentor

Gehrke and Kezar (2015) utilized a survey from the Values, Practices, and Faculty Hiring Decisions of Academic Leaders designed to evaluate leadership views on values and beliefs pertaining to adjunct faculty. The aim of the study was to determine how four-year institutions were supporting current adjunct faculty. The participants included multiple institutions that were members of the American Conference of Academic Deans (ACAD) and the Council of Colleges of Arts & Sciences (CCAS). The 47-item survey was sent via email to a total of 599 participants, with an approximate response rate of 30%. The survey included questions regarding pressures deans face in hiring and policies surrounding adjunct faculty. The results indicated that public institutions are less supportive than private institutions regarding adjunct faculty orientation and mentoring. Survey data also revealed that the administration plays a large role in advocating for support for adjunct faculty. The authors suggested that creating a more inclusive environment for

adjunct faculty by using mentors could make adjunct faculty feel more supported and valued in their position.

Grimes and White (2015) performed a case study of two instructors in a biochemistry course at the University of Delaware and documented a three-year observation period between expert-novice mentoring relationships. The focus was to transfer the problem-based learning model (PBL) from one faculty member to the next and provide a model of mentoring as a way to transfer this knowledge. During the first year, the mentee shadowed the expert by observing and actively participating in the classroom. The second year, the mentee was the primary instructor, but the mentor attended and engaged with the mentee during the transition. The final year resulted in the mentee being the sole teacher without mentor interactions. Throughout the project, the team of researchers conducted and analyzed participant observations. A qualitative analysis suggested that the mentoring relationships contributed to the improved instruction of the participants. Although a three-year period may be difficult to incorporate with some adjunct faculty, this study offers insight into creating collaboration with mentor-mentee relationships and offering a transition program over time. The researchers concluded that creating environments of collaboration could be especially valuable in actively engaging adjunct faculty in a specific teaching strategy.

Overall, mentoring can serve as a catalyst for the inclusion of adjunct faculty within a department (Grimes and White, 2015). Creating environments of collaboration for adjunct faculty can help improve their sense of belonging. Gerke and Kezar's (2015) survey of adjunct faculty showed that having a mentor helped provide a sense of value to their position. Providing

mentors helped the adjunct create a deeper connection to the institution and also helped the institution to integrate adjunct faculty into the learning community.

Adjunct faculty need a learning community

Furco and Moley (2012) reported on the use of a faculty learning community (FLC) initiated to create awareness of service-learning pedagogy. Although this study was not exclusive to adjunct faculty, it did have 6% adjunct and 4% instructor participation. The study compared eight institutions over three years and examined how the use of an FLC impacted faculty perceptions of service learning. The authors were also interested in the FLC impact on classroom implementation of service learning. For this, they created a Faculty Service-Learning Attitude survey (FS-LAS) that was utilized pre- and post- FLC for attitude changes. The survey contained 35 Likert-style survey items that collected information on faculty attitudes, implementation of service-learning, and feelings of competence in performing service-learning. When they analyzed the 152 total responses from the pre-post FS-LAS regarding how faculty implemented service learning, they saw no difference in responses between faculty types. This result suggests that both the adjunct faculty and tenure-track faculty in the study benefited equally from the intervention. Overall, this study suggests that a 'learning community approach to faculty development can be an effective tool for reducing faculty resistance and securing stronger faculty support and commitment' (Furco and Moely 2012, p. 150).

Elliott *et al.* (2016) reported on student learning outcomes after implementing a learning community PDP focused on active teaching methods. A team of ten faculty instructing the same course, created a learning community to implement and adapt course materials to include more active learning. The researchers collected classroom observation data over three semesters, and

one-course section was retained as a lecture-based course for comparison. Researchers performed classroom observations to analyze the amount of time instructors used for active learning, but they did not use a specific observation protocol to collect this data. Reform classrooms utilized 20-30% of their class time for active learning activities compared to the nonreformed classroom that utilized only 4% of the class time for these activities. Students in reformed, active learning classes showed an increase in learning gains in two of the three content assessments over the lecture-based course. The authors also correlated the increase in gains with the percentage of time the instructor utilized active learning and found that a linear correlation supported previous findings (see Freeman et al. 2007). Faculty members who participated in this FLC study said that there was tremendous 'value in the sharing of resources and activities, especially those regarding the efficient use of limited time and inspiring classroom innovations' (Elliott et al. 2016, p. 10).

McCourt *et al*. (2017) conducted a qualitative interview study of 19 instructors to uncover motivating factors to stay committed to a long-term PDP. The researchers conducted this study at six research-intensive universities that participated in the same PDP. Researchers conducted interviews over a two-year period using the expectancy-value theory lens for considering the motivation of faculty. A few themes emerged that clarified faculty motivation in persisting in the program, such as the feeling of connection, respect, camaraderie, value, and sense of belonging. Some participants mentioned time limitations as a barrier to PDP participation. McCourt *et al*. suggested that including observational teaching feedback would be beneficial to a learning community, while not increasing the time commitment to the PDP.

Participants agreed that this PDP was beneficial due to its low time investment for the faculty while creating interaction and collegiality among peers.

Overall, studies have shown a connection between the use of faculty learning communities, increased student performance, and motivation to participate (Furco and Moely 2012, Banasik and Dean 2016). Helping adjunct faculty recognize the student gains in the classroom as a result of the PDP could also motivate them to continue to participate (Furco and Moely 2012, Banasik and Dean 2016). Additionally, faculty consistently noted that they valued the connection, camaraderie, and the sharing of resources afforded to them in a community setting.

Rethinking professional development programs for adjunct faculty

Considering the information from literature, the authors concluded that adjunct faculty members can benefit from PDPs comprised of features such as mentoring, feedback, and collaborative opportunities such as learning community programs. These features offer many benefits, including face-to-face interaction, inclusion, and community (Furco and Moely 2012, Webb *et al*. 2013), areas that have been shown to provide adjuncts an avenue to increase their connection to the university and provide access to instructional strategies that could improve their teaching in the classroom (Banasik and Dean 2016). However, the literature also indicates that room remains for improvement (Webb et al. 2013, Dailey-Hebert et al. 2014). These studies report that adjunct faculty appreciate the value of having a mentor to connect with and feel more included in the university when they are part of a learning community setting (Webb et al. 2013, Grimes and White 2015, Elliott *et al.* 2016). The studies did not have an emphasis on adjunct faculty learning, however. As such, future designs of PDPs could examine the potential to meet

both connection and inclusion desires expressed by adjunct faculty by incorporating various features into the PDP design.

Based on an analysis of the studies, we propose that PDPs for adjunct faculty should contain multiple features in order to meet various desires of adjunct faculty. While some PDPs offered by institutions are moving toward considering these features in their design; many adjunct faculty members still report feeling disconnected from the community within their university setting (Miles 2017). Future PDPs for adjunct faculty should aim to resolve the disconnection that many still face by offering multiple ways for adjunct faculty to engage in the PDPs. Approaches could include creating learning groups where adjunct faculty and other university faculty work together on improving their teaching.

These designs might consider including a variety of features, such as providing a mentor, providing more feedback, and offering a community that provides a collaborative experience with other faculty (Makinson 2002, Diegel 2013, Gormally *et al*. 2014, Grimes and White 2015, McCourt *et al.* 2017) First, the PDP could include a community environment designed to engage faculty members in learning various teaching strategies with other faculty. This feature includes sharing ideas on teaching and making connections with departmental faculty. Second, literature suggests that receiving feedback and having mentoring relationships with other faculty members adds value for the adjunct faculty participating in the PDP, in the form of making connections and teaching reform (Webb *et al.* 2013, Grimes and White 2015, Elliot *et al.* 2017).

Discussion and Conclusion: Rethinking PDPs for Science Adjunct Faculty

The face of faculty in higher education has drastically changed in the last decade, resulting in one in three faculty obtaining a nontenure-track position (Hoyt *et al*. 2008, Eagan and Jaeger

2009, ASHE 2010). Additionally, science adjunct faculty members teach a majority of the introductory gateway courses in STEM fields and often instruct many first-generation college students (Lyons 2007, Whalen *et al*. 2010, Kezar 2012, Banasik and Dean 2016). It is important to ensure that adjunct faculty are knowledgeable about teaching in their field. It is even more important in the sciences, where the number of students is growing, as are guidelines about how science should be taught to students (see AAAS 2011, NRC 2012). As the numbers of adjunct faculty across higher education continues to increase, it is important to consider how to best support this growing group. Although they may not persist in the same institution for an extended time frame, university support is still vital for continued to improvement of instruction, as these faculty members provide a vital service to students and the institution as a whole.

From this literature review a few important points can be made in terms of science adjunct faculty and PDPs. Science adjunct faculty benefit from engaging in PDPs just as other faculty member do. Adjunct faculty are often overlooked, however, in terms of PDP opportunities in institutions of higher education. The studies in this review pertaining to the sciences (as indicated on table 2.2 with a **) indicate that science adjunct faculty members who participate in PDPs aimed at teaching reforms are impacted, and they change their instruction to become more student centered. These instructional changes can include the incorporation of important strategies or assessments outlined in teaching reforms, such as those put forth by AAAS and the NRC (e.g., Webb *et al.* 2013, Grimes and White 2015, Banasik and Dean 2016, Elliot *et al.* 2016). An important outcome of professional learning opportunities in science education is to support participants in enhancing their instruction through the use of scientific inquiry to improve the learning of their students. One possible way to ensure that adjunct faculty

reach this outcome could be to offer a PDP that utilizes collaborative forms of engagment opportunities, which could include features such as feedback, mentoring or a community setting.

Creating opportunities for mentoring and engaging in learning communities of practice have been shown to offer many benefits to adjunct faculty, such as face-to-face interaction, inclusion, and community (Furco and Moely 2012, Webb *et al*. 2013), and may also improve their teaching in the classroom (Banasik and Dean 2016). Individually, a mentor can provide feedback to an adjunct faculty member, which is often in response to an observation or a specific request of an adjunct faculty member (Gormally *et al*. 2014, Grimes and White 2015). For the sciences, observational feedback has been shown to be beneficial in aiding faculty in the adoption of active learning strategies (Ebert-May *et al.* 2011, Gormally *et al*. 2014). Additionally, Grimes and White (2015) reported the use of mentoring as a way to pass on a specific inquiry teaching strategy, problem-based learning.

Learning community settings are also important, as they can facilitate connections with other faculty members while focusing on a specific topic, such as teaching scientific inquiry (Webb et al. 2013). For example, Elliot et al. (2016) and others described how science adjuncts perceived their improvement of teaching science. These studies also described the collaboration of a team of faculty members teaching introductory science courses, implementing a learning community to transform the classroom to include more active learning. This community provided a space where faculty could learn, collaborate, and prepare to implement strategies that resulted in increased student outcomes. Overall, these communities can help an adjunct faculty member feel connected to other faculty, the department, and the greater education conversation. Ultimately, this feature could be a productive way to contribute to a science adjunct faculty

member's sense of well-being and their own professional learning regarding science education instruction.

In doing this review, it became clear that little research has been done on the learning of adjunct faculty. As they are a significant population in institutions of higher education, there is a need to understand how adjunct faculty come to their positions and how they are supported to build their knowledge and practices. With this type of information, it will be possible to conceptualize and study new ways to support adjunct faculty that have not been considered previously. This unique and diverse population at institutions of higher education is worthy of study in order to improve their learning of instructional practices.

These studies suggest that at least a new form of collaborative professional learning can be proposed for adjunct faculty members. Such a program could consist of various PDP features that are centered around envisioned standards in a discipline such as science. Our future work will involve designing such a PDP for science adjunct faculty with the goal of improving science instructional strategies. This program ultimately emerges from a need to support adjunct faculty and to better understand their development as professional educators.

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Table 2.1 Rubric for research rigor analysis of remaining 48 review articles. Using this rubric, the articles were narrowed down to the final 12 that are reviewed in this paper.

Criteria	High	Medium	Low
Data collection and analysis	Clear procedures on both	Describes the process but is not clear in the analysis	Not clear on the way data was collected or analyzed
Design of PDP	Clearly described program	lacked details but offered insight into the program design: (could include a review of various PDPs or support systems)	Not clear on the PDP or support discussed
Impact on Adjunct faculty	Clearly stated the impact of the PDP mentioned on adjunct faculty teaching or profession	Reasonable impact but lacked full data on impact mentioned	No mention of impact on adjunct faculty

Table 2.2 Characteristics and focus of studies examining professional development for adjunct faculty

Study	Faculty population	Methodology	No. of Participants	Focus of PDP/Support provided
Diegel (2013)	Adjuncts	Qualitative interviews	15	Adjunct perspectives of PDPs
Ebert-May et al. (2011) **	Mixed (Tenure track and instructors mentioned)	Mixed methods	211	Two different active learning strategy PDPs
Elliott et al. (2016)**	Instructor	Multiple methods	10	Learning community focused on Active learning and student outcomes
Furco and Moley (2012)	Adjunct and Instructor	Quantitative survey (pre-post)	152	Learning community focused on teaching
Gehrke and Kezar (2015)	Deans and Admins	Quantitative survey	599	Administrative support of adjuncts thru PDP
Gormally et al. (2014) **	Mixed	Review of studies	n/a	Feedback on teaching
Grimes and White (2015)**	Instructors	Case study	2	Dissemination of Problem Based Learning Teaching Strategy through mentoring
Hoyt et al (2008)	Adjuncts	Quantitative Survey	700	How to best support adjuncts to improve job satisfaction
McCourt et al. (2017)**	Instructor	Qualitative interviews	19	Faculty learning groups
Meixner, Krunck, and Madden (2010)	Adjuncts	Qualitative survey	85	Support for inclusion of adjunct faculty includes mentoring
Owens et al. (2018)**	Tenure-track and Adjuncts	Mixed Methods	55 total (20 adjunct)	Semester long cohort on active learning
Webb et al. (2013)**	Adjuncts	Mixed Methods	24	Learning community group on active learning

** denotes PDPs focused on science faculty

CHAPTER 3

A PROFESSIONAL DEVELOPMENT PROGRAM FOR SCIENCE ADJUNCT FACULTY: THE MENTORING-LEARNING COMMUNITY (MLC)

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Abstract

Institutions of higher education have become increasingly dependent on adjunct faculty. These faculty members are often unfamiliar with current teaching strategies emphasizing an active learning approach. To support science adjunct faculty in learning about active learning, a professional development program (PDP) was designed and implemented by the authors of this study. The Mentoring Learning Community (MLC) program design was informed by literature regarding the use of professional development programs (PDPs) that focused on adjunct faculty. To determine the impact of this program, participants in the MLC were observed and interviewed over one semester. This paper presents the results of the study, which reveal that MLC participants modified some aspects of their instruction and felt more empowered to utilize active learning approaches in their classrooms.

Keywords: adjunct, professional development, transformation, instructional change

Introduction

For many years, student enrollment in higher education has been on the rise. To meet the demands of a growing student population, administrators hire a significant number of *adjunct faculty* (Association for the Study of Higher Education [ASHE], 2010). This hiring trend has resulted in roughly 70% of all faculty in higher education having the status of adjunct faculty (Flaherty, 2018). These faculty members often work part-time and have limited term contracts (Leslie, 1998). In addition, they are often called upon to teach introductory level courses in response to the high student enrollment in these courses (Bettinger & Long, 2005; Ehrenberg & Zhang, 2005; Yakoboski & Yakoboski, 2017).

The increased hiring of adjunct faculty is observed in many disciplines but especially in science, technology, engineering, and math (STEM) areas. The growing student population in STEM fields is a result of the increase in career options in these areas (Barrick & Brock, 2018). Additionally, demand has increased for more active learning approaches in teaching for science disciplines (American Association for the Advancement of Science [AAAS], 2011; National Research Council [NRC], 2012). These reforms reach across all STEM disciplines and emphasize that science instruction should include various scientific teaching approaches that include, but are not limited to modeling, simulations, collaborative work, and reasoning. In addition, science instructors should utilize various forms of assessment that can track the progress of student learning and provide feedback to the students regarding their learning (AAAS, 2011). Although science adjunct faculty are familiar with the science content needed to teach, they often lack familiarity with these current teaching approaches. While the efforts to educate faculty on these reforms has increased, recent reports have indicated that adjunct faculty

are known to rely less on the use of active-learning approaches due to their lack of access to professional learning opportunities (Baldwin & Wawrzynski, 2011).

Universities have developed centers for teaching and learning to increase access to professional development programs (PDPs) on many campuses, but a great need remains for programs targeting science adjunct faculty (D'Avanzo, 2013; Friedrichsen, Linke, & Barnett, 2016). Adjunct faculty often have irregular schedules that prevent them from participating in traditional PDPs offered by universities (Lyons, 2007). Unfortunately, PDPs in higher education tend to consist of one-day workshops or short-term intervention programs designed for tenure-track faculty members who need the program for promotion qualifications (Ebert-May et al., 2011). Despite the high numbers of adjunct faculty involved in the delivery of introductory science instruction, most universities have not dedicated the same time, resources, or support to provide PDPs for adjunct faculty as they do for tenure-track faculty (Marshall, 2003; Miles, 2017). PDPs for science adjunct faculty should be informative regarding these teaching reforms (AAAS, 2011), of ample duration (Emmerson & Mosteller, 2000, Henderson, Beach, & Finkelstein, 2011), and be accessible to adjunct faculty by considering their schedules (Diegel, 2011; Gess-Newsome, Southerland, Johnston, & Woodbury, 2003; Miles, 2017).

Taking these considerations into account, we implemented a PDP designed to reach and inform adjunct faculty regarding the use of active learning strategies. Drawing upon a review of literature, key features from two PDP approaches – mentoring and learning communities – were merged into one program, a *mentoring-learning community* (MLC) that would be the basis of a new PDP for adjunct faculty in STEM areas. The explicit goal of this program was to provide a professional learning experience for adjunct faculty that would advance their understanding of active learning by providing access to a mentor and a collaborative learning community. The

adjunct faculty in the program were viewed as learners who were eager to increase their knowledge and improve their abilities to teach. This study was guided by an overarching question: What impact does the MLC have on the teaching practices of science adjunct faculty who are learning about instructional strategies?

Theoretical Framework

This study was guided by the Transformative Learning Theory (TLT), which was proposed by Mezirow (Mezirow & Marsick, 1978) as he explored adult learners in a new environment and the transformation that took place. This framework recognizes that individuals hold a point of reference that can transform in response to the information learned (Mezirow, 1997; Mezirow, 2012). For example, reframing can occur as a person engages in learning new information, planning for a course of action, or recognizing the need for change. This reframing is a result of reflection and discourse, which happens in a specific context and in conjunction with other individuals.

As an individual engages in reflection and discourse, habits of mind and points of view support the reframing process. Habits of mind are ways of thinking, feeling, or acting. Points of view are the emerging positions about the information learned during the reframing process. An important outcome of the reframing process is that individuals become more empowered and autonomous. For our study, these outcomes are viewed as gaining confidence in trying a new teaching strategy or reflecting on how to implement one in the classroom.

Mezirow's (1991) TLT has previously described three dimensions of transformation: psychological, convictional, and behavioral. Psychological refers to learning new information; convictional is where reframing begins and beliefs shift. The behavioral dimension is where a transformative action begins to take place. In addition to these dimensions, readiness to learn has

been documented in other fields such as student learning, teacher education, and professional learning (Gess-Newsome et al., 2003; Henderson et al., 2011; Mezirow, 1990). This framework also provides a basis with which to follow the progress of transformation by the three basic dimensions Mezirow described. Each of these dimensions describes the process a learner experiences as new information is grappled with and points of view are transformed. Using these dimensions to understand the transformation process of adjunct faculty members lends itself to clarifying important findings in this study.

The TLT framework lends itself to this study as the participants in the MLC provided an opportunity for reflection, planning new actions, and collaboration with others within the same context. The MLC served as a reference point for this reframing to take place for adjunct faculty. We used TLT to guide our consideration of ways adjunct faculty members transform their teaching practices while participating in the MLC as they learned about various instructional strategies. By using TLT as a lens for this study, shifts in points of view and habits in observed teaching practices helped to inform how participating adjunct faculty learned and benefited from the MLC program.

Literature Review

PDPs have become more important in recent years as new instructional approaches are being emphasized in undergraduate science courses (Kober, 2015). In higher education, PDPs are built upon an expanding research base on student-learning that emphasizes instructional approaches requiring students to actively construct their knowledge (see Erol et al., 2015; NRC, 2012). Research in the area of PDPs for adjunct faculty is lean, but a few studies have revealed important features to aid in supporting adjunct faculty to transform their instruction or improve

student learning (Dailey-Hebert, Mandernach, Donnelli-Sallee, & Norris, 2014; Elliott et al., 2016; Webb, Wong, & Hubball, 2013).

In considering how adjunct faculty members learn about improving their instruction when participating in PDPs, it is important to review literature on ways to best support adjunct faculty in this process (Cooper & Booth, 2010; Hurtado, Eagan, Pryor, Whang, & Tran, 2012; Miles, 2017). When developing a PDP, specific features have been previously documented as beneficial in providing support that is more like to transform faculty teaching practices. Feedback is commonly considered to be a valuable factor (Ebert-May et al., 2015; Gallos, van den Berg, & Tregust, 2005). Most instructors receive feedback in the form of student evaluations and, occasionally during annual evaluations (Gormally, Evan, & Brickman, 2014). However, a more valuable type of feedback is peer observation. Gormally et al. (2014) found that peer observation feedback motivated and encouraged faculty to adopt new teaching strategies. Peer feedback on instructional practices is a valuable outcome for participants in any PDP (Brownell & Tanner, 2012; Dailey-Hebert et al., 2014; Loucks-Horsley, Hewson, Love, & Stiles, 2010; Lyons, 2007). Unfortunately, due to the temporary nature of adjunct faculty contracts, peer observation feedback is often minimal or nonexistent. PDPs that included peer feedback on their instruction would help provide adjunct faculty the kind of help they have expressed as a need (Gehrke & Kezar, 2015, Miles, 2017).

Providing mentors is one way to facilitate feedback in a PDP (Diegel, 2013; Grimes & White, 2015; Nam, Seung, & Go, 2011; van der Weijden, Belder, van Arensbergen, & van den Besselaar, 2015). Mentoring is often considered to be a one-on-one interaction where a less experienced faculty member learns from a more experienced colleague (Nam et al., 2011). For example, Grimes and White (2015) implemented an apprentice-style mentoring model between

two faculty members, where a more seasoned instructor mentored a new faculty member to adopt a problem-based learning (PBL) teaching style. This three-year process included in-depth feedback from the mentor and ultimately resulted in the mentee adopting the PBL teaching strategy. By including a mentoring relationship that encourages peer feedback, a PDP could help adjunct faculty engage in collaboration and the exchange of teaching strategies, which may have a significant and lasting impact on adjunct faculty. While successful, this model of feedback and mentoring was intensive and aimed at the transfer of a specific science teaching style. Other studies have suggested that providing a mentor relationship increases access to feedback and can serve as a connection point within a department for adjunct faculty (Meixner, Krunck, & Madden, 2010).

Another feature shown to be important in designing PDPs around instructional learning is the duration of the program. Several studies recommended that PDPs be at least one full semester in length, or longer if possible (Emerson & Mosteller, 2000; Henderson et al., 2011). For most adjunct faculty, the only professional learning experience they can access is a one-day orientation welcoming them to the campus. This session usually focuses around institutional paperwork and overall teaching responsibilities, not teaching practices.

Multiple surveys of adjunct faculty have revealed that the biggest barrier they face in participating in PDP on campuses is their nontraditional schedule (Dailey-Hebert et al., 2014; Egan & Jaeger, 2015; Miles, 2017; Wallin, 2010). For example, in a survey by Dailey-Hebert et al. (2014) 33% of adjunct faculty stated that scheduling was the biggest barrier limiting their participation in PDPs offered by the universities. Designing PDPs around the schedules of adjunct faculty can be challenging but when adjunct faculty schedules were considered in the

design of the PDP, there was an impact on their professional learning of new teaching strategies (Grimes & White 2015; Owens et al., 2018).

Finally, the use of faculty learning communities (FLC) has been growing tremendously in PDPs (Banasik & Dean, 2016; Cox, 2004). An FLC is defined as a cross-disciplinary group of faculty that engage in collaborative ways to enhance teaching practices (Cox, 2004). These learning communities offer an avenue for faculty of all ranks to collaborate, share ideas and have an environment for learning and growth. For example, many successful learning community focused PDP models (i.e., FIRST IV and HHMI Summer Institutes) have impacted classroom practices when faculty participate in collaborative learning teams (D'Avanzo, 2013). These learning communities also provide a place for faculty members to provide and receive feedback (Ebert-May et al., 2011) and learn about student-centered teaching practices (Elliot, 2016), and they can motivate faculty to persist in PDPs (McCourt et al., 2017). Even though the use of learning communities has increased, little published research has examined their effectiveness with adjunct faculty populations (Banasik & Dean 2016).

While creating opportunities for participating, receiving feedback, considering the duration, including mentors, and providing a learning community have all been shown to offer benefits to adjunct faculty (Banasik & Dean, 2016; Grimes & White, 2015), the literature still lacks studies demonstrating the impact of adjunct faculty participating in PDPs with some of these features (Banasik & Dean, 2016; Dailey-Hebert et al., 2014; Gadberry & Burnstad, 2005; Webb et al., 2013). Previous studies have reported that adjunct faculty membesr appreciate the value of having a mentor to connect with and provide feedback (Grimes & White, 2015; Dailey-Hebert et al., 2014; Webb et al., 2013), and they also feel more included in the university when they are connected through a learning community setting (Elliott et al., 2016). While these

studies evaluated the feasibility of the implementation of each of these types of PDP independently, we were interested in the outcome of converging multiple PDP features into a single study design that provided and measured instructional learning to the adjunct faculty community.

Mentoring-Learning Community Program

The MLC program sought to fill the missing gap of resources available to adjunct faculty members. This program was designed to support and engage adjunct faculty in student-centered teaching strategies through the use of a learning community (Cox, 2004), while also connecting them to faculty mentors that provided feedback. The call for teaching practices in science has shifted toward more active learning (AAAS, 2011; Lysne & Miller, 2015; NRC, 2012), and this program was designed to better equip adjunct faculty to meet that goal.

This semester-long program was designed to utilize multiple features from various PDP approaches simultaneously to engage adjunct faculty in learning about student-centered teaching approaches recently called for in the sciences (AAAS, 2011; NCR, 2012). These features included mentoring, feedback, and a learning community, allowing adjunct faculty to engage with full-time faculty in a different way than they had previously. The structural components of this program included ongoing mentoring, monthly learning community meetings, and program times specifically catered to the adjunct faculty participants. Additionally, this study aimed to determine the impact of this program on adjunct faculty teaching transformations. The following section describes the implementation of these features into the overall design of the MLC. (See Table 3.1 for the full program design.)

Mentoring Implementation

During the semester-long MLC, each adjunct member was paired with a tenure-track faculty member who served as a mentor. Prior to the beginning of the MLC, the mentors were provided expectations and a description of the role they would provide during the course of the program. These expectations included instructions for giving peer observation feedback to the adjunct faculty mentee and suggestions on ways to offer additional support. Mentors and mentees also met or communicated weekly or biweekly to reflect and discuss ways to implement what was learned during the MLC. Pairing of the mentors and mentees was arranged based on schedule availability of the participating faculty, again, to be mindful of the time adjunct faculty had available. Every effort was made to ensure that the mentor and mentee would be on campus during the same block of time during the week to allow for them to be able to observe each other and meet outside of the monthly group meeting. Both the mentor and mentee participated in the monthly learning community group together, learning the same teaching strategies. This approach allowed the pair to have accountability, community, and common ground to build a relationship during the program.

Learning Community Implementation

To create a learning community, certain features must be present. For the MLC, these features consisted of a safe environment for open sharing, collaboration, relevance, and empowerment (as recommended by Cox, 2004). The adjunct faculty participants played an active role in designing the monthly MLC group schedule to ensure their ability to participate. For example, after volunteering for the program, a schedule poll was sent out to give each participant an opportunity to influence the meeting time of the MLC.

The MLC utilized a learning community with a specific theme of learning student-centered teaching strategies that have been encouraged in science education. Specifically, the focus topic of the program was engaging students using formative assessment. Each monthly meeting discussed various strategies that could provide formative assessment feedback to the students regarding their learning progress. This strategy is specifically aligned with the goals of implementing *Vision and Chang*e *in Undergraduate Biology Education* (AAAS, 2011) in biology classrooms as a way to activate students' knowledge and allow faculty members to identify gaps or misconceptions as the course progresses. As this strategy can take on many forms in the classroom, the monthly learning community meetings offered an opportunity to introduce various ways formative assessment might look in the classroom.

To meet the goals of the program, the MLC included collaboration between the College of Science and the College of Education faculty at the host institution (as recommended in AAAS, 2011; Cox, 2004; NRC, 2012). The College of Education faculty provided demonstrations of these assessment tools during the monthly meeting and instructions on how to format them for the science classroom. Additionally, this cross-disciplinary interaction during the learning community allowed for the participants to gain knowledge from various faculty members, connect with faculty outside of their discipline, and gain exposure to various teaching strategies designed to engage biology students through active learning methods.

As the program progressed during the semester, these meetings included demonstrations from biology faculty already implementing a variety of engaging, student-centered teaching styles in the classroom. Additional information on technology resources, such as clicker question systems, game-based platform Kahoot!, learning platform Top Hat, case studies, discussion, and group activities were also demonstrated. These tools have been mentioned as ways to effectively

encourage peer-learning and discussion in the classroom (AAAS, 2011; NRC, 2012). Overall, the goal of the group meetings was to provide an environment that fostered open collaboration between faculty members and provide resources that would empower participants to enact these new teaching strategies in their classrooms.

Methods

This study's research question was best informed using a mixed methods approach. The mixed methods approach is appropriate, because using multiple data sources provides insights to help inform the transformation of adjunct faculty teaching practices and beliefs through the use of the MLC program (Creswell & Plano Clark, 2011). Within the mixed methods approach, we enacted a concurrent data analysis (Creswell & Plano Clark, 2011) merging the two data pieces during the analysis stage. This design entailed quantitative instruments that explore how adjunct faculty modify their teaching by observations of the classroom practices of adjunct faculty. The qualitative component of the study involved semistructured interviews collected before and after the MLC program. These data were analyzed accordingly and merged during the analysis. The TLT was important during the interpretation and analysis as a means to view the data over the duration of the MLC program. Triangulation of this data occurred through the involvement of several researchers, the use of multiple data sources, and collecting the data over time. This triangulation contributed to the validity of the conclusions (Creswell & Plano Clark, 2011).

Participant Selection

This study took place at a southeastern regional university with a student population of approximately 20,000. The university is a teaching-focused university where tenure-track faculty have a teaching expectation of 60%, and part-time adjunct faculty teach multiple, large sections of introductory level courses. As an exploratory study, we implemented the

MLC using biology adjunct faculty, as this university had a higher number of adjunct faculty in biology compared to other science disciplines.

Using purposeful sampling (Creswell & Plano Clark, 2011), adjunct faculty and full-time participants (who would serve as mentors) for this study were identified and email solicitation was sent. The participant selection requirements were:

1. Must have been an adjunct for at least one full semester prior to participating.
    a. If full-time, must have been at the host institution for at least one full academic year and teach introductory courses.
2. Must teach introductory biology at the regional university during the semester participating.
3. Must be a biology faculty member.

Interested participants responded, and interviews were scheduled at the convenience of the participant. Participants were not incentivized for their participation in the MLC.

Introduction to the Adjunct Faculty Participants

Two biology adjunct faculty members volunteered to participate in this program. Bobby and Joe were both part-time adjunct faculty in the biology department of the study institution. Both had taught an introductory nonscience-major biology course for the past three years. Bobby taught evening courses, while Joe taught courses during the day. Joe had an additional adjunct appointment at another institution and was previously a physician's assistant. Bobby, however, was a full-time researcher at another institution, and this was his only teaching appointment.

Data Collection

The goal of this study was to evaluate the views of learning that science adjunct faculty members experienced during the MLC and the resulting impact on transforming adjunct teaching practices. A variety of data were collected, including interviews and observations. The data

included both qualitative and quantitative measures and were both utilized to inform the findings of the study using the TLT. To ensure validity of the results, the researchers used methodical triangulation (Brewer & Hunter, 2006; Roulston, 2010), in which multiple forms of data are used to cross check findings. All faculty participants' names were changed to protect the confidentiality of the participants and allow for nonbiased interpretation of results. Due to the sensitivity of the subject, the researchers were constantly aware of their subjectivity surrounding this field of research (see Appendix C). Data collection was done with permission granted by the host institution and appropriate IRB agreements (see Appendix A).

Interviews

This study sought to gain in-depth, first-hand knowledge from the adjunct faculty members regarding their experiences during the MLC program and their teaching beliefs. Roulston (2010) stated that phenomenological interviews are the best route to generate detailed, in-depth descriptions of such lived experiences. The interview data captured a snapshot of the experiences, feelings, and perspectives of the participants before and after their participation in the MLC (See Table 3.2 with question themes.)

All interviews utilized a semistructured interview guide designed and aligned with the overall research question for the study and sought to understand any resulting transformative views and perspectives of the adjunct faculty as a result of participating in the MLC program (see Appendix B). Interviews were recorded, transcribed, and open coded to look for themes (Bogdan & Biklen, 2006; Gallman, 2013). Codes and themes were discussed by the researchers until they had agreement on the overall themes from the interviews. In this study the interview questions helped to support the observation findings over the course of the semester so that our interpretation of the interview findings were not the sole source of data. For example, questions such as, "Which strategies from the MLC have you

implemented in your classroom?" also allowed the participants to reveal information that we might not have captured using the observations.

Classroom Observations

To gain an understanding of the instructional impact of the MLC on adjunct faculty, we conducted four classroom observations of each instructor over the course of the MLC. These observations were conducted using the Classroom Observation Protocol for Undergraduate STEM (COPUS; Smith, Vinson, Smith, Lewin, & Stetzer, 2013). This observation method has been previously utilized to measure and understand transformations faculty members make due to teaching reform efforts (see Ebert-May et al., 2011; Lund et al., 2015; Smith et al., 2014). Observations were done before the first MLC meeting to gather an initial teaching assessment, and then participants were observed every two weeks after an MLC meeting. This data provided insight to the activity in the participants' classroom and allowed us to back up the interview findings with actual classroom data. These observations were distributed evenly through the semester. MLC participants provided a syllabus at the start of the MLC program to allow us to schedule observations around any exams to capture only teaching activity. Additionally, observations were unannounced to the participants so that the data collection truly captured classroom activity with no interference.

Before using the COPUS we underwent training suggested by Smith, Jones, Gilbert, and Wieman (2013) and used interrater reliability (IRR) to ensure convergence in observations made throughout the study. To compare observer IRR across all 25 codes in the COPUS protocol, we calculated Cohens Kappa IRR scores using SPSS (2013). Researchers maintained an IRR of 0.90 throughout the study, indicating validity and cohesiveness in observations. This IRR is considered very high and thus indicates good IRR for this study (Fleiss, Levin, & Paik, 2013;

Landis & Koch, 1977). As a result of having a high IRR, researchers were able to alternate observations to prevent any bias in coding of the participants, which further prevented any bias interpretation of the observations of participants throughout the study. We also cross-checked codes with one another frequently and discussed observations to ensure cohesiveness throughout the length of the MLC.

Data Analysis

Interviews

For purposes of analysis, the semi structured interviews were audio recorded and transcribed within a week after the interview. To gather an in-depth understanding of the participants' feelings, experiences, and views, the interviews were coded thematically using inductive categorization. We drew upon patterns in the text of the transcript to develop codes. Second, those codes were categorized into clusters (Gallman, 2013; Roulston, 2010) utilizing the frequency function within the Nivo 12 plus software program (QSR International, 2017). This process allowed the data to be reduced to its "essential meaning" (Roulston, 2010, p. 161). Finally, themes were created and grouped together by commonality or their link to the research question. The constant comparative method was utilized to look for transformations in attitudes and views as a result of the adjunct faculty participation in the MLC (Boeije, 2002; Glaser & Strauss, 1967).

Classroom Observations

For each two-minute interval of the class, designated activities of the instructors (e.g., lecturing and posing questions) and their students (e.g., listening and answering questions) were recorded. We followed Smith et al.'s (2014) protocols for grouping behaviors for analysis. For instructors, we assessed (a) presenting, (b) guiding, (c) administration, and (d)

other. For students, we assessed (a) receiving information, (b) talking to the class, (c) working, and (d) other (Smith et al., 2014). To capture what instructors and students were doing throughout a class period, we determined the percent of time a group of behaviors occurred throughout a class (i.e., the number of two-minute time periods a behavior was recorded / the total number of two-minute time periods). We used percent of time periods instead of percent of total behaviors because it better represented what occurred throughout the entire class period (Lund et al., 2015; Smith et al., 2014).

Findings

The goal of this study was to evaluate the use of the MLC program designed specifically for adjunct faculty to provide access to current teaching practices (see Figure 3.1 for program overview). Utilizing observations and interviews as tools to analyze the impact of this program helped gage the overall transformation of adjunct faculty teaching practices.

Interview Findings

In seeking to understand how adjunct faculty viewed their teaching; several questions inquired about their role in teaching, why they wanted to participate in the MLC, and their views of teaching practices. Both pre- and postinterview questions had similar themes (see Table 3.2) that aligned with the overall research question for this study.

Theme 1: Adjunct faculty desire to learn and improve their teaching practices

When adjunct faculty participants were asked why they chose to participate in the MLC, one theme that emerged was a desire to learn ways to improve their teaching practices. In the pre-interview, both Joe and Bobby expressed a desire to learn about new teaching strategies and connected this learning with improved student success.

> I want to improve every day. It sounds like I might be able to benefit and learn some new things from this program, and I am excited to do so. – Joe

> I want to learn from the regular faculty who teach more classes than me. They may have come across some other way to keep the attention of students. I'm just hoping to learn something new. – Bobby

This same sentiment of wanting to learn and improve their teaching was reflected in their post interview regarding why they signed up to participate in the MLC program.

> I want to be a better teacher. Simple as that. Learn from you all. That was the reason I wanted to participate. Just to learn from other people. It was a great opportunity; you don't have that kind of chance while you're working. – Joe

> I just wanted to learn from this course about something to help my teaching. Maybe a new teaching method or way to engage students in class. That was the major motivation for me. - Bobby

This theme was consistent in both pre- and postinterviews of the participating adjunct faculty. A sentiment of wanting to learn and grow as an educator was at the root of their participating in the MLC program.

Theme 2: Adjunct faculty views of teaching were transformed by the MLC

When asked about their experiences during the MLC and how they viewed teaching after participating, they said their views on teaching were different than when they began the MLC. When asked how the MLC helped them, both Joe and Bobby agreed that the program directly impacted their thoughts and perceptions of teaching practices.

> It definitely helped me in terms of getting those ideas, and although I've not implemented much yet, I've have been able to implement some, and this [experience] was really helpful. By getting to hear from other people who are participating in this program, both pros and cons, I gained faster knowledge so I can decide whether that is a good or bad thing for me to try and if it might be feasible in my classroom setting. It has definitely increased my ability to instruct in this way and has added to my ability in teaching students in a different way. – Bobby

The MLC provided an avenue for both adjunct participants to interact, collaborate, and reflect on teaching. This opportunity was something Bobby said he never had available to him before.

> It's good to know there are so many levels I can implement. I have not been able to listen to people who have tried these before, so that was a good experience for me and changed my thoughts on using them in class. – Bobby

Joe went on to say that the MLC had a transforming impact on how he thought about his classroom practices. Both participants expressed that their views of what could be done in the classroom were transformed because of the MLC. Joe stated that the biggest reflection he had from the experience was that "it could be done," meaning that he now believed he could transform the way he taught.

> The most surprising thing for me was that it can be done! You can change. Seeing how other people were doing things surprised the heck out of me. I thought it was too big of an obstacle, but I can see that it works and truly has an impact on the students' learning. – Joe

He admitted that prior to the MLC he did not believed he change, even though he was interested. He stated that "seeing how his mentor was using various strategies and being able to ask questions" really transformed his way of thinking toward active learning. Both adjunct faculty expressed that their teaching and thoughts about teaching were impacted because of their participation in the MLC program.

Theme 3: Adjunct faculty appreciated collaboration

In the postinterviews, both participants were asked their feedback regarding the inclusion of both features, mentoring and learning, into the MLC design. Bobby stated that being able to experience a variety of perspectives from the participants really influenced his thinking and experiences. He had no prior experience with a learning community or mentor and found both aspects helpful for him.

> The MLC exposed me to various ways people are teaching and learning their problems, their benefits from their experiences. It exposes and widens your thinking in terms of

> teaching differently. These were things that made this a good way to learn. Coming together with other instructors to discuss various ways they are teaching in their classes. Getting feedback from your mentor on how you implement something in your class. All of these things, I believe, will be for the betterment of my students regarding my teaching. – Bobby

Bobby stated that he and his mentor observed each other, and he found the feedback from his mentor helpful. He also benefited from being able to observe his mentor to learn and observe a different way of teaching. He went on to state that the feedback from his mentor gave them both an opportunity to reflect on their teaching and have a "lively discussion about teaching styles and student learning."

Joe also found both his mentor and the learning community features of the MLC useful to his views of learning. Joe had mentioned in his pre-interview that he was looking forward to learning from a mentor and getting feedback on his own teaching, so it was no surprise this was reiterated as a benefit in his postinterview.

> Having Joy [his mentor] look over my shoulder and sit down with me and say, "I would have done this a little different," and show me in a constructive way. That was very useful. It helped me, it really did. Both the group discussions and having my own mentor – Joe

Both participants also stated that the face-to-face component of this program was very useful for them to be able to connect and interact with colleagues in similar teaching situations.

Overall, these interview findings suggest that the adjunct faculty participants had a desire to continually learn and improve their teaching methods. Participating in the MLC reframed their thoughts regarding this new teaching style. Both participants stated that their main desire to participate in the MLC was to improve their teaching and learn something new from the MLC. They also stated that the use of a mentor was valuable throughout the program, providing feedback and constructive criticism which they had not previously received. The learning community aspect also provided them faster access to information regarding teaching reform and

allowed them to make decisions regarding the feasibility of using these new strategies in their own classroom by discussing it with another participant in the MLC. Both participants also expressed a transformative shift in their thinking about teaching because of the MLC and the information they learned, and they recognized change was possible. Even though their implementations were different, both expressed they had plans to utilize the new teaching strategies moving forward.

Classroom Observation Findings

The COPUS (Smith et al., 2013) was utilized to evaluate in-class teaching as the adjunct faculty members participated in the MLC. We observed several trends from the analyzed data (see Figure 3.1 for overall results). First, Joe and Bobby presented information in the form of lecturing during most of their class time (Figure 3.1 A and B), and they were observed consistently throughout the MLC using this teaching method. A difference was noted in the final observation of Bobby's classroom, where a notable decrease in the amount of time presenting was observed by the research team. In that observation, Bobby shifted his presenting to guiding (3.1 B) with the incorporation of clicker response questions. By implementing this one activity, Bobby doubled the amount of guiding he typically used during a class period and presented one third as much (Figure 3.1 B). Using clicker questions also engaged his students, who spent much of the class time working and talking twice as much as a typical class period (Figure 3.1 D).

Second, guiding was mostly observed as posing questions to the students (Figure 3.1 A and B), commonly in the form of verbal questions. These questions may or may not stimulate the same student response as clicker or discussion questions, which are also commonly grouped under the guiding category. The data suggests that Bobby averaged 40% of his class time guiding the students by asking questions, whereas Joe averaged 20%. Although Joe increased his use of

guiding to 60% in Observation 2, Bobby increased guiding to 90% with the incorporation of clicker questions in Observation 4. Both increases were after formative assessment discussions in the MLC. Joe's implementation was different than Bobby's, as Joe was observed verbally asking students more questions, and Bobby was observed integrating clicker questions throughout his class. Both adjunct faculty members included the use of more questions, however, resulting in a 40-50% increase in the guiding of students in class, which also corresponded to an increase in their students talking (Figure 3.1 C and D).

Finally, the increased "other" category (Figure 3.1 C and D) was commonly observed as students communicating amongst themselves in response to instructor questions or regarding the clicker questions in Observation 4 (Figure 3.1 D). This observed increase in peer communication is also reflected as an increase in the student talking category. Both Bobby's and Joe's students responded with increased talking when their instructors utilized more guiding teaching styles.

Overall, the COPUS data revealed that instructors began transforming a portion of their teaching during their participation in the MLC. Joe's second observation revealed an increased posing questions to students, and Bobby included a clicker response activity at the end of the semester. The COPUS data showed slight shifts in teaching practices when Bobby and Joe implemented these formative in-class assessments. However, no consistent trends emerged in implementation, indicating that the instruction had only begun to transform their classroom

Discussion and Conclusion

This study was guided by the research question, "What impact does the MLC have on the teaching practices of science adjunct faculty members who are learning about instructional strategies?" Through semistructured interviews and COPUS data, we sought to gain a deeper

understanding of how adjunct faculty learn and transformation their teaching views and practices while participating in the MLC.

In our study, three important ideas emerged when we merged the findings through the theoretical framework. First, adjunct faculty participants only began to implement behavioral actions leading to a transformation of their teaching practice during the MLC. This finding is consistent with previous findings suggesting the transfer of learning into action takes time to observe (Gess-Newsome et al., 2003). Although participants in this study showed some progress in transformation, the transformations were inconsistent. Mezirow (1997) showed that transformation is unique to the individual. Not all faculty will transform in the same way or at the same speed. While transformation began to occur, it was observed differently in both adjunct faculty participants. Some practices were initiated toward the end of the MLC program, indicating the participants attempted the new teaching strategy. No other practices discussed during the MLC were used by either participant. Not all participants will utilize the same strategy or implement them in the same time frame, if at all. Both of these examples reveal that transformation is a slow process and is unique to the individual.

Second, data revealed that the adjunct faculty began to reframe their views of teaching regarding the use of active learning strategies. Participants each began the MLC wanting to learn and improve their teaching, as noted in both interviews and in the act of volunteering to participate. In the convictional dimension of the TLT, learners begin to grapple with their previous beliefs as they learn new ideas. The interview findings reveal that improving teaching was a clear motivator for adjunct faculty participation, which suggests that they had a desire to try something new or had a readiness for learning a new idea. For example, Bobby attempted to

implement one of the new strategies toward the end of the MLC, as he became more confident that it could help improve his teaching and, therefore, the learning of the students.

Finally, the MLC provided a community for adjunct faculty to collaborate. Participants in the MLC had an opportunity to have a rich engagement among a diverse group of learners with various teaching experiences (Meizrow, 1995), which has been known to support transformative learning. The MLC design was able to bring tenured, tenure-track, and adjunct faculty together through using a variety of PDP elements, specifically mentoring and a learning community. Adjunct faculty found the collaboration with other faculty beneficial to their learning of new instructional strategies as expressed in the interviews. The design of the MLC also provided an environment for the participants to be connected to a mentor. By creating a learning environment in which adjunct faculty can learn and share information around teaching, the MLC afforded these adjunct faculty an opportunity to learn and grow professionally. Other studies have also suggested that participating in a like-minded learning group encourages faculty try new things (Furco & Moely, 2012). In the MLC, both participants expressed a reframing of their views on teaching and an increase in their confidence to teach in a new way as a direct result of the MLC program. This reframing was noted in the interview data by both Bobby and Joe and in the COPUS data, as Bobby attempted a new strategy in the fourth COPUS observation.

This study provides insights for university administrators as they consider ways to engage adjunct faculty in PDPs. In the sciences, these findings help to shed light on ways adjunct faculty can learn about science teaching practices from the recent calls for reformed instruction (AAAS, 2011). The most recent report from the *Vision and Change* group acknowledges adjunct faculty as a stakeholder in biology education reform (AAAS, 2018). As such, this study provides insight as to how adjunct faculty can improve and transform while participating in PDP, which can be

beneficial information for those advocating for adjunct faculty support programs in higher education.

This study builds on what is known about adjunct faculty transformation of teaching practices. Previous reports suggest that faculty members who participated in a learning community were able to adopt new teaching strategies and transform their teaching (Elliott et al., 2016); however, this study reports specifically on science adjunct faculty learning. The study used qualitative and quantitative measures that provided a deeper insight into their views and actions. Because transformation is a slow process, understanding the reflection and thought process is valuable when actions are not readily seen. Measuring qualitative gains such as views of thinking provides a potential new way to monitor the progress of transformation. Many studies measure transformation using quantitative measurements such as classroom observations (Elliot et al., 2016; Furco & Moley, 2012; Smith et al., 2014). Utilizing qualitative feedback from participants of a PDP program may provide greater insight as to the design, duration, and benefits gained from participation that may not be reflected in quantitative measures such as classroom observations.

Utilizing the TLT, we created a table using indicators from this study to evaluate where faculty were in the transformation process as expressed by their views and actions (Figure 3.2). This approach could potentially be used as a guide to evaluate the transformation process that can be pointed to during the PDP to help researchers and faculty evaluate their progress toward transformation. It could also inform administrators in higher education of the potential impact of a PDP in spite of the results reflecting that participants have all not reached behavioral transformation. As adjunct faculty are usually a temporary part of a university, this could be a valuable way to see the influence a PDP has on adjunct faculty in a short amount of time. Since

the transformation process is slow, learning where faculty are is one way to measure the outcome of a PDP, as opposed to measuring only the ending behavioral transformation.

Limitations and Future Work:

As with any research study, our study was not without limitations. Our institution had only two participating adjunct faculty, which is a small sample size. However, this small sample can provide insights into the impacts of the MLC program. As an exploratory study, the data suggest that the MLC design indeed had an impact on the views of the participating adjunct faculty, which may lead to changes in their practices. Although, our study was isolated to one science discipline, the data from this study provided some insights into the instructional learning of adjuncts.

Future work could incorporate a specific core science competency proposed by *Vision and Change* (AAAS, 2011), such as evolution, and use the concept to introduce various student-centered teaching practices to convey this concept. This approach would help better inform PDPs for science adjunct faculty or tenured faculty in reaching the goals outlined by *Vision and Change*. Additionally, it could provide greater insights into the transformation process when applied to a specific science concept.

Another expansion on this study would be to examine how the transformation continues post MLC. These studies would further inform decisions regarding the impact PDP has for science adjunct faculty teaching practices and provide insights to higher education administration on the importance of ensuring all faculty have access to PDP regarding teaching practices. As an exploratory study, this evidence provides a basis that can be added to as universities continue to understand how to better support adjunct faculty through PDPs.

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Table 3.1 Mentoring Learning Community (MLC) organizational design: order of meeting times/ topics, activities and data collection.

Timeline		
May-June	Solicit Participants	Plan MLC Program materials
July		PRE INTERVIEW
August	1st MLC meeting	MLC Team Building/outline- Mentoring and instructions for program
		COPUS OBSERVATION
September	2nd MLC meeting	MLC Teaching Strategy – Formative Assessment Diagrams (Gallery walk), Concept Mapping
		COPUS OBSERVATION
October	3rd MLC meeting	MLC Teaching Strategy – Technology to engage students and provide formative feedback Clickers, Top Hat, Kahoot !
		COPUS OBSERVATION
November	Final MLC meeting	MLC Wrap up session- What has worked for you? Demonstrations from participants and other faculty
		COPUS OBSERVATION
December		POSTI NTERVIEW

Table 3.2. Themes of the interview questions asked in both pre and post semi-structured interviews of adjunct faculty participating in the MLC program.

Interview Question Themes	
Pre	• Reason for Participating in the MLC • Teaching Background and Experience • Familiarity with teaching reforms • Learning Goals for MLC
Post	• Reason for Participating in the MLC • Goals achieved in MLC • Shifts in teaching practices or views • Impact of the MLC

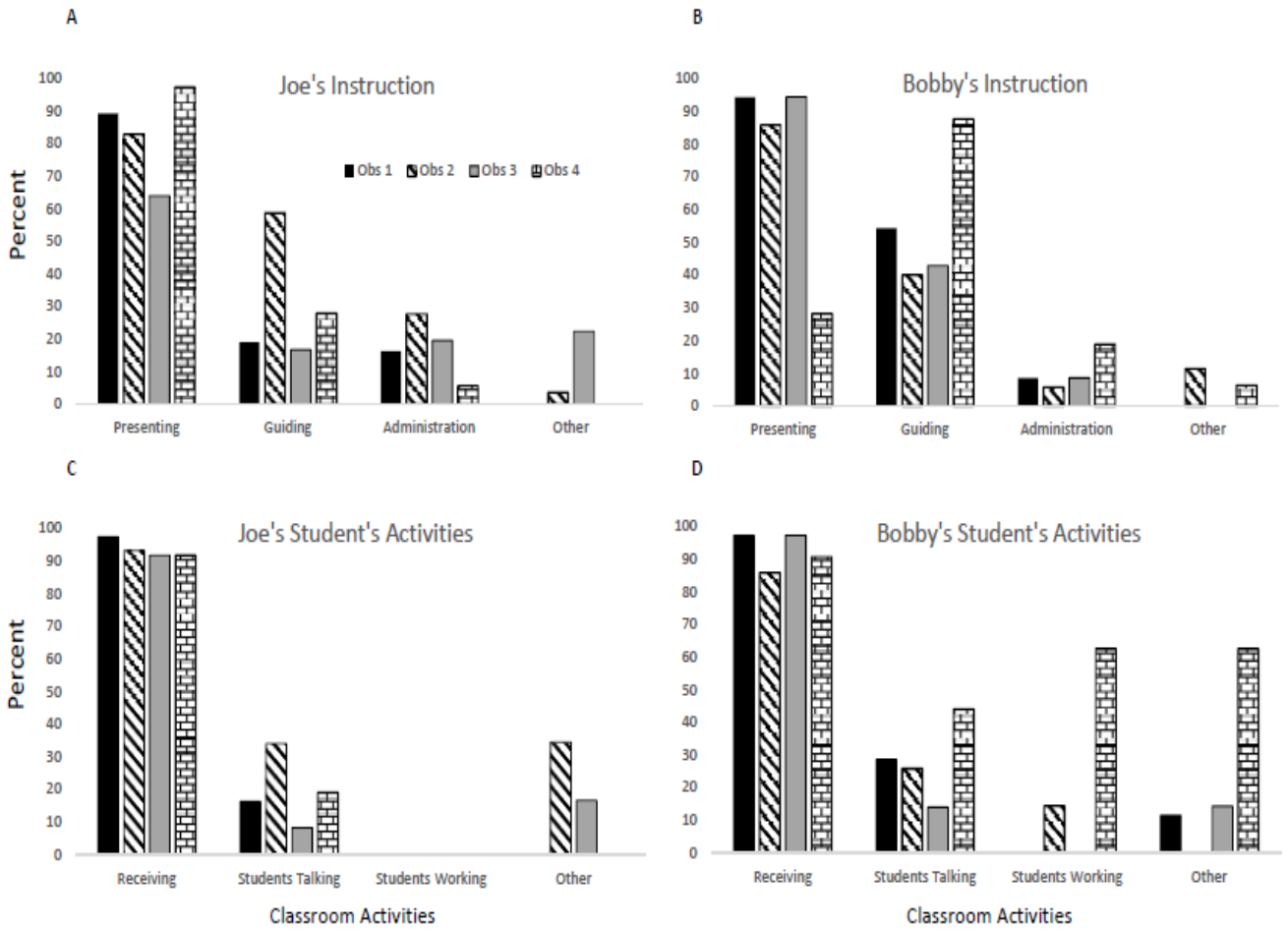

Figure 3.1. Percent of a class period that instructors (A & B) and their students (C & D) performed given activities. We used COPUS (Smith et al. 2013, 2014) to systematically record activities during two-minute time intervals throughout a class period and made four observations (Obs 1-4) that spanned the fall 2018 semester at a Southeastern U.S. university whose focus is on teaching undergraduates.

Meizrow's Dimensions	Views of thinking	Modes of action	MLC Participants Progress	Observed by
Psychological	-want to learn -want to improve -gaining ideas	-Attends PDP -Reads literature related to education	✓ Bobby ✓ Joe	Pre Interview for both participants
Convictional	-changed thoughts on using them in class -gained faster knowledge -recognizing change can happen	-Reflects on teaching practices -Observes other instructors -has mentor observe and provide feedback	✓ Bobby ✓ Joe	Post Interview for both participants
Behavioral	-planning for a new strategy -implementation of a new skill -increased ability to teach	-Shifts from presenting to guiding students in their learning	✓ Bobby ✖ Joe	COPUS Obs 4. And post interview

Figure 3.2 Transformation during the MLC process. This figure represents our instructors as they move through this process during their participation in the MLC. Bobby and Joe both started with a desire to learn and ended further on the continuum at varying stages of implementation. Bobby showed a more developed transformation as his implementation was more planned and reflected on during his interview. This could be due to him being more ready for transformation at the start of the MLC than Joe.

CHAPTER 4

SUMMARY

Professional development programs (PDPs) have become a common avenue for disseminating important instructional knowledge to educators (Luft & Hewson, 2014; Pfund et al., 2009). Recently, the use of PDPs has expanded, as a shift in instructional approaches is being emphasized in undergraduate science courses (Kober, 2015). All faculty members in higher education need to have access to PDPs aimed at learning new instructional knowledge. Unfortunately, most institutions across the United States are not providing this kind of professional development for faculty members, especially not to adjunct faculty.

An adjunct faculty population is comprised of faculty members holding part-time or full-time limited teaching contracts with one or more universities, with no promise of long-term employment (Leslie & Gappa, 2002). Currently, this population makes up approximately 70% of all faculty positions in higher education (Flaherty, 2018; Lin, 2016). Adjunct faculty members often teach a majority of the introductory level courses and often are some of the first instructors college students may encounter (Leslie & Gappa, 2002). As the use of adjunct faculty continues to increase, higher education institutions need to consider how best to support this population of faculty and provide them with access to the latest teaching strategies through the use of PDPs.

This dissertation examined ways to provide support to science adjunct faculty through PDPs. The two papers presented in this dissertation contribute to the overall question of this dissertation: What is a potential PDP for science adjunct faculty that can impact their instruction? The goal of this study was two-fold. First, I reviewed the literature regarding adjunct faculty and

their professional development experiences to determine key features of PDPs that have been shown to be effective for adjunct faculty. The features that emerged included duration, mentoring, feedback, and a learning community. Scheduling of PDPs is important to consider, as adjuncts may have limited-term appointments and may be on campus only part time (Diegel, 2013; Lyons 2007; Miles 2017). Faculty mentors can provide much-needed feedback to adjunct faculty members who are mostly working in professional isolation (Meixner, Krunck, & Madden, 2010). These features had an impact on the instruction of the adjunct faculty in the studies reviewed. In addition, Elliott et al. (2016) reported that a learning community PDP had an impact on student outcomes when instructors used active learning in the classroom. Considering each of these features in the design of PDPs for adjunct faculty could be beneficial in not only providing access to teaching instruction, but also helping them feel more connected to the university (Diegel, 2013; Lyons 2007).

Second, I wanted to implement and examine a potential PDP that utilized a combination of features allowing adjunct faculty to have access to vital knowledge that could impact their teaching practices. This study sought to answer the question, "What impact does the MLC have on the teaching practices of science adjunct faculty who are learning about instructional strategies?" The design of the PDP included a mentoring component and a learning community where adjunct faculty could come together with other biology instructors to discuss and learn various ways to provide formative assessment in the classroom. This type of assessment was highlighted in *Vision and Change in Undergraduate Biology Education* (American Association for the Advancement of Science [AAAS], 2011) as a way to follow the progress of student learning and allow the instructor to adapt the classroom instruction to the needs of the students. Overall, this study provided insights into the learning transformation of two adjunct faculty

members participating in a PDP. This chapter closes this dissertation by synthesizing the important contributions these two articles make to this field.

Major Contributions

This dissertation provides insight into supporting adjunct faculty populations and for improving teaching practices in science. The study examined the impact of the MLC on adjunct faculty teaching practices. Additionally, it provides a few insights about how future adjunct faculty PDPs such as the MLC might transform science teaching practice.

By analyzing programs that have already been in practice, the review described here suggested key features of PDPs that could better support science adjunct faculty. Previous work in this field provided many suggestions on how to incorporate the ever-growing adjunct faculty population into already defined PDPs (Furco & Moely, 2012; Webb, Wong, & Hubball, 2013). This review was focused on making PDPs beneficial to adjunct faculty in higher education and offered some insights into science adjuncts as well. The literature review was analyzed using two themes: (a) how to best support adjunct faculty and (b) how to integrate adjunct faculty into the community. In each of these themes, features such as observational feedback (Ebert-May et al., 2011), a learning community (Banasik & Dean, 2016), and providing a mentor (Meixner, Krunck, & Madden, 2010) were suggested as important for adjunct faculty PDP design.

The second major contribution is the evaluation of a specifically designed PDP—the MLC. This study looked at the transformation in adjunct teaching practices as a result of a program featuring a learning community with which to share ideas and a mentor who would provide peer observational feedback and support while participating in the program.

The results from this study indicated the MLC began to transform both teaching practices and teaching views of the adjunct faculty participants, as indicated in the interviews and the

Classroom Observation for Undergraduate STEM instrument (COPUS; Smith, Jones, Gilbert, & Wieman, 2013). The COPUS data revealed that one of the adjunct faculty participants, Bobby, began to transform one of his classroom practices by incorporating clicker questions, a formative assessment tool, which was discussed in the MLC meetings. This implementation began to shift the focus of the classroom from a lecture-centered class to a more student-centered class. This finding supports similar findings of adjunct faculty changing teaching practices after participating in a PDP (Owens et al., 2018). However, the MLC was only a semester-long program, whereas other programs have been significantly longer. As adjunct faculty members have limited contracts, this program may offer the benefit of a quick dissemination method for adjunct faculty to learn about teaching practices.

In the interviews from this study, both participants indicated that the MLC contributed to their understanding of current teaching reforms and empowered them to implement them in their classroom in the future. This empowerment is an outcome of Transformative Learning Theory (TLT) and suggests that the participants felt confident in their learning to enact this new knowledge. Transformation happens only through a process of reframing one's ideas or beliefs. As these adjuncts began to transform their thinking about teaching in a student-centered way and began to feel more confident in their ability to use this new knowledge, they could then begin to put those practices to use in the classroom.

Additionally, this dissertation builds on what is known regarding the transformation process in adult learners. Participants may enter into the transformation process at different stages of learning. Mezirow's (1990) TLT provides an insight into the progress of learning by three dimensions: psychological, convictional, and behavioral. Where participants enter a PDP on this progression could be an indicator of how quickly they adapt or transform their teaching

practices. Participants could utilize the TLT framework as a way to evaluate their progress in transforming or adopting a new teaching strategy.

This study is the first to report on the impact of creating a PDP that consists of multiple recommended features in a single program. Previous studies indicated that mentoring relationships and learning communities could be beneficial in helping adjunct faculty transform their teaching practices (Elliott et al., 2016; Hoyt et al., 2008; Webb et al., 2013). This dissertation provides insight into using these two approaches in one MLC program. Participants in the MLC mentioned that both aspects, their mentor and the learning community component, were beneficial to their learning process. Additionally, this assertion was reflected in both the interviews and COPUS data.

While previous studies have reported that transformation in teaching practices can take time (Bush, Rudd, Stevens, Tanner, & Williams, 2016; Owens et al., 2018), this study revealed that small transformations can begin to happen, even in a short time frame, when adjunct faculty are in a supportive environment such as an MLC. This finding supports previous literature, which has suggested that learning communities would be beneficial in transforming adjunct faculty teaching practices (Banasik & Dean, 2016). Additionally, a core tenant of TLT is that learning involves both an individual effort and social interaction (Mezirow 1997). Individually, the MLC provided a mentor who could encourage and provide peer feedback for the adjunct faculty members. The MLC also provided a learning community for a social interaction of learning that allowed adjunct faculty participants to discuss and learn about various teaching practices. The findings from this study support that these two features, mentoring and learning communities, contributed to the learning and transforming of the adjunct faculty regarding teaching practices.

Finally, some important points should be considered from this study. First, adjunct faculty in higher education and in STEM subjects make up a significant portion of the faculty population (Lin 2016). To support a large portion of the faculty in higher education, it is important to consider the PDPs available. In the sciences, *Vision and Change* (AAAS, 2011) emphasized that, for biology education to be reformed in the classroom, all faculty must have access to teaching support. This study offers key features for PDPs that can provide access to instructional learning for adjunct faculty. By creating a community of scholars (i.e., learning community for science faculty that includes adjunct faculty), departments can work toward achieving the goals of *Vision and Change* in the classroom and ensure that all faculty members have access to the knowledge needed to adopt this way of instruction.

Second, many surveys of adjunct faculty consistently show that they desire feedback and community (Diegel, 2013; Hoyt et al.; 2008, Miles, 2017). This study offers a program that can begin to meet both of those desires in a one-semester program. Additionally, the transformation of teaching practices happened within the time frame of the MLC. Duration was one of the key features mentioned in literature as important to the design of PDP when instructional change was the intended outcome. Our program was a semester in length, the minimum suggested duration in previous studies (Emerson & Mosteller 2000; Henderson, Beach, & Finkelstein, 2011). As adjunct faculty members are short-term contract holders in universities, this design could be one that not only meets their time constraints, but also provides access to instructional feedback and engagement in a community. Additionally, it builds upon previous work by Thiroff (2017) and Wallin (2010), suggesting that when adjunct faculty feel connected to the university, they are more likely to stay committed to the institution. As higher education continues to change, the

PDPs must also adapt to meet the changing needs of all faculty, and this program provided a different insight into meeting those various needs of adjunct faculty.

Overall, this dissertation contributes to the growing body of literature surrounding adjunct faculty PDPs and the impact on adjunct faculty teaching practices. With estimates suggesting that universities will continue to rely on adjunct faculty to teach introductory science courses, administrators must attend to their needs and limitations by providing adequate support (Association for the Study of Higher Education, 2010). These chapters provide a new perspective on PDPs for adjunct faculty and provide data on the implementation of the MLC program. By providing timely support that meets the needs and limitations faced by adjunct faculty, this study was able to show that participants could transform their teaching views and begin to implement new teaching practices in the classroom. The program has potential to transform adjunct faculty's experiences with PDPs in the future.

Implications of this Dissertation

This study contributes to the understanding of how better to support adjunct faculty members through PDPs. As such, it has several implications for various stakeholders in higher education. First, administrators in higher education should reconsider the nature of professional learning opportunities for adjunct faculty in their institutions. As this population of faculty continues to grow in higher education, it will be important to consider ways to provide them with access to current teaching practice information through PDPs. As adjunct faculty play a key role in teaching introductory level science courses, science department administrators should evaluate the PDP opportunities these adjunct faculty have access to and find ways to include them in more discussions regarding scientific teaching. Additionally, this study adds to the knowledge of

adjunct faculty learning and provides insights to some key features for designing PDPs for adjunct faculty, as well as other faculty members.

For full-time faculty at universities, this study offers guidance for interacting with adjunct faculty in the form of mentorship. Full-time faculty members can provide a helpful service both to adjunct faculty and universities by mentoring adjuncts and providing feedback to them regarding instructional practices. This interaction benefits the adjunct faculty member who receives the feedback and makes connections within the department, but also benefits the full-time faculty members, as they help to bridge connections and engage in teaching conversations with other faculty colleagues in the department.

Finally, this study provides insight into the opportunity to learn and transform teaching practices for adjunct faculty. As adjunct faculty have limited scheduling, this study provides support that even in a short semester-long program, adjunct faculty can learn and begin to transform their way of thinking about teaching practices. Adjunct faculty should take advantage of opportunities provided to learn and improve their teaching practices. Additionally, it provides an opportunity to connect to both the department and the university setting through a learning community and a mentor. Adjunct faculty may obtain valuable feedback on instruction and learn information on current teaching practices that can ultimately help in the transformation process.

Questions for Future Work

This study contributes to the understanding of the needs for adjunct faculty and ways to better support them with instructional learning opportunities such as the MLC. This study defined some key features for adjunct faculty PDPs and ways utilizing those features in the MLC might impact adjunct faculty teaching. While this study provided a stepping stone into the professional learning of adjunct faculty, room remains for future studies to build on this work.

Teaching practices aimed at core science concepts can be better developed during PDPs to align with *Vision and Change* (AAAS, 2011), building on and refining the MLC design to incorporate a variety of scientific teaching practices. The core concepts in *Vision and Change* could provide topics for adjunct faculty PDPs to focus on and grow teaching practices to support each core area. For example, a PDP could focus on the core concept of evolution and provide a variety of teaching strategies aimed at incorporating it into the curriculum. Mentors could observe and provide feedback around this specific topic, and the learning community component could offer demonstrations and resources for introducing it in a variety of ways in the classroom. This approach would better inform departmental administrators in science fields on promoting and adopting a commitment to change in teaching practices.

As adjunct faculty in science are being heavily relied on to teach introductory courses, it would also be important to evaluate how a learning community for adjunct faculty teaching these types of courses would impact their practice. Adjuncts have expressed in previous research surveys a desire to be more connected in the department or university (Diegel, 2013; Hoyt et al., 2008; Miles, 2017). A learning community would help to meet that perceived need and provide opportunities to learn about best practices for scientific teaching directly related to the courses they teach. This step would expand upon this study but also provide a deeper look into the actual teaching practices and learning transformation of science adjunct faculty.

In our future work we will look at long-term impacts of the MLC on adjunct faculty. By following the participants from this first MLC cohort, we can collect data on how transformation takes place over time. We will continue to utilize the COPUS to follow their teaching practices, as well as perform follow up interviews one-year post MLC. By continuing to expand on this study, we hope to further our understanding of the potential impacts of the MLC for adjunct

faculty and how long it might take to see behavioral transformations as suggested by Mezirow (1990).

Revisions to the current study

Although this study provides several insights into PDPs for adjunct faculty, it has significant limitations. Part of any research process is reflecting on the study and recognizing limitations that impacted the work. These limitations are constraining in this study; however, they present an opportunity to learn for future studies.

The study was based on a too narrowly limited literature search. Expanding the range of literature reviewed could have steered this study toward a different direction. A review of literature is important to give the researcher a deep understanding of what has been done, what information is lacking, and what future work could be done. While my specific interests were focused on adjunct faculty PDPs, more attention should have been focused on studies involving PDPs for the improvement of scientific teaching practices at the undergraduate level. Although I did use search terms specifically targeting my population and interest, I could have also included more terms such as “science faculty” or “science teaching” that would have provided deeper insight into how science practices are developed, which might have ultimately aided in the MLC design. I also could have looked at the impact on teaching practices as part of my rubric for studies that I reviewed. Additionally, my literature review was narrow and limited. To thoroughly consider PDPs in higher education, I could have reviewed studies on tenure verses nontenured faculty, which would have provided insight into what works for the different faculty groups or their specific PDP needs based on their career path.

As most of my study was focused on the MLC program, an in-depth review of mentoring and learning communities in higher education would have better informed the trajectory of this

study. Both are well-known features, so the review would have helped inform the implementation of each feature into the design of the MLC. Mentoring involves several key features that have been previously described (Diegel, 2013; Loucks-Horsley et al., 2003; Nam, Seung, & Go, 2011; Webb et al., 2013), and these features could have been better implemented into the design of the mentoring aspect of the MLC. A deeper understanding may have resulted of the role a mentor can play for adjunct faculty. Additionally, the learning community component could have been planned to allow for more data to be collected that would inform how the collaboration aspect of the MLC allowed adjunct faculty to transform their thinking about teaching practices. Both played key roles in the design of the MLC, and a deeper understanding of their implementation could expand what was learned from this study.

While I considered the design elements of PDP, I could also have looked into the impact and feasibility of some of these elements being placed together. Much is known regarding PDPs (see Loucks-Horsley et al. 2010), and greater attention to previous studies using mentoring or learning communities would provide me deeper insight into using them for adjunct faculty. Perhaps reviewing K-12 literature in these areas would have also provided another insight into the impact potential in short time frames.

If I were to do this study again, I would change several things that may have impacted on the findings. In the MLC study, a few elements could be improved to provide a richer understanding of adjunct faculty experiences in PDP and their teaching practices. First, I would incorporate more focus on science teaching in the MLC program, selecting only one topic that is a foundational concept listed in *Vision and Change* (AAAS, 2011). The MLC monthly meetings could introduce various teaching strategies, with the focus being strategies for teaching this core concept. One example could be to use the core competency of pathways and transformations of

energy and matter. Creating various teaching plans that integrate active learning strategies aimed at helping students better understand this core competency would not only provide more insight to the science teaching practices and transformations of adjunct faculty but provide a basis for helping departments move toward the goals of *Vision and Change*. Although my MLC study was designed to provide information and demonstrations using active teaching strategies in the science classroom, I did not make the science a focus of the PDP.

In addition, I would change some of the interview questions for the participants. One piece of information that was missing from my findings was how they reflected on their teaching. As reflective practice is part of the convictional dimension of TLT, it would have been helpful to ask some questions to gain an understanding of this thought process before and after the participation in the MLC. Some sample questions might have been:

- How do you typically plan for a class when introducing a new content area?
- Tell me about your routine before and after class as you prepare and reflect on your teaching.
- Describe your typical classroom experience. What could I expect to see if I walked into your classroom?

The responses to these questions would provide more insight into their teaching practices, before and after participation in the MLC, and allow for them to express how they viewed themselves as instructors. Additionally, it would aid in triangulating the COPUS observations, to see if what they say or think they are doing matched what was observed.

Finally, in analyzing the results of this study, it was difficult to keep my beliefs and biases from clouding my analysis of the data. Although I attempted to remove myself from the situation and recognize the results, this was a difficult task. I did write a subjectivity statement and tried to revisit it throughout the data collection process. However, the analysis is where I began to cloud the data with my own beliefs. Maxwell (2013) discussed using identity memos to

keep track of the way your personal beliefs and conflicts creep into data or analysis. I did write a few of these, but ultimately was not disciplined in this area, which created issues in the analysis. Identity memos and subjectivity statements are key elements to social science research, especially when the researcher is close to the subjects. In future studies I must attend to this issue in greater detail throughout the study by being more diligent in utilizing these tools to keep my bias at bay.

Overall, this study serves as a foundation to build on for future research regarding improving the teaching practices of science adjunct faculty. While there were limitations to this study, it provided insight into the transformation process some adjunct faculty move through while they learn about new teaching strategies. It also provided some insights into ways to better support adjunct faculty in higher education. The trajectory of hiring adjunct faculty is on the rise, so finding improved ways to support this population is of utmost importance in higher education. This study sought to provide contributions to the process of starting that conversation and created a stepping stone for future studies to expand.

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APPENDIX A

UNIVERSITY OF GEORGIA
CONSENT FORM
Science Adjunct faculty teaching experiences at a regional university

Researcher's Statement
I am/We are asking you to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether to be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: Julie Luft
Professor, Department of Science Education, University of Georgia
jaluft@uga.edu
Student Researcher: Linda Purvis, PhD student Department of Science Education University of Georgia

Purpose of the Study
The purpose of this study is to evaluate adjunct experiences with professional development and feelings of inclusion on campus.

Study Procedures
If you agree to participate, you will be asked to …
- *Take part in a one or more 60 minute semi-structure audio recorded interview*
    - *Example questions: Describe your first day of teaching at this institution.*
    - *Give an example of what resources you have found beneficial during your time here.*
- *Initial interviews will be conducted after April 10th, 2018 but the project is not expected to be completed until June 2019.*

Risks and discomforts
I/We do not anticipate any risks from participating in this research.

Benefits
- *There are no direct benefits to the participant, however some participants may enjoy sharing their experiences or sharing their frustrations.*
- *I/We anticipate that this study will provide more information and insight on support systems that can help adjunct and part/time faculty at universities.*

Incentives for participation
There are none for this project.

Audio/Video Recording
Interviews will be audio recorded and the interview will be transcribed. These will be protected and kept confidential. Names and places will be changed for your protection. Once this study is completed, and in no more than 3 years, all recordings and transcripts will be destroyed.
Privacy/Confidentiality
Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written consent unless required by law.

Taking part is voluntary
Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time.
If you have questions
The main researcher conducting this study is *Linda Purvis* a *graduate student in the Science Education department* at the University of Georgia. Please ask any questions you have now. If you have questions later, you may contact *Linda Purvis* at *Lpurvis@uga.edu*. If you have any questions or concerns regarding your rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:
To voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

Results of this study will be shared with you upon completion.

APPENDIX B

Pre MLC Interview

Research Question	Interview Question(s)	Rationale
What impact does the mentoring-learning community (MLC) have on the teaching practices of science adjunct faculty?	1. What is your name and class you teach at this institution? 2. Tell me about how you came into your current position with the university? 3. How many different classes have you taught here? 4. Tell me about your experiences with professional development programs here. 5. What things do you hope to gain by participating in the MLC program? 6. Are there specific topics you would find especially valuable? 7. Are you aware of any recent teaching reforms? 8. Looking back over all your experiences as an adjunct, are there things that might have helped you as a faculty member here? 9. What was it about the MLC offering that caused you to sign up to participate? 10. We've covered a lot of ground in this interview, I wonder if there are any other things we haven't touched on that you would like to share?	An introductory question to get to know the interviewee to allow them to gain rapport and trust with me as interviewee (Roulston, 2010, p.60). Seeking to understand their challenges and how they overcome them—did they draw upon any professional development, mentor or other aids to help guide them, or did they feel on their own and isolated? -Reflection can cause them to reveal some struggles they didn't remember at first and allow the interviewee to open up a bit more. - - - Hoping they will reveal some hindrances or avoidances of PD.

Post MLC Interview

Research Question	Interview Question(s)	Rationale
What impact does the mentoring-learning community (MLC) have on the teaching practices of science adjunct faculty?	1) What inspired you to participate in the MLC program this semester? 2) Describe the biggest benefits you gained from participating in this program? 3) What was the most surprising thing you learned from the program? 4) How do you feel this program impacted your classroom/teaching practices? a. Can you give me an example of something you implemented this semester in your classroom? b. If you haven't implemented yet, what do you hope you will take from this program and implement in the future?	- Reflecting back on why they wanted to participate allows them to recall their early goals and sets the tone for the interview. - These questions aim to find out their view of teaching and see if it aligns with what was observed using COPUS over the semester.

	5) Now that you have participated in the MLC, how would you describe your role at this institution? a. How/Has this view changed at all since the last time we talked? 6) Tell me a little bit about the mentor relationship in this program? a. How often did you meet? b. In what ways was that relationship useful (or not?) 7) Do you feel any different about your role in this department? a. than your mentors? 8) What would you change about this program? 9) We've covered a lot of ground in this interview, I wonder if there are any other things, we haven't touched on that you would like to share?	- These questions seek to uncover how the adjunct faculty member navigates their role after being connected for a full semester to a mentor and to others in the department. - Do their views change? - How do they feel about their role compared to their mentors? - Allows interviewee to share anything they feel lead to share that hasn't been addressed.

APPENDIX C

Subjectivity Statement

Reflecting on one's subjectivities is crucial to understand how they can creep into a research design or data collection. Peskin described this process very well as identifying the "I's" in your research (Peshkin, 1988). This is not always possible during the design but should be monitored and made known during the data collection and analysis. Briefly, I'll outline a few of my precursors for this work and how I am connected to not only the study but also the participants.

As a full-time faculty member of a small regional university, I work with a variety of faculty daily, including adjunct faculty members. I, myself, began as an adjunct faculty member, which might lend itself to some prejudicial issues on this research topic. My experience as an adjunct, in regard to professional development was lacking, however it was not my current institution. I am afraid I feel almost *inclined* to want to improve the professional development for our adjunct faculty. Since becoming a full-time faculty member, I have had the privilege to attend several workshops that have begun to improve my own teaching practices. This could potentially lead me to the "I as a previous adjunct" subjectivity. I also have a close working relationship with several of our science adjunct faculty members and this lends me to the "I as a co-worker" subjectivity. On one hand it is nice to have a rapport with the participants in your study, which gains you confidence and the ability to get in their circle for observations and/or interviews; however, it can lend itself

to subjectivity of being afraid to report things as they really are with your fellow co-workers. *Will I be okay if my co-workers do not want to participate in my study? Will I accept the outcome even if it is worse than I anticipate?*

Seeing as I also teach non-science majors as well as majors, I can relate to both curriculums in regard to student learning and involvement. I do not claim to have a perfect understanding of active teaching, and I am still learning, but I can say I have seen how my students change within my own classroom. This is especially true for my non-majors, whom in the past have been very passive in the classroom. This could potentially lead me to the "I as a user of active learning strategies" which could lead me to want all instructors to have the same desire to use these as I do. However, that is not always going to be the case. *Will I be okay with finding out that some adjunct faculty just want to 'show up and lecture' as opposed to actively engage students and improve them as educated science consumers for the long run?*

Reflecting on these thoughts and ideas during my data collection will be valuable to me and help me be more aware of my inclinations to interject my subjectivity onto the participants. It has been suggested that keeping a research journal to allow for reflexivity to help with this process, something I think will be valuable to me (Watt, 2007). Taking the time reflect and consider what I am thinking, as well as what I am becoming subject to will help keep me aware of my own subjectivities during the study. Because of my own connections to the study, and participants, I will need to try to keep a close reign on interjecting my thoughts and perceptions into the data collection. Maxwell (2013) reiterates that two of the biggest threats researches struggle with are bias and reactivity. He goes on to say that while it is nearly impossible to eliminate these, it is

important to explain your possible biases and how you plan to handle them research in your proposal (Maxwell, 2013)