

The Research Roadmap: A Primer To The Approach And Process


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ABSTRACT

Performing research can be an overwhelming and challenging endeavor. It's easy to get confused just from collecting, reading and deciphering textbooks and journal articles. Getting organized and mapping out the entire process would be extremely helpful and more importantly provide a path for accomplishing the research project. This paper will provide a research roadmap that can be used as a guide for accomplishing a research project or a doctoral dissertation. It will discuss research methods, ethics in research, key components, and provide a comprehensive graphic that can be used as a guide to quick-start the research effort.

Keywords: Research Methods, Roadmap, Quantitative, Qualitative, Mixed Methods, Action Research

INTRODUCTION

 n the national level, graduation rates for doctoral programs between 1960 and the present time are approximately fifty percent (DiPierro, 2007; Smallwood, 2004). For those who actually complete the coursework, nearly one third will not complete the dissertation portion (Davis & Parker, 1997). For a private university, these rates have an impact on revenue and academic reputation. As professors, administrators and mentors, the authors have wrestled with the problem of students who are unprepared for the rigors of doctoral research. Our students come from business, government, and industry. They are experienced experts in their field and want to get their doctorate for professional reasons. Most come to our program because it is an “executive” or “professional” doctorate (HLC, 2006; Leasure, 2008; Neumann, 2008), meaning, that the research projects are applied and focus on problems the students would face on a daily basis in their organizations.

A “professional” doctorate is different from the traditional research focused Ph.D. in that the doctoral students will be continuing their careers as managers and technical experts, rather than working as university researchers or the more traditional tenured faculty members (HLC, 2006; Neumann, 2007). The philosophical orientation and tools that they learn in the doctoral program provide them with the opportunity to improve processes at work, publish, and conduct research to solve problems in their work environment, thus contributing to the strategic objectives of their companies. Thus, whether these students are entering the Doctor of Management program, or the Doctor of Computer Science / Enterprise Information Systems programs, they have specific expectations (www.ctuias.edu). Many are surprised by the research requirements, given their expectation that “applied” would mean they could continue to address their work problems in their own way.

We, as their readers, professors, and mentors found, as did Fernando and Hulse-Killacky (2002), that students rarely had an understanding of the steps in the research process, or of the options available for conducting research projects. Having had little background in formal research activities, and the specific processes and protocols for conducting research, many students are surprised and frustrated when they are asked in each class to produce specific research projects. Students also tend to be apprehensive when the professional papers or dissertation work that they do requires adherence to specific protocols (such as compliance with editorial styles). Being introduced to the research process while they are completing various research projects for individual classes can leave the student without the “big picture” view of where all the research pieces fit and how the research process will complement their dissertation topic.

CONCEPTUAL FRAMEWORK

Mentoring and Social Support

A review of the professional literature identifies that mentoring and social support are two of the most helpful means of reversing this trend (Di Pierro, 2007; Bell-Ellison & Dedrick, 2008; Hall & Burns, 2009; Harris, 2007; Ku, et. al., 2007; Protvenak, 2009; Whitley & Oddi, 1998). Many of these researchers who have explored mentoring, point to the importance of demonstrating respect for the doctoral student, helping students make the transition from student to professional researcher (Hall & Burns, 2009), building social support networks (Roberts & Plakhotnik, 2009), providing continuing faculty support and guidance (Di Pierro, 2007; Melies, Hall & Stevens, 1994) in developing effective research skills through team research (Fernando & Husle-Killackey, 2002), providing tools and explanations of research processes (Hollingsworth & Fessinger, 2002), socializing students to the research process (McElmurry & Minckley, 1986) and collaborating on publishing projects (Conn, 1995; Whitley & Oddi, 1998; Whitley, Oddi & Tyrrell, 1998). Ku and associates (2008) conducted an intensive study on the mentoring needs of international students, noting that many have language, socialization and identity challenges beyond coursework and the honing of research skills. Several articles indicated that many students entering the doctoral program had little or no experience with the research process and that their understanding of research might be quite different from that of their professors and mentors (Fernando & Hulse-Killackey, 2002; Green & Bauer, 2009; Hall & Burns, 2009).

Research Process and Design Resources

A variety of textbooks provide overviews of the research process. These resources can provide structure and a depth of understanding for the philosophical orientation of various research approaches, research approaches within qualitative and quantitative approaches, and the various methodologies for each approach. Of course, there are many textbooks on research available, with many that are specific to a discipline. Those presented here are used to support the development of research skills among our doctoral student population.

Plano-Clark and Creswell (2010) outline a seven step process and demonstrate how this process frames the construction of reports of research studies. The seven steps (adapted from p. 67) include the following: (1) describe the research problem; (2) review of the literature; (3) Identifying the purpose of the research; (4) Choosing research design and data collection method; (5) Analysis of data and reporting the results; (6) Interpreting and discussing the data; and (7) evaluating the research process and publishing. This approach is very helpful in that it helps the student learn how various types of research studies (quantitative, qualitative, mixed methods, and action research) are structured, approached, and written. In learning this process, students can also learn how published research reports are analyzed and critiqued. As an entry level text, this information can provide the confidence that students need and also help them to see the relevance of various statistical procedures, the role of qualitative and quantitative research designs, and when to use each type.

John Creswell (2009) provides valuable instruction on research design. In his text on research design, he addresses qualitative, quantitative and mixed methods approaches. He frames each research approach from its philosophical roots and its purpose in the overall research approach. In an earlier text, Creswell (2007) addresses five different traditions for qualitative research. Creswell and Plano Clark (2007) offer an overview of mixed methods approaches for research designs including quantitative and qualitative approaches. This text provides a helpful comparison of quantitative, qualitative and mixed methods designs.

Maxwell (2004) provides a way of thinking about qualitative research, including how to develop reflective thinking. Wolcott (2001) provides an approach for students to find their own voice in writing up qualitative research studies. Schön (1995) zeros in on the process of reflective thinking that enables students to position themselves as reflective practitioners, providing an understanding of how to experience and explore the problems that they see in the workplace and to apply new approaches for problem solving.

Pryczak Publishing is an excellent resource for “how to” manuals for quantitative and qualitative research approaches. These manuals provide detailed (and easy to read) instructions for how to conduct various statistical

procedures (Pyrzczak, 2010), advanced multivariate statistical methods (Mertler & Vannatta, 2010), how to review research articles (Pyrzczak, 2008), how to write literature reviews (Pan, 2008), how to use sources properly (Harris, 2005) and many other topics that can assist students in enhancing their understanding of the various elements of the research process. Of course there are many other textbooks available on these topics as well. This series, available at www.pyrzczakpublishing.com, provides an economical way to focus on the specific areas that need to be developed.

Understanding the philosophical and theoretical paradigms that frame the research approaches is very important for helping doctoral students to understand the “schools of thought” or points of view for research studies. These paradigms provide the foundation of assumptions and beliefs that researchers use to direct their studies. As students learn more about these philosophical approaches and how they are used to guide research studies, they become more aware of their own points of view and philosophical orientations. Prasad (2009) provides a philosophical orientation to the various qualitative approaches to research, setting them within the intellectual framework of post modern philosophy. Creswell (2006) provides an orientation to the five traditions of qualitative inquiry, setting each within its philosophical framework. Hatch (2004) provides a view of positivist and post modern perspectives of organization theory that serves to situate the student in relation to the various theoretical perspectives for management and organizational projects. Oates (2007) explores various applications for quantitative and qualitative research for computer science. Two chapters in the book are devoted to exploring philosophical assumptions. Oates also provides excellent examples of published research reports in the references for each chapter.

There are also individual books that support the learning process around specific methodologies and research designs such as case studies (Yin, 2008), designing survey questions (Fowler, 1995; Rea & Parker 2005), qualitative data analysis (Auerbach & Silverstein, 2003; Bazeley, 2007; Boyatzis, 1998; Miles & Huberman, 1994), conducting interviews (Rubin & Rubin, 2004; Seidman, 2006), and approaches to ethnography (Emerson, 1995). For each research design or data collection methodology and analysis, there are books that provide instruction and focus for students who are struggling to understand. Supplementing course survey textbooks with titles that focus on specific tasks can help the student to develop confidence and skill. Mentors and course instructors could introduce these resources as the students begin to develop their own research projects.

For many applied doctoral students, making improvements in their communities or organizations is an important goal. The action research model provides an option that allows teamwork, continuous improvement, empowerment, and problem solving at the practice level. A variety of textbooks can be used to develop the understanding and skills for conducting action research in the community or the organization (Coghlan & Brannick, 2009; Greenwood & Levin, 2006; McIntyre, 2007; Reason & Bradbury, 2001; Stringer, 2007) and for developing action research dissertations (Herr & Anderson, 2005). While this approach to research has not been widely accepted in all doctoral programs, some of the more current books, (listed above) emphasize the research protocol and help the student deliver a professional research report that can also meet the requirements of doctoral research. This option provides students in management and in computer sciences with a more flexible approach to their dissertation process.

THE RESEARCH ROADMAP

The framework of the Research Road Map (Appendix A) addresses both the research process and a number of research options, in a matrix format with columns representing the steps in the research process and rows representing elements in the research designs. This model allows novice researchers to locate where they are in the process and compare research designs, options for methods, analysis and interpretation.

The expectation is that having this tool as a roadmap to research will alleviate some of the confusion and help students to make better research project choices. If provided at the beginning of the program, the student can use the Research Road Map to track what they are learning in each of the courses, thereby linking together the concepts, processes and philosophical orientations of the various research elements. This should also assist them in approaching their dissertation project or their professional articles with more confidence.

The Process

The first step of the Research Roadmap is to lay out the process for the research project. The process includes nine tasks: Topic selection; Purpose Statement; Research Question; Literature Search; Research Methodology/Design: Data Collection Tools; Research Proposal; Collection & Analysis: and Reporting. It is also important to note that while the sequence “looks” linear in the model, in actual practice there is a great deal of iterative or recursive effort, circling back, to refine and revise earlier steps. It is also important to note, that depending upon the research design, some of the linear steps are actually done simultaneously (i.e. data collection and analysis). As the student gains more confidence in each of the process steps, it will become necessary to make adjustment to earlier steps. Helping students to recognize the sequence of the various research activities that are required and their role in the research process (i.e. defining a topic, choosing the research question, completing the annotated bibliography and the literature review) can make doing research based projects more meaningful and beneficial. Plano Clark and Creswell (2009) address the process of both qualitative and quantitative research by having the student identify the elements of the process in published articles. Thus, the students are able to see how the process looks in published form. It is also helpful to have students examine completed dissertations. Proquest online database (n. d.; 2009) provides a search option to find dissertations on a variety of topics that can demonstrate what is expected in the final project. And, the student can use the completed dissertation and a research article to identify the specific elements of the research process. This will give them a much better understanding of how the process steps show the progression of the research project.

The Research Options

Throughout the doctoral program (and even within many master’s degree programs) conducting small research projects is part of the pedagogical design. It has been our collective experience that students enter into these projects blindly, and try to complete the project by rote, not understanding the reasons behind research designs and methodologies. By linking the aspects of the various research designs to the stage of the research process, students can see where they are going, and what options are available to them. The resource texts can provide the necessary “how to” for each choice. The Research Road Map identifies four research options: quantitative, qualitative, mixed methods and action research.

RESEARCH METHODS AND DESIGNS

Quantitative Research

Quantitative research methodology is a powerful form of inquiry. For most students, this is the type of research they have come to expect and what they understand as “research.” Students will recognize the process from their high school science fair days: (1) Ask the question; (2) Conduct the background search; (3) Construct a hypothesis; (4) Create an experiment to test the hypothesis; (5) Analyze the results of the data and draw conclusions; (6) Disseminate results in a report. Philosophically, this form of research comes from the Positivist perspective (Creswell, 2007; Hatch, 1997; Oates, 2004; Prasad, 2005). Researchers from this intellectual camp look for universal laws and govern cause and effect. They look for the “one” theory that explains everything. Their focus is on what they can see and observe and they test their ideas or assumptions by manipulating the variables of their study. Plano Clark and Creswell (2009) outline five different categories of quantitative research designs: experimental, quasi-experimental, single subject experiments, correlation, and survey research designs. Each one of these is designed to solve a different type of research problem. It is important that students understand the purpose and focus of each one. It is also helpful for students to explore published research reports that address each one of these designs. Doing so will also make them aware of the value and benefits of learning the various statistical analysis procedures; and they approach those classes with an eagerness that is missing when this step is ignored.

An example of a quantitative research project would be developing an electronic component based on two different kinds of software. The research question might be which software enables the electronic component to perform faster and more efficiently. The hypothesis is that software A will outperform software B using a specific set of criteria. The research design would be to conduct an experiment and based on a specific set of criteria the performance is measured to determine the best performing and most efficient software for the electronic component.

The focus on hypothesis testing is really what distinguishes quantitative versus qualitative research (Creswell, 2006).

Qualitative Research

The qualitative research methodology developed out of the social sciences and can trace its roots to anthropology and sociology. The philosophical paradigm that shapes the assumptions of qualitative approaches is that of the post modern approach, rather than the positivist approach that characterizes the scientific method and the quantitative research designs. Prasad (2005) and Hatch (1997) address the differences between these two approaches from the research perspective and from the organization theory perspective. Helping students to learn the philosophical foundation for qualitative research helps also to understand the reasoning behind the five different research designs that are commonly used in qualitative research: phenomenology, ethnography, case study, narrative, and grounded theory research. Prasad (2005) also addresses a variety of other research designs in qualitative projects such as dramaturgy, ethno methodology.

Researchers who use qualitative research designs for their studies are interested in understanding, in exploring, and discovering. They use interviews, focus groups, analyze documents, observe behaviors in groups, investigate culture, and look for trends and patterns in the data they collect. In the grounded theory approach (Charmanz, 2006), the research actually builds a theory from the data that is collected and can even establish a set of propositions or hypotheses that could be tested using quantitative approaches. An example of a phenomenological qualitative research study could be interviewing individuals to find out their experience with losing their jobs and what that experience means to them. Another example (ethnographic) could be the exploration of the culture of an organization to determine what the important symbols of that culture might be and what those symbols mean to various member of the organization. Trends and themes can also be identified from documents such as interview transcripts, observation (field) notes, emails, letters, contracts, annual reports, and articles, using various coding schemes and classifying those codes into categories (Boyatzis, 1998). Results and conclusions from the study may generate recommendations or even more questions that need to be further researched.

Mixed Methods Research

The mixed methods research approach is often considered the most powerful since it combines the power of quantitative and qualitative research approaches (Creswell & Plano Clark, 2006; Greene, 2007). The mixed methods research strategy could be applied to both case study and a survey research design. Many researchers use mixed methods approaches as a way to increase the validity of their research process. For instance, surveys could capture quantitative data that could be used in a correlation study that describes the relations between variables. Interview or focus group data used in the same study could provide a more in depth understanding of what the situation under study means to the subjects. An example of this type of research methodology is a case study that explores an organization's processes. Processes are observed, changed, measured, compared, and the results are statistically analyzed. The research methodology uses the case study (qualitative) to set the stage for the research study and may use surveys, or quasi experimental designs, or correlation studies (quantitative) to establish cause and effect, or relations between specific variables within that organization's processes. The researchers could also go one step further and conduct interviews or focus groups to see how the individuals in this particular organization (the case) experience specific processes. The order in which the qualitative and quantitative approaches are used depends upon the questions that are being asked (Creswell & Plano Clark, 2006).

Action Research

This research methodology provides a great way to approach solving a problem, improve a process, or empower employees (community members). Action research can be used in any type of setting. It is process oriented and the goals are pragmatic. One of the key characteristics of many forms of action research is that the organization or community members serve as co-researchers. Participatory Action Research and Community Based Action Research focus on empowering the members of the organization or community through the research process (Reason & Bradbury, 2000; Israel, Eng, Schultz, & Parker, 2008). The iterative nature of action research methodologies is very similar to performing a quality process improvement effort within an organization, and in

general is reminiscent of the Shewart model (1939), Plan, Do, Check, Act (PDCA), or the Deming (1986) approach Plan, Do, Study, Act (PDSA). Action research projects can be conducted using quantitative, qualitative or mixed methods designs. Although there are a number of implementation models, the basic approach is a spiral process which includes identifying the problem, fact finding, planning, taking action, and evaluating and correcting as necessary (Coghlan & Brannick, 2009). A good example of an action research project could be found in organization that operates a sales call center. The call center is dropping a high number of calls thus losing potential revenue. A process team is assembled, data is collected, reviewed, and an action plan is developed. Corrections are continuously implemented until the call center metrics have shown continuous and positive improvement. Action research creates a structured process that not only helps to solve the problem, but also provides a documentation trail for organizational learning and for adding to the knowledge of the field in general.

Ethics in Research

Whether in our daily lives, jobs and especially in research ethical behavior is critical in order to protect our personal and organizational integrity. Ethical considerations in research projects include three issues (NIH, 1979): (1) do no harm—benefits of the research outweigh the risks; (2) respect—maintaining an awareness of intellectual integrity and personal responsibility for the impact that research processes have on participants; (3) Fairness and justice—who bears the burdens; who receives the benefits. While conducting research it is imperative that the entire research process is monitored and carefully administered to ensure each step of the process is following the highest standards of conduct possible. Regardless of the research methodology implemented honesty, intellectual property, use of human subjects, confidentiality, and social responsibility must each be considered during the entire process (Resnick, 2010; Trochim, 2006).

Researchers will not have to look too far to find examples of unethical behavior. In research, ethics are crucial in order to maintain credibility of the researcher, the team, and even the organization conducting the research project. Once the information, analysis, results, and conclusions have been compromised the value of the research could be rendered invalid. Several areas of ethical behavior are included in the research process, some of these include: (1) data—collection, maintenance, sharing, and ownership; (2) training—responsibilities of research mentors and trainees; (3) publication—practices and responsibilities of authorship; (4) bias—conflicts of interest in research; (5) professional conduct; (6) rights and protection of human subjects (respect for persons); (7) protection of animals used in research; (8) peer review; and (9) collaboration with sponsors and client populations. Some of the ethical violations that could occur, either consciously or unconsciously include: (1) violating agreements of disclosure; (2) violating confidentiality of participants; (3) invoicing for work not done, or excessive charges; (4) misrepresentation of the results of the study; (5) deceptive interactions with participants (ignoring informed consent); (6) disregarding legal liability for risks.

Typically, each institution that supervises research for educational or professional purposes will have an Institutional Review Board (IRB). The purpose of the IRB is to ensure that ethical behaviors and procedures are followed in all research activities. The role of the IRB is to approve and require modifications prior to beginning the research project, or disapprove the research effort. Furthermore, the IRB provides an oversight function for research conducted on human subjects that are scientific, ethical, and regulatory in nature. The U.S. Department of Health and Human Services, Office for Human Research Protections (Penslar, n.d.) provides an online guide for implementing Institutional Review Boards. Prior to accomplishing any research project the institution will more than likely require the researcher and research team receive research ethics training. The Collaborative Institutional Training Initiative (CITI, n.d.) provides online training. It is highly recommended even if it is not required by the institution that every individual engaged in research receive this training prior to beginning the research effort.

RESEARCH COMPONENTS

Research Strategy and Plan

Having a solid research strategy and developing the plan early in the research process is critical to success. Not only will it help organize the entire research effort but more importantly provide a blueprint or roadmap by which the researcher can conduct the research. Think of this activity as a pre-proposal effort. It can however, be

used throughout the development of the proposal. Too often, researchers will jump right to developing the proposal with little to no thought of planning and even if the research is usable or will add to the overall body of knowledge in the particular discipline or profession.

Carefully crafting a solid strategy and plan will help ensure the highest quality research effort or study. A strategy or plan will also help focus and structure the research and process and ensure the researcher will have an overall view of what, when, where, how, and why for performing the research.

A good way to begin to develop and formulate a research strategy and plan is to map out a simple box drawing of the entire research effort. The boxes on the drawing can represent and link major milestones, activities or events covering the entire process (from topic selection to final research report). Along with the map, a timeline can be applied so it becomes apparent as to how long each task will take. Keep in mind this is only an estimate of the time it may take to accomplish a particular task. However, the estimate will at least give the researcher an idea of the total amount of time it will take to accomplish the research project. Now that the researcher has assembled a simple box diagram drawing and the timeline the researcher can begin detailing the milestones and fine-tuning the box diagram drawing to the specific details for each of the major milestones or activities for the entire process. The researcher may have to perform several iterations to better define the box diagram in the end, the researcher will have a visual and sequential map with a timeline of the research project. The map can be included in the research proposal and it can be used and included as part of the proposal outline. Again, this is a great way to visually illustrate the research process as well as provide an overview of the entire research project. The visual roadmap will also help the research audience to better understand the project as well as ensure the researcher has not missed or overlooked any major steps in the overall process.

Topic Selection

Selecting a topic that the researcher desires to analyze and assess is the beginning of the research effort. The topic must be sufficiently narrowed so it can be adequately quantified and studied. A good process step to begin the research effort is to review professional journals and articles, previous research initiatives, formal reports, and doctoral dissertations. Most documents will include a section that will identify areas that are in need of additional research or recommendations for further study and analysis.

Purpose Statement

The research effort or study must include a purpose statement. This statement must be clear, concise, detailed, and describe the intent of the research. The purpose statement should also include the outcomes or results the researcher reasonably expects as a result of the research. Plano Clark and Creswell (2009) explain that the role of the purpose statement is to define the direction of the study. Once the purpose is determined, the researcher can develop the research questions, select the appropriate research design, data collection and analysis procedures. In quantitative research projects, the purpose is to measure differences or to make predictions. In qualitative research studies, the purpose is to gain an in-depth understanding of what a particular situation, phenomenon, or experience means to individuals, groups, or cultures. To get to the purpose, the researcher would explore these issues: (1) what the project is about; (2) the nature of the problem that needs to be addressed; and (3) what the researcher intends to do (Plano Clark & Creswell, 2009).

Research Question

The key research questions should be derived from the purpose statement. The questions should also help narrow and further focus the research. The research questions need to clearly state what will be studied or investigated. What does the researcher want to find out? What is the best way to do that? A good approach for developing a solid research question is to begin with a general topic and then begin to narrow the topic down to a specific question. Once the research question is crafted it will form the basis for the research project. The researcher should not approach the research effort to prove anything. Depending on the question, the researcher might be looking for cause and effect, for trends or perceptions, or perhaps explore relationships, or understand the experiences of and the meaning of those experiences for an individual, group or culture. The research question is

related to the design chosen for the research. Qualitative researchers use research questions to guide the process of discovery. Often, as the research project unfolds, and the researcher learns more about the individuals, groups or culture being examined, the research questions are refined (Charmaz, 2006; Creswell, 2006; Greenwood & Levin, 2006).

Literature Search

Maxwell (2005) and Prasad (2006) explain that researchers approach their project from a specific point of view. This point of view can be grounded in a philosophical perspective (i.e. feminism, post modern, post structural) or it could be informed in specific theories or models that have captured the attention of the researcher. These perspectives make up the conceptual framework of the researcher in relation to the issue being studied. In addition, examining and cataloging the theories, models, or specific research approaches to the problem by previous researchers is an essential analysis process for understanding the background of the topic and also for identifying what is missing from prior research. The initial research effort should include a broad investigation regarding the subject or topic (Galvan, 2006). The project researcher will perform a fairly exhaustive search to ensure pertinent information is appropriately acquired and reviewed. The literature review will also help to identify definitions, important variables, and create a trail of the development of the current state of practice in the field (Creswell, 2009). The researcher would also take steps to verify the credibility of the author and the philosophical perspective of the author (Pan, 2004). The next step will be for the researcher to narrow the results of the literature review to the most related and specific information that will support the research project study. Missing an important document or study can potentially cause hypothesis statement problems and errors of interpretation later in the research process. Reviewing the literature can also provide suggestions for approaches to studying the topic, for methods to use for gathering and analyzing data, and for sampling approaches (Pan, 2008; Patten, 2009). To help organize the research materials the researcher can use a literature map, chart, or matrix that illustrates the connectivity and relationship to the study effort (Galvan, 2006; Garrard, 1999; Orcher, 2006). From there, the researcher would develop an argument or approach to the literature review (Machi & McEvoy, 2009; Maxwell, 2005). A conceptual framework (visual model) would be developed to illustrate the relationships among the variables or the concepts that inform the work (Maxwell, 2005).

Annotated Bibliography

Developing an annotated bibliography is another procedure to organize research information. Most academic organizations require this deliverable as part of the initial research process. What the annotated bibliography will display is that the researcher read and understands the materials gathered. It also identifies critical research issues that directly support the study topic, such as research designs, methodology, samples and findings. Excellent resources for developing annotated bibliographies are located at various university websites (Cornell University, 2010; Purdue University, 2010).

Research Methodology and Design

The purpose will also provide clues to the type of research design, whether qualitative, quantitative, mixed methods, or action research in approach (Campbell & Stanley, 1963; Coghlan & Brannick, 2009; Creswell, 2006, 2008; Creswell & Plano Clark, 2006; Lodico, Spaulding, Voegtler, 2006; Maxwell, 2005). Quantitative designs include experimental, quasi-experimental, single subject experiments, survey and correlation approaches (Plano Clark & Creswell, 2009). Qualitative designs include narrative, phenomenology, ethnographic, case study, grounded theory approaches (Creswell, 2007; Plano Clark & Creswell, 2009). Prasad (2005) explores a variety of unique research designs such as ethnomethodology, dramaturgy, critical theory, and feminist studies. Mixed methods approaches are explained by Creswell and Plano Clark (2006) and Greene (2007).

The design strategy selected is the key to the research plan. The plan needs to be developed early in the process and specifically defined in the research proposal. Think of the design as the entire research approach and plan that includes specific procedures as to how the study will be conducted. The research design will drive the selection of the data collection tools and processes as well as the procedures used for data analysis. It should be noted the study researcher may have to accomplish a number of iterations of the entire research strategy and plan

until every section and all procedures are completely and thoroughly specified.

Research Proposal

The research proposal outline should be considered to be similar to a formal contract. The proposal outline will describe and detail the entire research process, information collection, data analysis, and final report writing effort. At a minimum, the proposal will contain the following major topic sections: Topic, Problem Statement, Review of the Literature (or Conceptual Framework) Purpose, Research Question or Hypothesis, Definitions of Terms, Assumptions and Limitations, Methods and Procedures, Results and Conclusions, Ethical Considerations, Timeline and Major Milestones, and the list of references. Each of the sections must contain detailed information and not guesswork. This is where developing a good overall research strategy and plan can help. Keep in mind the research organization may have a specific format or requirements they may want the researcher to follow for both the proposal and the final research report.

The research proposal will consist of a formatted document, formally presented for review and comment before the research project is approved. Often more than not the researcher may find research itself in an iterative process before the proposal is finally approved to proceed. The researcher should not be discouraged the situation is very normal. The study researcher should not be afraid to ask for help and guidance. Mentors and instructors can be very helpful in providing guidance (Bell-Ellison & Dedrick, 2008; Green & Bauer, 1995; Hollingsworth & Fessinger, 2002). In addition, examples of completed dissertations can be found in online data bases such as Proquest or in the University's library. Seeing how a completed dissertation looks can alleviate much of the apprehension on the part of the student. In fact, it is very helpful for students to be encouraged to explore dissertations a part of their literature review process. Libraries might consider subscriptions to the Proquest UMI Dissertation Service (Proquest, 2009). The more reviewer assistance the researcher has assessing the research proposal the more insight the student researcher can gain. External reviewer assistance could provide the researcher with invaluable ideas based on other experiences, similar research conducted, and from individuals with different skills and perspectives.

Data Collection

The methodology section of the research paper includes sampling strategies, data collection and data analysis. The data collection process varies with the design of the research. Quantitative researchers use surveys, specific measurement tools or instruments, set up control groups, test hypotheses, and look for relationships among variables or to set up processes for identifying predictions (Campbell & Stanley, 1963; Creswell, 2007, 2008; Creswell & Plano Clark, 2006; Lodico, Spaulding, Voegtle, 2006; Plano Clark & Creswell, 2009). Qualitative researchers use various types of interviews (including focus groups), observation and field work approaches, or the examination of documents and artifacts (including photos, letters, diaries) (Creswell, 2007, 2008; Plano Clark & Creswell, 2009).

Sampling

Selecting the participants, items and sites for the data collection requires different strategies for different research designs. For instance, in the experimental projects for quantitative research designs, random sampling is essential. This process provides confidence that the results do not occur by chance and adds to the ability to generalize the results from one setting (or sample population) to another. Sample sizes in quantitative projects are often very large (Lodico, Spaulding, Voegtle, 2006). Statistical procedures for demonstrating confidence require large numbers of data sets. However, in qualitative research, the goal is to explore unique situations, experiences, or phenomenon in depth. Thus, samples are selected with a purpose. Purposeful sampling allows the researcher to find those individuals, groups, cultures, or documents that best represent the issue being studied (Plano Clark & Creswell, 2009).

Data Analysis

The analysis that the researcher conducts will depend on the research methodology implemented. Quantitative studies use analysis approaches that include the use of descriptive, correlation, and inferential statistics (Orcher, 2005; Mertler & Vannatta, 2010; Plano Clark & Creswell, 2009; Pyrczak, 2003; Triola, 2007). Data analysis in quantitative studies is a discrete process that occurs after all of the data has been collected. Data analysis in qualitative studies includes a variety of approaches (axial coding, analysis of themes, thick description, structural description, personal bracketing), depending on the type of study being conducted (i.e. narrative, phenomenological, grounded theory, case study, or ethnographic study). Boyatzis (1998) explains a process for development of thematic codes used for qualitative studies. Creswell (2007) introduces a spiral approach for analyzing data and also provides a set of models that can be used for various qualitative projects. Creswell (2007) and Merriam (2009) both emphasize that the process of data analysis begins as soon as the data is collected; the stages of the research process in qualitative projects are not linear, but rather iterative and recursive.

Given the vast quantities of data collected in both quantitative and qualitative approaches, computer assisted qualitative data analysis software (CAQDAS) is an essential. SPSS provides a set of statistical tools that researchers can use to analyze and display data (SPSS, Inc., 2009). Microsoft Excel can also be used to analyze statistics (Dreztko, 2008). For storing and organizing qualitative data there are a variety of software programs. Data analysis is supported by providing tools for archiving phrases, sentence fragments, themes, codes (labels) and data from various levels of analysis. NVivo (QSR International, 2007) is one of the most common programs (Bazeley, 2007). Merriam (2009) provides an overview of a variety of other CAQDAS programs, including those available at no cost from the Center for Disease Control and Prevention such as AnSWR (2009) and CDC EZ-Text (2009).

Reporting

The research report is just as important as the rest of the research process. The final report can be a published article, a dissertation, evaluation report, or other formal paper that allows the researcher to formally document the research strategy, methodology, sources, analysis, and results (Czarniawska, 1999; Miles & Huberman, 1994; Wolcott, 2001). For doctoral students, the dissertation is the research report. For projects using a qualitative research design, the dissertation is presented in chapters that correspond to the step by step process of the scientific method. The same is true for qualitative research reports published in peer reviewed journals. Typically, a research proposal is developed and when approved the researcher will be required to follow the proposal submitted just like a contractual obligation (Creswell, 2007; Glatthorn & Joyner, 2005; Herr & Anderson, 2005; Merriam, 2009; Plano Clark & Creswell, 2009). The reports follow a systematic process. For quantitative research reports, the steps of the quantitative research method are used as the structure of the report. For qualitative research reports, the purpose of the project and the nature of the themes being addressed will provide a framework for the report.

RECOMMENDATIONS

Students and researchers need guidelines and procedures for conducting research projects. Additionally, they need to have a structured approach that allows them to identify where they are, where they are going and how to get there. The “box diagram” illustrated by the Research Roadmap provides that structure. The many references described provide resources that can help the novice researcher gain a solid foundation, or even the seasoned researcher to add to his or her repertoire of techniques and strategies. The goal is to improve the research process and make it more transparent for both the student and the mentor guiding that student.

SUMMARY

Research can be a daunting experience if the appropriate planning is not accomplished up front. Even more important, is understanding of the entire research process and the steps necessary to produce a solid research effort. This paper provided a roadmap of the research process, common designs, and the activities throughout the entire process. Finally, some recommendations are provided to further guide the researcher through the process.

The references cited in this paper are an excellent source for gaining a greater understanding of the details for each of the research approaches.

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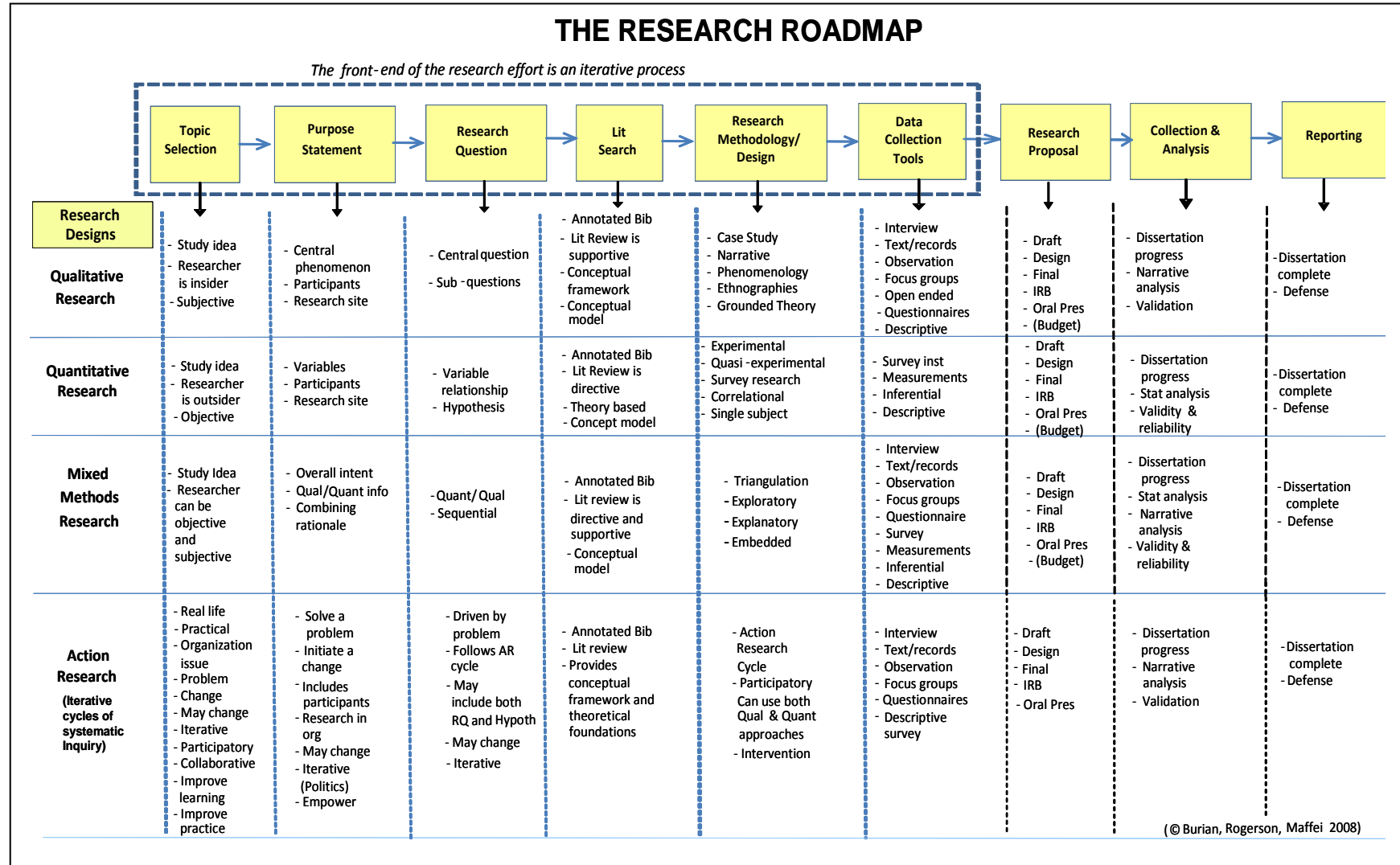
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APPENDIX A – RESEARCH ROADMAP MATRIX



NOTES