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Abstract
The field of mixed methods research abounds with opportunities for creative development in terms of methodological advances and potential to contribute to important and complex societal problems. Inspired by issues that arose in the Mixed Methods International Research Association task force report on the future of mixed methods, this article contemplates its implications for challenges and opportunities for the mixed methods community for advancement in philosophy and methodology, innovative designs, technological advancements and big data, preparation of mixed methods researchers, and responsiveness to complex societal problems. We invite the mixed methods research community to participate in the conversation about these important, as yet unanswered, questions relevant for the future of mixed methods research and the world.

Keywords
future, social justice, mixed methods design, training, transformative

The use of mixed methods in research can be traced back centuries, yet it is only in the late 1980s and early 1990s that mixed methods research was recognized as a “distinct and self-

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conscious strategy” (Maxwell, 2016, p. 12) with attention focused on how to combine quantita-
tive and qualitative methods in systematic ways. Developments in the field have increased dra-
matically in the ensuing decades and have led to what might be considered to be an
embarrassment of riches fraught with challenges. The world of mixed methods research is in
some ways like a kaleidoscope—an elegantly simple device made of a cylinder, mirrors, and
pieces of plastic or glass that produces seemingly unpredictable patterns full of rich possibilities
for diversity and potential to provide opportunities to see things that have not yet been seen.
But unlike the kaleidoscope, which produces patterns on a random basis, we write to encourage
systematic thinking about the rich possibilities and challenges open to the mixed methods
research community in the coming years in terms of fresh understandings of methodology, pre-
paration of mixed methods researchers, and advances in our abilities to be responsive to com-
plex societal problems. Within that systematic process, we also believe that encouragement of
creativity and openness to new ideas is necessary for the field to progress. Maintaining a spirit
of creativity and openness in the context of advancements in the field of mixed methods brings
an exciting and challenging tension into our future.

John Creswell, in his role as the president of the Mixed Methods International Research
Association in 2015, established a task force to examine issues related to the future of mixed
methods for the next 5 years. The task force report, The Future of Mixed Methods: A Five Year
Projection to 2020, is available at the website (www.mmira.org). This article extends the report
by focusing on the questions and challenges that the mixed methods community faces in the
future. To this end, we explore the movement of the field in terms of conceptual advancements,
technology and big data, preparation of researchers, and application of mixed methods to com-
plex problems.

Conceptual and Methodological Advances in Mixed
Methods Research

The field of mixed methods has contributed to the advancement of understandings about the
philosophical assumptions that guide researchers. Rather than stagnating in “paradigm wars,”
the conversation about philosophical frameworks now reflects an encompassing spectrum of
options some of which are quantitatively dominant mixed methods designs (White, 2013), qua-
litatively dominant mixed methods designs (Hesse-Biber, 2013), pragmatic mixed methods
designs (Hall, 2013; Tashakkori & Teddlie, 2010), transformative mixed methods designs
(Mertens, 2013, 2015a), and dialectical pluralism as a meta-paradigm that allows conversations
to occur across paradigms (Greene, 2007; Johnson & Stefurak, 2013). This multiplicity of para-
digmatic stances associated with mixed methods provides space for dialogues across philoso-
phical assumptions that can be challenging and potentially productive. Among the challenges
facing the mixed methods research community in the future is the need for an improved under-
standing of the meaning of the word paradigm and how it is interpreted in different disciplines
and different research traditions. Questions for future exploration include the following: What
is the level of understanding of this concept and what is the usefulness of the concept for
furthering understandings of methodologies? How can researchers clearly articulate the philoso-
phical assumptions that guide their work? What are the methodological implications of articu-
lating assumptions that frame mixed methods research studies?

In terms of methods, the mixed methods community has moved far beyond the idea that
good practice of mixed methods means that the researcher includes a survey and focus groups.
While these two data collection practices may indeed be appropriate for a specific study, the
development of newer approaches to design, data collection, and presentation of findings
provides opportunities and challenges. Developments in mixed methods design such as cyclical designs seen in design research (Philip & De Bruyn, 2013) and transformative mixed methods cyclical designs (Mertens, 2015a; Mertens & Wilson, 2012) are providing frameworks for flexible designs in which information from early phases of the study inform the next steps in the research. Cyclical design–based designs are used to progressively inform the development, implementation, and revision of intervention research studies. Transformative mixed methods cyclical designs are similar in some respects to this, but they are planned and implemented with a social justice lens. These elaborate designs allow for use of mixed methods in different ways at different times in the study while enhancing the quality of the findings by providing opportunities for adjusting the research design to be responsive to early results.

Challenges associated with such designs include how to incorporate findings from earlier cycles of data collection into the modification of the next cycle of data collection and how to tie the findings to changes in policies and practices in more deliberate manners. Designs with multiple phases and extended timelines also present challenges in terms of time, money, and the expertise of the researchers to carry out a multidimensional study and maintain relationships with stakeholders over a sustained period of time. Additional questions about advancing methods in the future include the following: How can researchers integrate quantitative and qualitative thinking at all levels of the research study, that is, at the philosophical and theoretical levels, for data collection and analysis, and for reporting and use? How can the mixed methods community provide a supportive environment for creative thinking and the emergence of new methodological combinations? When are design-based investigations and cyclical design–based investigations appropriate and not appropriate? How can different designs be used to more effectively involve stakeholders at different points during the research?

Technology and Big Data

Ongoing developments with technology used in data collection, analysis, storage, and reporting continue to advance and to present challenges. Access to “big data” is one example of a challenge that mixed methods researchers are likely to encounter in the form of accessing data that were not collected for a specific study. This raises concerns about the quality of the data, its relevance, the ability to merge data across data sets, levels of analysis that are possible, the integration of quantitative and qualitative data, and confidentiality issues (Hesse, Moser, & Riley, 2015). Future technical questions arise about appropriate statistical techniques to use with such massive data sets, how to integrate their statistical uses with qualitative components, as well as questions about sharing data and using it in constructive ways to advance knowledge. For example, future challenges might include that “big data” can be regarded as a population value because they can contain data on an entire population in contrast to a sample of the population. In the past, researchers sought to generalize their results based on a representative sample to the population from which the sample was drawn. How will mixed methods research change to adapt to data from an entire population when developing and testing of theory. Tests of significance with very large samples can potentially be misleading. Also, certain relationships may be specific to certain contexts. The future brings methodological challenges as well as ethical challenges when big data are used and when they are combined with contemporary data that may come from different (and smaller) samples.

The use of secondary data, even if they are not “big data,” carries similar challenges. The ubiquity of mobile phones and other technological devices that can be used to capture or record data by a specific act of the participant, for example, through surveys administered online, or through mapping applications, overt or surreptitious video or audio capture, or online social networking sites, raises issues of ethics and strategies for appropriate inclusion of such data in
mixed methods studies (Fielding & Fielding, 2013). Such ubiquitous data collection raises questions for future consideration in the mixed methods community about the potential to include a wider range of stakeholders, as well as ethical questions about transmission of personal images, faces, and activities that is possible when data are collected everywhere by everyone (Bonney, Phillips, Ballard, & Enck, 2016).

Another aspect of digital tools that is relevant to mixed methods researchers is the use of data visualization as a method for analyzing data, sharing results, and engaging with stakeholders in innovative ways (McCrudden, Schraw, & Buckendahl, 2016). The use of graphical and pictorial displays can be used to combine quantitative and qualitative data that provide new insights not possible with data restricted to statistical results or words. This is an emerging area that provides opportunities and challenges as mixed methods researchers develop strategies for using data visualization as a means to engage with stakeholders in new ways.

### Preparation of Mixed Methods Researchers

Training for researchers in academe was traditionally discipline based and divided the world into either quantitative or qualitative methodologists for the most part. The legacy of this traditional divided approach is that many issues and questions arise when claims are made that it is possible and desirable, in some situations, to combine methods. In the future, mixed methods researchers can explore and illustrate the need for transdisciplinary approaches that use mixed methods and implications of working on such a team for the preparation of mixed methods researchers. Preparation of mixed methods researchers brings with it challenges in the form of determining how to support research that is transdisciplinary, incorporates both quantitative and qualitative methods, and has the ability to integrate those methods at multiple levels in order to reflect the questions of interest in the context of the purpose (Bazeley, 2003). These issues raise questions about how the professional mixed methods community can prepare mixed methods researchers to focus on the consistency between the purpose, the problem, the research questions, and the research methodology (Newman & Covrig, 2013).

These challenges are relevant for the future preparation of faculty who teach mixed methods, their undergraduate and graduate students, as well as practicing professionals in multiple research communities. In situations in which a specific methodological/philosophical orientation is entrenched (whether that is postpositivist or constructivist), a future challenge is how to engage with members of the faculty and student body or professional development specialists to create a culture shift—a will to change to accept a different idea about research that is inclusive of mixed methods approaches. How can theories of change be brought into the process to incorporate ideas for supporting those who are leaders and innovators in the use of mixed methods?

In the future, what form should the preparation of mixed methods researchers take? This is a major challenge. For example, what should be the sequence of courses in academic programs to effectively prepare mixed methods researchers? What should be included in the curriculum materials that are used in undergraduate or graduate courses? What is needed in terms of ongoing professional development for mixed methods researchers to increase their abilities to use these methods effectively? How can the preparation of researchers insure that there is sufficient shared understanding of concepts in mixed methods without restricting the possibility for the emergence of newer, better concepts? What are the essential skills needed for mixed methods researchers and how can that be organized into effective training? How can professional preparation be designed to encourage cross-disciplinary and cross-methodology work?
Mixed Methods and Complex Social Problems

The ever-expanding repertoire of methods that is emerging in the mixed methods community leads to the possibility that researchers will be able to address questions about and design studies to address complex conditions in society in ways heretofore not considered feasible. One area of challenge for mixed methods researchers is consideration of the role of the research community with regard to what are termed wicked problems. Wicked problems are problems involving multiple interacting systems, replete with social and institutional uncertainties, for which there is no certainty about their nature and solutions, and for which time is running out to find solutions (Levin, Cashore, Bernstein, & Auld, 2012; Mertens, 2015b; Rittel & Webber, 1973). Additional concepts related to researching wicked problems include the need for researchers to address power inequities, violations of human rights and impediments to social justice, and strategizing for action in the form of policies and behaviors (Mertens & Wilson, 2012). Examples of wicked problems include environmental degradation and climate change, poverty, lack of access to health and educational services, social and economic inequality, geopolitical instability, migration, forced repatriation, and violence. Given the complex nature of wicked problems, future challenges for mixed methods researchers include how to bring multidisciplinary teams together to share their expertise in respectful ways. While this is not a new problem, it is one that continues to challenge researchers and so warrants continued attention by the mixed methods research community.

Mixed methods has the potential to contribute to finding solutions to wicked problems because it stimulates new kinds of questions and involves the use of innovations in methodology needed to address complexity. Future challenges include how to methodologically, technically, and creatively bring mixed methods to finding solutions to wicked problems in terms of researchers’ roles as they advocate for social justice, engagement with policy makers and those in political power, and respectful relationships with members of marginalized communities. In the future, how can mixed methods researchers explore new territory in terms of developing strategies for enhanced citizen participation in science, as well as appropriate and respectful engagement with indigenous peoples, people with disabilities, people who live in poverty, deaf people, racial and ethnic minorities, and others who experience discrimination and oppression in their daily lives (Cram & Mertens, 2015). What kinds of mixed methods designs will support the conduct of research that increases the potential for transformative change? What safeguards need to be in place to insure that change is positive and constructive and not introducing additional harm?

Conclusions

Mixed methods researchers hold a kaleidoscope in their hands—rich in possibilities for new discoveries and full of challenges. In this article, inspired by deliberations in the development of the 2016 Future of Mixed Methods research report, we raise questions that challenge the mixed methods community to advance our field conceptually, philosophically, and methodologically. We also raise questions about the use of technology and big data, the preparation of mixed methods researchers, and the application of mixed methods to formulate solutions to wicked problems; that is, those that are in urgent need of solutions, are complex, and for which no current solutions are known.

We encourage the multidisciplinary and methodologically diverse members of the mixed methods research community to reflect on the questions and challenges raised in this article, to read the task force report, and to contribute to the conversation about how to systematically improve mixed methods research approaches—all without stifling the need for flexibility and
creativity, while enhancing our abilities to be responsive to stakeholders through the development of new methodologies and methods to address increasingly complex questions. We believe that the consequences of engaging in this conversation will be the improvement of thinking about the assumptions that guide researchers, the question-asking process, and the conduct and applications of mixed methods that will contribute to a better society.

Authors’ Note
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