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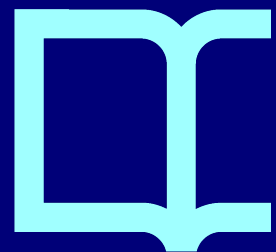
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Sergi Fàbregues,<sup>1</sup> Marie-Hélène Paré,<sup>2</sup> Julio Meneses<sup>3</sup>

**Operationalizing and Conceptualizing Quality in Mixed Methods  
Research: A Multiple Case Study of the Disciplines of Education, Nursing,  
Psychology, and Sociology**

<sup>1</sup>Department of Psychology and Education  
Universitat Oberta de Catalunya  
Rambla del Poblenou, 156, 08018  
Barcelona, Spain  
Email: [sfabreguesf@uoc.edu](mailto:sfabreguesf@uoc.edu)  
Tel: 933263600 / Fax: 933568822

<sup>2</sup>The Qualitative Analyst  
Qualitative data analysis consultant

<sup>3</sup>Department of Psychology and Education  
Universitat Oberta de Catalunya

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## **Abstract**

The purpose of this qualitative multiple case study is to describe and compare how researchers in the education, nursing, psychology, and sociology disciplines operationalize and conceptualize the quality of mixed methods research (MMR). An international sample of 44 MMR researchers representing these four disciplines were interviewed. The study findings point to: (a) two perspectives from which the quality of MMR is understood, one contingent and flexible and the other universal and fixed; (b) a relationship between these two perspectives and the participants' discipline; and (c) a similar occurrence, both in terms of nature and frequency, of the MMR quality criteria most mentioned by the participants across disciplines. Implications of the findings for the field of MMR are discussed.

**Keywords:** mixed methods, quality, disciplines, multiple case study, Miles and Huberman

# **Operationalizing and Conceptualizing Quality in Mixed Methods Research: A Multiple Case Study of the Disciplines of Education, Nursing, Psychology, and Sociology**

## **Introduction**

What constitutes quality in mixed methods research (MMR) and the criteria by which it should be judged is currently one of the most important and debated issues in the MMR field. According to a recent review of the literature (Fàbregues & Molina-Azorin, 2017), since 2006, the number of publications on the quality of MMR has grown exponentially, with contributions coming from a variety of disciplines and countries. These publications coincide in two major points. First, given the unique attributes of MMR, this type of inquiry faces particular challenges that demand additional quality criteria, over and above those used for appraising the quantitative and qualitative components (Collins, Onwuegbuzie, & Johnson, 2012; Onwuegbuzie & Johnson, 2006). Second, quality criteria are fundamental for researchers to ensure that the MMR studies they conduct and review are warranted and transparent (Collins et al., 2012). This latter point is especially important, given that MMR is still relatively unknown in a number of disciplines (Tashakkori & Teddlie, 2010).

The current literature on the quality of MMR, however, has three important limitations. First, more than three quarters of the proposed quality frameworks have been conceptually generated (Fàbregues & Molina-Azorin, 2017). Indeed, rather than being empirically derived from research practice, most of the criteria included in these frameworks come from the authors' personal views about what criteria should guide appraisal of the quality of MMR. The lack of empirical contributions is problematic, given the likelihood that current quality frameworks may not accurately reflect MMR researchers' practices. On the other hand, the few studies that have examined researchers' views on quality criteria for MMR have been limited to the disciplines of evaluation (Caracelli & Riggin, 1994) and social policy (Bryman, Becker, & Sempik, 2008). Moreover, given the growing expansion of

MMR in the social, behavioral and health science fields (Ivankova & Kawamura, 2010), it is timely and relevant to extend the study of researchers' views on quality criteria for MMR to other disciplines, especially those where MMR studies are more prevalent (as described later in this article).

A second limitation is that most publications on the quality of MMR have focused on how quality should be operationalized (i.e., by which criteria it should be appraised), but have paid less attention to how quality should be conceptualized (Fàbregues & Molina-Azorin, 2017). Any attempt to develop quality criteria must include the views of researchers regarding the very nature of criteria generation, including the approach to appraising quality or even whether a consensus on criteria is appropriate to the field of MMR. Accordingly, one may argue that considering researchers' conceptualizations of quality is important for both fostering debates on how quality should be addressed and developing quality frameworks that include the full range of competing views.

Third, a number of scholars (Collins, 2015; Creswell, 2015; Plano-Clark & Ivankova, 2016) have highlighted the significant role that disciplines play in shaping researchers' thinking and decisions regarding MMR quality. These authors argue that the habits and practices prevalent in each discipline may affect how a good quality MMR study is described, how criteria for MMR are perceived, and which quality framework is used. However, although the contextual nature of quality has been an important topic in the literature, to date, no study has examined the differences and similarities in how researchers operationalize and conceptualize the quality of MMR across disciplines. This fact reflects an important gap in the literature, since knowing how disciplines interact with quality would help researchers take discipline-related features into account when reading or appraising MMR publications from disciplines other than their own and when conducting MMR in interdisciplinary contexts. The latter acquires even greater importance in view of the growing adoption of MMR in multiple

disciplines (Ivankova & Kawamura, 2010) and the strong links between MMR and interdisciplinarity (Schwandt & Lichty, 2015).

In light of the above, the purpose of this qualitative multiple case study is to describe and compare how MMR researchers in the disciplines of education, nursing, psychology, and sociology operationalize and conceptualize the quality of MMR. The study asked the following research questions: (RQ1) how do education, nursing, psychology, and sociology researchers operationalize the quality of MMR?; (RQ2) how do education, nursing, psychology, and sociology researchers conceptualize the quality of MMR?; and (RQ3) what differences and similarities exist in how education, nursing, psychology, and sociology researchers operationalize and conceptualize the quality of MMR? In answering these research questions, this study aims to contribute to the field of MMR in three ways: (a) by adding to the existing literature on the quality of MMR; (b) by deepening understanding about the quality of MMR through an assessment of quality dimensions other than the identification of criteria; and (c) by empirically examining the claims made regarding the relationship between quality and disciplines.

We acknowledge that research quality is not an homogeneous concept, but has — according to the critical realist stance (Maxwell & Mittapalli, 2010) — a number of ‘real’ properties, for which reason it is perceived and approached differently by researchers depending, among other factors, on their academic and research contexts.

## **Methods**

### **Study design**

A multiple case study (Miles & Huberman, 1994) of the disciplines of education, nursing, psychology and sociology was designed that allowed us to develop an in-depth, contextual description of researchers’ views on the quality of MMR within each of these

disciplines and to identify patterns of similarities and differences in views across these disciplines. The four disciplines were selected on the basis that they are featured by basic knowledge of the field of MMR, are associated with a high percentage of methodological and empirical publications on MMR (Ivankova & Kawamura, 2010), and have clear disciplinary boundaries which offer the potential for interesting comparative insights (Alise & Teddlie, 2010).

### **Sampling**

An international sample of 44 MMR researchers was purposefully selected using a combination of criteria and maximum variation sampling. To be included in the sample, participants had to meet two author-inclusion criteria: (a) have conducted research primarily in education, nursing, psychology, or sociology; and (b) be authors, or co-authors, of at least one methodological publication about MMR. The latter allowed us to identify participants with knowledge of the nature and practice of MMR that enabled them to provide an informed opinion on the quality of MMR.

On the basis of the above two criteria, participant identification involved three steps. First, in February 2013 we systematically searched for methodological publications about MMR in the form of articles, books and book chapters in four ways: (a) we searched four disciplinary databases using the parameters described in Table 1; (b) we performed additional searches in Google Books and the SAGE Research Methods Database; (c) we scanned the references listed in key publications on MMR and followed up with a citation search of these publications in Google Scholar and Web of Knowledge; and (d) we conducted hand searches in four key methodology journals, namely, *International Journal of Multiple Research Approaches*, *International Journal of Social Research Methodology*, *Journal of Mixed Methods Research*, and *Quality and Quantity*.

INSERT TABLE 1 ABOUT HERE

Second, five inclusion criteria were applied to the identified publications: (a) the first author had to be from one of the study disciplines; (b) the publication was a methodological paper as defined by the *Journal of Mixed Methods Research*; (c) the publication's definition of MMR concurred with that of either Creswell and Tashakkori (2007) or Johnson, Onwuegbuzie, and Turner (2007); (d) the publication was dated from 2003 or later; and (e) the publication was in English. A total of 266 publications met those five criteria.

Third, profile information for authors (i.e., field of expertise, country of affiliation, job title) was obtained for the pool of potential participants. The two author-inclusion criteria applied to potential participants resulted in 144 eligible candidates. At this stage, maximum variation sampling was applied to seek heterogeneity in participant characteristics within each discipline. For this criterion, the iterative approach for selecting participants — similar to that used by O’Cathain et al. (2014) — was used. Thus, a first group of authors — prioritized according to sample diversity — was contacted by email and by post, and those who agreed to take part were interviewed. To replace authors who failed to reply or who declined to participate, a further set of authors was contacted. This iterative approach was followed until 11 participants were recruited for each discipline. The decision not to go beyond 11 participants came from sample size recommendations from the literature (Guest, Bunce, & Johnson, 2006). The characteristics of the 44 study participants are summarized in Table 2.

INSERT TABLE 2 ABOUT HERE



## **Data collection**

Semi-structured interviews were held with the 44 study participants between April 2013 and March 2014. The interview guide — based on the research questions and a comprehensive review of the literature (Fàbregues & Molina-Azorin, 2017) — had three sections: (1) participant's research background (i.e., experience with MMR, methodological expertise, prevalent paradigmatic stance); (2) participant's conceptualization of MMR (i.e., definition of MMR, views about the distinctiveness of MMR, role of MMR within the discipline); and (3) how the participant operationalized and conceptualized the quality of MMR (i.e., preferred quality criteria for MMR, opinions about existing quality frameworks, views regarding a consensus on quality). The interview guide was piloted with two MMR researchers (excluded from the study sample) and minor modifications were made as a result. All interviews were audio-recorded and verbatim transcribed by the first author of this study. Interviews were conducted in English (41 interviews), Spanish (two interviews), and Catalan (one interview), using either Skype (24 interviews), telephone (18 interviews), or email correspondence (two interviews). Average interview length was 49 minutes. The study received ethical clearance by the Institutional Review Board of the Universitat Autònoma de Barcelona. An informed consent was signed by all participants before the interview.

## **Data analysis**

Data analysis included a combined strategy of thematic analysis (Boyatzis, 1998) for the coding phase, and a within-case and cross-case analysis for pattern seeking in the data (Miles & Huberman, 1994). We used Boyatzis' (1998) hybrid approach, which blends inductive coding with the researcher's own theoretical assumptions in the identification of themes in the data. In its original form, Boyatzis' hybrid strategy relies on the selection of a variable (i.e., the criterion reference) to select subsamples (Stage I), the identification and

comparison of themes across subsamples to create codes (Stage II), and code validation (Stage III). In this study, only elements of Stage II and III were adopted (Stage I was deemed methodologically irrelevant).

Stage II consisted of multiple readings of each interview followed by summarization of the main themes to condense the essence of each interview. Using Boyatzis' definition of a theme – i.e. a pattern found in the data that “describes and organizes possible observations or at the maximum interprets aspects of the phenomenon” (Boyatzis, 1998, p. vii) – themes captured both the manifest and latent understanding of the data. The summaries, later used for the member-checking exercise, were imported into NVivo where each theme became a code and the corresponding summary excerpt was coded. An initial list of 168 codes was generated which, after comparing, merging, and refining, was reduced to 94 codes. Boyatzis' (1998) five elements for generating good codes were applied, where each code had a clear label, definition, description, inclusion and exclusion criteria, and examples. In line with the process of immersion and crystallization of inductive coding (Crabtree & Miller, 1999), codes that were clearly connected with the literature review sources (also imported into NVivo) were assigned memos and were cross-referenced to the corresponding passage in the source using the NVivo 'see also links' function.

Stage III involved the coding of data; the coding unit corresponded to the meaning unit, defined as a data passage “that is comprehensible by itself and contains one idea, episode, or piece of information” (Tesch, 1990, p.116). This code list, refined to take into account new dimensions not recorded in the memos, yielded a final list of 54 codes that were hierarchically organized in two families (parent nodes), fifteen child nodes, and 37 grandchild nodes.

To seek patterns in the data we first applied a within-case analysis (to answer RQ1 and RQ2) and a cross-case analysis (to answer RQ2 and RQ3). For the within-case analysis

for each discipline, Miles and Huberman's (1994) conceptually clustered matrix was applied using NVivo's 'framework matrix' function: cases were cross-tabulated with codes, with the cells showing the coded extract for each case. Using the 'matrix coding query' function, this qualitative output was complemented with quantitative information following a similar data tabulation approach where cells showed the coding frequency of each case for the codes. The latter helped to establish within-case generalizability and the interpretive validity of results (Maxwell & Chmiel, 2014). The within-case analysis concluded with a summary for each discipline.

The first part of the cross-case analysis was conducted using Miles and Huberman's (1994) partially ordered meta-matrix (the stack of discipline-level matrices) in NVivo. A second 'framework matrix' for qualitative data and a second 'matrix coding query' for quantitative output were generated, in which all 44 participants were cross-tabulated with codes. A matrix coding query binary output — with the 'yes' cells indicating presence of coding and the 'no' cells the absence of coding — was used for the multiple correspondence analysis (MCA), which constituted the second part of the cross-case analysis. MCA is an exploratory statistical technique that examines the multivariate association of categorical variables (Greenacre, 2007). The technique generates a map of the underlying structure in a given set of data by representing a cloud of categories and a cloud of individuals, with distances between points indicative of similarities and dissimilarities in participant response patterns. In our study, MCA helped identify the relationship between codes closely related to conceptualization of the quality of MMR and the participant's own discipline. Codes were transformed into categorical variables and treated as active variables and the participant's discipline was treated as a supplementary variable. Given that some participants did not provide a clear response to some interview questions, subset MCA (Greenacre & Pardo,

2006) — a variant of MCA that allows missing values for certain variables to be excluded without loss of data — was performed using XLSTAT version 2016.1 (Fahmy, 2016).

### **Trustworthiness**

Three strategies were used to enhance the trustworthiness of the study (Lincoln & Guba, 1985). First, the participants member-checked their verbatim interview and summary to confirm their accuracy and to provide additional information. Second, peer-debriefing was performed with a qualitative researcher familiar with MMR who was not included in the sample. Finally, an audit trail was kept to record our methodological and analytical decisions during the research process and to provide space for reflection regarding the possible influences of our disciplines and assumptions in the interpretation of study findings.

### **Findings**

#### **RQ1: How do education, nursing, psychology, and sociology researchers operationalize the quality of MMR?**

To answer RQ1, participants were asked to list the quality criteria they usually use when conducting or appraising MMR studies, to outline the characteristics of a good MMR study, and to describe the main pitfalls found in the empirical MMR literature for their discipline.

INSERT TABLE 3 ABOUT HERE

Table 3 shows, organized by study phase, the 14 quality criteria mentioned more than five times by the participants. As can be observed, these criteria are not restricted to distinctive aspects of MMR, but also include quantitative and qualitative research criteria and

generic research criteria. This variety of criteria is consistent with the fact that, despite its unique features, MMR still stems from quantitative and qualitative research and, at the same time, is governed by the same foundational principles as any other type of social research. In fact, the criterion regarding the quality of quantitative and qualitative components was most mentioned by the participants (ranked first for the undertaking phase and first overall). Likewise, three generic research criteria were also highly cited: reporting transparency (ranked first for the disseminating phase and fifth overall); statement of the study purpose and research questions (ranked second for the planning phase and sixth overall); and linkage between MMR design and aims/research questions (ranked fourth for the undertaking phase and seventh overall).

With regards to the criteria specific to MMR, three criteria in particular stood out in the responses, namely, the provision of a rationale for using a MMR design (ranked first for the planning phase and second overall), the effective integration of the quantitative and qualitative components of the study (ranked second for the undertaking phase and third overall), and a clear and accurate description of the MMR design implemented (ranked third for the undertaking phase and fourth overall). Likewise, three criteria unique to MMR were also mentioned, although less emphasized: a clear and accurate description of the planned MMR design (ranked third for the planning phase and eighth overall); description of the unique insights obtained with a MMR design (ranked second for the disseminating phase and eighth overall); and congruency between the quantitative and qualitative components (ranked fifth for the undertaking phase and ninth overall).

Finally, noteworthy is the fact that the undertaking phase of Table 3 contains the most criteria (5), followed by the planning phase (4), the disseminating phase (3) and the interpreting phase (2). The findings also reveal that 40 participants cited at least one criterion

pertaining to the undertaking phase, but this number dropped to 31, 26 and 16 participants for the planning, disseminating, and interpreting phases (data not shown in the table).

**RQ2: How do education, nursing, psychology, and sociology researchers conceptualize the quality of MMR?**

Six themes related to conceptualization of the quality of MMR were explored in the interviews. Table 4 lays out these themes, the participant *n* for each theme (excluding missing data), their corresponding subthemes, and participant quotes.

INSERT TABLE 4 ABOUT HERE

**(a) Distinctiveness of MMR.** Whether or not MMR is conceived as a distinctive methodology is an important factor in determining how scholars understand the quality of MMR. Some scholars (Collins et al., 2012; Tashakkori & Teddlie, 2008) have argued that, given its distinctive characteristics, MMR should be appraised differently from quantitative and qualitative research. In our study, more than half of the participants agreed that MMR is a distinctive methodology. In other words, MMR implies the adoption of a different outlook when researching social phenomena and when addressing philosophical issues, is guided by discrete procedures in terms of how research questions are formulated or designs are implemented, faces a series of unique challenges such as the need for specialized skills in quantitative and qualitative methods, and lastly, yields added value compared to monomethod research. Nonetheless, many participants disagreed with some of these claims. Though they acknowledged the singularities of MMR, they contended that this type of inquiry is not a distinctive methodology, that this form of inquiry is not as ‘new’ as is claimed in the literature, and that it does not constitute a paradigm. Regarding the last of these, it was argued

that conceiving MMR as a paradigm runs the risk of artificially associating it with certain epistemological and ontological stances, limiting, therefore, its breadth and potential.

**(b) Views on MMR quality criteria.** Based on the argument that a MMR study is more than just the sum of its parts, more than half of the participants agreed with the idea of developing and using MMR-specific quality criteria. In their opinion, such criteria are essential to appraising the unique traits of this kind of research, contribute to strengthening and consolidating the MMR field, and help avoid flawed research practices — such as the common absence of a rationale for using MMR, or the lack of integration of the quantitative and qualitative components. In contrast, participants who did not share such views argued that, since MMR is no different from other types of research, it should be appraised by generic research criteria and quantitative and qualitative research criteria. They also considered that specific criteria may reify MMR, thereby reinforcing the idea of distinct methodological paradigms (i.e., quantitative, qualitative, and MMR) with clear boundaries between them.

**(c) Approaches to appraising quality.** Half of the participants in the study mentioned that quality frameworks should be based on a limited number of ‘soft’ criteria (i.e., criteria in the form of recommendations or open-ended questions, that are highly flexible, adaptable to different research contexts, and open to the subjective judgment of researchers) representing the fundamental characteristics of MMR (i.e., provision of a rationale for using MMR and integration of the quantitative and qualitative components). On the other hand, a handful of participants suggested that frameworks should take the form of checklists (i.e., criteria in the form of closed questions or scoring systems, highly structured, and that aimed at generating objective measurements of quality), which allow for a more straightforward approach to quality appraisal. For these participants, checklists are particularly useful for both inexperienced researchers and busy academics, due to their

clarity, simplicity, and ease of use. Nine participants opted for an intermediate position, advocating the adoption of both ‘soft’ criteria and checklists, on the basis that their combined use does offset the weaknesses of one approach with the advantages of the other.

**(d) Consensus on quality criteria for MMR.** A quarter of participants in the study agreed that the MMR community needs to reach a consensus on a set of universal quality criteria for conducting and appraising MMR. In their opinion, such a consensus would help avoid confusion when addressing quality issues in MMR and, at the same time, would enhance the status of MMR as a legitimate and mature field of research. Nonetheless, a higher number of participants disagreed with this idea, arguing that a consensus would result in a set of fixed and preordained criteria that would stifle creativity, impose uniformity in the field, and hinder necessary debates on the conceptualization of the quality of MMR. Moreover, a consensus might turn out to be inapplicable in certain circumstances, due to the contingent nature of research quality. Participants who did not favor either approach opted for the intermediate position of a consensus, which, while a desirable goal, needed to be feasible and practical, and also to be built around a parsimonious list of key ‘soft’ criteria, similar to those described in subsection (c) above.

**(e) Disciplinary shaping of quality.** Participants in the study were also asked about the role of disciplines in shaping views on MMR quality. Half of the participants believed that discipline-related features, such as prevalent methodological approaches, dominant worldviews, and the pure or applied orientation of each discipline, shape how the quality of MMR is operationalized and conceptualized by researchers in their respective disciplines. Fewer participants disagreed with the above claim to the effect that quality criteria cut across disciplines and heavily rely on primary MMR publications (e.g., books and journal articles).

**(f) Familiarity with MMR quality frameworks.** Half of the participants mentioned to be familiar with at least one of the published MMR quality appraisal frameworks, with



most mentions made of the frameworks of Tashakkori and Teddlie (2008) and O’Cathain (2010). Several advantages and drawbacks of frameworks were mentioned. Advantages were their usefulness in summarizing key aspects of MMR quality reported in the literature, their hands-on nature (i.e., the provision of guidelines for conducting or appraising MMR), and, albeit their structure, their flexibility and critical application. As for the drawbacks mentioned, one was that, since frameworks tend to be organized around separate study phases, they ignore dynamic interaction between study components (e.g., how sampling quality is dependent on the type of MMR design used); another perceived drawback was that some frameworks are excessively long and difficult to understand due to the complexity of the proposed criteria. To overcome this last problem, participants suggested that criteria could be prioritized by importance and could be illustrated with research examples to facilitate understanding and application.

To show the relationships between the above six themes, MCA was conducted. Aside from these themes, the mention of quality criteria from any of the study phases was also included in the analysis. The first two MCA axes, accounting for 89%<sup>1</sup> of the total inertia, were retained for interpretation.<sup>2</sup> Table 5 shows the contributions of the themes (i.e., active variables and active categories) to the orientation of each axis. Figure 1 shows the relationships between themes and participants, with axis 1 explaining 57.9% of the inertia and differentiating between two main perspectives on the quality of MMR.

INSERT TABLE 5 AND FIGURE 1 ABOUT HERE

As can be observed in the MCA map, axis 1 contrasts a universal and fixed perspective on quality on the left-hand side (i.e., agreement about the distinctiveness of

MMR, agreement about a consensus on quality criteria, disagreement that disciplines shape quality, and a checklist approach) to a contingent and flexible perspective on the right-hand side (i.e., disagreement about the distinctiveness of MMR, disagreement about a consensus, agreement that disciplines shape quality, soft approach to quality appraisal, and criteria for the interpretation phase). Axis 2, explaining 31.1% of the inertia, contrasts a soft consensus, familiarity, and agreement with MMR criteria in the lower part of the map (i.e., agreement with a soft consensus, agreement with MMR quality criteria, being familiar with MMR quality frameworks, and criteria for the dissemination phase) with a consensus, unfamiliarity, and disagreement with MMR criteria in the upper part of the map (i.e., agreement with a consensus, disagreement with MMR criteria, neutral in the role disciplines play in shaping quality, unfamiliarity with MMR frameworks, and no mention regarding criteria for the planning and dissemination phases).

### **RQ3: What differences and similarities exist in how education, nursing, psychology, and sociology researchers operationalize and conceptualize the quality of MMR?**

To examine disciplinary differences and similarities in the operationalization of the quality of MMR, a partially ordered meta-matrix (Miles & Huberman, 1994)<sup>3</sup> was generated that cross-tabulated the quality criteria mentioned by participants as columns and the four disciplines as rows. Across disciplines, no substantial differences were found as far as the criteria displayed in Table 3 are concerned. However, some key differences were observed for a number of criteria that are not shown in Table 3 because they were mentioned fewer than six times. Of these criteria, omitted altogether by sociologists, were the provision of a literature review or conceptual framework that situates the study and informs the research questions and methods, and participation by the study participants in formulating the research questions. These omissions are consistent with the fact that sociologists were the least likely

to mention criteria related to the MMR planning phase. On the other hand, only educationalists mentioned criteria related to the credibility of conclusions and to consistency between study inferences and the rationale for combining quantitative and qualitative methods. This aligns with the fact that educationalists were those who mentioned most criteria related to the interpreting phase.

To examine disciplinary differences and similarities in the conceptualization of the quality of MMR, disciplines were projected as complementary categories in the MCA map. Figure 2 shows that the discipline is only clearly associated to axis 1, given the horizontal distance between the four disciplines in the coordinate system. The MCA map shows that nurses and psychologists were more likely to adopt a universal and fixed perspective on quality, while sociologists and educationalists were more likely to adopt a contingent and flexible perspective. More specifically, nurses and psychologists were more inclined to believe that disciplines do not exert any influence on the quality of MMR, contending, therefore, that a more standardized and consensual approach to quality is adequate. In contrast, most educationalists and sociologists tended to agree that quality is mainly contextual, and that its appraisal requires a more contingent and flexible approach. Of the four disciplines, nursing and sociology held the most contrastive views on the conceptualization of the quality of MMR, as indicated by the sum of their distance (1.712 points) from the centroid (the origins of the axes). On the other hand, the vertical distance between the four disciplines is smaller – which means that they are more related to axis 1 than to axis 2. Indeed, on axis 2, the distance between sociology and psychology is negligible (0.095 points), while the distance between nursing and education is far greater (0.733 points). Therefore, nurses were more likely to agree about a consensus, be unfamiliar and disagree with MMR quality criteria and, in contrast, educationalists were more likely to agree to a soft consensus, be familiar, and agree with MMR criteria.

INSERT FIGURE 2 ABOUT HERE

## **Discussion**

### **Criteria for appraising the quality of MMR**

The responses to RQ1 synthesized the criteria that researchers from the disciplines of education, nursing, psychology, and sociology considered most appropriate for appraising the quality of MMR. On comparing these criteria with those proposed in the literature, two interesting observations can be made.

First, in their review of critical appraisal frameworks for MMR, Heyvaert, Hannes, Maes, and Onghena (2013) found that integration of quantitative and qualitative components and the provision of a rationale for using an MMR design were the two most prevalent criteria specific to MMR. The fact that these two criteria ranked first and second, respectively, in our study reflects the growing consensus within the MMR community that these two criteria are core principles of MMR practice. Second, close resemblances can also be found between our findings and those of Fàbregues and Molina-Azorin (2017), whose review on the quality of MMR summarized the most important quality criteria according to their prevalence in the literature. Of the 10 criteria found to be most prevalent in that review, seven were frequently cited by our study participants.

Therefore, a first conclusion of this study is that the quality criteria most mentioned by participants are similar to those highlighted by the MMR literature. However, despite this convergence, it must be stressed that very few participants mentioned quality criteria associated with the philosophical domains of MMR despite the importance attached to this issue in the literature on MMR quality. We conclude, therefore, that although paradigmatic

issues may somewhat influence researchers' practices, in our study, these issues were not explicitly linked to the quality criteria for appraising MMR.

Lastly, it is relevant to note that half of the criteria presented in Table 3 are concerned with the reporting quality of MMR. In fact, four out of the six reporting quality criteria included in O'Cathain, Murphy, and Nicholl's (2008) GRAMMS guidelines were frequently mentioned by our participants. Among others, Pussegoda et al. (2017) have distinguished between the methodological quality and the reporting quality of research studies by defining the former as the quality of the study design and conduction, and the latter as the completeness, clarity, and transparency of the reporting of the study procedures and findings. Despite the differences between these two types of quality, none of the study participants differentiated between these two when asked about the quality criteria for MMR. This observation is consistent with the fact that in all the existing quality frameworks for MMR — with the exception of O'Cathain et al. (2008) — the methodological and the reporting criteria are presented conjointly (see the review by Fàbregues & Molina-Azorin (2017)).

### **The quality of MMR across disciplines: perspectives and variations**

The responses to RQ2 led to the exploration of a number of themes and their relationships regarding the conceptualization of the quality of MMR. Overall, two main perspectives were identified: a universal and fixed perspective, and a contingent and flexible one. Consistent with the study critical realist stance and the literature emphasizing the socially constructed nature of research quality (Papadimitriou, Ivankova, & Hurtado, 2013), the identification of these two perspectives underlines that the conceptualization of the quality of MMR is not homogeneous across disciplines but rather, “varies according to context and culture” (Symon, Cassell, & Johnson, p. 15) . Indeed, the responses to RQ3 allowed us to conclude that these two perspectives were strongly related to a participant's

disciplinary background. These findings align with those of Thorne (2001), who argues that, as far as qualitative research is concerned, the attributes of a discipline, such as “its philosophical tradition, its social and historical positioning within the domain of empirical science, and its interpretation of its own social mandate, [are] its *raison d’être*” (p. 148-149), are closely related to the ways in which research quality is perceived by researchers. On the other hand, educationalists tended to be familiar and agree with MMR criteria. This is consistent with the review by Fàbregues and Molina-Azorin (2017) where education was the discipline most represented in the literature on the quality of MMR.

In the same vein, Plano-Clark and Ivankova (2016) highlight the relationship between disciplinary conventions and researchers’ perspectives on the quality of MMR. An example of this relationship is provided by Creswell (2015), who suggests that, while criteria in the form of checklists and protocols tend to be pervasive in the health sciences, in the social sciences researchers are more inclined to use flexible and contingent criteria. Creswell (2015) further argues that differences in quality appraisal practices illustrate both the prevalence of certain beliefs about the nature of reality and the preference for particular research methods within each discipline. Consistent with this argument, in our study, nurses and psychologists were more likely to adopt a universal and fixed perspective on the quality of MMR, whereas sociologists and educationalists were more inclined to adopt a contingent and flexible viewpoint. The convergence of our findings with the arguments of the above scholars constitutes the second conclusion of this study, in a context of a growing interest in the MMR literature in the contextual and disciplinary nature of MMR practice (Greene, 2007; Plano-Clark & Ivankova, 2016), and the lack of similar studies in the field.

Contrasting with the disciplinary variations in the conceptualization of the quality of MMR described above, we nevertheless observed a commonality with regards to its operationalization: the criteria most mentioned in each discipline were equally prevalent

across the four groups. This indicates that, despite differences in participants' perspectives on quality, there is overall agreement with regards to a number of key criteria for the assessment of the quality of MMR. This agreement echoes Bryman's (2014) recommendation that quality appraisal in MMR should be guided by a limited number of core criteria that reflect the most important attributes of a good quality MMR study, that are shared by all members of the MMR community, and that can accommodate different research contexts. Interestingly, the six criteria suggested by Bryman (2014) are among those most cited by our study participants irrespective of discipline. This constitutes the third conclusion of this study.

On a final note, Plano-Clark and Ivankova (2016) contend that the way researchers define MMR may also influence their operationalization and conceptualization of the quality of MMR. Using Creswell and Plano Clark's (2011, p. 2-6) typology of MMR definitions, in our study, 31 participants proposed a methods orientated definition, nine proposed a methodological definition, and four did not provide a concise definition of MMR, as shown in Table 2. To the contrary to what Plano-Clark and Ivankova's (2016) contend, we did not find any substantial relationships between participants' views on the quality of MMR and their own definition of MMR. One minor relationship was observed, though: participants who defined MMR from a methodological orientation were more familiar with MMR quality frameworks.

### **Implications for the MMR field**

Our findings point to three key implications regarding current practices and debate around the quality of MMR. First, in relation to published frameworks for appraising the quality of MMR, a convergence was observed between their content and the criteria mentioned by the participants in our study. While it is outside of the scope of this study to assert whether this convergence is the result of existing frameworks reflecting researchers'

views on the quality of MMR or vice versa, our study points out that the literature and researchers' thinking and practices regarding the quality of MMR coincide. Participants also highlighted other positive attributes of these frameworks, such as their potential to summarize the most important quality criteria and the fact that they blend structure and creativity. However, participants also mentioned some pitfalls, such as their complexity, excessive length, and the fact that they ignore the interactive nature of research practice. We suggest, therefore, that MMR scholars should take these criticisms into account when developing new, or updating existing, quality frameworks for MMR.

Second, the fact that our participants held different perspectives on the quality of MMR, and that these are intrinsically related to their discipline, would indicate that the conceptualization of quality is heavily context-dependent. On that basis, we contend that it is unlikely that MMR researchers will ever share a complete common understanding of the processes underlying the generation and use of the quality criteria for MMR. Our findings support the view that, in order to ensure that the construct of quality evolves conceptually and in day-to-day practice, the MMR community must embrace diversity and “create opportunities to dialogue with different paradigms and intellectual research communities” (Collins, 2015, p. 253). However, as argued by Bryman (2014), and in light of our own findings, it is nevertheless possible — and to be hoped — that MMR researchers can come to an agreement regarding a set of core criteria that cut across disciplinary lines and other contextual elements.

Finally, the findings of this study should be helpful to MMR researchers from the four disciplines of education, nursing, psychology, and sociology. Awareness of other disciplinary perspectives on quality should mean that researchers, when working on collaborative MMR projects, will be able to anticipate potential misunderstandings and challenges inherent to interdisciplinary work. Furthermore, in coherence with the views of Thorne (2001),



awareness of their own disciplinary views and practices may prompt researchers, when reviewing MMR manuscripts from other disciplines, to consider the limitations and boundaries, and not just their strengths, of their own particular approach. Both these implications suggest that, far from reinforcing boundaries between disciplines, our findings may actually promote and strengthen MMR practice across disciplines.

### **Limitations of the study and future research**

This study has several limitations. First, the selection of disciplines rather than sub-disciplines as cases may have meant that important internal variations within cases were overlooked. Although diversity in sub-disciplinary expertise was a key criterion guiding the selection of participants, many sub-disciplines were not represented in our final sample. It is therefore possible that alternative perspectives on the quality of MMR held by researchers from unrepresented sub-disciplines have been overlooked. Despite this limitation, it is important to note that sub-disciplines tend to adhere to an overall core of disciplinary scholarship that determines their belongingness (Trowler, 2014). And, as we highlighted earlier, it is precisely this scholarship nexus that was the focus of our interest.

A second limitation is that interviews were conducted by telephone and Skype. Despite the potential afforded in terms of interviewing geographically dispersed participants, these interviewing modes may have impeded rapport building with more reserved participants. To palliate this limitation, all participants were given the opportunity to provide additional information (undisclosed during the interview) when member-checking their verbatim transcript and summary.

Finally, it is worth stressing that more than three years have passed since the data collection was undertaken. Although a number of publications on the quality of MMR, such as Bryman (2014) and Onwuegbuzie and Poht (2016), were published during this period, our

study is still relevant and timely for current challenges. First, if we compare our findings with those of the review by Fàbregues and Molina-Azorin (2017), we see that a large number of criteria mentioned by our participants coincide with those suggested in recent publications. Second, the fact that the Mixed Methods International Associations' (MMIRA) Task Force report (Mertens et al., 2016) recommends to discuss and agree on a set of core quality criteria for MMR, is also indicative of the timeliness of our study.

Future research should assess the generalizability of the study findings to a larger sample of MMR researchers from the four disciplines and beyond. Specifically, a follow-up study based on a quantitative survey would be helpful to examine whether other MMR scholars share the practices and views expressed by our participants. Such a study would also allow statistical testing of the disciplinary differences we detected in our research.

### **Conclusion**

This study's main contribution to the field of MMR is that it is the first attempt to explore how researchers from four different disciplines operationalize and conceptualize the quality of MMR. Our findings highlight the following: (a) the criteria participants consider to be most suitable for appraising MMR; (b) two perspectives from which the quality of MMR is perceived and understood, one contingent and flexible and the other universal and fixed; (c) a link between the contingent-flexible and universal-fixed perspectives and the participant's own discipline; and (d) an equal prevalence of the most-mentioned criteria across the four disciplines.

On the basis of these findings, we can outline several implications for the field of MMR: first, the need to review existing MMR quality frameworks in light of criticisms evoked by the participants; second, the need to foster inclusive and respectful dialogue on the quality of MMR across disciplines; third, the feasibility of reaching a consensus on core

quality criteria for MMR; and fourth, the importance of taking discipline-related features of quality into account when working in cross-disciplinary MMR contexts. It is hoped that our findings and implications will, as well as enhancing understanding of the MMR field, inform future developments and debate on the increasingly important topic of the quality of MMR.

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## Endnotes

<sup>1</sup> Percentages of inertia were corrected using the Benzécri (1979) formula.

<sup>2</sup> Following Le Roux and Rouanet (2010), only active categories with above average contribution ( $100/23=4.3\%$ , where 23 is the number of active categories) were considered in interpreting the axes.

<sup>3</sup> The meta-matrix is available from the authors on request.

Table 1. Database search strategy

Discipline	Database	Search terms	Limits
Education	ERIC	“Mixed method*” in Title/Abstract AND “Educat*” in Title/Abstract/Journal Title	Type of reference = Peer-Reviewed
Nursing	CINAHL	“Mixed method*” in Title/Abstract AND “Nurs*” in Title/Abstract/Journal Title	Journal Article, Book or Book Chapter
Psychology	PsycINFO	“Mixed method*” in Title/Abstract AND “Psych*” in Title/Abstract/Journal Title	Language = English
Sociology	Sociological Abstracts	“Mixed method*” in Title/Abstract AND “Sociolog*” in Title/Abstract/Journal Title	Year = 2003 and onwards

Table 2. Characteristics of the 44 participants by discipline

	Education ( <i>n</i> =11)	Nursing ( <i>n</i> =11)	Psychology ( <i>n</i> =11)	Sociology ( <i>n</i> =11)	Total ( <i>n</i> =44)
Gender, <i>n</i> (%)					
Male	5 (45.5)	2 (18.2)	6 (54.5)	8 (72.7)	21 (47.7)
Female	6 (54.5)	9 (81.8)	5 (45.5)	3 (27.3)	23 (52.3)
Geographic location, <i>n</i> (%)					
North America	8 (72.2)	5 (45.5)	7 (63.6)	4 (36.4)	24 (54.5)
Europe	3 (27.3)	4 (36.4)	4 (36.4)	7 (63.6)	18 (40.9)
Oceania	0 (0)	2 (18.1)	0 (0)	0 (0)	2 (4.6)
Position, <i>n</i> (%)					
Professor	8 (72.7)	6 (54.5)	5 (45.5)	8 (72.7)	27 (61.4)
Associate Professor	1 (9.1)	2 (18.2)	2 (18.2)	1 (9.1)	6 (13.6)
Assistant Professor	1 (9.1)	1 (9.1)	0 (0)	2 (18.2)	4 (9.1)
Other	1 (9.1)	2 (18.2)	4 (36.3)	0 (0)	7 (15.9)
Years since PhD completion, <i>n</i> (%)					
Fewer than 15 years	3 (27.3)	8 (72.7)	5 (45.5)	4 (36.4)	20 (45.5)
15 years or more	8 (72.7)	2 (18.2)	5 (45.5)	5 (45.5)	20 (45.5)
Does not have a PhD	0 (0)	1 (9.1)	1 (9.1)	2 (18.2)	4 (9.1)
Methodological expertise, <i>n</i> (%)					
Quantitative	2 (18.2)	1 (9.1)	3 (27.3)	2 (18.2)	8 (18.2)
Qualitative	7 (63.6)	1 (9.1)	2 (18.2)	4 (36.4)	14 (31.8)
Equally quantitative and qualitative	2 (18.2)	9 (81.8)	6 (54.5)	5 (45.5)	22 (50)
Definition of MMR, <i>n</i> (%)					
Methods – mixing methods, data or techniques	7 (63.6)	8 (72.7)	8 (72.7)	8 (72.7)	31 (70.4)
Methodological – mixing approaches, viewpoints or philosophies	3 (27.3)	2 (18.2)	3 (27.3)	1 (9.1)	9 (20.5)
No concise definition provided	1 (9.1)	1 (9.1)	0 (0)	2 (18.2)	4 (9.1)

Table 3. Quality criteria mentioned more than five times by participants

Study phase	Criterion	<i>n</i>	Rank (phase)	Rank (overall)
Planning	A rationale is provided for using an MMR design to address the research problem and questions	25	1	2
	The study purpose and research questions are clearly stated	12	2	6
	The planned MMR design is clearly and accurately described in terms of purpose, phasing, priority, and process for integrating quantitative and qualitative components	10	3	8
	An MMR research question is formulated	6	4	11
Undertaking	Quantitative and qualitative components are well implemented and adhere to the quality criteria of each tradition	26	1	1
	Quantitative and qualitative components are integrated effectively	21	2	3
	MMR design is clearly and accurately described in terms of purpose, phasing, priority, and process of integrating quantitative and qualitative components	17	3	4
	MMR design is linked to study aims and research questions	11	4	7
	Quantitative and qualitative components are congruent with each other	8	5	9
Interpreting	Inferences are consistent with study findings	7	1	10
	Inconsistencies between findings/inferences that emerge from quantitative and qualitative components are stated	6	2	11
Disseminating	The research process is reported transparently	14	1	5
	The unique insights and added value gained from using an MMR design are described	10	2	8
	Key MMR literature is cited	7	3	10

Table 4. Themes, subthemes, and quotes related to the conceptualization of the quality of MMR

Themes	Subthemes	Participant quotes			
a. Distinctiveness of MMR	Agreement (n=24)	MMR implies a different outlook and philosophical stances	"...[mixed methods] provide a unique worldview and a unique way of approaching issues" (Psychologist)		
		MMR relies on particular procedures	"I think that [mixed methods research] requires specialist attention...I think it has particular design issues" (Nurse)		
		MMR faces unique challenges	"I think mixing is unique and it also generates unique challenges that the researcher should respond" (Educationalist)		
		MMR yields added value compared to monomethod research	"...[mixed methods] give you something more than you would just get using one or both kind of just on their own" (Nurse)		
		MMR is a singular way of approaching research, but not a distinctive methodology	"...[mixed methods are] a way of rethinking research methodology in terms of trying to sort out the conflicting methodological ideas...I don't see it like that [a distinctive methodology]" (Sociologist)		
	Disagreement (n=14)	MMR is not a new way of doing research	"I, I know that some people are trying to connect it to a new epistemology, a new ontology...and I haven't discovered anything new about it" (Sociologist)		
		MMR does not constitute a paradigm	"I don't see mixed methods research as a, some people use the phrase 'a third paradigm' in addition to quantitative and qualitative" (Educationalist)		
		Neutral (n=3)			
		b. Views on MMR quality criteria	Agreement (n=29)	MMR quality criteria are essential for appraising the unique features of MMR	"...there are additional issues in terms of how the qualitative and quantitative data are integrated and that is unique to mixed methods research" (Educationalist)
				MMR quality criteria contribute to consolidating the MMR field	"And having criteria are, I mean, it's, it's, in some ways it legitimizes why we're mixing methods" (Psychologist)
MMR quality criteria help avoid flawed MMR research practices	"I think that [mixed methods criteria] prevents us from having studies where people are very loosely integrating" (Psychologist)				
Disagreement (n=10)	MMR is appraised by generic and quantitative and qualitative research criteria		"I don't understand why they [criteria] would be different if you were still using qualitative and quantitative methods" (Nurse)		
	MMR quality criteria may reify MMR as a paradigm		"That [MMR quality criteria] is reifying mixed methods into a paradigm and it's making all the mistakes we made in relation to qualitative research where that was identified as a paradigm" (Sociologist)		
Neutral (n=3)					

Table 4. Themes, subthemes, and quotes related to the conceptualization of the quality of MMR (contd.)

Themes	Subthemes	Participant quotes	
c. Approaches to appraising quality		Soft criteria are coherent with the contingencies of research practice	
	'Soft' criteria (n=22)	Soft criteria are a tool for informing judgment	
		Checklists are useful to students and inexperienced researchers	
	Checklist (n=6)	Checklists are useful for busy academics and practitioners	
		Combination of 'soft' criteria and checklists (n=9)	
d. Consensus on quality criteria for MMR	Agreement (n=11)	Consensus would help avoid confusion when addressing quality in MMR	
		Consensus would enhance the status of MMR	
		Consensus would stifle creativity	
	Disagreement (n=16)	Consensus would close down necessary debates on the conceptualization of MMR quality	
		Consensus might turn out to be inapplicable due to the contextual nature of research	
		'Soft' consensus (n=16)	Consensus needs to be built around key 'soft' criteria

Table 4. Themes, subthemes, and quotes related to the conceptualization of the quality of MMR (contd.)

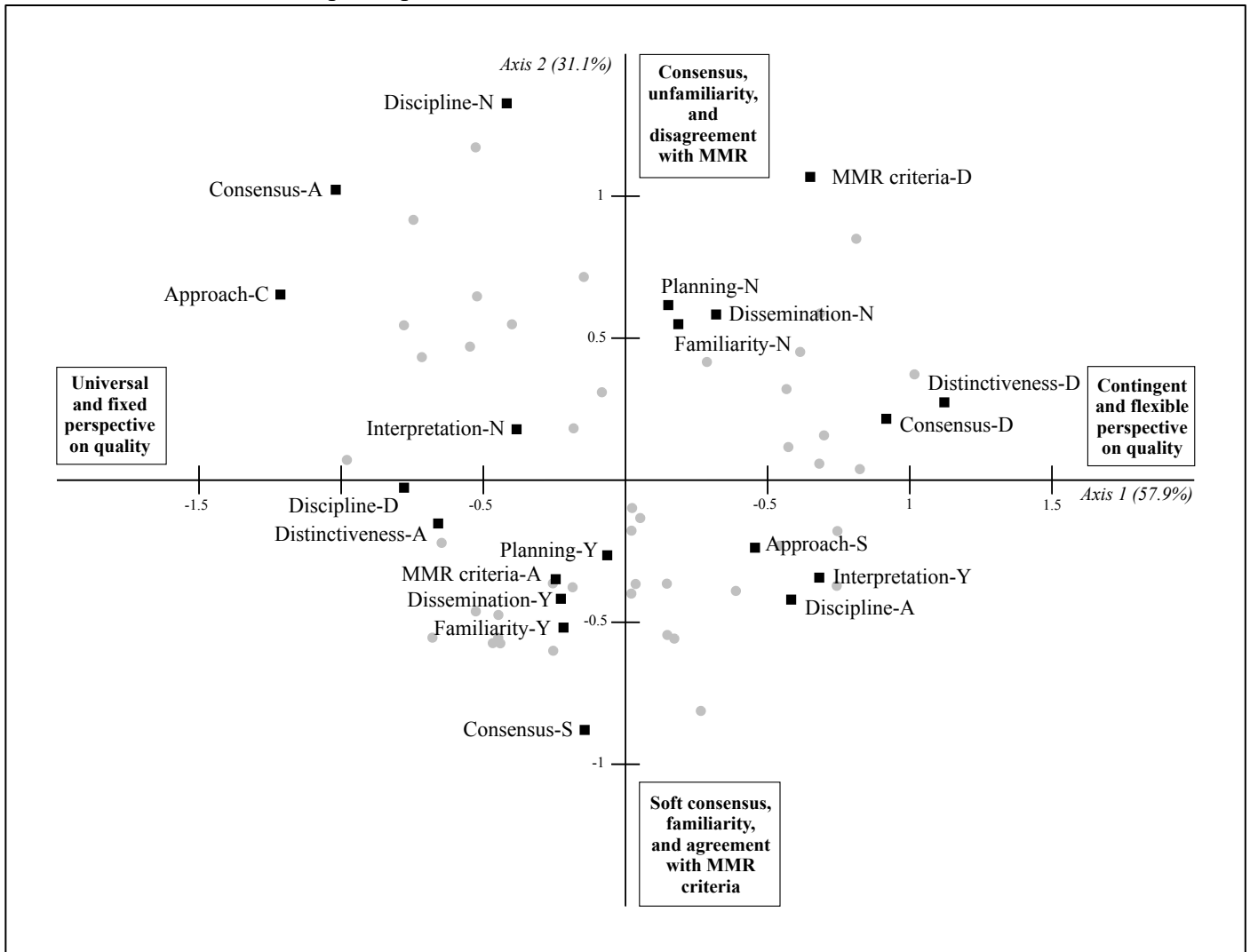
Themes	Subthemes	Participant quotes	
e. Disciplinary shaping of quality	Quality is shaped by the methodological approaches prevalent in each discipline	“...for many psychologists sampling...the measurement issues are dominant. And it is not a good idea to judge a psychology questionnaire based on sociological criteria and vice versa” (Sociologist)	
	Quality is shaped by the dominant worldviews in each discipline	“...discipline is a pretty powerful influence on, on how we, scholars, see the world. Health researchers, for example, see the world differently than I do!” (Educationalist)	
	Agreement (n=22)	Quality is shaped by the pure or applied orientation of each discipline	“Sociology...is much more influenced by make a contribution to theoretical ideas...those different orientations [pure and applied] will, I think, or are likely to have implications for notions of quality” (Sociologist)
	Disagreement (n=15)	Quality criteria cut across disciplines	“I think the same criteria apply across social sciences, health sciences, others...” (Nurse)
		Quality criteria rely on MMR books and journal articles	“When researchers from different disciplines conduct mixed methods and have to decide which quality criteria to use, they usually refer to the same well-known sources: Creswell, Tashakkori and Teddlie, Onwuegbuzie...” (Psychologist)
		Neutral (n=5)	
f. Familiarity with MMR quality frameworks	MMR quality frameworks are useful summaries of key aspects of MMR quality reported in the literature	“I think they [frameworks] are useful as checklists of things to think about to remind you: ‘Oh, did I think about this?’” (Educationalist)	
	MMR quality frameworks balance structure and creativity	“...[framework developers are] really trying to find a balance between: ‘This is how we assess quality, so we know what we’re doing’, while still leaving some room open for people to, to be creative in their methods” (Psychologist)	
	MMR quality frameworks ignore dynamic interaction between study components	“...[frameworks] typically begin with sampling, and then data collection, and then data analysis, as if somehow those can be pulled apart” (Sociologist)	
	Yes (n=22)	MMR quality frameworks are excessively long and complex to use	“I’m not sure that I wanna have a ten set, ten sets of things to check off to warrant the quality of this work” (Educationalist)
	No (n=19)		

Table 5. Contribution of the active variables and their categories to MCA axes 1 and 2

			Position in the MCA map					
			Left		Right			
	Active variables	Contr. (%)	Active categories	Abbreviation	Contr. (%)	Active categories	Abbreviation	Contr. (%)
Axis 1	Distinctiveness of MMR	25.4	Agreement	Distinctiveness-A	9.7	Disagreement	Distinctiveness-D	15
	Consensus on quality criteria	22.6	Agreement	Consensus-A	10.6	Disagreement	Consensus-D	11.7
	Disciplinary shaping of quality	15.6	Disagreement	Discipline-D	8.1	Agreement	Discipline-A	6.7
	Approach to appraising quality	14.9	Checklist	Approach-C	7.6	Soft	Approach-S	4.3
	Interpretation quality criteria mentioned	9.9	No	Interpretation-N	3.6	Yes	Interpretation-Y	6.3
Axis 2	Consensus on quality criteria	26.6	Soft	Consensus-S	13.1	Agreement	Consensus-A	12.6
	Views on MMR quality criteria	20.1	Agreement	MMR criteria-A	4.3	Disagreement	MMR criteria-D	12.2
	Disciplinary shaping of quality	13.2	Agreement	Discipline-A	4.0	Neutral	Discipline-N	9.2
	Familiarity with MMR quality frameworks	12.2	Yes	Familiarity-Y	6.2	No	Familiarity-N	6
	Dissemination quality criteria mentioned	11.2	Yes	Dissemination-Y	4.6	No	Dissemination-N	6.6
	Planning quality criteria mentioned	7.7	Yes	Planning-Y	2.3	No	Planning-N	5.4

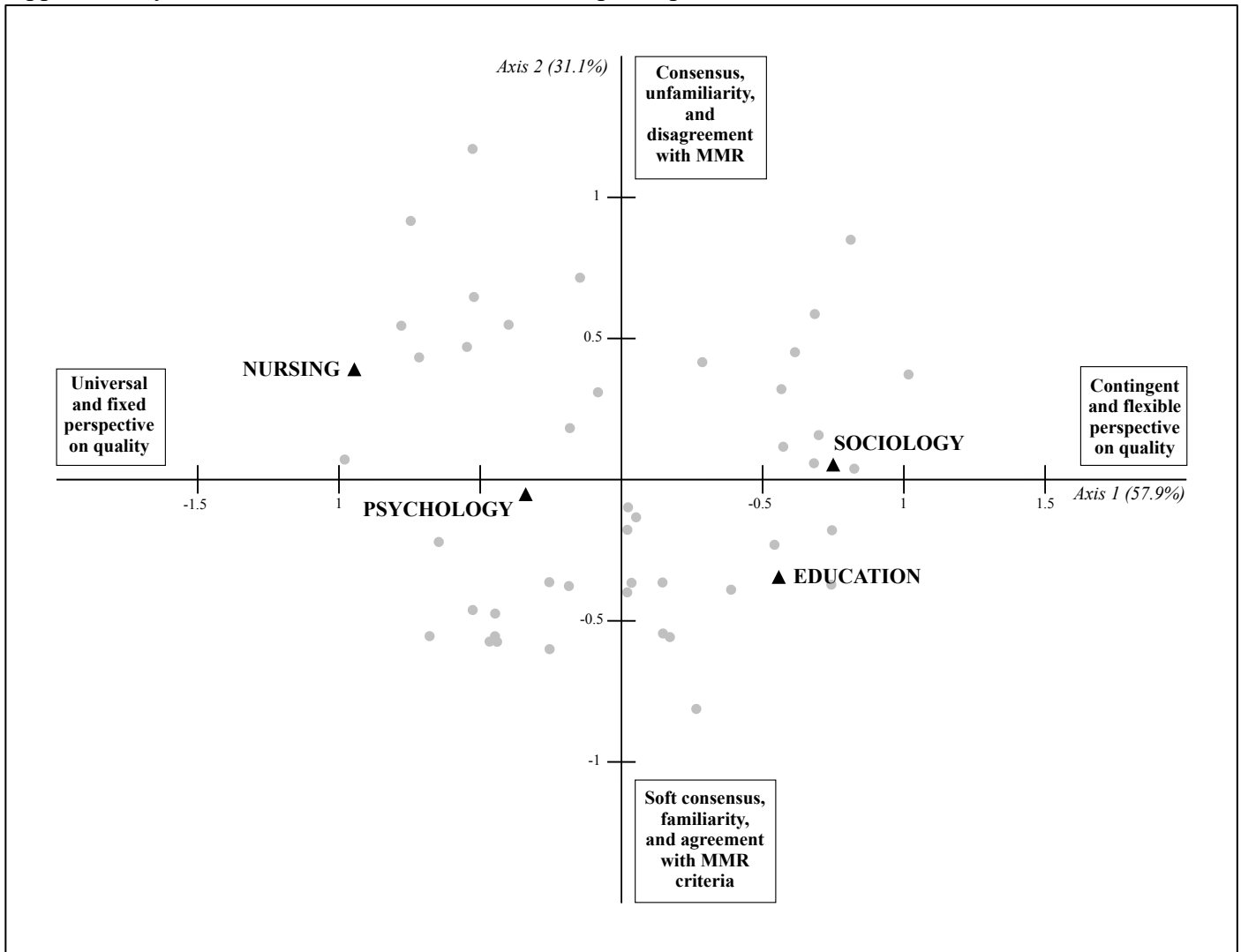


Figure 1. MCA map of the conceptualization of the quality of MMR by study participants: active categories in axes 1 and 2 and cloud of participants<sup>1</sup>



<sup>1</sup>The squares represent the position of each active category in the coordinate system and the dots represent the position of each participant. A key to abbreviations of the categories is given in Table 5.

Figure 2. MCA map of the conceptualization of the quality of MMR by study participants: discipline as a supplementary variable in axes 1 and 2 and cloud of participants<sup>1</sup>



<sup>1</sup>The triangles represent the position of each supplementary category in the coordinate system and the dots represent the position of each participant.