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DISCURSIVE ARTICLE

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There is a method to the madness, and a madness to the method: A beginner's guide to qualitative research

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Abstract

Qualitative research is increasingly engaged in anatomical sciences education research. However, many in the discipline are not formally trained in qualitative methodology and—like other research methods—qualitative methods are continually developed and enhanced. Indeed, qualitative approaches appear to be entering a new era of acceptability and rigor. As such, those researching, reviewing, and practicing in the anatomical sciences require a strong basis of understanding qualitative methodologies to be able to accurately execute, appraise, and apply qualitative work. This article aims to review core tenets of qualitative research, through the lens of anatomical sciences education by first focusing on: principles underpinning qualitative methods and aspects of philosophy and rigor. The article then transitions to how these principles can be used to understand phenomena through the introduction of common qualitative methodologies, with a special focus on framework analysis as an approachable and widely used method. The authors of this work have, combined, decades of qualitative research experience in the anatomy and health sciences, as well as knowledge of positivist research frameworks. The author's varied paradigmatic experiences provide an opportunity to present qualitative research in a way that is approachable to those who may come from a novice, and often positivist, perspective. The depth of experience also allows for exploration of qualitative research current and future "gray areas." Ultimately, this discursive article covers content that will be supportive to those across the spectrum of experience with qualitative research, and which is applicable to multiple papers in this special issue.

KEYWORDS
anatomical sciences/medical education, anatomy education, educational methodology

INTRODUCTION

Discipline-specific education research is becoming increasingly recognized as a valuable component of the academic mission.[1] While it is acknowledged that faculty professional development training in educational research methods is important to develop the knowledge and skills necessary to produce quality education research, not all institutions or organizations provide professional development in

education research.[2] Anatomy educators, while familiar with educational research topics, have expressed concerns about their lack of formal training in educational research and specifically with qualitative methods.[3] That said, graduate programs in anatomy education often include coursework in education research theory and methods.[4,5]

Despite the lack of formal methodological training in qualitative research, there has been an increase in qualitative inquiry in the anatomical sciences. For example, a review of abstracts in *Anatomical Sciences Education* (ASE) demonstrates an increase in the number of articles reporting on the use of qualitative methods or thematic analysis (see Figure 1). These methodological trends have also been documented in other major journals in the world of health professions education.[6] This is evidence that qualitative research is growing in popularity, and that readers, reviewers, and writers alike should be more familiar with its processes.

Qualitative methods are entering a new era of acceptability, challenging the status quo of rigor established through positivism. Similar to other research methods, qualitative research approaches develop with time. Qualitative researchers are increasingly highlighting discontinuities between published qualitative research and the theoretical underpinnings of qualitative work.[7–9] For those of us who regularly engage in qualitative research, it can feel *maddening*—continuously having to defend our methodological choices and the methods behind them, particularly when positivist paradigms are applied to interpretivist research (seeks to investigate subjective meanings and experiences, e.g., qualitative work[8]). And for those new to qualitative research, it can feel equally maddening trying to decipher the occasionally complex lexicon of the field with confidence or clarity. But given its expansion and role in helping the field better understand the context being studied, there is the necessity for all in anatomical science education to have a strong basis of understanding qualitative methodologies.

The goal of this discursive article is to review the essential basics of qualitative research. The article will review these basics by guiding the reader through a reflective activity (the Junk Drawer Activity) that utilizes a "beginner friendly" qualitative methodology to explore a simplified research question in an accessible manner. While this is a fantastic resource for a novice qualitative researcher looking to understand how to use this aspect of research to better understand questions in anatomical sciences education, we also posit that it can be of use to expert qualitative researchers, or anyone in the middle of this spectrum. For the experts, this article can be a useful teaching tool for mentees or may inspire experienced researchers to reflect on their approach in supervising beginner qualitative researchers. For anyone who reviews or reads qualitative research, the article includes references for many seminal qualitative papers and breaks down complex topics to facilitate higher quality reviews of qualitative research.

Why a junk drawer, specifically? A junk drawer was chosen because the concept tends to be a widely held experience (e.g., many people have a junk drawer) making the topic more approachable. Furthermore, using everyday objects (e.g., pens, rubber bands etc.) removes some of the more challenging aspects of qualitative research, such as latent meanings and differing perspectives of phrases due to worldviews and/or prior experiences. For most, for instance, a pen is for writing. Thus, this exercise allows readers to focus more on the process of qualitative research, with the interpretation of the data being bounded.

We encourage readers (particularly qualitative research novices) to follow along with the Junk Drawer Activities as you read. As you work through the process, we specify how the steps relate to philosophical and theoretical underpinnings of qualitative research. We will also provide examples of how rigor can improve the process of "junk drawer organization"—making an essential consideration of qualitative research, which is often overlooked, more approachable.

Of note, the Junk Drawer Activity was originally developed and presented at the 2022 Annual Meeting of the American Association for Anatomy (Philadelphia, PA) in the format of a facilitator-guided workshop. A PDF of these slides is included for reference in our Supplemental Materials to support any individual

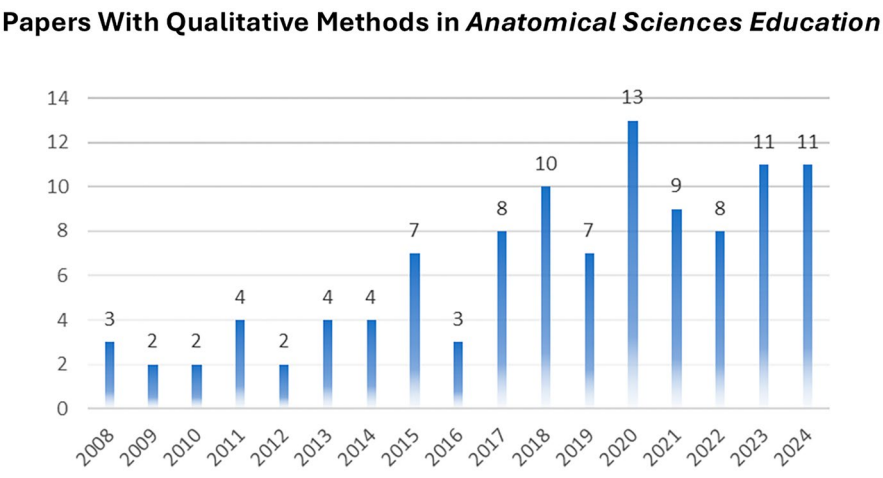

FIGURE 1 Number of abstracts in Anatomical Sciences Education who reported using "qualitative" methods and "thematic analysis" over 2008 to August 2024.

who might wish to utilize this fun and approachable way toward dabbling in qualitative analysis, particularly as we get to 'Activity 5' and introduce analysis in this article. To request a PowerPoint version of the activities, please contact the relevant corresponding author (MDL).

ACTIVITY 1: YOU OPEN A JUNK DRAWER IN YOUR KITCHEN… WHAT DOES THIS MEAN?

We all face metaphorical junk drawers—educational questions that we have that are incredibly complex and may seem overwhelming. However, finding meaning in the patterns of these questions is essential. Upon discovering we have questions, one of the first steps any researcher should do is ask and answer the following question: what is the best approach to answer *this* question?

This is where a little understanding of the philosophical assumptions of different research approaches can be critical. One hallmark of qualitative research is the focus and emphasis on the philosophy of science that underpins research. All of us have reasons for *why* we decide to research a particular topic, what we believe can be known about a topic, and the best approaches to discovering new knowledge. Simply put, all these beliefs and motivations form the philosophical underpinnings behind research—the human doing the research impacts the approaches and interpretations of the research.

In the world of research philosophy, specific terms are used to describe components of these beliefs. These include axiology, ontology, epistemology, and methodology. Each of these concepts is briefly detailed below.

- **Axiology**: the "why?" What do you value that has led to your line of inquiry? Components of axiology may be reflected in the conceptual framework of a work. While one purpose of a conceptual framework is to clearly communicate the lens at which a research study is approached,[10] it can also be used to emphasize the perceived value of the research.[11]
- **Ontology**: what is the nature of reality? Ontological beliefs tend to fall on a spectrum ranging from beliefs that there is one true (measurable) reality to reality being a socially constructed concept, of which there can be multiple.[12]
- **Epistemology**: what is the nature of knowledge? Epistemological assumptions are influenced by ontological beliefs.[13] How one interprets reality determines what they can potentially learn about said reality.
- **Methodology**: how can you come to know what is real and build knowledge? Based on one's previous answers to these philosophical questions, we can determine the methodologies we use to learn about the world. Methodologies tend to fall somewhere on a spectrum of objective or subjective approaches to collating data. While historically, qualitative research has been associated with subjectivity (inductive approaches) and quantitative research with objective (deductive approaches), there are more recent calls to consider "uncoupling" these associations.[14] Still, there are numerous methodologies that traditionally align with qualitative and inductive exploration; these are detailed later in this piece.

There are no "right or wrong" answers to the aforementioned questions, although there are some common schools of thought around each. These are described as paradigms. Paradigms, or "worldviews," are established sets of common beliefs (or philosophical assumptions) that underpin research.[15] While you could define your axiology, ontology, epistemology, etc. in great detail, in some cases (particularly with word limitations in publishing), it is preferred to share the paradigmatic approach you applied to work to summarize these areas into a single idea. This can be done by highlighting established paradigms that your research aligns with.

There are a few common paradigms that anatomy education researchers should be familiar with and may find their work aligns with.[16] These are detailed in Figure 2, including brief statements on how these paradigms reflect specific philosophical assumptions. However, these are just a few of the many established paradigms that researchers may find they align with. As this is a "beginner's guide," there is not space to deeply describe every paradigm in existence, and if there were, this would certainly be overwhelming for anyone just getting started in the philosophy of science that is so critical for qualitative inquiry. As such, we present some of the paradigms that we and other health professions educators,[12,17] often regard as most salient in our field. We encourage interested readers to explore other paradigms.

To return to the example of the junk drawer, let us say you opened and began organizing it because you are moving, and the drawer needs to be emptied. This reason represents your axiology. While you recognize that you have this purpose in opening the drawer, you believe there are multiple reasons someone might need to open and organize a junk drawer depending on the specific circumstances—this is your ontological view. Your epistemological stance could be that you may be able to uncover many of the reasons someone might need to open such a drawer, but perhaps not ever know all of them. But for the present time, you simply want to open it and create a reasonable way to organize the contents while you are moving. You plan to also confer with your partner (whom you live with) on this process. As such, your paradigm for this project might align best with an interpretivist approach.

Through this example, it is clear to see that the aim or research question and underlying beliefs of a project are essential foundations. Given this, we will define the research question (RQ) for the remainder of this activity as "*What belongs in my junk drawer in the kitchen*?" In this case, the researchers' axiology is defined as the goal of ensuring accessibility of resources in the kitchen, but they recognize that not everyone's kitchen junk drawer requires the same resources or organization (ontology)—particularly in the kitchen. For this reason, the researcher consults those living in the location of the junk drawer to understand other subjective realities (epistemology). They may explore what the primary purpose of the kitchen is (e.g., cooking, family gathering, etc.), for example.

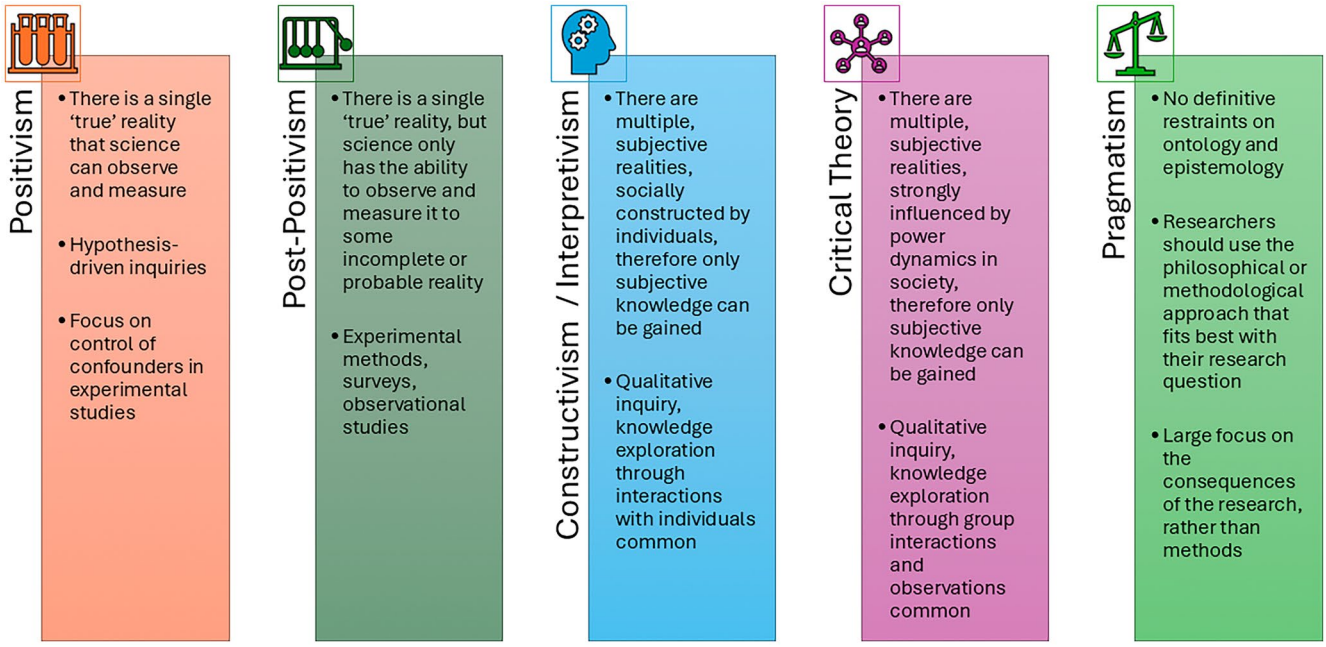

FIGURE 2 Some of the primary paradigms that underpin research, including how these align to the philosophical tenets detailed above.

It is also hopefully apparent how essential clear communication about research beliefs and processes is in qualitative research—so before returning to our junk drawer, it is important to consider this via reflexivity.

ACTIVITY 2: COMMUNICATE WHY YOU OPENED THAT JUNK DRAWER

Your junk drawer is open, but why? How will others know why you decided to go into this drawer, at this given moment, and really delve into its contents? This is where the process of reflexivity is essential—without this, a reader or reviewer may place their own motivations on the research, potentiating opportunities for misinterpretation. For instance, you may want to state explicitly that researchers were a mix of cooks and non-cooks to help readers understand what content was reviewed and through what lens, and that the motivation for opening the junk drawer was moving to a new home.

Reflexivity is the reflection of one's research values, and clear communication of one's positionality. While this is essential for qualitative inquiry, there is also the argument that as such philosophical considerations underpin every pursuit of knowledge, reflexivity should be a practice not just reserved for qualitative research, but all research—including quantitative.[18]

While this discursive article is not a research report, paradigms can also influence how research and writing are interpreted and approached. Here is an example of what a reflexivity statement might look like, written from the perspective of the first author of this manuscript, like she is following along with this junk drawer activity:

> AND is an early-career anatomy educator. While she has experience in multi- and mixed-methods approaches to research, she was largely trained in the tradition of qualitative research. She considers her primary paradigm to be pragmatism (though some debate if this is a 'true' paradigm); she often aligns with constructivist and critical theory approaches in her work. She opened the junk drawer because she is moving soon and needs to organize this space to pack it. AND has no cooking expertise, but is an avid baker, therefore has interest in current and future organization of the kitchen space to fit these needs. Given her pragmatism, she believes that not everything that is in the junk drawer needs to be retained, and this influences her interpretation of it.

ACTIVITY 3: FORMULATE A PLAN FOR HOW PEOPLE CAN TRUST WHAT YOU SAY ABOUT YOUR FINDINGS IN THAT JUNK DRAWER

Whichever paradigm your work might align with, or however your reflexivity statement might appear, one important final tenant of qualitative research to consider is how the rigor of the work will be conveyed. Ideally, like philosophical assumptions, this should be reflected and discussed amongst a research team ***before*** the selection of an appropriate methodology (hence it is presented here as Activity 3). As such, we will introduce some tenets of rigor here, and reference them as we continue to organize our junk drawer. Recognizing this article is a "beginner's guide" for those more familiar

with positivist paradigms—in many places we also make comparisons to standard measures of rigor in quantitative research. The goal is not to say that either are "better" or "worse," but rather to make accessible analogies for readers.

One of the most important ways to plan to communicate rigor in qualitative inquiry is through trustworthiness. Trustworthiness was developed to evaluate the value and rigor of qualitative research by Lincoln and Guba.[19] Trustworthiness includes the criteria of credibility, dependability, confirmability, and transferability as equivalents to the notions of internal validity, reliability, objectivity, and external validity, respectively.

Each of these criteria includes several different procedures, which can be described by researchers to demonstrate the rigor of their qualitative study. However, it should be noted that the work of Lincoln and Guba[19] was established during a period when qualitative researchers were attempting to demonstrate the rigor of qualitative work as an extension of more traditional, quantitative, and positivist studies.[20] Therefore, these recommendations have semblances of "positivist-creep".[7] Since this era, qualitative researchers have been increasingly critical of the ways in which trustworthiness criteria are applied to qualitative work and highlight where misalignments exist with the tenets of interpretivist research. For researchers interested in diving deeper into the "gray areas" and criticisms of quality measures of qualitative research, the final activity (Activity 6) of this article expands on these elements.

Below, several different trustworthiness criteria and procedures are briefly described, including suggestions for the critical application of the trustworthiness procedure, using the ongoing junk drawer activity to show how these tenets are applied in practice. Researchers, reviewers, and readers should all be familiar with these applications, being mindful of how they are presented in research in our field.

Activity 3.1: Are you accurately sharing what you find in the junk drawer? (Credibility)

Comparable to the positivist concept of internal validity, credibility seeks to demonstrate that the findings are consistent with and accurately represent the phenomenon in the context in which it is being studied. Several procedures are proposed to demonstrate the credibility of a study and include (but are not limited to): triangulation, member checks, adequate/prolonged engagement in data collection, reflexivity, and peer examination/review. A few of these approaches are described in more detail below. However, it is worth noting that these elements are not necessary in all qualitative projects; their utility should align with the paradigmatic and methodological choices. Researchers utilizing (or reviewers appraising) post-positivist approaches might find these concepts useful in defining credibility:

- **Triangulation**: connects several methodological elements and may involve the use of multiple data collection methods, sources, investigators, or theories to corroborate or confirm findings. Triangulation is purported to counter a concern that the findings are an artifact of a single method, source or interpretation.[21] In essence, triangulation may be used as evidence of rigor because using just one method of data collection, study population, or investigator can be perceived as less rigorous. There have been criticisms of triangulation,[22] leading some researchers to instead propose "crystallization" as a method to view the study from a multidimensional approach.[23] Furthermore, information power (discussed later in the manuscript) suggests that it is the quality and depth of the data that can enhance its credibility.
- **Member checks**: are also referred to as response validation as one is soliciting feedback from participants on the accuracy of transcription and/or the accuracy of one's interpretation of their experiences or perspectives.[24] The assumption underlying member checks is that researchers are influenced by their subjectivity, which may influence their analysis, and that soliciting participants' perspectives may illuminate personal bias and provide alternative explanations.[25] Birt and colleagues suggest using Synthesized Member Checking, which is a five-step process that acknowledges the co-constructed nature of knowledge by providing participants with the ability to engage with raw and interpreted data, provide feedback, and then integrate the feedback into existing results or elicit additional data.[20] Like triangulation, though, member checking is not without its criticisms[20] and requires clear communication about procedures for conducting member checks.[25] Reflexivity, discussed next, may be a more effective way to address this element of rigor.
- **Reflexivity or positionality**: as discussed previously, reflexivity has long been used as a methodological tool by qualitative researchers to represent and legitimize their data.[26] Pillow[27] likens reflexivity to an understanding of research subjectivity in that it is "a focus on … who I am, who I have been, who I think I am, and how I feel [I] affect data collection and analysis" (p. 176). Thus, it is an ongoing process of self-awareness during the entire research process that makes visible the construction of knowledge to demonstrate an accurate portrayal of the findings.[27] Positionality statements often include descriptions of the researchers' approaches to reflexivity but are also where researchers can explain and describe their assumptions about the research, their paradigm, and/or worldview.[28]
- **Peer review**: frequent debriefing sessions with colleagues, members of the research team, and/or research supervisors, and having multiple analysts may provide richness to the data interpretation step by offering multiple perspectives or viewpoints. Peer reviews and debriefing sessions offer opportunities to collect feedback on progress, discuss alternative approaches, and explore assumptions and interpretations.[24] In the absence of a research team, "critical friends" may be recruited to ask clarifying questions, offer critique, and provide another lens to examine the data.[29] While it is perfectly acceptable to have a single analyst, some claim having multiple analysts who have differing perspectives adds richness to the analysis by prompting deeper analysis. However, having multiple analysts requires additional planning

and coordination of the research team, and does not necessarily lead to deeper analysis—rather it just provides a different set of positions and reflexivity. The research team must decide in their discussions of inter-coder reliability whether the goal is to come to a reliable consensus on codes, or to use the practice as a method to uncover nuance and significance in the data,[30] or if the practice is necessary at all. Barry et al.[31] claim some teams are misguided by positivist concepts of inter-rater (coder) reliability and instead consider the benefits of team analysis as enabling sounder methodological design and encouraging richer conceptual analysis and interpretation.

To optimize teamwork in qualitative research and address issues that may affect productivity and functioning of the team, we propose reflexivity as a team activity, accomplished through the sharing of reflexive writing and group discussions about assumptions and worldviews.[31] Much like reflexivity should be an iterative process through the study, from design to interpretation, team reflexivity should continue throughout the research process during team meetings and debriefing sessions—as one's perspectives is likely to change through the process of research data collection and analysis resulting in a developing and changing reflexivity. Researchers might find this is quite an easy practice to implement during regular research meetings—consider adding "return to reflexivity" discussions to agendas, and continued action items.

Activity 3.2: Will your descriptions about the junk drawer change over time? (Dependability)

Dependability refers to the stability of the data over time, with similarity to reliability in quantitative research. Reliability is inherently problematic within social science research—into which interpretivist approaches tend to fall. Human behavior is dynamic, and due to the changing nature of social phenomena, we would never expect the same results if a study were replicated, or even when we look back on a prior study with new information. Instead, a qualitative study can be determined to be "dependable" if the results are consistent with what you would expect to find at a specific point in time given detailed descriptions of the research methods—illustrating the importance of a detailed and descriptive methods section in qualitative reporting. A researcher can enhance dependability by using an audit trail that documents all aspects of the research process throughout design and implementation. Such an audit trail should include details regarding decisions made, issues encountered, interpretations, and reflections throughout the process[24]—including noting when interpretations of data changed (and the reasoning). While it might not be expected that you submit every documented detail of a project for publication in the main document (though authors could consider such notes for inclusion in appendices), we still recommend this as good practice, and to have for reference, particularly if questions arise about methods during the peer review process.

Activity 3.3: Will you be objective in your description of the junk drawer? (Confirmability)

The concept of confirmability is comparable to an assurance of objectivity in positivist research, an inherently difficult task (and arguably misaligned with interpretivism) due to the subjective nature of qualitative research. It is best thought of as an approach to ensure that the findings of the study represent the experiences of the participants rather than the characteristics of the researcher and their preferences. As such, reflexivity and positionality statements, rich descriptions of data, and audit trails are often recommended to reduce perceived "bias" by recognizing the essential role of the researcher.[24] Though, as readers will learn by progressing through the activity—even the term "bias" is wrought in interpretivist paradigms.

Activity 3.4: How does your junk drawer description apply to others descriptions? (Transferability)

Transferability's closest positivist concepts are external validity, generalizability, and the extent to which the results from one study can be applied to other contexts. While generalizability cannot occur in qualitative studies, nor should it be the goal, with sufficient description of the context and research methods (e.g., thick or rich descriptions), readers or users of the research can determine whether the findings are applicable or transferable to their similar situations or context.[32] "Thick" (or rich, deep) descriptions include robust details about the study setting and participants, details about data collection and analysis, and detailed descriptions of the findings that include direct quotations. We recognize that reporting thick descriptions might be challenging for some authors, when word limits can be exactly that to qualitative researchers in particular—limiting.[33] Still, use of appendices can be useful tools for researchers to utilize to include details related to transferability. Alternatively, there are some arguments that transferability can also be framed through application of study findings to theory.[34]

ACTIVITY 4: HOW ARE YOU GOING TO ORGANIZE THE JUNK DRAWER?

Your drawer is open, you have thought about the purpose and processes of rigor that will ensure you can evaluate your drawer. But how will you actually organize it? This is where methodology familiarity is essential as a qualitative researcher. It is important to identify a methodology that will best answer your questions and that aligns with beliefs on what can be learned through the study.

Within the field of qualitative research, there are several well-established and common methodologies. The goal of qualitative research is to explore, describe, and explain phenomena. As such, it is not typical to have hypothesis testing be a facet of qualitative

methodology. The goal of exploration, rather than hypothesis testing, is reflected in the core methodologies of qualitative inquiry, their methods, and analysis goals. Here, we describe some of these and more specifically highlight examples of these methodologies in our discipline of anatomy education, which may be particularly useful references for novice researchers in the field to explore further:

- **Ethnography:** a methodology that aims to describe how individuals construct, interpret and present social realities and relationships. With traditional ethnography having anthropological origins in the study of cultures and peoples, in the field of health professions education, we see many "modified" forms of ethnography emerging that allow researchers to focus on the nuances of our disciplines.[35] For instance, Wheble and Channon[36] performed an ethnographic study to determine how veterinarians use anatomical knowledge in veterinary clinical practices. The authors used observations and semi-structured interviews with veterinarians working within a single, independent branch small animal practice. Transcripts, field notes, and videos were analyzed iteratively as additional data were collected. To gather the social interactions, the researcher's data collection methods involved focusing on the social aspects of the topic being researched, with a key feature of ethnography being some form of observational study.
- **Phenomenology**: While ethnography focuses on social realities, phenomenology allows for focus on individual experiences. It can take more descriptive forms (focusing on how individuals describe their experiences) to more interpretative flavors (focusing on implicit meanings behind these "lived" experiences), though this diversity can also make phenomenology a challenging methodology to understand.[37] These implicit meanings are ideas, beliefs, or attitudes that are revealed through analysis, rather than stated verbatim from the participants. At its crux though, phenomenology focuses on understanding a "phenomenon" from the viewpoint of the individuals who have experienced it.[38] Kirkness et al.[39] conducted a phenomenological study to understand how anatomy educators grapple with changes to the medical curriculum. Specifically, the authors chose interpretive phenomenological analysis (IPA) as their methodology because the aim of the study was to tell the story of anatomy educators through the authors' interpretation of their sense-making. Transcripts of semi-structured interviews were analyzed using a cyclical analytic process of interpretation and reflection, according to IPA conventions that recognize the role of the researchers in interpreting what their participants are describing.
- **Grounded theory**: a unique methodology as it explores phenomena but has an underlying explanatory goal. The purpose is to ideally develop a theory or conceptual model "grounded" in the data provided by participants. Similar to the other common qualitative methodologies, grounded theory has been adapted from a "classic" form, with options to perform a "modified" or "constructivist" form depending on the philosophical assumptions of the research team.[40] Dueñas et al.[41] utilized grounded theory to explore the phenomena of anatomy outreach programming, from the perspective of anatomy educators, to understand why outreach is such a commonplace practice amongst the discipline. The goal, presented in the article, was to formulate a conceptual model of outreach to better illustrate shared motivation, best practices, and challenges. This study also utilized analysis of semi-structured interviews to construct this conceptual model, illustrating an important distinction between methodology and methods.[42] Methods are the specific methods of data collection that might be used across different methodologies; methodology is the framework that align with the research purpose and philosophical underpinnings of the work.

While these are the "big three" common methodologies in qualitative inquiry, there are numerous other methodologies and methods researchers might use. Interested readers may review related papers in anatomical and health professions research in areas including but not limited to: reviews utilizing thematic synthesis,[43] design thinking for designing curricula,[44–46] narrative research for understanding learner experiences,[47] case study research for rich descriptions of educational programs,[48,49] and Q-methodology for exploring student opinions beyond standard course evaluations.[50,51]

To return to our working junk drawer example, Table 1 includes some ways you might think about the RQ established in this activity but see how different methodologies could be utilized to answer said question. Depending on the more specific aims or purposes of a study, different methodologies may be suitable.

Thematic analysis (TA) is also notable as a "method-turned-methodology" due to its usability.[52] While frequently reported as a means of qualitative analysis, it does require its own focus on rigor, and the decision to use it should still be supported by philosophical reflections. It is also more nuanced than a true "method," and rather, might be thought of as a family of methods that aim to explore themes of meaning in data.[53] The benefits of thematic analysis include the flexibility of the methods that can be used for data collection. However, this has unfortunately led to an overabundance and perhaps overuse of thematic analysis without clear methodological justification.[54] As Braun and Clarke (the creators of reflexive thematic analysis) reflected upon, they did not anticipate their methodology to be so widely adapted.[52]

Given its wide usability, we will focus on a thematic method for the remainder of this article, as a way for beginners to understand how these approaches can be applied. Before delving into that, there are some common pitfalls of theming methods that beginners can fall prey to, including but not limited to: the assumption that themes "emerge" or "uncovered" rather than generated or constructed, the different conceptualizations of theme (ranging from domain summaries versus patterns of shared meaning), and the need to still rely on philosophical assumptions to appropriately identify the best methods to use in a study. Keeping these pitfalls at the forefront of your mind can help better guide your qualitative inquiry from the start.

In the "family" of thematic analysis approaches, framework analysis is also a noteworthy method, as it takes a systematic approach to

TABLE 1 Application of methodologies to junk drawer activity.

Core RQ: What belongs in my junk drawer in the kitchen?		
Methodology	**RQ focus**	**Example of how methodology might be utilized with above RQ**
Ethnography	Social—what belongs in the junk drawer from a social perspective	You opt to perform a focused ethnography observing how partners organize drawers—you will observe the organization process, but also do semi-structured interviews with individual partners to understand their construction of this activity
Phenomenology (interpretive)	Experience—what experiences influence (inhibit) the ability to determine what belongs in the junk drawer	You want to explore the challenging experiences individuals face when organizing junk drawers. You opt to have participants write short diaries, about their challenges, as they organize junk drawers. Later, you do focus groups, using the diaries as a "jumping off" point and as part of the questions (schedule), to promote deeper conversations about individual experiences across participants
Grounded theory (constructivist)	Construction—what decisions and practices do people use to construct belonging in organization of their junk drawer	You aim to create a conceptual framework to guide others in the organization of junk drawers. You conduct semi-structured interviews with a focus on your specific RQ and perform interviews while analyzing data to have a robust and iteratively constructed understanding

qualitative data analysis that can again make it quite "user-friendly" for those of us from a science background (and trained in the tradition of positivism/post-positivism). This is particularly useful in our discipline, as noted in the introduction of this manuscript that many anatomical sciences educators are trained in the post-positivist practice. It has a systematic and somewhat rigid structure, focusing on patterns, which can make it feel more aligned with the scientific method. In a field inundated with improper use of the term "thematic analysis," as explored above, framework analysis presents an approachable alternative methodology.

The "stepwise" approach of framework analysis is also often why it is regarded as "beginner friendly." Ritchie and Spencer[55] described the 5-stage approach, with Stage 1 as familiarization. Here the researcher(s) immerse themselves in the data during collection and familiarization. This often occurs as the interview is taking place (and reflections immediately following these interviews), but also through re-listening or re-watching interviews, and reflection on these experiences. In Stage 2, Identifying a thematic framework, the researchers begin to identify and define codes and themes through reviewing the quotes. A key potential output from Stage 2 is a codebook, or a sort "dictionary" of codes, themes, definition, and exemplar quotes. Stage 3 is termed "indexing," which is when the codebook is applied to the data set. Here codes and themes may be further refined and reorganized as the research team gets deeper into analysis. Once the dataset is fully coded, and the coding hierarchy is finalized, Stage 4 can begin. During this charting phase, thematic patterns (including dominant themes or theme matrices, or thematic patterns) can be explored. Finally, the results are compared to the broader literature and related to relevant theories in Stage 5. While this sounds like a linear process, these steps are iterative, and often the final stages of qualitative analysis are not complete until the paper is published—with researchers revisiting these five stages throughout the research process (including during editing and revising the paper). Furthermore, like many of the aforementioned methodologies, framework analysis has also expanded to take on many forms, though all generally have the shared feature of a systematic and structured coding process.[56]

Elements of philosophy and rigor, detailed above, are as important in framework analysis as any qualitative approach. Notably, if the researchers are taking an interpretivist worldview, the "organization" of the themes is not meant to be representative of a universal thematic framework, rather, the thematic framework represents the researchers' perspectives of the dataset. This is why reflexivity is so critical to qualitative analysis with an interpretivist worldview, this helps a reader understand the researchers' perspectives, and thus their approach to qualitative analysis.

ACTIVITY 5: YOU OPT FOR FRAMEWORK ANALYSIS TO APPROACH YOUR JUNK DRAWER

Because of its potential use and approachability, we will use framework analysis now to elucidate how following its methods can be a good guide, particularly for beginners, looking to delve into qualitative research, as we continue through the junk drawer activity. By continuing this thought activity through the analysis process, we hope that novice qualitative researchers can continue to appreciate the "moves" and process of qualitative inquiry, and that experienced qualitative researchers will be able to draw upon this analogy when supporting developing researchers.

Activity 5.1: Considering the research question

As iterated above, the starting point of any qualitative approach is a high-quality research question (RQ). Typically, qualitative research is seeking to understand a complex phenomenon, and the RQ helps the researcher(s) focus on the relevant data which answers the question. To reiterate, for this activity, the research question is "*What belongs in my junk drawer in the kitchen*?"

While we pose a RQ for readers to consider, "bounding" or contextualizing this RQ is important. As such, we suggest considering a junk drawer in your own house that you are tasked with organizing, and to consider what is most important to you as you begin this process of organization (e.g., which room you would focus on and what drawer contents might be important).

However, in the present work, there is a rather narrow focus of our RQ that requires attention. This is not about organizing any junk drawer in the house, this is a junk drawer in the *kitchen*. This RQ specificity can help identify which contents of the drawer "answers" the research question, and which do not (e.g., if clothing items are present, while they are items in the junk drawer, should we "code" them to a junk drawer in a *kitchen*?).

Activity 5.2: Familiarization

The stage of familiarization focuses on "general" impressions of the dataset. Look at the picture of the junk drawer shown in Figure 3 (also see Page 11 of Activity 2 of the Supplemental Material), and consider "overall impressions" of the contents of the drawer, any "general" categories of items, and where you might like to start with organization (and how you will do this).

The image presented is quite overwhelming, and purposefully so. One cannot see all the items in the drawer. The goal in this activity is to realize that when you first start with a dataset, it is likely to be similarly overwhelming, and that there is not a "right way" to begin. However, beginning—gazing across the clutter and noticing some big categories—can help make things more manageable.

For example, via familiarization (looking over) the junk drawer, you can see some things that might not seem to belong in the drawer, or multiples of items. As we start to "pick through" this broad idea, some categories are easily identified, such as "furniture pads", "colored stuff", "straws", and "chopsticks".

The next set of pictures (also shown in Figure 3, and Page 13 of Supplemental Material) illustrate that taking these categories out of the junk drawer (by coding them, no matter if these are the final codes or not), makes the "junk" in the drawer seem less overwhelming to the researcher.

Often in qualitative inquiry, where you start is just that—a starting point. In fact, some methodologies include iterative processes as part of their methods. It is expected that researchers will not take a step-by-step approach. Even here, with a more stepwise approach, the starting point is unlikely to look like the endpoint of framework analysis because there will be many changes along the way. But, getting started—no matter where—helps to manage the dataset. Beginner researchers, in particular, are encouraged to just start somewhere.

Activity 5.3: Developing a thematic framework

Moving toward a deeper exploration of the "data," it is essential to constantly be returning to your RQ; when coding begins—all data relevant to the RQ should be coded, and in a manner that answers the RQ. During the initial phase of this stage of framework analysis, you might find that the codes or themes identified no longer "fit," which is okay.

An example of this is illustrated through consideration of items that represent "colored stuff." The theme for these could be "colored stuff," as was initially coded. This "colored stuff" is a larger group code. Alternatively, these items could be broken up into smaller groups such as "straws" and "candles" or even new groups such as "implements for eating/drinking" and "birthday supplies." What this illustrates, again, is that there is not a single "correct" way to go about developing the thematic framework. All of these options will work, as long as they align with certain restrictions.

The boundaries in thematic analysis are that phrases (or in this case, items) cannot be coded to two codes simultaneously. If participants are assigning two codes to the same item/phrase (e.g., candles are coded to both "colored stuff" and to "birthday candles"), it suggests that this may be a hierarchical relationship

FIGURE 3 A sample junk drawer image that can be shown to participants in this activity that aims to make framework analysis (and qualitative methodology) more accessible. This figure also depicts some of the early coding categories named in the activity.

(e.g., "birthday candles" sits under a theme of "colored stuff") or that the theme needs to be adjusted (e.g., "colored birthday candles"). Ultimately, whichever solution identified is still an important step toward organizing the data—and helps make the data more manageable.

This process of developing a thematic framework can also highlight some of the paradigmatic differences between positivism and constructivism/interpretivism, explored in Activity 1. For example, an item made of wire is uncovered in the junk drawer (see Page 19 of Supplemental Materials). Here, referencing our reflexivity statement (Activity 1), we know that the person organizing the junk drawer is not a cook, and really spends most of her time in the kitchen baking. This wire item is not a recognized baking tool. As such, this "unbiased" researcher organizing the junk drawer decides that this wire structure is not meant to be in a junk drawer in the kitchen and almost throws the item away.

Before doing so, the researcher in this activity asks a positivist's definition of a "biased" colleague (someone who regularly cooks, and cooks in this kitchen) about the wire item. It turns out that the item is the oven mount for the meat thermometer—a critical element for a junk drawer in a kitchen. In this case, the positivist perception that the "cook" researcher is biased could have resulted in "throwing away" valuable data. Instead, the interpretivist approach—where researchers disclose and explore their perspectives—helps both the researcher and those learning from the research understand the viewpoints influencing the decisions made—illustrating the value of reflexivity of concepts of "bias" in qualitative research.

Activity 5.4: Coding the dataset

We will now consider how codes and themes can be organized—from the top down, or the bottom up—by using examples. One example to consider is a code for "batteries." As coding continues, there is identification of some sub-codes such as "single use" and "rechargeable." So, this theme/code was developed from the top down.

Considering other items in the drawer, there are the codes of "clips" and "rubber bands;" these could be organized into a theme named "closures"—representing a theme identified in a "bottom-up" approach.

No matter how the coding progresses, what starts to happen is that you may also spot some items that do not fit into a code and may struggle to figure out what code to assign them. In this case, as with qualitative data, these elements can get assigned a code of "IDK" (I don't know), or "Orphan Codes" to allow you to continue through the coding process. Such temporary IDK codes prevent the researcher from getting trapped in the sandpit of not being able to progress without assigning a code, and can by its very nature be a way to generate ideas for a code once enough items land in this "orphan" code group. For example, generating the codes of knives, hooks, tools could lead to a theme named "utility," again derived from a "bottom-up" approach.

There is an amount of uncertainty that may always remain; for instance, what if an EpiPen is in the junk drawer? You may start to wonder whether this is the best place for the medicine, depending on where the junk drawer is in the kitchen and whether the allergy that requires the EpiPen is a food allergy.

As you complete these activities, you do not have answers to these questions, which highlights how ultimately, researchers cannot always know what the intent is behind all the data, which is why reflexivity is key. Being transparent about the researcher's perspectives at least helps a reader to understand why the data was coded the way it was; thus, enhancing the rigor of the process. (For the purposes of this activity, the researcher has knowledge that their partner has a peanut allergy and opts to leave the EpiPen in the "dataset").

Ultimately moving forward and not getting stuck or focused on "perfection" when a code is not readily identifiable is the key to managing large qualitative data sets. While the overall trajectory is moving forward, this is a recursive process that may require additional revisions to the codebook to ensure alignment with your research question.

Activity 5.5: Charting

Once the coding framework has been completed, charting can commence. Charting is an opportunity to organize the themes and codes in a manner that answers the research questions and reflects the priorities, values, and perspectives of the researchers.

For this activity, charting focuses on organizing how the themes/subthemes/codes etc. will be organized in the drawer, and to consider whether (and which) themes/codes need to be reorganized. This is where the iterative nature of qualitative research comes into play again: coding often continues throughout the length of publication (until the paper is published, as peer review can also influence researcher perspectives which, in turn, influences the coding framework).

Given the codes discussed thus far, you may end up organizing the junk drawer based on urgency (e.g., EpiPen in the front), frequency of use (e.g., birthday candles toward the back), or purpose (e.g., eating versus repairs). But how individual researchers might organize their junk drawer can be different, and that this difference is not wrong or something to criticize. Rather the reflexivity and research question should provide insights into the way the charting occurs, and provide an understanding as to why the "researchers" organized their junk drawer in the manner presented.

Activity 5.6: Mapping and interpretation

Finally, it is important to consider the role that existing theories can have in interpreting qualitative data. In the case of organizing the junk drawer, going to the wider "literature" could include Marie Kondo's perspective about "joy" that items bring,[57] or could include

Van de Ven (1976)[58] theory of organization which considers aspects such as environmental factors and process. In the latter case, the existing thematic organization of the junk drawer may be compared and contrasted to other organizational theories wherein points of differences, extensions, or changes are proposed alongside future research.

ACTIVITY 6: YOU ORGANIZED YOUR JUNK DRAWER—NOW WHAT?

If you have followed through these activities, you have thought through qualitative research via the lens of a junk drawer. You answered the question "what belongs in the junk drawer in the kitchen" by utilizing framework analysis. Unfortunately, not all qualitative inquiry is as simple as unpacking a junk drawer. Further, qualitative research has many "gray areas;" where interpretation is dependent on context and are frequently debated.[59] This is particularly relevant and apparent in the process of peer review, when navigating feedback that may be contentious, even amongst seasoned researchers.

This can be maddening, particularly if you are just getting started in qualitative research. As such, we want to list some of the most prominent "gray areas" of qualitative research here, to support novices as they feel ready to "level up," and dive deeper into the complexity of qualitative inquiry. We recognize that whole papers can (and are) dedicated to these topics but hope the list and some seminal references in the scope of this piece are particularly supportive to novices. These topics are also points reviewers and readers of qualitative work should consider:

- **Numbers in Qualitative Research**: Whether it be the length of interviews, number of words in transcripts, or number of code applications, use of numbers in qualitative research is debated.[60] As with much of qualitative inquiry, we encourage readers to consider the *why* and *when* in using numbers[61]; quantification should be used to critically convey points, not provide legitimation to qualitative research with many researchers choosing to "closet" coding frequencies to limit the misinterpretation of data.[62]
- **Thematic Emergence**: Many presentations of qualitative data use variations of the term "themes emerge." However, contemporary qualitative research leaders argue that this terminology detracts from the essential role of the researcher in qualitative analysis.[22] Themes are identified, constructed, or generated as they take human work and effort to find during qualitative analysis and thus, it is argued, that themes do not emerge. Clear communication of research processes can convey to readers how this process of theme identification occurs, including (based on paradigm) whether researchers are "constructing" or "generating" themes.
- **Positive Reframe of Bias**: Qualitative research has long been viewed as more biased than quantitative research due to its underpinning of subjective ontology. However, we recommend a positive reframe of this perceived bias as subjectivity, in that a researcher is intricately linked to every step of the research process through their preferences and actions[9] regardless of their research approach. Jamieson et al.[18] propose using reflexivity in quantitative research and argue "the first major challenge in making the case for embedding reflexivity into quantitative research is relinquishing the perception of quantitative data as the 'gold standard' of objectivity, and more 'scientifically sound', than qualitative data" (pg. 3). Indeed, we view the researcher as the "knowledge holder" necessary to conduct a rigorous qualitative study, as is illustrated in workshop Activity 5.3.
- **Trustworthiness & Methodologies**: While several general procedures to establish trustworthiness and rigor of qualitative research were presented in Activity 3, it should be noted that certain methodologies have trustworthiness criteria that align with the paradigms supporting that specific methodology—as opposed to universal criteria.[63] For example, Elo and colleagues present specific trustworthiness criteria for qualitative content analysis and discuss the importance of sampling to ensure credibility of the study, even supporting data saturation as a method.[64] So, while data saturation is an inappropriate trustworthiness criterion for Framework Analysis, it is appropriate for content analysis—despite both being qualitative methods. McGloin describes trustworthiness measures to demonstrate rigor for qualitative case studies and describe, for instance, how triangulation of methods can be used to combat perceptions of bias from small samples related to the "case" being studied.[65] Researchers must ensure there is coherence between trustworthiness criteria and methodology and that trustworthiness is revisited throughout the research process, and that criteria not just "stated" to combat perceptions of bias or to tick a proverbial box for reporting qualitative research.

Finally, underpinning many of the conversations around trustworthiness of a qualitative study are adequacy of the sample and determinations around appropriate sample size. To return to the junk drawer—let us say that you followed all the aforementioned steps, clearly conveyed trustworthiness, and compared your finding to organizational theories. As many seasoned qualitative researchers have experienced, you might be frustrated to find that you receive "major revisions" or even a rejection from a journal, by a reviewer who posits that a sample size of one drawer is not enough to support your findings.

There is a general implication that larger samples are better, when in actuality, one is better able to capture the nuance and complexity of the data with smaller samples. And while it is impossible to predict what would be an appropriate sample size to answer a research question, researchers can be reflexive and revisit sample size throughout a study.[66,67]

The prevailing concept for demonstrating that an adequate sample size has been reached in qualitative studies is saturation. Saturation was born from the constant comparative method in Grounded Theory (GT; see description above in Activity 4) and

	Philosophy	Rigor	Application
DO's	State your paradigm, and encourage others to supply their own reflexivity statements (to reduce philosophical assumptions)	Consider rigor BEFORE beginning research, so you don't force it after the fact.	Use qualitative methodologies with purpose - these are good for what they're good for: exploring phenomena.
DO's	Recognize the spectrum of qualitative-quantitative research. For example, most quantitative scales depend on qualitative research to be formed.	Focus on the elements of rigor that are essential for your selected methodology.	Constantly return to your research question – this will guide the level of analysis. Not every word needs to be coded!
DON'Ts	Apply your worldview (paradigm) to other people. Instead, read their paradigm and work from that lens.	Ask for methods of rigor beyond the scope or paradigm of the research project (for example, don't ask for hypothesis in interpretivist work).	Assume there's one way to form a thematic framework – this will look different for different people!
DON'Ts	As a reviewer, don't privilege one research paradigm over another.	Assume # of participants is the only way to achieve information power.	Assume that just because you used words you can simply throw in analysis of them!

FIGURE 4 Some helpful "do's and don'ts" for qualitative research in practice, considering philosophy, rigor, and application recommendations for the work.

supposes that a concept will continue to be investigated until no new information arises. Saturation is often used to justify sample size, though not always appropriately, as this is often provided in studies that are not using GT methodology and without explanation as to how saturation was achieved.[68,69] Varpio and colleagues take this further and question philosophically whether data or themes can ever be truly saturated.[22]

Malterud et al.[68] propose the concept of information power for estimating an adequate number of units, events, and/or study participants, which we suggest readers consider. In essence, the more information power a sample holds, fewer of that sample is needed. The authors propose that five dimensions have an impact on information power: 1) study aim (broader aim requires larger sample), 2) sample specificity (fewer participants are needed if they have highly specific characteristics), 3) use of established theory (smaller sample for studies applying specific theories for data collection and analysis), 4) quality of the dialogue (strong versus weak), and 5) analysis strategy (case versus cross-case and, therefore, more participants). While this model cannot be used to calculate sample size, it provides criteria that can be considered by researchers and reviewers to determine whether the sample has sufficient information power.

Study aim (dimension 1) is crucial to the concept of information power, and reference back to this constantly during qualitative research is one of the best recommendations we can make. Referencing the aim or goal of a project is also essential is selecting the most appropriate methodology to explore those aims.

As these gray areas and topics of contention show, we all can benefit from continued education and reflection about qualitative research. That is why we conclude this piece with a few recommendations of "Do's and Don'ts" of qualitative research (presented in Figure 4). The purpose of these is to just remind us of some best practices, whether engaging in research for the first time, or appraising it (as a reviewer, or just an interested reader!).

CONCLUSION

This article delves into the basic principles of qualitative research, such as the philosophical underpinnings, elements that convey rigor, and several useful methodologies. It also includes a detailed example of how to introduce framework analysis as a useful method for beginner qualitative researchers. All of this was done through the metaphor of organizing a junk drawer.

We aimed to frame this article, in this metaphorical and approachable way, to break down the stereotypes that can surround qualitative inquiry: that it can be overly verbose, philosophically challenging, and lacking the rigor that quantitative research attempts to convey. If approaching qualitative research from a positivist mindset, the research can often seem like madness, with its lack of hypotheses and researcher role in interpretation that can be conflated with leaning into biases. But there are rigorous methods to this madness, as this article has highlighted. It is essential to clearly communicate these methods—to challenge this perception of "madness"—and to thoughtfully engage in qualitative inquiry as an essential way to understand how parts of our discipline functions.

As this special issue illustrates, qualitative research provides a means to understand the world around us. By understanding the sociocultural and nuanced context of anatomical sciences education better, including the rigor, methods, and philosophy that underpin it, we can understand ourselves, our profession, and the world with greater depth and a little less madness.

AUTHOR CONTRIBUTIONS

Angelique N. Dueñas: Conceptualization; investigation; writing – original draft; methodology; validation; visualization; writing – review and editing; project administration; resources. **Michelle D. Lazarus:** Conceptualization; investigation; writing – original draft; methodology; validation; visualization; writing – review and editing; resources. **Jessica N. Byram:** Conceptualization; investigation; writing – original draft; methodology; validation; visualization; writing – review and editing; resources.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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