

Using Action Research as a Signature Pedagogy to Develop EdD Students' Inquiry as Practice Abilities

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ABSTRACT

In this essay, I describe the role of action research (AR) in developing inquiry as practice among students in a CPED-guided EdD program. The essay is focused on issues such as (a) the need for developing inquiry as practice skills; (b) a rationale for using AR to develop inquiry skills; and (c) developing inquiry as practice through cycles of AR. I provide a rich, detailed description about how our faculty members have used it to develop students' inquiry skills. The essay concludes with an examination of the challenges of using AR and a summary of its merits to prepare students' inquiry as practice orientations and skills.

Keywords: inquiry as practice; signature pedagogy; action research; EdD programs

INTRODUCTION

No action without research; no research without action

—Kurt Lewin

The epigraph attributed to Lewin aptly portrays the inquiry orientation employed by the EdD in Leadership and Innovation program of the Mary Lou Fulton Teachers College at Arizona State University. Consistent with Lewin's ideas, research conducted by the students in our practitioner-oriented EdD program has been action research (AR)—research with roots in and conducted in a workplace setting by educators who know the context, the problem of practice (PoP), and the change they want to effect. From the beginning of our program, faculty members easily and enthusiastically agreed AR had great potential to develop educational leaders/practitioners who could conduct sound inquiry as part of their practice. On the other hand, we have found fostering inquiry as practice skills has required much more effort. This challenge led faculty members to devise a progressive, developmental process, designed to build inquiry skills systematically through action research as students advance through their doctoral preparation.

Evidence from program research suggests our action research orientation has been effective in developing inquiry as practice skills among program participants. For example, in studies about students' research skills, participants in our EdD program freely admitted they knew very little or nothing about research and did not employ systematic inquiry skills as part of their practices when they entered our program (Buss, 2017a; 2017b; Buss & Avery, in press; Buss, Zambo, Zambo, & Williams, 2014; Zambo, Buss, & Zambo, 2015). By comparison, those who have completed one year of the program maintained they were developing emerging inquiry and

research skills (Buss, 2017a; Buss & Avery, in press). Importantly, graduates of the program readily claimed they had developed powerful, worthwhile research and inquiry as practice abilities, which they applied to their workplace settings (Buss, 2017b; Buss et al., 2014; Zambo et al., 2015). These positive findings have encouraged me to write this essay in which I describe how this substantial growth of inquiry as practice abilities among students may be accounted for. In the next section, I have situated this idea within the context of EdD programs. I then go on to explain the lessons we have learned about how AR fostered the development of inquiry as practice among EdD program participants.

Objective and Questions Guiding the Essay

In this essay, I focus on two compelling questions:

- (a) How has a 'signature pedagogy' approach like AR offered practitioners an effective tool to develop practice-appropriate inquiry skills for use in their workplace settings?
- (b) How have we more deliberately connected students' inquiry, both in their courses and dissertations, to their daily practice?

In the remainder of the essay, I present responses to these two questions and organize them around such issues as the need for inquiry skills, a rationale for using AR, and notably an extensive explanation of developing inquiry skills through cycles of AR. Additionally, I conclude the essay with describing the challenges of using AR and provide a summary of the merits of AR for preparing students' inquiry as practice orientations and skills.



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THE CHALLENGE: DEVELOPING INQUIRY AS PRACTICE

Inquiry as practice is the process of posing significant questions that focus on complex problems of practice. By using various research, theories, and professional wisdom, scholarly practitioners design innovative solutions to address the problems of practice. At the center of inquiry as practice is the ability to use data to understand the effects of innovation. As such, inquiry as practice requires the ability to gather, organize, judge, aggregate, and analyze situations, literature, and data with a critical lens. (CPED, 2010)

The previous characterization is CPED's definition of inquiry as practice. It serves as a foundation for developing inquiry as practice abilities, which are considered to be a fundamental component of strong EdD programs. Using CPED's ideas on inquiry as practice led faculty members to anticipate that our program's participants and graduates would draw upon their inquiry as practice skills as they initiated and subsequently continued to conduct inquiry in their settings.

On the Need for Developing Sound Inquiry as Practice

Levine (2005) presented a harsh critique of the preparation of educational leaders in EdD programs. In this critique, Levine focused his severest criticisms on the poor preparation of school leaders with respect to conducting sound research that was relevant to their workplaces. He argued research preparation for these school leaders was "disconnected from practice" (p. 44). Further, Levine claimed this problem arose because students were prepared as traditional researchers, not as educational leaders who were engaged in meaningful research connected to their professional practices, and which would serve them subsequently in their educational practice settings.

Shulman, Golde, Bueschel, and Garabedian (2006) articulated similar criticisms of EdD programs. Like Levine (2005), Shulman et al. expressed great concern about the mismatch between research preparation and career paths. Shulman and his colleagues also argued EdD students were prepared as traditional researchers, rather than attaining inquiry skills better suited to their roles as educational leaders and educational practitioners. For example, Shulman et al. suggested, "education has struggled to strike a balance between the *practice* of education and *research* in education, in crafting doctoral programs" [italics in original] (p. 26). This uncertainty has resulted in the EdD being "widely regarded as a 'PhD lite'" (Shulman et al., 2006, p. 27).

Thoughtful consideration of the criticisms articulated by Levine (2005) and Shulman et al. (2006) suggest several important implications with respect to inquiry in EdD programs. First, inquiry and research skills must be better matched to career demands and requirements. Thus, by using an *inquiry as practice* approach, EdD programs can better meet the needs of students who work in educational practice settings. Both critiques attest to the importance of developing practice-related inquiry skills appropriate to the workplace setting; not technical skills, which could not be used routinely in educational practice settings. Second, to be *practicable*, EdD students' learning about research and the *research skills they develop must be connected to practice* in meaningful ways. By situating inquiry *in practice*, doctoral programs can capitalize on

authentically connecting inquiry with practice and create potent learning circumstances, *laboratories of practice*, that include (a) learning initial inquiry skills by practicing them in relevant, real-world educational settings and (b) subsequently using those skills on an on-going basis in their workplace settings throughout their educational practice careers after their doctoral work.

Importantly, Shulman and his colleagues (2006) went beyond a critique of EdD research preparation by suggesting *hallmarks* that could be used to guide the (re)design of EdD programs to overcome the shortcomings related to inappropriate research preparation for practitioners. These hallmarks included (a) utilizing signature pedagogies, (b) developing practice-related research skills, (c) requiring students to be engaged in prior and on-going practice experiences, and (d) expecting that program participants "would be skilled in carrying out local research and evaluations to guide practice" (p. 29).

In fact, thoughtful consideration of the hallmarks showed they have served as the foundation for some of CPED's framework, principles and design concepts, for EdD programs (CPED 2009, 2010). Specifically as related to the EdD program developed in the Mary Lou Fulton Teachers College at Arizona State University, CPED (2009) principles 4, 5, and 6 were influential in developing students' inquiry and research skills, just as they undoubtedly have been at other CPED-influenced programs. For example, we incorporated principle 4 into our students' inquiry work because it focuses on how programs provide opportunities for students to analyze and develop solutions to their field-based PoP. Similarly, we included principle 5 because programs are to aid students in developing professional knowledge that integrates practical and research knowledge, which allows them to link theory with inquiry. Additionally, we involved principle 6 because students were to generate and use professional knowledge to influence their practice.

With respect to CPED's (2010) design concepts, many of them are related to research and inquiry and are consistent with the design of inquiry-based components of the program. The first, *problem of practice*, suggests a specific issue or concern that is rooted in a practitioners' workplace setting and warrants some type of resolution. The second, *inquiry as practice*, proposes that students should be engaged in working on a problem of practice and determining solutions for it as they gather, organize, analyze, and use data to aid their thinking about the problem, and was defined more fully above. The third, *laboratories of practice*, suggests students should be afforded opportunities for theory, inquiry, and practice to come together in productive ways in workplace settings as they work toward resolution of the PoP. The fourth, *dissertation in practice*, recommends that the culminating experience reflect the scholarly practitioners' comprehensive ability to employ inquiry in a meaningful way to address the PoP. These design concepts were taken into account as we designed research and inquiry skills that were specifically suited to students working in educational practice settings.

Programmatic Definitions

Before proceeding, it will be instructive to consider briefly definitions of some key terms as they are applied in our program. First, AR in our program provides opportunities for students to examine a PoP by taking action in repeated cycles of inquiry (Mertler, 2017; Mills, 2014).

Moreover, AR as carried out by students in our program, tends to be more pragmatic in nature (Buss & Zambo, 2016) because insiders conduct it as they work individually or collaboratively with others (Herr & Anderson, 2015) in settings such as schools, higher education, or other workplace venues. In other professions (e.g., rounds in medicine), signature pedagogy is seen as a set of relevant practices, employed in the preparation of professionals, and later used in their practice (Shulman, 2005). In preparing educational professionals, we use signature pedagogies like AR to develop decision-making, collaboration, and other relevant practice skills.

RESPONDING TO THE CHALLENGE: USING ACTION RESEARCH TO DEVELOP INQUIRY AS PRACTICE

A Rationale for Using AR to Develop Inquiry Skills

AR serves as an inquiry as practice approach that guides our program efforts because of its flexibility and functionality. We highlight AR in our doctoral program because various characteristics make it appropriate for use by doctoral students as they develop an inquiry as practice approach and work to investigate and resolve their PoP (Buss, 2017a). Four characteristics appear to be foundational with respect to developing students' abilities to engage in inquiry as practice. See Buss and Zambo (2016) for a more thorough discussion.

First, AR is adaptable to a variety of contexts and to PoP situated in those contexts. Students in our program explore PoP from contexts as diverse as K-12 classrooms, school sites and district offices, higher education settings, and other organizational venues. Second, AR allows students to ease into research over time. Because students in our program conduct AR in cycles over time, it permits them to initiate and continue their inquiry as practice work in smaller, more manageable efforts. The various AR cycles students conduct throughout the program along with the AR requirements are depicted in Figure 1. See Figure 1. Thus, for example, during Cycle 1, students are extending their efforts from Cycle 0, implementing a small-scale intervention, and developing/revising intervention and data collection procedures.

Third, use of AR facilitates the development of systematic inquiry by offering a structured framework that is employed by program participants. Specifically, AR provides students with an elegant four-step process that is used to conduct systemic inquiry about their PoP in their workplace settings. The AR four-step framework includes (a) studying and planning, (b) taking action, (c) collecting and analyzing data, and (d) reflecting on the data (Mertler, 2017; Mills, 2015). The four-step process is displayed in Figure 2. See Figure 2

Finally, AR is sustainable during the program (Buss, 2017a; Buss & Avery, in press) and afterward (Buss, 2017b; Buss et al., 2016). Students use AR in their workplaces because subsequent AR work builds on previous efforts. Moreover, the effects of AR are also sustainable. To illustrate, consider the following example. One graduate maintained, "Yes, it's [her intervention is] still part of our professional development program in our district ... we have about 130 teachers and probably to varying degrees they've been influenced to utilize problem-based math a ... bit more."

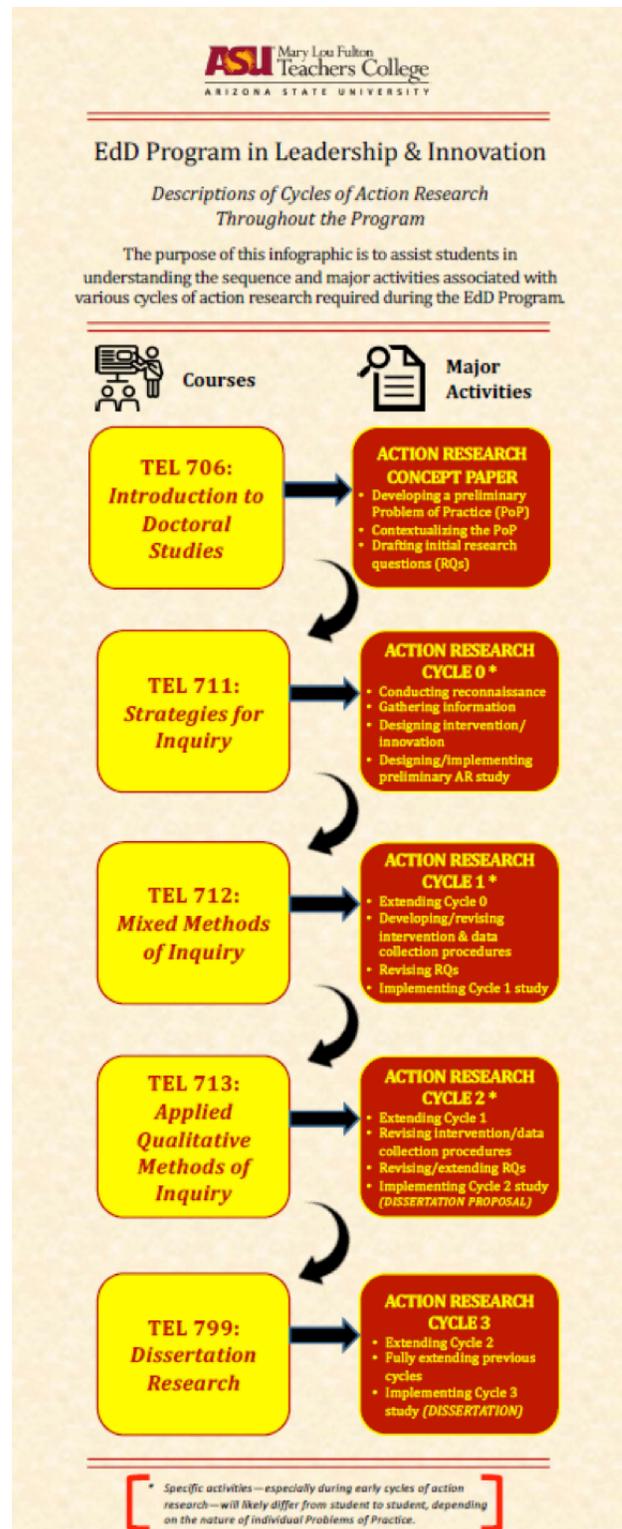


Figure 1. Cycles of AR in Arizona State University's EdD Program in Leadership and Innovation

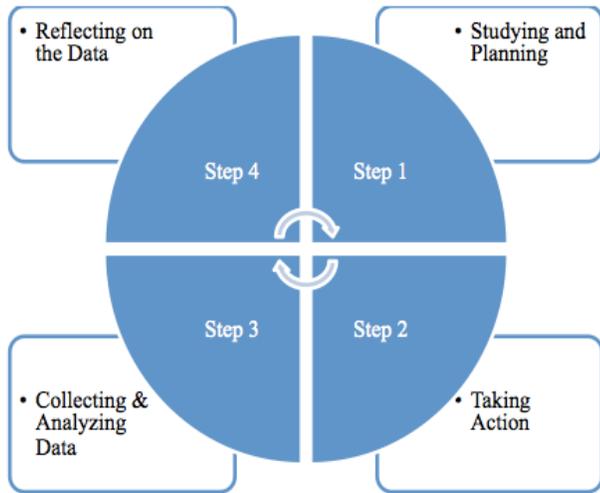


Figure 2. Representation of the Action Research Approach

To capitalize on these four important characteristics of AR, faculty members employ a complementary component about teaching AR to doctoral students. Specifically, AR is readily scaffolded over time to foster EdD students' use of AR as an inquiry as practice approach. As noted in the following section, requirements during the cycles are incremental to make them quite manageable for students.

Developing Inquiry as Practice Abilities through Cycles of Action Research

We use cycles of AR throughout our program as shown in the third column of Table 1. Our efforts in describing our use of cycles of AR, here, extend the work of Mertler, Buss, and Henriksen (2016). Table 1 has been presented in three columns—(a) the course(s), (b) a description of inquiry skills that are being developed within the course(s), and (c) the attendant cycle of AR that is being conducted by students in the program during that timeframe. See Table 1. As demonstrated in the discussion that follows, these cycles afford students opportunities to ease into the work over time. Further, the cycles allow students to 'dig deeply' into their PoP because they are conducting AR in their workplaces on an on-going basis. Moreover, as evidenced in Table 1, the cycles of AR are connected to a methods or methods-like course in the program.

In the next section, I describe the cycles of AR in detail to provide a clear explanation about how the cycles are used to develop inquiry as practice among students participating in the program. Additionally, taken as a whole, the descriptions demonstrate how the cycles are scaffolded to foster the development of workplace, relevant inquiry as practice skills among students. Taken together, the descriptions also confirm how these inquiry skills are consistent with Shulman et al.'s (2006) hallmarks, the criteria for strong doctoral programs; CPED's (2009) principles 4, 5, and 6; and four of CPED's (2010) design concepts including problem of practice, inquiry as practice, laboratories of practice, and dissertation in practice. Finally, in the descriptions about the cycles of AR

throughout the program, we demonstrate how we provide students with opportunities to develop practice-appropriate inquiry as practice skills—skills that are employed as they develop transformative actions in their educational settings. Moreover, in presenting the cycles of AR below, we make evident how students' inquiry is purposefully and strongly connected to their daily practice throughout their coursework and during their dissertations in practice.

First term AR including AR concept paper

In TEL 706—Introduction to Doctoral Studies, students are introduced to one of the signature pedagogies of the program, AR. Students learn about AR, the AR process, its value in inquiry as practice, and the long-term benefits of continuing to engage in AR throughout their professional careers as explicated in Mertler (2017) and Herr and Anderson (2015). As students begin to develop their understanding of AR, they apply these ideas as they articulate and refine a PoP of their own choosing that is connected to their workplace setting. They also formulate their initial research questions related to their PoP. Moreover, they preliminarily identify and review some initial research literature in a very limited way.

Based on their emerging understandings of AR, their PoP, and the initial, limited research literature connected to their PoP, they develop a brief, 10-12 page paper, in which they articulate their AR concept. In it, they communicate their PoP and contextualize it, draft their initial research questions, provide a very concise summary of some literature relevant to their PoP, and develop some initial thoughts about methodology on how to address their PoP.

Second term AR including Cycle 0 and preparing for Cycle 1

In TEL 711—Strategies for Inquiry, students extend and refine their thinking about their PoP and their research questions. Note: It is not expected that students will develop an ultimate PoP or final research questions at this time. Instead, we consider these early efforts to be developmental in nature. Thus, the PoP and the research questions are viewed as 'working PoP and research questions' that are intended to be refined as students proceed through the program. Moreover, the course is designed to aid students in developing understanding of quantitative and qualitative research, developing background on theories (along with TEL 703), and building skill in critically reading the literature (in conjunction with TEL 707). Texts such as Creswell (2015) on general research using quantitative and qualitative research techniques, Plano Clark and Creswell (2015) on reading research, and selected chapters from Brinkmann and Kvale (2015) on interviews are used to help facilitate students' development of knowledge and skills appropriate to the AR work in which they are engaged this semester. Finally, students design an initial, simple interview or survey for their Cycle 0 research efforts and conduct that work.

In their AR efforts, the scope of the work for Cycle 0 is limited. Typically, students conduct 3-4 interviews of key informants such as their colleagues, staff members, or students in which they focus on reconnaissance work and gather additional data to support inquiry into their PoP. Alternatively, some students conduct a survey with a small group of informants. To prepare students for this cycle, they read and discuss selected chapters from *InterViews* by Brinkmann and Kvale (2015). The instructor provides initial training on interviewing and developing interview questions to aid their efforts. Students develop interview items, receive feedback, and practice



Table 1 Coursework, Inquiry Strategies, and Cycles of Action Research in the EdD Program at Arizona State University.

Term and Course(s)	Course Content to Develop Inquiry Skills	Action Research Activity
Term 1 TEL 706—Introduction to Doctoral Studies	<ul style="list-style-type: none"> Developing understanding of AR Considering, articulating, and refining a Problem of Practice (PoP) Writing Research Questions (RQs) Identifying and considering initial research literature 	<p>Action Research Concept Paper</p> <ul style="list-style-type: none"> Developing a preliminary PoP Contextualizing the PoP Drafting initial RQs
Term 2 TEL 711—Strategies for Inquiry	<ul style="list-style-type: none"> Developing understanding of quantitative and qualitative (Q/Q) research Developing background on theories (w/ 703) Building skill reading the literature (w/ 707) Designing an initial interview or survey Writing about context, theories, related literature and initial methodology Considering and developing an initial intervention/innovation 	<p>Action Research Cycle 0</p> <ul style="list-style-type: none"> Conducting reconnaissance Gathering information and writing it up <p>Action Research Foreshadowing Cycle 1</p> <ul style="list-style-type: none"> Clarifying and writing about their context Reviewing and writing about theoretical frameworks guiding the project Designing initial intervention/innovation Designing preliminary Action Research study
Term 3 TEL 712—Mixed Methods of Inquiry	<ul style="list-style-type: none"> Developing mixed method research skills Extending interviewing and survey skills Developing initial qualitative analysis skills Developing initial quantitative analysis skills using SPSS 	<p>Action Research Cycle 1</p> <ul style="list-style-type: none"> Extending Cycle 0 Developing/revising intervention and data collection procedures Revising RQs Implementing Cycle 1 study using a small scale intervention
Term 5 TEL 701—Applied Methods of Quantitative Inquiry TEL 713—Applied Methods of Qualitative Inquiry	<ul style="list-style-type: none"> Extending mixed method research skills Extending interviewing and survey skills Extending qualitative analysis skills Extending quantitative analysis skills using SPSS Learning to use qualitative analysis software (using HyperResearch) 	<p>Action Research Cycle 2</p> <ul style="list-style-type: none"> Extending Cycle 1 or stepping to the side Revising intervention and data collection procedures Revising/extending RQs Implementing Cycle 2 study
Term 6 TEL 792—Research in the Leader Scholar Community	<ul style="list-style-type: none"> Extending mixed method research skills Extending interviewing, survey, etc. skills Extending qualitative analysis skills Extending quantitative analysis skills 	<p>Action Research Cycle 2.5</p> <ul style="list-style-type: none"> Extending Cycle 2 or stepping to the side Revising intervention and data collection procedures Revising/extending RQs Implementing Cycle 2.5 study
Terms 7-8 TEL 799—Dissertation Research	<ul style="list-style-type: none"> Applying mixed method research skills Applying interviewing and survey skills Applying qualitative analysis skills Applying quantitative analysis skills 	<p>Action Research Cycle 3</p> <ul style="list-style-type: none"> Extending Cycle 1, 2, and 2.5 Fully extending previous cycles Implementing Cycle 3 study—Dissertation in Practice

with peers. Then, students conduct interviews and use simple analysis procedures such as listening to the audio files several times and determining three or four key ideas or concepts from the interviews. No formal analyses using coding, themes, and so on are conducted at this time because faculty members feel students are not ready for such complex approaches at this point in their preparation.

Before presenting an illustration of one student's work, I provide some background information about the student's PoP. Holly's (pseudonym for a graduate of our program) PoP was concerned with how to develop teachers' technology skills to implement a 'bring your own technology' (BYOT) program at her school. Holly was newly appointed as principal of an elementary school. Further, the district had just implemented a BYOT initiative, which she was required to

develop at her school site. As indicated in the descriptions in the cycles of AR below, she successfully implemented a BYOT effort in her school. Note: Holly's work was used throughout this section to illustrate the various cycles of the AR process and how cycles of AR have culminated in the dissertation in practice (DIP).

To illustrate the nature of the work that typically is performed in Cycle 0, consider the following example of Holly's Cycle 0 project, in which she gathered reconnaissance data about her PoP—how to foster teachers' use of student, hand-held technology (HHT, e.g., tablets, smart phones, etc.) for instructional purposes in their classrooms. Holly conducted interviews with key informants including two individuals from her campus who were higher users of HHT and two district instructional technology coaches. She interviewed them to determine what model BYOT classrooms would look like, as well as, the skills and resources that would be required by teachers implementing student, HHT for instruction. Respondents identified four potential barriers—support, time, resources, and professional development. They also indicated ways to overcome these barriers. Holly used all of this information as she developed plans for an intervention to prepare teachers to use HHT during instruction. By conducting this reconnaissance work, she was better able to articulate her PoP and gained additional insight into how she might construct an intervention to deal with her PoP.

Additionally, in TEL 711, students are required to think about their AR efforts for the next cycle, Cycle 1. In particular, they write about their context and frame their efforts within the larger national or international work in the area. Moreover, they consider different theoretical perspectives and research related to their PoP to understand it better. This work on theoretical frameworks also assists them in considering what their intervention might be to deal with their PoP. Based on their review of the theoretical perspectives and related literature, they write an initial literature review that includes several theoretical perspectives. Further, they describe an initial, potential intervention/innovation and articulate some initial methodological work suitable for use in the next term when they are required to conduct Cycle 1 of their AR work. Again, this work on the methodology is quite basic and includes sections on participants, their role as researcher, an initial intervention/innovation, and preliminary instruments to measure outcomes relevant to the Cycle 1 study. Notably, much of this work, which is initial material, serves as foundational material for later efforts as they craft their dissertation proposals.

Third term AR including Cycle 1

In TEL 712, students explore mixed methods AR using Ivankova's (2015) text as a source to guide their learning. Additionally, they extend their learning about interviews by studying the remaining chapters of Brinkmann and Kvale's (2015) *InterViews*. Students receive their first formal preparation in analyzing qualitative data using Charmaz's (2014) approach and they employ these techniques with their own Cycle 1 data. They also learn a bit about surveys and developing survey instruments. Finally, they engage in their first formal analysis of quantitative data as they work through their own data and other data sets using SPSS and these efforts are guided by Green and Salkind (2014).

Cycle 1 AR efforts include developing and implementing a small-scale intervention, which is usually conducted with two or three teachers, staff members, or a small group of students. Generally, the intervention is limited in scope to ensure the researcher could

adequately implement it, monitor it for its effectiveness, and make changes as necessary. Frequently, data collection instruments are more limited because students are developing their knowledge with respect to designing instruments. Thus, instruments are being tried out in this cycle with the intent of revising them as necessary grounded in information from this cycle. Based on the outcomes from this cycle, students typically revise the research questions, intervention, and/or data collection procedures as seen later in the discussion of Cycles 2 and 2.5.

Consider the following example from Holly's work that illustrates the nature of the work she conducted in Cycle 1. Holly initiated a small-scale intervention with eight teachers, four who used student, HHT (albeit in limited ways) and four who did not. In this cycle, she created a small community of practice (Wenger, 1998; Wenger, McDermott, & Snyder, 2002) in which participants learned with and from each other; and she provided professional development, time, support, and resources for using HHT for instruction using a collaborative apprenticeship model. This model was based on the work of Glazer, Hannafin, and Song (2005; Glazer & Hannafin, 2006) who suggested collaborative apprenticeship is a professional development model that "features reciprocal interactions between peer-teachers [PT, novices in using HHT] and teacher-leaders [TL, more experienced users of HHT]" (Glazer et al., 2005, p. 59). She also asked these participants to implement the use of HHT in a limited way during instruction in their classrooms. Results from quantitative and qualitative measures such as scores on Hall and Hord's (2011) Stages of Concern measure, interviews and teachers' journals about their implementation of HHT indicated the intervention was successful in increasing the use of HHT and it appeared to address the four perceived barriers.

Note that Term 4 in the program is a summer term and students are not required to engage in AR activity.

Fifth term AR including Cycle 2

In TEL 701—Applied Methods of Quantitative Inquiry, students focus their efforts on learning how to apply quantitative procedures and increase their understanding of quantitative data collection and analysis. For instance, they spend considerable time learning about reliability and validity. They also are involved in developing, fine-tuning, administering, and revising survey instruments. They expand their understanding of quantitative analysis by working in such areas as reliability analysis, ANOVA, regression analysis, and correlational procedures using SPSS (Green & Salkind, 2014). All of this work supports students' understanding of these various techniques as they read the literature related to their own research efforts and/or as they use it in their research work. Additionally, in TEL 713—Applied Methods of Qualitative Inquiry, they extend their learning about qualitative data collection and analysis. Students expand their learning about gathering and analyzing qualitative data including developing their qualitative analysis skills and learning to use qualitative software such as HyperRESEARCH (HyperResearch, 2016).

Cycle 2 AR efforts typically involve students in a variety of research endeavors, but the scope of work, usually narrows as students take a 'step to the side' and examine their instruments in detail or work on developing their interview skills, expanding qualitative data collection efforts, revising research questions, and increasing data analysis procedures. Some students chose to examine very carefully their survey instruments by administering,



analyzing, and revising them. Others chose to revise, administer, and refine their interview questions or explore new qualitative data collection processes. Still other students may test their intervention or a component of their intervention to ensure its effectiveness with respect to influencing outcomes associated with their PoP.

During Cycle 2, Holly refined her interview questions. In addition, she worked on revising and sharpening the prompts she used with teachers in their journal entries as they wrote about their assessments and reflections on implementation of HHT practices in their classrooms.

Sixth term AR including Cycle 2.5

In TEL 792—Research in the Leader Scholar Community, students extend their research skills by working on their interviewing skills, data analysis skills, and so on. With respect to their AR, they are extending Cycle 2 by revising their intervention, data collection procedures, or data analysis procedures, and revising or extending their research questions as they prepare their dissertation proposals.

In Cycle 2.5, which is similar to Cycle 2, students take a step to the side and typically narrow the focus of their AR efforts. Again, students select various AR efforts that best meet their needs with respect to conducting research on their own PoP. Some students work on their survey instruments, whereas others refine their interview questions, and others expand their qualitative data collection efforts. By comparison, others work to refine and finalize their intervention or a component of their intervention for their PoP.

During this cycle, Holly spent time developing and exploring a digital ethnography component, which she subsequently used in her dissertation in practice. The digital ethnography component included asking teachers what was happening in the digital image that was taken while they were using HHT in their classrooms. Additionally, she worked on developing stronger interpretive skills for analyzing her qualitative data.

Seventh and eighth terms AR including Cycle 3—dissertation in practice

In this culminating activity, students expand their work by conducting a dissertation in practice (DiP) based on their previous cycles of AR. During the DiP, students fully implement an intervention designed to effect change with respect to their PoP, engage in comprehensive data collection, and conduct thorough data analyses. During the first of these terms, term 7, the intervention is implemented and data are collected and analyzed. In the subsequent term, students finish the data analyses and complete writing the DiP.

Holly conducted a DiP in which she extended her efforts from the previous cycles; particularly the efforts in which she engaged during Cycle 1. In the dissertation, the proposal and the dissertation itself, Holly used data and information from her previous efforts during earlier cycles to inform the conduct of the AR DiP. For example, she used data from Cycle 0 to help establish the context for her work in Chapter 1 of the AR DiP. In particular, she discussed the barriers noted by respondents in Cycle 0 reconnaissance work that hindered them from using student, HHT during instruction in their classrooms, which helped to establish the need for the intervention to aid in resolving the PoP. In Chapter 2 on theoretical perspectives *and* research guiding the study, she described results that indicated the intervention used during Cycle 1, when she conducted her small-scale intervention, was effective. Moreover, in

Chapter 3, as she described her method, Holly drew upon the work she had done earlier in Cycles 1, 2, and 2.5 to inform her method including using well-developed instruments, developing the intervention, and delineating data collection and analysis procedures. In the AR DiP, she implemented a larger-scale intervention that included 22 teachers, 11 who indicated they were 'more accomplished' in using HHT during instruction and 11 who were 'less capable.' Again, she used the collaborative apprenticeship approach to develop a community of practice for the participants where they learned with and from others about using HHT during classroom instruction. She also provided professional development on using HHT for instruction; and she asked teachers to use HHT during instruction. She collected a variety of data including data from Hall and Hord's (2011) Stages of Concern Questionnaire and Innovation Configuration Maps, collaborative weekly reflections (a blog shared among participants), digital ethnography data, and semi-structured interview data. Results showed her intervention was effective because teachers increased their use of student, HHT during instruction, decreased their concerns, and demonstrated increased efficacy for using student, HHT during classroom instruction.

Post graduate AR efforts

The influence of AR on inquiry as practice endures among graduates who continue their AR work and/or extend it to other PoP (Buss et al., 2016). In particular, graduates of this CPED-guided program continue to engage in AR in their local contexts as they lead, foster innovation, and collaborate with their colleagues. For example, one graduate who teaches mathematics at a community college successfully used cooperative learning in her DiP. She has continued those efforts and mathematics department colleagues saw the strong results she obtained. Now, as a result of her work, most of the mathematics faculty members have been trained how to use cooperative learning and they employ it to aid learning of mathematics and retention of students. Another graduate who mentored alternatively certified teachers at her school using action research as a form of professional development has influenced her whole school campus as noted when she said, "Now, every ... teacher on my campus engages in action research." Thus, these results show graduates have influenced and continue to influence their workplaces through their AR efforts.

Challenges of Using Cycles of AR

Cycles of AR as implemented in this EdD program have not been without limitations. In fact, three challenges that warrant consideration have arisen as we implemented cycles of AR. First, a very small number of students have 'tunnel vision' in which they become too narrowly focused on 'their PoP.' When this occurs, students may deem material that is not directly related to their PoP or its resolution as extraneous or irrelevant. As noted, this overly narrow focus by students occurs infrequently and has been remedied by individual consultation with the student.

Second, students have changed their PoP. Frequently, when this type of change occurs, students moved to a related PoP that allowed them to use their contextual setting, theoretical perspectives, and so on, which they had been using in earlier cycles. Of course, these students may not be able to engage in all the cycles of AR as they have been articulated, here. Nevertheless, they have typically engaged in the work of Cycles 1 and 2, and incorporated some of the work of other cycles, as they were able before they culminated their

efforts with Cycle 3, the DiP. Moreover, for those who chose a new PoP that is unrelated to their earlier one, they, most often, have completed Cycles 1 and 2 prior to the DiP.

Third, students have changed professional positions and this has prevented them from engaging in all the AR cycles as described, above. In this situation, students have successfully used two types of strategies. The first has been a 'compression strategy.' In this process, students have conducted Cycles 0 and 1, for example, in one semester. Another compression strategy that has been used was compressing Cycles 2 and 2.5 into one semester. An alternative, second strategy, which has had a similar outcome and which has been used by students who were further along in the program has been the 'blending strategy' where students have executed Cycles 1 and 2 concurrently. Specifically, because they were more knowledgeable, they more carefully designed their instruments, Cycle 2, as they executed Cycle 1, the trial intervention, on their new PoP. Thus, although students may not have been able to conduct the cycles of AR as outlined in the timeframes denoted above, the cycles of AR framework has been sufficiently adaptable to allow students to make modifications in the cycles of AR, as they progress through the program in a timely way.

Conclusions: Strengths of AR and Implications for Preparing Students' Inquiry as Practice Orientation and Skills

For the EdD program in the Mary Lou Fulton Teachers College at Arizona State University, AR is a very powerful technique that fosters development of skills allowing students to conduct effectively inquiry as practice in their work settings. Several aspects of AR make it especially useful in developing an inquiry as practice orientation and requisite skills for students in an EdD program and bode well for its use in other programs. First, AR has some inherent characteristics that make it a potent approach that can be used readily by educational leaders and practitioners in their practices. Those characteristics include (a) adaptability to various contexts and PoP, (b) easing into AR over time, (c) developing systematic inquiry because of the elegant, four-step process in AR, and critically (d) sustainability of AR in educational practice settings after completing the program.

Second, faculty members can scaffold AR to prepare EdD students to use it as students inquire into their practices during the program and beyond it. For example, the cycles of AR as articulated in this program provide students with a demanding, but supportive approach to learning AR and using it during inquiry into their practices. Specifically, faculty members scaffold the AR work to allow students to move from conceptualization, to reconnaissance, to a small scale intervention, to modifying an intervention as warranted, to refining quantitative and qualitative instruments and procedures, and then to conducting a DiP. Thus, students are aided in applying AR processes to inquire into their practices during the program and following it.

Third, it is apparent in the descriptions about the cycles of AR that students are afforded opportunities to develop practice-appropriate inquiry as practice skills that are employed as they engage in transformative actions in their educational workplace settings. Additionally, it is evident that students' inquiry is pervasively connected to their daily practice, their laboratories of practice, throughout their coursework and during their DiP. Finally, although there are some challenges with respect to using cycles of

AR as outlined in this essay, there is sufficient flexibility to accommodate students who change their PoP or their professional position.

Taken together, the arguments I offer here along with the data from several research studies suggest AR is highly effective for developing and sustaining inquiry as practice abilities among EdD students (Buss, 2017a, 2017b; Buss & Avery, in press; Buss & Zambo, 2016; Buss et al., 2014; Zambo et al., 2015). Specifically, it is clear these inquiry as practice abilities emerge during the program as students try them out in their laboratories of practice and become more adept at using them (Buss, 2017a; Buss & Avery, in press). Importantly, these AR inquiry abilities are sufficiently durable that program graduates continue to employ them in their educational practice settings after they complete the program (Buss, 2017b; Buss et al., 2016; Zambo et al., 2015.)

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