Action Research for Educational Communications and Technology

14

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Abstract

Action research refers to the formalized, self-reflective research of practitioners. According to Cochran-Smith and Lytle (Inside and outside: Teacher research and knowledge. NY: Teachers College Press, 1993) action research is "systematic and intentional inquiry" (p. 7). It is often conducted collaboratively in research groups that meet in person or at a distance via communication technologies. Action research transforms the traditional "outside-in" relationship between practitioners and the educational community. It can provide a powerful means for bridging the divide between theory and practice and encouraging practitioners to engage in innovative practices. Action research includes a cyclical process of posing questions, collecting data, reflecting on findings, and reporting results. This chapter provides a comprehensive overview of action research and its history in the USA, Great Britain, and Australia. It also describes the epistemological and ontological differences between practical and critical action research. To inspire future action research in our field, we detail the action research method, including data collection and analysis techniques and provide example studies from the field of educational communications and technology. More specifically, we demonstrate the manner in which action research has already been used to better understand the impact of the integration of technology in classrooms and social settings. At the same time, we describe how action researchers have used educational communications and technology to conduct action research and to teach this research method through online or hybrid classes. Technology can be both the focus and part of the method of the action research.

Keywords

Action research • Participatory action research • Technological pedagogical content knowledge

Introduction and Overview

According to Savenye and Robinson (2004), "Assumptions, questions, methods, and paradigms that formerly dominated research in the [educational technology research] field are changing" (p. 1045). Concerns about the scope and impact of technology integration dominate the field of educational communications and technology and relevant research questions require new strategies and methods. Action research represents a dynamic methodology, enabling our field to address persistent questions within the context of practice.

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In this chapter we introduce action research and its history in three contexts—the USA, Great Britain, and Australia. We also describe the characteristics distinguishing practical and critical action research and the various forms of data collection and analysis that contribute to an action research study. More specifically we review current action research studies focused on the integration of technology. Action research has the potential to transform our field by engaging stakeholders in meaning-making through the process of systematically collecting and analyzing data to improve practice. Elliot (1991) wrote, "It [action research] aims to feed practical judgment in concrete situations, and the validity of the 'theories' or hypotheses it generates depends not so much on 'scientific' tests of truth, as on their usefulness in helping people to act more intelligently and skillfully" (p. 69).

Action Research Defined

According to Cochran-Smith and Lytle (1993) action research is "systematic and intentional inquiry" (p. 7). It has often been linked to Dewey's (1933, 1938) notion of the teacher as a reflective practitioner (e.g., Cochran-Smith and Lytle, 1990), but it can be conducted by anyone seeking to enhance practice, regardless of their context or status. Action research is often conducted collaboratively in research groups that meet in person or at a distance via communication technologies. Due to the intimate nature of action research, the findings can reveal new understandings and knowledge not always readily apparent to outside researchers. As a result, action research transforms the traditional "outside-in" relationship between practitioners and educational researchers (McNiff and Whitehead 2010).

"Action research" is often used interchangeably with "teacher research" or "practitioner research." Borko, Whitcomb, and Byrnes (2008) group action research with "participatory research", "self study", and "teacher research" as a distinct genre of "practitioner research" (p. 1029). We use the term "action research" (unless an alternative appears in direct quotations taken from authors) to refer to the systematic and intentional research undertaken by practitioners about their own practice.

Action research is a cyclical or spiraling process "that integrates theory with practice, through reflection and action planning" (Altrichter, Feldman, Posch, & Somekh, 2008, p. 9). The process includes a series of steps including posing a question, collecting and analyzing data, and reporting findings. Kurt Lewin was the first to describe action research as "a spiral process of data collection to determine goals, action to implement goals and assessment of the result of the intervention" (Bargal, 2006, p. 369). The process spirals as the action researcher reflects on and continues the inquiry, basing decisions about new directions in the research on previous findings. Stringer (2007) described the spiral as repeating the routine of "look", "think," and "act" and Altrichter et al. (2008) pointed to several "'mini' action research cycles" within one project (p. 11).

History of Action Research

A variety of histories of action research have been published (e.g., Carr & Kemmis, 1986; McKernan, 1991; Noffke, 1997). Almost all of the accounts agree that industrial psychologist Kurt Lewin's work in the 1940s did the most to encourage the growth of action research inquiry (see also Bargal, 2006). Lewin's original model for action research developed from the field of group dynamics and included a focus on systematic study in a cyclical process to create new knowledge. Lewin's effort to "find ways to involve social actors with research through group decision making and elaborate problem solving procedures" (Hollingsworth & Sockett, 1994, p. 3) helped to define the process.

Action research eventually evolved from its origins to focus on educational issues. Stephen Corey (1953) first applied action research to educational settings in his work at the Horace Mann-Lincoln Institute at Teacher's College (Ferrance, 2000). By the late 1950s excitement over action research in the USA ebbed. However in the UK and Australia "a strong tradition of 'action research' by teachers began in the 1960s and continues today" (Lampert, 2000, p. 65).

Action Research Movement in the UK

Current scholarship on action research draws heavily upon the work of Lawrence Stenhouse (1985) and his colleagues at the Centre for Applied Research in Education (CARE) in the UK. According to Goodson (1999), under Stenhouse's leadership CARE began to push for acknowledgment of the "educational researcher's social and political purpose" (p. 279). Stenhouse nurtured an emphasis on critical inquiry during his tenure at CARE and encouraged educators to push for social change beginning in schools. "He [Stenhouse] saw teaching and research as closely related, and called for teachers to reflect critically and systematically about their practice as a form of curriculum theorizing" (McNiff & Whitehead, 2002, p. 43). Stemming from the Humanities Curriculum Project (HCP) which began in 1967, CARE "drew deeply on the egalitarian commitments of sections of post-war British society" (p. 279). From the beginning, CARE emphasized emancipatory strategies and critical outcomes for practitioner research. Especially when the conservative financial and economic events of 1976 ushered in the federal "New Right Programme," Stenhouse encouraged educators to push for change beginning in schools. According to Goodson (1999),

"During the 1970s, besides conducting a wide range of curriculum development and evaluation projects, CARE became a centre for defining educational research modalities in the public sphere" and its major task became finding "intellectual answers to the problems of empowering education for all" (pp. 283–284).

Stenhouse's ideas were extended by John Elliot and Clem Adelman with the Ford Teaching Project, 1973–1976 (Altrichter et al., 2008; Carr & Kemmis, 1986). Later, Elliot, the coordinator of CARE in 1991, continued the tradition established by Stenhouse of moving beyond objective curriculum research to focus on the process of teacher inquiry. His revised version of Lewin's model argued that, rather than consistently pursue a single aim in practitioner research, the "general idea should be allowed to shift" as the study progressed (cited in McNiff & Whitehead, 2002, p. 46). Elliot (1991) also emphasized a continual cycle of research and action, of planning and implementation. He cautioned against too quickly judging a teaching strategy's value without first clarifying the extent to which it was implemented.

Critical-Emancipatory Action Research in Australia

Stenhouse influenced the work of action researchers in Australia (e.g., Carr & Kemmis, 1986; Kemmis & Grundy, 1997; McTaggart, 1991a, 1991b, 1997). Carr and Kemmis (1986), for instance, wanted to help teachers understand the social and political construction of educational practices and described classroom-based inquiry as "educational action research." Their model of action research involved a spiral process including devising a question, planning, implementing, observing, reflecting, and replanning. They wrote:

> Action research is a form of self-reflective enquiry undertaken by participants (teachers, students or principals, for example) in social (including educational) situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations (and institutions) in which their practices are carried out. p. 162

Carr and Kemmis also applied Habermas' (1972) early work to conceptualize critical action research within the framework of the "emancipatory interest." They encouraged teachers to critically interrogate their practice and its social impacts.

Robin McTaggart of Deakin University was a colleague of Kemmis and collaborated on *The Action Research Planner* (Kemmis and McTaggart, 1988) which became a well-known text for practitioners and university-based educators around the world. McTaggart (1991a, 1991b) also wrote extensively about his cross-cultural work with Aboriginal people. He repeatedly emphasized the emancipatory possibilities of action research and was severely critical of what he considered to be more benign forms of action research. McTaggart (1997) feared that the action research cycle would lose its radical potential and develop "iconic simplicity" (p. 17).

Collectively the work of Australian and British action researchers created a more critical philosophical tradition for the genre. According to Cochran-Smith and Lytle (1999) this tradition "shared a grounding in critical and democratic social theory and in explicit rejection of the authority of professional experts who produced and accumulated knowledge in 'scientific' research settings for use by others in practical settings" (p. 16). Action research that was grounded in critical social theory emphasized the emancipatory function of action research as a path to greater democracy in schooling and society.

Contemporary Action Research Movement in the USA

Influenced in part by the work of action researchers in Britain and Australia, American educators grew increasingly interested in practitioner-based inquiry towards the end of the twentieth century. Also contributing to this trend, according to Cochran-Smith & Lytle (1993) was a "paradigm shift in researching, teaching, and assessing writing that evolved during the 1970s and 1980s" (p. 6). For example, the Writing Projects were designed to improve the teaching of writing through teacher reflection on practice and examination of student work (e.g., Bay Area Writing Project, 1979). At the same time, influential texts such as Schön's (1983) *Reflective Practitioner* and Berthoff's (1987) phrase "The teacher as RE-searcher" provided the necessary language to articulate an interest in teacher inquiry. By 1999 Cochran-Smith and Lytle identified five major trends in action research in the USA: (1) growth in the prominence of action research in teacher education; (2) development of conceptual frameworks and theories of action research; (3) dissemination of action research findings in journals and conference proceedings; (4) critiques of action research; and (5) belief in the transformative potential of action research in education.

According to educational historian Ellen Lagemann (2000) contemporary action research holds a more prominent position within the American educational research community than in previous times. Increasingly, action researchers present their work at national conferences, including the American Educational Research Association (AERA) annual conference. They share their findings in national and international educational journals (e.g., *Educational Action Research*, *Action Research*, *Systemic Practice and Action Research*, *Action Learning,* and *Learning*) and other outlets.

Theoretical Frameworks

Perhaps as a result of the history of action research, there are differing ideas about its aims and purposes as well as its epistemological and ontological assumptions (Altrichter et al., 2008). For instance, Noffke (1997) offers three "dimensions" of action research as "political," "personal," and "professional." Our review of the literature (including manuals and texts for conducting action research, journal articles, and anthologies chronicling action research studies) revealed more of a bifurcation between those who advocate for practical or critical action research (see also, Cochran-Smith & Lytle, 1999; McCutcheon & Jung, 1990). We found practical action research focuses on the day-to-day issues teachers face, whereas critical action research seeks to better the classroom while also confronting larger political and social issues (see also Manfra, 2009a). Below we describe the diverging conceptions of action research as practical or critical.

Practical Action Research

Practical action research focuses on improving "teachers' professional knowledge landscapes" (Clandinin & Connelly, 1995) and "craft knowledge" (Grimmett & MacKinnon, 1992). In an overview of the different forms of action research, Cochran-Smith & Lytle (1999) explain that "theorizers in this [practical] group assume that some of the most essential knowledge for teaching is practical knowledge" (p. 19). Here the day-to-day work of teachers or other practitioners is of primary importance. The emphasis repeatedly is on "real classrooms and real schools" (Allan & Miller, 1990, p. 196). Proponents of practical action research argue that through reflection on practice, teachers can generate knowledge about teaching and learning. Implicit is the emphasis on the *practicality* of action research for teachers and schools. According to Cochran-Smith & Lytle (1999), "practical inquiry is more likely to respond to the immediacy of the knowledge needs teachers confront in everyday practice and to be foundational for formal research by providing new questions and concerns" (p. 19).

Critical Action Research

Critical action research aims to bring about social change and a more just and democratic society by influencing educational structures (e.g., Gitlin & Haddon 1997; Kemmis & Grundy, 1997; Kincheloe, 1991, 1995; Noffke, 1997). "The emphasis is on transforming educational theory and practice toward emancipatory ends and thus raising fundamental questions about curriculum, teachers' roles, and the ends as well as the means of schooling" (Cochran-Smith & Lytle, 1999, p. 18). Proponents of critical action research refer to the work of a variety of critical theorists, including Freire (1972) and Habermas (1972). For example, Kincheloe (1995) wrote that, "The critical teacher researcher asks questions of deep structure of his or her school or classroom settings—in other words, he or she takes Habermas's notion of emancipatory interest of knowledge seriously" (p. 81). Critical action research seeks fundamental change in social and institutional structures.

In some cases, proponents of critical action research criticize "benign" versions of action research because they ignore political and social issues (Kincheloe, 1995). For example, Noffke (1997) argues that practical versions of action research are separated from the "political sphere" and, according to Zeichner (1994), they serve to "further solidify and justify practice that is harmful to students" (p. 66). Kincheloe argues that uncritical action research is "dangerous" in that it "upholds status quo" practices and "reproduces extant ideology" (p. 82). According to this perspective, practical action research only serves to entrench a view of teachers as uncritical actors manipulated by the educational status quo.

The epistemological disagreements in the field of action research have created a division between practical and critical action research. Table 14.1 outlines some of the major differences of these two forms of action research. Currently there is little dialogue in the literature between the two (Manfra, 2009a).

In our discussion of methodology below we choose not to privilege practical or critical action research, emphasizing instead that the diversity of approaches can be liberating for researchers. Similar to MacLean & Mohr (1999) we believe "that teachers are thinkers and inquirers with knowledge about teaching and learning" and, accordingly "we don't 'prepare' or 'train' teachers to ask the 'right' questions in the

Table 14.1 A summary: practical action research compared to critical action research

Practical action research:	*Critical action research*:
• "Practical-Deliberative" (McKernan, 1996)	• "Critical-Emancipatory" (McKernan, 1996)
• Concerned with practical knowledge or "craft knowledge"	• Concerned with social and cultural factors that impact school
• Interest in day-to-day issues of practice	• Interest in democratic participation and emancipation
• May result in improved practice and student performance but not social or cultural change	• Seeks deep change [enlightenment] within the classroom • Implicit goal towards improving society

Manfra 2009a)

'right' way" (p. vii). According to Altrichter et al. (2008), Elliott similarly rejected much of the criticism of supposedly benign forms of action research. "He [Elliot] argues that teachers do not need to be liberated from oppression, but are able to generate knowledge and understanding of their practice through engaging in systematic research and reflection" (p. 12). In this chapter we describe the variety of methodologies and potential outcomes as strengths of action research.

Action Research Methodology

Of course the differing philosophical rationales for action research means there are also "methodological variations" (McCutcheon & Jung, 1990, p. 144). Data collection methods range from conventional quantitative and qualitative approaches to ethnographic storytelling and autobiography. There is general agreement across these methodological differences, that action research involves a cyclical process of action and reflection and a systematic approach to data collection and analysis. Action research is distinct from the everyday work of teachers and practitioners since it goes beyond reflection to interrogate the action through data collection. According to Glanz (1998) there are six steps in an action research project: (1) "Select a focus", (2) "Collect data", (3) "Analyze and interpret data," (4) "Take action," (5) "Reflect," and (6) "Continue and modify" (p. 27). There can be many variations to the steps, yet the basis of the cycle is always the same—reflection in action. Below we provide more details about each of the steps in the action research cycle.

Selecting a Focus

Altrichter et al. (2008) recommend identifying "experiences of discrepancies" as "starting points" for action research (p. 41). That is, practitioners should use action research to confront pressing concerns and issues. Similar to educational research in general, a variety of types of research questions can set the focus and scope of an action research project. The theoretical framework that the researcher brings to the process will impact the research questions asked and the data collected. According to McNiff and Whitehead (2010), action research involves "a commitment to educational improvement; a special kind of research question, asked with educational intent; putting the 'I' at the center of research; educational action that is informed, committed, and intentional" (p. 34).

Ethical Considerations

Before embarking on a project there are important ethical considerations for the action researcher. First, action researchers should be aware of the relevant requirements of their Institutional Review Boards (IRBs). Depending on university regulations, action research may be exempt from full IRB review or prohibited (Brydon-Miller & Greenwood, 2006; Stoecker, 2008). Since most action research focuses on human and social issues, researchers must follow the ethical rules and regulations required in human subjects research. Action researchers must remain "cognizant of the power and privilege we carry with us into our interactions with research participants" (Brydon-Miller & Greenwood, 2006, p. 125). Given its democratic nature, issues of coercion, power, and risk must be addressed by action researchers (Judah & Richardson, 2006) and important ethical principles for researchers should include "negotiation," "confidentiality," and "participants' control" (see Altrichter et al., 2008, pp. 154–155).

Data Collection

As in other forms of educational research, the research question determines the data collection methods used in action research. Action researchers conduct inquiry by collecting quantitative data and/or qualitative data. According to Glanz (1999), "In action research, we apply traditional research approaches (e.g. ethnographic, descriptive, quasi-experimental, and so forth) to real problems or issues faced by the practitioner" (p. 301). Ross and Morrison (2004) provide a useful description of experimental methods and Savenye & Robinson (2004) outline qualitative methods in educational technology research. Throughout the process of data collection, the action researcher analyzes the information gained, draws conclusions, and makes plans for change. Action researchers often triangulate, or collect multiple forms of data, to ensure their findings are meaningful, accurate, and credible (Hendricks, 2009).

According to Hendricks (2009), the methods of data collection in action research fall into three overarching categories: "artifacts, observational data, and inquiry data" (p. 81). Artifacts are items created by participants and usually fall within one of three subcategories: "student-generated," "teacher-generated," and "archived" (see Hendricks, 2009, p. 82). Observational data is generally collected in the form of field notes. Inquiry data is collected specifically to address the overarching research questions, often via interviews or questionnaires. In some instances these categories of data overlap, but, nonetheless, they provide a framework for delineating the various forms of data in the action research process.

Engaging students in action research

Engaging students in data collection provides both rich sources of information and insights about student experiences. Reflecting back on his study about high school

drop-outs, Shager (2007) wrote, "They [students] brought a lot of knowledge to the project in the form of anecdotal information and personal experience; as they gathered more evidence, they built upon that knowledge" (p. 42). Rarely do teachers have explicit opportunities to learn from their students. However, the action research cycle provides a framework for engaging students in meaning making within the classroom. According to Lytle and Cochran-Smith (1994), "Researching teachers create classroom environments in which there are researching students" (p. 37). As a result of engaging students actively in the research process, teachers develop empathy and a new "mindfulness" (van Manen, 1990) towards their students. The combination of increased empathy and mindfulness leads teachers to be more responsive to their students. Often this results in changing teaching practices by incorporating more student-centered learning activities. According to Brause and Mayher (1991), "We [action researchers] increase our effectiveness as teachers because we are able to design and institute practices which are sensitive to the needs of our individual students (p. 208). The opportunity to learn from students leads teachers to consider new approaches to teaching that often allow for greater student engagement (Manfra, 2009b).

Keeping an action research journal

Action researchers may also include samples of their own work in their data archives, including lessons plans and other ancillary materials. The action researcher's journal or log is often an important source of more nuanced data, including perceptions about student outcomes and behaviors and written reflections about the data (Altrichter et al., 2008; McNiff & Whitehead, 2010). MacLean and Mohr (1999) advise teachers to keep a "research log"—a "systematic and organized" journal that "will include dates and times, careful quoting, observations and reflections" (p. 12) and "thinking writing" about data (p. 13). According to Strieb (1993) keeping a teaching journal provided her with an effective means for collecting and analyzing data. She wrote, "Keeping a journal has been a realistic way for me to learn about, inquire into, collect data about, and enhance my practice as well as to learn about and plan for the children" (in Cochran-Smith & Lytle, 1993, p. 121).

Triangulating data

In order to make their findings more accurate, action researchers collect a variety of data, from a variety of sources. For instance quantitative, archived data, including statistics, may be paired with qualitative data such as portfolios of student work. In her action research study on African American male student experiences, Nguyen (2007) relied heavily on archived data. She analyzed quantitative data including student enrollment figures, free and reduced lunch statistics, special education status, and achievement data from the district. She paired this data with student interview data to uncover those factors that supported or hindered student success in school. According to Mills (2011), "Observational data… can suggest questions that can be asked in subsequent interviews" and "pairing observation and interviewing provides a valuable way to gather complementary data" (p. 78). For example, Richards (2007) studied strategies to help English language learners (ELL) in her classroom by observing classroom interactions between students and recording revelations about her own teaching in her research journal. She used this data to develop follow-up interview questions for her ELL students. Again, the form and scope of the data collection methods will relate to the aims of the researcher and the overarching research questions. Throughout the process, action researchers engage in data analysis.

Data Analysis

Since action research is an iterative process, data collection and analysis occur continuously. According to Hendricks (2009) "This may mean altering an intervention plan, changing data collection strategies as the study progresses, or modifying the project timeline" (p. 121). Analytical strategies help the researcher make sense of the data and answer the overarching research questions. "Analyzing therefore involves looking at the data, taking account of your categories of analysis, and noting any emergent patterns within them" (McNiff & Whitehead, 2010, p. 175).

When action research studies include multiple types of data, the researcher needs to develop clear analytical strategies to compare and contrast across data and interpret findings (MacLean & Mohr, 1999) Analyzing quantitative data will often involve running statistical operations using software programs or creating charts or tables to illustrate data graphically (see also Ross & Morrison, 2004, p. 1029 for a detailed list of "common statistical analysis procedures used in educational technology research").

Qualitative data analysis can provide a rich description of the subject under study (see also Savenye & Robinson, 2004). To manage the amount of data, field notes and audio or video recordings should be transcribed into a workable format for data analysis. Then qualitative coding schemes should be developed to begin analyzing data and looking for patterns across the data (Glesne, 1999). A "constant-comparative" method (Glaser & Strauss, 1967) or other analytical methods may be used to refine the coding scheme and to make initial interpretations about the data. Data analysis is a complex process, involving multiple iterations. Once all of the data have been organized and analyzed, the action researcher is left with the final stage of implementation and reflection.

Implementation and Reflection

After data collection and analysis the action research cycle continues as the researcher reflects on the implications of the research findings. Glesne (1999) writes, "During the reflection phase, the data are interpreted and the multiple viewpoints are communicated and discussed among those with a stake (the stakeholders) in the process" (p. 13, parenthetical note in original). Throughout the process, the action researcher continuously reflects on and shares the findings (Kindon, Pain, & Kesby, 2007). According to McNiff and Whitehead (2010) action researchers should communicate their findings both within and outside of the workplace via conferences and publications. They write, "The purpose of sharing your work is so that people can learn from it and adopt or adapt your ideas to their own situations, in terms of subject matter as well as the enquiry processes involved" (p. 242). Sharing findings and making research reports available for peer review and critique is an important way action researchers "ensure quality and rigor" (Borko et al., 2008, p. 1031).

Action Research Groups

Action research groups provide support and guidance throughout the action research process and can be an important venue for sharing findings (MacLean & Mohr, 1999). Research groups help members refine research topics and data collection methods through meaningful conversations. "The group challenges each other's assumptions, proposes alternative interpretations, offers suggestions about research methodology, responds to drafts, and often lends personal as well as professional support" (p. 21).

There are numerous examples of large action research groups or networks working together to answer pressing, critical research questions (Cochran-Smith & Lytle, 1993; Mohr et al., 2004). The Madison Metropolitan School District (MMSD) has supported a school district-wide action research initiative focused on creating more equitable classrooms since 1990 (see Caro-Bruce, Flessner, Klehr, & Zeichner, 2007). All teachers and support staff in the district are invited to join action research groups focused on social justice and equity. The district has supported this initiative over the years by providing access to district data systems, leadership development, and professional development. As a result of the collective work of numerous teachers and staff in MMSD, action research has supported the "empowerment of students from diverse backgrounds" (p. 290) and "engagement through culturally relevant practice" (p. 291). The pervading notion in the district is that action research could contribute to research-based understandings regarding equity. Other examples of large teacher research groups include the Physics Teachers Action Research Group in San Francisco (see Feldman, 1993, 1996) and the Classroom Action Research Network (see Cochran-Smith & Lytle, 1993; Hollingsworth, 1994). These collaborative groups support the collective professional development of member researchers and the development of professional learning communities.

Large scale action research collaboratives often include university researchers. Cornelissen, vanSwet, Deijaard, and Bergen (2010) describe school-university research networks in which the "relationships in the research partnership can be collaborative with a high degree of mutual engagement; the research agendas, methods and outcomes are negotiated and collective research activities are undertaken" (p. 148). For example, a collaborative effort in Philadelphia, PhilWP, has been focusing on studying issues affecting urban youth for many years (Lytle, Portnoy, Waff, & Buckley, 2009). The project began as a Writing Project partnership between faculty at the University of Philadelphia and teachers in the Philadelphia school district. PhilWP has had numerous iterations including "'inquiry communities'—single school, across-school, and across-district groups" (p. 26). Action research collaboratives that include university researchers also often engage in participatory action research or community based research.

Participatory Action Research

Participatory action research (PAR) differs from the previously described classroom-based action research because it is "a social, collaborative process" (Hendricks, 2009) that aims to "change practices, social structures, and social media which maintain irrationality, injustice and unsatisfying forms of existence" (McTaggart, 1997, cited in Reason & Bradbury, 2006, p. 1). In PAR the researcher is both a researcher and activist—"collaborating with marginalised or 'vulnerable' others" (Kindon et al., 2007, p. 11). PAR alludes to the work of Brazilian educator, Freire (1972), who used a problem posing method to teach adult literacy and bring about "praxis". There are more direct links in parts of the world where participatory action research is used to improve adult education and empower the working poor. For instance, McTaggart (1991a) investigated Aboriginal education by transferring control of the research process to the "researched." According to Kindon et al. (2007) "The most common methods used in PAR focus on dialogue, storytelling, and collective action" (p. 16). Participatory action research projects involve the subjects of study actively throughout the research process (Kemmis & McTaggart, 2005).

Results of Action

Regardless of the aims, methods, or processes undertaken, action research is intended to bring about change—mainly

changing and improving some aspect of practice. Johnston (2005) writes, "The distinguishing characteristic of action research, however, is its focus on *action*…. The action is intended to create change for the better and the study is intended to find out if it does" (emphasis in original, p. 60). Emancipatory action research may result in larger social change, such as bringing about more democratic classrooms and institutions. The potential benefits cited by proponents of action research include: alleviating the gap between theory and practice (Brause & Mayher, 1991; Lytle & Cochran-Smith, 1994; Richardson, 1994; Zeichner, 1994); enhancing teacher education (Cochran-Smith & Lytle, 1993; Levin and Rock, 2003; Price, 2001; Price & Valli, 2005); improving teacher professional development (Alan & Miller, 1990; MacLean & Mohr, 1999; Mohr et al., 2004); improving student learning (Falk and Blumenreich, 2005); affirming and empowering teachers (Falk & Blumenreich, 2005; Mohr et al., 2004); reforming education (Brause & Mayher, 1991); and changing society (Carr & Kemmis, 1986; Grundy, 1997; Johnston, 2005; McTaggart, 1991a).

Educational Technology and Action Research

There are numerous ways that action research can support the goals of the field of educational communications and technology, including improving pre-service and in-service teacher professional development and university-based teaching that integrates technology. At the same time technology can enhance and improve the work of action researchers by supporting new forms of data collection, facilitating the work of action research groups, and providing tools for training pre and in-service teachers on action research methodology (McNiff & Whitehead, 2010). Technology can be both the focus and part of the method of the action research.

Improving Technology Integration

Action research has been used to study the integration of technology in classrooms and schools. A typical model involves university researchers engaging and supporting pre-service and in-service practitioners as they systematically study technology integration (e.g., Cavanaugh & Dawson, 2008; Dawson, 2007; Dawson, Cavanaugh, & Ritzhaupt, 2008). For example, Dawson (2007) reported the professional development outcomes when pre-service teachers collected and analyzed qualitative data during their field experiences. She concluded, "The results of this exploratory study suggest that when prospective teachers are supported through the inquiry process during technology integration, student learning comes to the forefront" (p. 10). In a similar study Cavanaugh et al. (2007) integrated action research into the professional development of Florida teachers using laptops in instruction. Their findings reported on the value of the action research process for improving teacher understandings about technology and instruction.

Action Research and TPACK

Action research appears to be a particularly promising method for studying and improving technological pedagogical content knowledge (TPACK, Mishra & Koehler, 2006). TPACK expands on Shulman's (1987) notion of "pedagogical content knowledge" (PCK) by adding technological knowledge. According to Harris and Hofer (2009), "TPACK can be developed when educational technologies become one of the foci of teachers' reflective action research" (p. 100). Arizona State University has integrated action research into the work of a cohort of doctoral students including administrators, teachers, and other educational personnel. "Using action research as a model for change, TPACK is integrated throughout the action research process and grounded in the unique needs of each candidate's site (Cunningham et al., 2011, n.p.). Similarly Hechter and Phyfe (2011) engaged science teachers in action research studies exploring the facility of lessons that reside in the "space between" each of the TPACK elements—"technological pedagogical knowledge," "technological science content knowledge," and "pedagogical science content knowledge" (p. 4115). Across these studies action research appeared to be an effective means for improving TPACK (Pierson, 2008).

Investigating Technology Education Courses

University based researchers have also used action research to study the effectiveness of their own teaching about the use of digital technologies. For example, over several years a group of teacher educators collected data on the Innovations Mini-Teach project (see Foulger & Williams, 2007; Foulger, Williams, & Wetzel, 2008; Wetzel, Foulger, & Williams, 2008–2009; Williams, Foulger, & Wetzel, 2009). The Mini-Teach project was designed to help pre-service teachers investigate numerous technologies for possible integration in classroom instruction. "Instructor researchers sought to investigate the process, perceptions, and outcomes of students after their experience with the *Innovations Mini-Teach* project" (Foulger et al., p. 31). In order to investigate whether the Mini-Teach project was effective the "instructor researchers" collected data including the culminating wiki projects, focus group interviews, and questionnaires. The authors reported: "Based on their analysis of student voices, the instructors concluded that students gained high levels of expertise with their assigned innovation and became familiar with the range of innovations covered by their classmates and archived in the class wiki" (p. 36). In this case, action research proved to be a particularly robust method for investigating the affordances and limitations of a particular method of instruction on technology integration.

Participatory Action Research and Technology Integration

New computer-based technologies can facilitate participatory action research (PAR) and group action. According to Kindon et al. (2007) technology tools have been integrated into the PAR process as the focus of study as well as to help collect data and convey findings. For instance, Elwood et al. (2007) led a participatory geographic information system (PGIS) project that involved university based researchers and community organizations in using GIS to impact community planning and development. They focused on critical issues such as affordable housing and crime prevention. Other PAR projects have investigated the integration of technology to bring about change in marginalized communities. For example, PAR was conducted collaboratively by university-based IT specialists and social service providers in Taipei, Taiwain to determine the most effective approaches to integrating technology (Chang, Liao, Wang, & Chang, 2010). Another PAR study, "The Pocket School," investigated the use of "a mobile learning model of literacy development for underserved migrant indigenous children in Latin America" (Kim, 2009, p. 415) and involved multiple researchers and stakeholders. These selected examples provide a snapshot of the myriad ways technology has increasingly entered into PAR as an important tool for both facilitating the action research method and as the focus of the research.

Technology-Rich Instruction About Action Research

Emerging technologies and social media have also positively impacted the instruction of action research (see Carroll, Jenkins, Woodward, Kop, & Jenkins, 2012). Perhaps the usefulness of technology to facilitate action research is most obvious in online and hybrid action research courses (Ostorga, 2010). Increasingly university instructors and academic programs are supporting the methodological instruction of future action researchers in technology rich environments. Due in part to increasingly affordable access to technology and the individualized nature of action research projects, action research methods courses seem to be effectively taught and supported at a distance.

Technology and Action Research Networks

Computer based technology also facilitates the work of action research networks, including disseminating research results. Action researchers increasingly use multimedia to share their findings (McNiff & Whitehead, 2010). At the same time, technology supports the collaboration of action researchers by engaging researchers at a distance. According to Cochran-Smith and Lytle (2009) technology has "enabled new inquiry communities to form and communicate on-line" (p. 22). Notable examples include the Bread Loaf Network (see Lewis, Guerrero, Makikana, & Armstrong, 2002), the Carnegie Foundation's CASTL Program for K-12 teachers/teacher educators (see also Hatch 2006, Hatch & Shulman, 2005), and the Collaborative Action Research Network (CARN). According to Cochran-Smith & Lytle (2009) emerging technologies have "spawned innovative uses of technology for sharing inquiries and classroom practices with audiences" (p. 22).

Conclusion

Action research is a complex, cyclical process that systematizes reflection in action. The history of action research and current variations of the methodology reflect divergent views about practical or critical action research. Hopefully proponents of both forms of action research will begin to look across their differences to recognize the suitability of action research to answer a variety of questions in educational research.

The variability in method may actually better serve the field of educational communications and technology where paradigm debates continue to arise (Savenye & Robinson, 2004). Action research can be used to answer myriad educational research questions. It can serve as the methodology of doctoral dissertations, guide the framework of professional development initiatives that focus on technology integration, and address larger social issues. Action research provides exciting opportunities to engage stakeholders in constructing new understandings about education and technology integration and to transform our field. Technology can both facilitate the action research process and serve as the subject of study.

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