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A Systematic Review of Research Questions in Mixed Methods Studies in Instructional Design

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ABSTRACT

Researchers' reliance on using mixed methods for in-depth understanding of a phenomenon is on a rise. This review provides a synthesis of studies using Mixed Methods Research (MMR) approach in the field of instructional design, with a particular focus on research questions. The results show that of the 752 articles published on MMR in the instructional design field, only 80 studies framed the research questions that were consistent with the practice of MMR. Of those 80 studies, findings revealed that experimental research questions and descriptive research questions were the most popular types of research questions used. Furthermore, the MMR articles were published in multiple (n=59) peer-reviewed journals are mostly in higher education (44%) and K-12 settings (42.5%). Although, there is a steady increase in the application MMR with the highest number of studies published in 2018 (29%) and 2017 (25%), the number of articles that accurately frame research questions were very low. This study revealed a need to build instructional design researchers' ability to use MMR questions in their studies. This report suggests optimal ways to develop research questions that are grounded in the fundamental principles of MMR.

Keywords: mixed methods, instructional design, mixed methods research questions, mixed methods research questions framework

INTRODUCTION

The mixed methods research (MMR) approach has been extensively applied across different disciplines to address complex research study purposes since the early 1970s (Plano Clark & Ivankova, 2016). Researchers recognize acceptance of MMR as the third research paradigm (Johnson & Onwuegbuzie 2004), the third methodological movement (Tashakkori & Teddlie, 2003), the third research community (Teddlie & Tashakkori 2009), and the third research approach (Creswell, 2014). In this paper, we apply the definition that the MMR design as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts, or language in a single study or set of related studies (Johnson et al., 2005).

The first Handbook of Mixed Methods in Social and Behavioral Research edited by Tashakkori and Teddlie in 2003 reviewed examples and discussed application of MMR across different disciplines including education. As the field of instructional design is the part of education, we focused on investigating the body of MMR literature in the field of education. We found that, several reviews on application of MMR in education have been conducted since 2003 (Alise & Teddlie, 2010; Collins et al., 2007; Hart et al., 2009; Leech et al., 2011; Lopez-Fernandez & Molina-Azorin, 2011; Niglas, 2004; Onwuegbuzie & Corrigan, 2018; Ross & Onwuegbuzie, 2010; Truscott et al., 2010). For example, Alise and Teddlie (2010) reviewed MMR studies from a variety of disciplines. They found that only 24% of the studies in the field of education used the MMR design including Journal of Learning Sciences while the majority of the articles in education (42%) used quantitative design. We emphasize Journal of Learning Sciences due to the focus of our study on the instructional design field which is connected to the science of learning. On the contrary, Lopez-Fernandez and Molina-Azorin (2011) analyzed articles in the Journal of Learning Science and found a clear trend in favor of using a qualitative approach (43%) followed by the MMR research articles (23%). With the increased popularity of MMR, researchers in the education field are also expanding their methodologies to include mixed methods designs.

Significance of the Study

In the field of instructional design, systematic literature reviews on the MMR design have been conducted on the use of mobile learning (Crompton et al., 2016) and MOOC (Zhu et al., 2018). Crompton et al. (2016) found that the MMR design was the primary research method in instructional design exploring mobile learning in educational context. On the other hand, when Zhu et al.

(2018) examined studies on the MOOC, they found that 45.9% of the articles used quantitative design followed by 35.6% of the articles with the MMR design. As the use of MMR continues to grow in instructional design field, it is important to review research trends to advance our understanding of how scholars are using this methodological approach.

MMR questions are the base of a strong mixed methods and despite this clear importance, the attributes of strong mixed methods research questions have remained relatively unexplored (Clark & Badiee, 2010; Tashakkori & Creswell, 2007). When deciding to do mixed methods work, authors should analyze their research question as well as their intended theoretical contributions (Gibson, 2017). According to Tashakkori and Creswell (2007, p. 207), "formulating, stating, and exploring research questions in mixed methods research are important issues for discussion." Therefore, we explored the research questions to shed light and answer the question – can we consider that the research is truly the MMR study?

The Mixed Methods Research Questions

Research questions are the most important part of any research design because they drive the research methods used (Clark & Badiee, 2010; Gibson, 2017). Research questions also dictate the type of the research design to be used, the sample size and sampling scheme to be employed, and the type of the instrument to be administered as well as the data analysis techniques to be used (Tashakkori & Creswell, 2007; Tashakkori & Teddlie 1998). Recently, Plano Clark (2019) in the special issue of Contemporary Educational Psychology reviewed an important collection of examples of how researchers have applied the MMR design to study questions of interest in the field of educational psychology. The collection of examples demonstrated how researchers intentionally integrated quantitative and qualitative methods within the MMR design. She mentioned that integration is the explicit conversation between (or interrelating of) the quantitative and qualitative components of the MMR design. The first integration strategy for researchers is to identify why they plan to integrate within their MMR study. Plano Clark (2019) explained that unique to the MMR design is to ask the research questions that call for quantitative methods, qualitative methods, and integrative mixed methods. She provided examples of the MMR research questions by study design following Creswell *et al.* (2003), such as convergent (quan→qual), explanatory sequential (quan →qual), and exploratory sequential (qual→quan).

However, no leading introductory MMR books (Creswell 2005; Johnson & Christensen 2004; Tashakkori & Teddlie 2003) or research provide any guidance or discussion on how to *write and structure* the research questions for the MMR design. Therefore, for this study, we used Onwuegbuzie and Leech (2006) framework on how to integrate the research questions for the MMR design. The MMR research questions are questions that can only be answered by the integration of quantitative and qualitative information (Creswell & Plano Clark, 2018; Onwuegbuzie & Leech 2006). The MMR research questions refer to the quantitative and qualitative aspects of the study and indicate the intent for combining these different aspects. According to Tashakkori and Creswell (2007):

> Mixed methods studies need at least one explicitly formulated mixed methods question about the nature of mixing, linking, or integration (i.e., how the findings of various strands relate to one another). Such a question about the nature of integration follows the qualitative and quantitative types of questions and emerges from the specific need to use mixed methods" (p. 210).

The MMR questions provide the specific reasons why the researcher intends to integrate within the study and how the MMR research questions will serve as the cue for analysis and interpretation of both quantitative and qualitative results (Plano Clark, 2019). Thus, this study is a systematic review of assessing research questions from the MMR lens. Specifically, this study aimed to examine whether the studies fulfilled and met criteria on the types of the MMR research questions following the Onwuegbuzie and Leech (2006) guidance on how to *write and structure* the research questions for the MMR. The following questions guided our study:

1. What are the descriptive characteristics of the studies that framed the research questions consistent with the practice of mixed-method research design?
2. Which category(s) of the research question(s) from the Onwuegbuzie and Leech framework is more commonly used by the studies framing the research questions consistent with the practice of mixed-method research design?

Theoretical Framework

We used Onwuegbuzie and Leech (2006) theoretical framework to guide this study. The researchers identified the following mixed methods research questions depending on the type of research design (Onwuegbuzie & Leech, 2006).

Table 1. Typology of the mixed-methods research questions (Onwuegbuzie & Leech, 2006)

Types of Questions	Quantitative	Qualitative	Notes
Descriptive research design (concurrent and sequential)	Independent variable Descriptive in nature	Dependent variable Phenomenological in nature	The difference between concurrent and sequential designs is that the quantitative stage in concurrent design does not inform the qualitative phase or vice versa while in sequential design quantitative part informs the qualitative part.
Causal-comparative research design	Embeds a quantitative question that leads to a causal-comparative / quasi-experimental design.	Could be represented by a case study design, a phenomenological design, an ethnographic design or a grounded theory design.	Concurrent in nature.
	Embeds a quantitative part that leads to an experimental research design.	Could be represented by a case study design, a phenomenological design, an ethnographic design, or a grounded theory design.	Concurrent in nature.
	Descriptive correlational or causal-comparative design.	Embeds a qualitative part that involves qualitative comparative design (i.e., pairwise sampling designs, subgroup sampling designs, nested sampling designs, multilevel sampling design).	Sequential in nature.

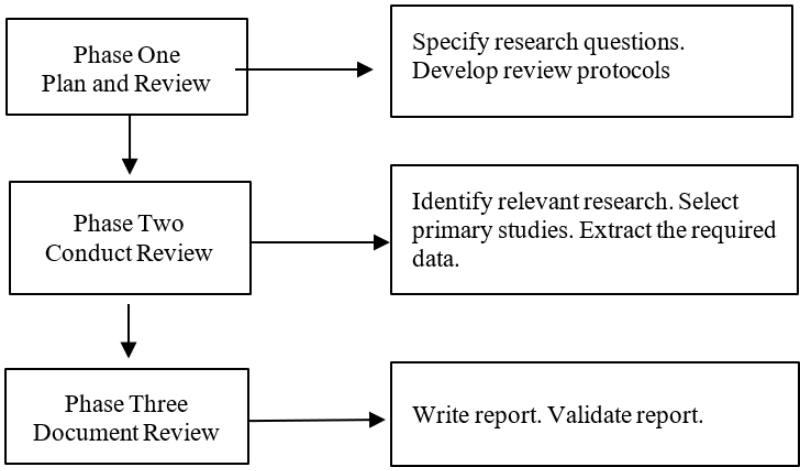

Figure 1. Three phases of research (Brereton et al., 2007).

METHODS

The Systematic Review

We systematically reviewed the literature in the field of instructional design to understand how studies framed research questions. We adapted the Brereton et al. (2007) three phases including plan and review as phase one, conduct review as phase two, and document review as phase three (**Figure 1**). We found the steps listed in the model informative and guiding the process of our systematic review to assess and synthesize research outcomes of studies to provide an objective summary of research evidence.

In this review, we followed the protocol and steps stated in the Preferred-Reporting of Items for Systematic Reviews and Meta-Analyses Statement (PRISMA) during the process of identifying, reviewing, and including studies to ensure quality and rigor (Liberati et al., 2009; Moher et al., 2009).

Data Collection Process and Analysis

Phase One - Plan and Review

Between December 2018 and February 2019, we employed the following strategies to identify studies for this systematic literature review. During phase one, we performed the search in two major databases separately, ERIC EBSCO and PsychInfo. Using the Boolean method, we searched with the keywords "*mixed-method research*" and "*instructional designer*" or "*instructional design*" to meet the selection criteria. We searched for articles published between 2008 and 2018.

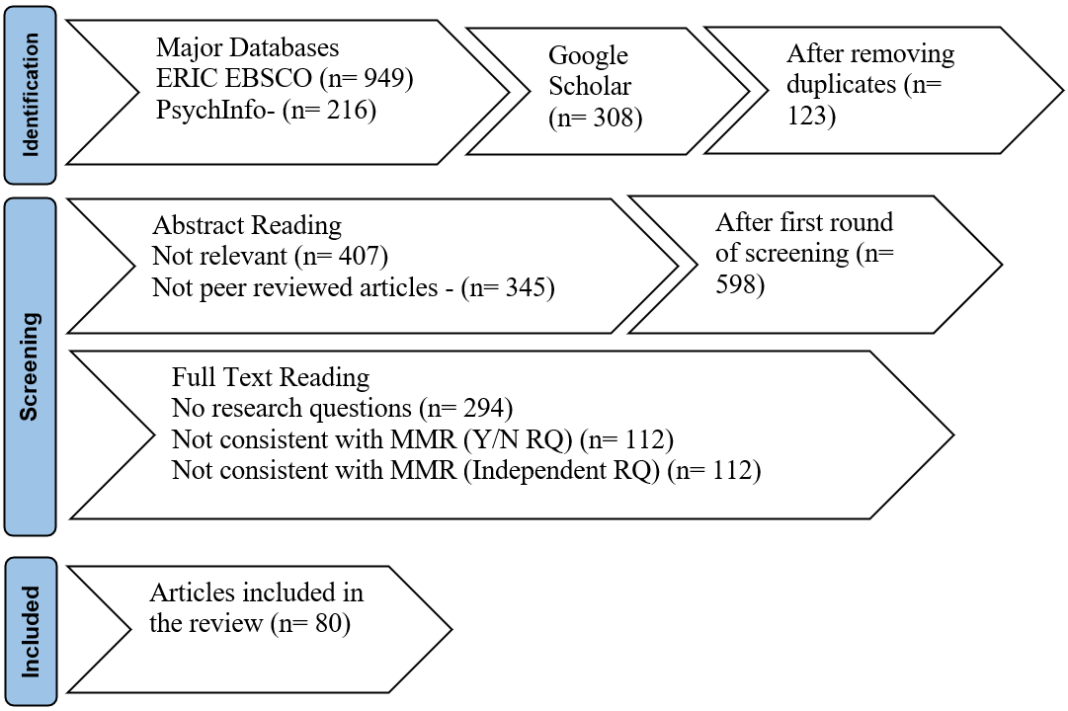

Figure 2. PRISMA flowchart for article identification, review, and inclusion process

Table 2. Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Field of Study	Articles that focused on a topic within the broader umbrella of the field of the instructional design were included.	Articles focusing on a topic not relevant to the field of the instructional design were excluded
Research Methodology	Articles employing mixed methods research approach consistent with the practice were included	Articles that did not employ a mixed methods research approach consistent with the practice or used either quantitative or qualitative were excluded. Articles who used the term mixed method but did not use that in the context of research.
Publication date	Articles published between 2008 and 2018 were included.	Articles published before 2008 were excluded
Publication Type	Articles published in peer-reviewed journals were included.	Studies published as conference proceedings, dissertations, or book chapters were excluded.
Language	Articles published in English were included.	Articles published in a language other than English were excluded.
Mixed Method Research Questions Based on Onwuegbuzie and Leech (2006) theoretical framework	Articles that consisted of at least one research question that was consistent with the Onwuegbuzie and Leech (2006) theoretical framework were included	Articles with no research questions or research questions not consistent with the Onwuegbuzie and Leech (2006) theoretical framework were excluded

We then conducted a search in the Google Scholar database using the same keywords to further expand the search scope. The first 25 pages of Google Scholar results were scanned to make sure no additional studies were left out in this phase of initial search. Branching searches were performed using forward and backward search procedures from the reference lists of studies included in the review. All articles collected during the initial search were saved in a shared file repository. This round of search yielded an aggregate of 1350 studies after removing a 123 duplicate studies.

Phase Two - Conduct Review

For this review, we delineated six inclusion and exclusion criteria that were used in the phase two to thoroughly screen the studies that cleared the first round of review (See **Table 2**). The author who conducted the initial search scanned each article's title and abstract to shortlist the articles that met the first five inclusion criteria listed in **Table 2**. A total of 598 articles cleared this round. Next, each of the first three authors read a third of the shortlisted articles completely that made it through the first round of the review. The authors coded the study using the sixth inclusion criteria. During this the final round of review, we eliminated a total of 518 (87%) articles because these studies did not list research questions. A total of 80 articles were included in the final review.

To ensure interrater reliability, each of the three coders recoded again a different set of the third of the shortlisted studies. Any fundamental differences in coding the studies were resolved through discussion. Initially, there was a 71% agreement between the raters. Later the coders met to discuss and resolved the differences.

Table 3. Journal distribution

No.	Journal	Frequency
1	Education Technology Research Development	7
2	Contemporary Educational Technology; Educational Technology & Society	4
3	English Language Teaching; Turkish Online Journal of Distance Education	3
4	American Journal of Distance Education; Computers & Education; Journal of Educational Technology; Journal on School Educational Technology; International Education Studies; International Journal for the Scholarship of Teaching and Learning; Universal Journal of Educational Research	2
5	Interdisciplinary Journal of Problem-Based Learning; Australasian Journal of Educational Technology; Australian Journal of Teacher Education; British Journal of Educational Technology; Cogent Education; Education and Information Technologies; Educational Sciences: Theory & Practice; Educational Media International; European Journal of Open, Distance and E-learning; Frontline learning research; Higher Education; Higher Education Pedagogies, IndoMS-JME, Information Research: An International Electronic Journal, Information systems education journal, Innovations in Education and Teaching International, Interactive Learning Environments, International Journal of Curriculum and Instruction, International Journal of Education & Literacy Studies, International Journal of Teaching and Learning in Higher Education, International Review of Research in Open and Distributed Learning, Journal of Educational Computing Research, Journal of Educational Technology Systems, Journal of Information Technology Education: Research, Journal of language and linguistic studies, Journal of Research on Technology in Education, Journal of science education technology, Journal of Teaching in Physical Education, L2 Journal, Learning Environments Research, Literacy Research and Instruction, Middle Grades Review, Online Learning Journal, ReCALL, Research in Learning Technology, Review of Research in Open and Distributed Learning, School Library Research, Teacher and Teacher education, Teachers College Record, TESOL Journal, The CATESOL Journal, The JALT CALL Journal, The Malaysian online journal of educational technology, Educational Sciences: Theory & Practice	1

We coded the 80 studies that made it into the final round of review. We coded these studies on three descriptive characteristics. These characteristics were the journals in which these articles were published, the year publication, and the study context, i.e., K-12 or higher education. We used the source of the study's participants to code for the context. We then coded the studies using the Onwuegbuzie and Leech (2006) theoretical framework to categorize them into one of the five categories delineated by these scholars.

This study has few limitations. First, our review of systematic review focused on published articles in peer-reviewed journals. There may be some valuable information available on MMR in book chapters, conference proceedings, dissertation and theses that were not included in this review. Second, this study was limited to the publications written in English so other relevant articles published in other languages on MMR might have been excluded. Third, we reviewed only three databases so there is a possibility that this review may not have included all articles published on MMR. Finally, despite our 12-months-long literature search and analysis, it is likely that we may have missed a few studies, especially ones that have been published within the past few years.

RESULTS

For a study to be included in the final round of review, at least one research question has to be framed in a way that warranted the use of both the research approaches, i.e., quantitative and qualitative research methods, in a single question. Only 80 studies had framed the research questions that were consistent with the practice of mixed-method research questions. We discuss the results of the coding of the studies organized in the form of the research questions.

RQ 1: What are the descriptive characteristics of the studies that framed the research questions consistent with the practice of mixed-method research design?

To answer this research question, we coded for three characteristics, journal name, publication year, and the context of the study. We found that the articles included in this review were published in 59 peer-reviewed journals. From these 59 journals, most articles were published in Education Technology Research Development (5), Contemporary Educational Technology (4), Educational Technology & Society (3), and Turkish Online Journal of Distance Education (3). The remaining journals published between 1-2 articles. **Table 3** presents more details on the journal name and publication frequency. Further, the mixed method research seems to gain popularity in recent years where the highest number of studies included in this review were published in 2018 (23, 29%) and 2017 (20, 25%). Finally, most of the studies had either Higher Education (44, 55%) or K-12 settings (44, 42.5%).

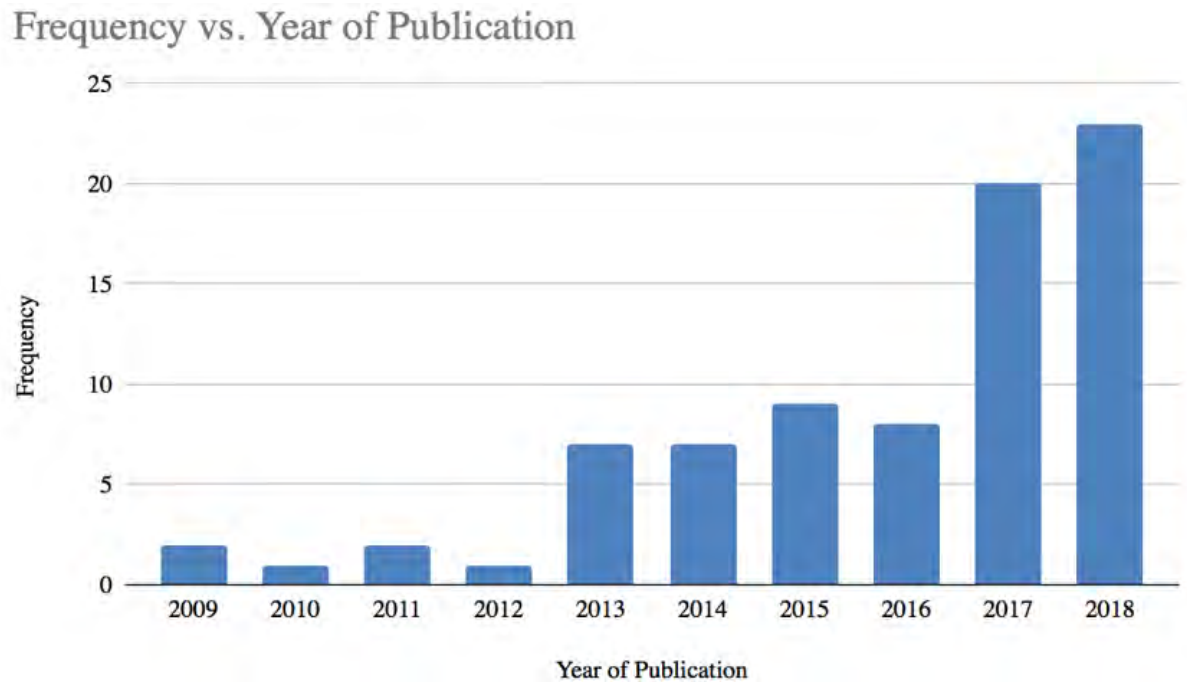

Figure 3. Bar chart for the number of publications in each year (2008 - 2018)

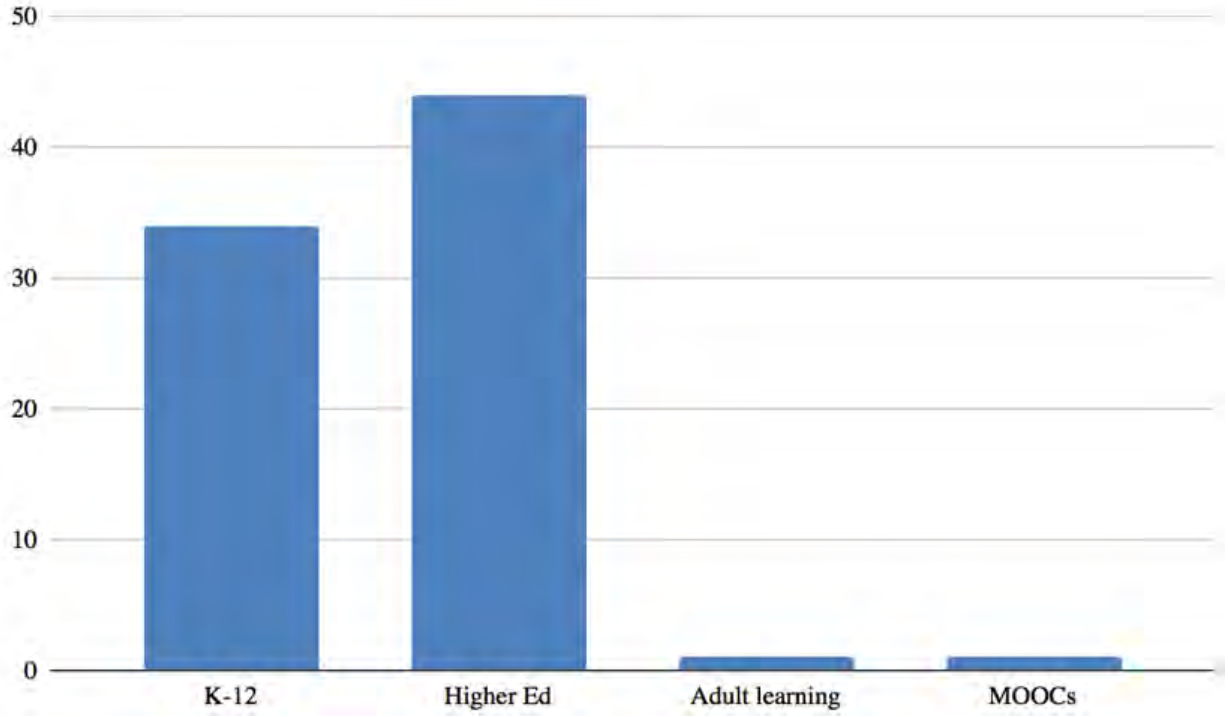

Figure 4. Bar chart for studies context

RQ 2: Which category(s) of the research question(s) from the Onwuegbuzie and Leech framework is more commonly used by the studies framing the research questions consistent with the practice of mixed-method research design?

The review of the 80 studies using the five categories of the mixed-method research questions presented in the Onwuegbuzie and Leech (2006) framework, we found a majority of the studies (n=33, 41.25%) fell in the category of designing experimental research questions that concurrently collected quantitative and qualitative data. The next set of studies (n= 30, 37.5%) identified themselves with the category of designing descriptive research questions that collected quantitative and qualitative data concurrently. Many studies (n=12, 15%) listed questions using descriptive research questions using the sequential design of data collection. This was followed by some studies (n= 3, 3.75%) and (n= 2, 2.5%) using a causal-comparative approach with a concurrent data collection design or qualitative comparative design with a sequential data collection approach. Delineated in the **Table 4**, is a list of studies identified by its authors and year publication categorized based on the research question type.

Table 4. Study identified by authors name and year of publication

Category of Research Questions	Authors Name
Mixed Methods Research Questions for Descriptive Research Sequential Designs (N=12)	Rienties et al. (2013), Kim et al. (2013), Leong and Alexander (2013), Alt (2014), Borup et al. (2014), Chua and Jamil (2014), Jara et al. (2015), Ciampa and Gallagher (2015), Qayyum and Smith (2015), Kihoza et al. (2016), Rodriguez and Diaz (2017), Deveci (2018)
Mixed Methods Research Questions for Descriptive Research Concurrent Designs (N=30)	Walker et al. (2011), Parenti (2013), Annetta et al. (2013), O'Hara et al. (2013), Leong and Alexander (2014), Foster and Shah (2015), Ermeling et al. (2015), Looi et al. (2015), Oktaviyanthi and Supriani (2015), Hazaea and Alzubi (2016), Youde (2016), Alyaz and Genc (2016), Korucu (2017), Akay (2017), Tang and Rich (2017), Koh et al. (2017), Xie et al. (2017), Durdu and Dag (2017), Grace (2017), Green et al. (2017), Fırat (2017), Putman (2017), Kuo et al. (2017), Dimitroff et al. (2018), Frazier and Trekles (2018), Stanley and Zhang (2018), van Thiel (2018), Hoque et al. (2018), Nami et al. (2018), Jones et al. (2018)
Mixed Methods Research Questions for Causal-Comparative Research Designs. (N=3)	Chen and Pedersen (2012), Chen and Tsai (2013), Wyant et al. (2015)
Mixed Methods Research Questions for Experimental Research Concurrent Designs (N=33)	Thompson et al. (2009), Weaver et al. (2009), Conn et al. (2010), Li (2011), Huh et al. (2014), Wu et al. (2015), Lan and Lin (2016), Lenski et al. (2016), Tuševljak et al. (2016), Webb and Doman (2016), Andújar-Vaca et al. (2017), Chow and Croxton (2017), Gokcearslan (2017), Ebrahimzadeh (2017), Kayacan and Razi (2017), O'Bannon et al. (2017), Turgut (2017), Watson et al. (2017), Adham et al. (2018), Awada and Diab (2018), Dursun et al. (2018), Hsu et al. (2018), Jahanbakhsh and Chalak (2018), Kale and Akcaoglu (2018), Konijn et al. (2018), Lin et al. (2018), Michelson and Dupuy (2014), Mohammadipour et al. (2018), Moran (2018), Pellas (2018), Squires (2018), Yang et al. (2018), Zilka et al. (2018)
Mixed Methods Research Questions for Qualitative Comparative Sequential Designs (N=2)	Brown (2014), Klisc et al. (2017)
Mixed Methods Research Questions for Experimental and Descriptive Research Designs (N=1)	Kara (2018)

DISCUSSION AND CONCLUSIONS

The purpose of this systematic review was to gain a deeper understanding of the current trends and use of the MMR research questions in the field of instructional design over the last decade following the Onwuegbuzie and Leech (2006) framework. Since research questions play a key role in driving the methods in the MMR studies, this article contributes to the field of instructional design by exploring the MMR studies and providing guidance about how to write mixed methods research questions specifically combining quantitative and qualitative approach.

Characteristics of Studies with Research Questions Grounded in the Principles of MMR

The 752 studies examined in this systematic review revealed several interesting trends regarding the characteristics of the studies that framed the research questions consistent with the practice of mixed-method research design. Results revealed that from the published MMR in the instructional design field only 11% of the studies framed the research questions that were consistent with the practice of mixed methods questions. The majority of the articles did not include or did not appropriately frame the research questions according to the MMR approach. This finding can be explained by Onwuegbuzie and Leech (2006, p.477) who noted that 'forming research questions is much more difficult in mixed methods studies than in monomethod (i.e., quantitative or qualitative) investigations because it involves the formation of both quantitative and qualitative research questions within the same inquiry.' Tashakkori and Crewell (2007) suggested that in MMR studies, it is important to develop at least one qualitative research question and at least one quantitative research question, and a mixed methods research question to combine or mix both the quantitative and qualitative research questions.

Further results showed that the MMR articles were published in multiple peer-reviewed journals in mostly higher education and K-12 settings. Additionally, a steady growth of the published articles every year with the majority of research published in 2017 and 2018 showed a positive trend in publishing MMR with accurately structured research questions. This indicates the popularity of MMR in both higher education and K-12 settings within the field of instructional design. This finding can be explained by Alise and Teddlie (2010, p. 104) who concluded that the increased number of MM studies 'indicate the degree of awareness that researchers in different disciplines have of the utility of MM research and how it can be used to uniquely answer certain types of questions in their areas of study'. These results show that with time, researchers in the instructional design field are getting more familiar with how to write research questions that call for quantitative methods, qualitative methods, and integrative mixed methods.

Although the results show the popularity of MMR in different settings within the field of instructional design, the low number of peer reviewed articles that accurately framed research questions indicate the need for following optimal ways to develop research questions that are grounded in the fundamental principles of MMR. Since research questions drive the research methods used (Plano Clark & Badiee, 2010; Tashakkori & Teddlie, 1998), researchers should be mindful of using MMR questions in order to accurately select the type of research design, the sample size and sampling scheme, and the data analysis techniques that are aligned with the type of MMR study.

Types of Research Questions More Commonly Used by the MMR Studies

With respect to the type of MMR questions, findings revealed that experimental research questions and descriptive research questions that concurrently collect quantitative and qualitative data, were the most popular types of research questions used in the instructional design studies. Such findings are in line with the results of Hanson et al. (2005) study in Counseling Psychology who found that concurrent designs, where quantitative and qualitative data are collected at the same time, were the most common type of MMR design published in the literature. This suggests that collecting both qualitative and quantitative data simultaneously to help confirm, cross-validate, and corroborate findings is the most common practice among researchers in the instructional design field. For instance, Chow & Croxton (2017) examined the e-learning perceptions and needs of faculty, students, and staff of the e-learning unit. They wrote a separate quantitative and qualitative questions, followed by an explicit mixed methods question asking, "Is there alignment between administrator, faculty, staff, and student goals, needs, and organizational elements to support e-learning?" Unique to the MMR design is to ask the research questions that call for quantitative methods, qualitative methods, and integrative mixed methods (Plano Clark, 2019).

One possible reason why researchers in the instructional design field mostly use experimental or descriptive MMR questions may be because the purpose of the studies is to triangulate or converge the results. In MMR studies, the purpose of the study plays an important role in selecting the research questions (Creswell 2005). Plano Clark (2019) suggested that the MMR questions provide the specific reasons why the researcher intends to integrate MM within the study and how the research questions will serve as the cue for analysis and interpretation of both quantitative and qualitative results. Another possible explanation may be those other types of MMR designs (e.g., Causal-comparative research design) are more complex and researchers may find difficulty in accurately framing the research questions that lead to analyzing and interpreting both quantitative and qualitative data.

Creswell and Plano Clark (2007) suggested that if a study involves concurrent quantitative and qualitative data collection, then this type of mixed question could ask, how do the quantitative results and the qualitative findings converge? On the other hand, sequential studies might ask the question ''How do the follow-up qualitative findings help explain the initial quantitative results?'' or ''How do qualitative results explain the experimental outcomes?'' Using specific questions that make explicit researchers' intent as to how they will mix the quantitative and qualitative is important in a MMR studies. In order to increase the impact and rigor of a mixed methods studies, the alignment between methods and research questions is very essential (Gibson, 2017).

According to Tashakkori and Creswell (2007, p. 207), "formulating, stating, and exploring research questions in mixed methods research are important issues for discussion." This study highlights the need to build understanding of MMR methods and on instructional design researchers' ability as they apply mixed methods techniques in their studies. The results contribute to literature by revealing current practices in instructional design studies as well as how MMR questions can be operationalized. This study found evidence of growing MMR research in the instructional design field due to its potential to add complementary strengths to qualitative and quantitative methods. The findings may inform instructional design researchers' application of MMR approaches, help them increase rigor in their investigative techniques, and suggest optimal ways to frame research questions that are grounded in the fundamental principles of MMR.

Implications of the Study

In this systematic review, we analyzed 80 journal articles on MMR in the instructional design field between 2000 and 2018. The review revealed several interesting trends that can inform scholarship on MMR and promote reflection about where we are and where we need to go. First, despite the evidence that MMR in the field of instructional design is growing, the number of peer reviewed articles that accurately frame MMR research questions is relatively small. This underscores the need for more accurately designed MMR studies with correctly framed research questions. Second, the findings from this study can extend beyond research questions and look at how the goal of the study, the research objective(s), and the research purpose shape the formation of research questions in the MMR studies. Third, future systematic reviews can explore whether research questions are logically aligned with the data analysis procedures in MMR studies using Onwuegbuzie and Leech's (2006) theoretical framework. Finally, this study can be replicated in other fields to see if the results are similar or different and to validate the results of this study.

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