

# Understanding State-of-the-Art Literature Reviews

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Sometimes the literature review you need isn't one that answers a narrow question: for that we would use a systematic review to determine, for example, the best workplace-based assessment tool for a pediatric residency program. Sometimes educators are not interested in how individual theories addressing a phenomenon align and differ, an answer you would find via an integrative review. Instead, educators may need to know how the modern conceptualization of a specific phenomenon became the norm—including the history that informed current understanding, what that understanding is, and what might develop in the future. For example, to understand resident assessment, you might want to know its history, what the current orientation is, and what future expansions might occur. To answer such questions, educators and researchers turn to *State-of-the-Art (SotA) literature reviews*.

## Foundations

### What Is a SotA Review?

SotA literature reviews provide a time-based overview of the current state of knowledge about a phenomenon and suggest directions for future research.<sup>1</sup> They are organized in relation to how the understanding of the phenomena has evolved over time. Structured around turning points in the history of knowledge development, SotA reviews articulate: *This is where we are now. This is how we got here. This is where we should go next.* By synthesizing how the main characteristics of a topic have changed over time to give rise to current understandings, SotA reviews offer a modern knowledge synthesis that “tend[s] to address more current matters in contrast to other combined retrospective and current [literature review] approaches.”<sup>1</sup> SotA reviews are used prolifically in many fields, such as biomedical science, medicine, and engineering, to provide information on the current understanding of a topic, the historical roots that shaped the understanding, and potential next directions for future research.

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### How Are SotA Literature Reviews Different From Other Knowledge Syntheses?

Given their time-based and turning point-based orientations, SotA reviews are inherently different from other types of knowledge synthesis. For example, systematic reviews focus on specific research questions that are narrow in scope; in contrast, SotA reviews present a broader historical overview of knowledge development. Scoping reviews focus on mapping the present state of knowledge about a phenomenon, including, for example, the data currently available, the nature of that data, and the gaps in knowledge. Conversely, SotA reviews offer interpretations of the historical progression of knowledge relating to a phenomenon, centered on significant shifts that occurred during that history.<sup>2</sup>

### When Might SotA Reviews Be Used in Graduate Medical Education?

SotA reviews are especially useful within graduate medical education due to their purpose: these knowledge syntheses focus on the turning points that ended older ways of thinking and gave rise to current insights, while also evaluating where the field should go next. Thus, by conducting this type of review, educators and researchers in graduate medical education will be positioned to understand and apply modern best practices and to influence future directions. The BOX illustrates the Case of Dr. Smith, which continues throughout this *Journal of Graduate Medical Education (JGME)* special review series, considering the same question using different review methodologies.

## Processes and Considerations

### What Are the Orienting Assumptions of SotA Reviews?

Although SotA reviews are frequently published in peer-reviewed journals, there are few descriptions of how to conduct these knowledge syntheses, their markers of methodical rigor, and their reporting standards. We set out to address this gap by: (1) analyzing all publicly available and indexed methods-related publications describing SotA reviews, and (2) studying all SotA reviews (n=398) published between

2016 and 2020 to identify the foundational principles and techniques underpinning them.<sup>3</sup> Through this work, we developed a 6-stage process for conducting SotA reviews,<sup>3</sup> which aligns with the existing brief descriptions.<sup>1,2,4-7</sup> These 6 stages are summarized in a short how-to guide accompanying this article.<sup>8</sup> Here, we explain the orienting premises that shape SotA reviews.

### Foundations of SotA Reviews

SotA literature reviews are founded on the principle that there is no single objectively true or correct synthesis of a body of literature. Instead, SotA reviews rest on the premise that literature is open for interpretation and that the context in which the review is conducted will shape the synthesis developed. SotA literature reviews are steeped in a relativist ontology: the nature of reality is socially and experientially informed and constructed. Consequently, SotA reviews do not require the literature included in the review to use identical methodology to support meta-analyses to generate a right answer. That is, not all findings synthesized in the review need to be carried out in the same way to enable cross-study data amalgamations. Instead—because SotA reviews assume that multiple different understandings of a phenomenon are available—this synthesis does not exclude research using different methodologies.

In terms of epistemology (the origins, nature, and limits of knowledge about reality), SotA literature reviews embrace *subjectivism*, the premise that knowledge generated from the review is a construction, not an objective fact. The knowledge generated through the review is value-dependent; it grows out of the subjective interpretations of the researchers who performed the synthesis. SotA reviews generate an interpretation of the literature informed by the expertise, experiences, and social context of the review team. Furthermore, the knowledge developed through SotA reviews is informed by the point in time when the review was conducted. A SotA review from 2000 reflects the contemporary knowledge of the year 2000; a SotA review from 2022 would report different knowledge reflecting that year's perspectives.

### Purpose of SotA Reviews

SotA literature reviews seek (1) to create a critical summary of contemporary thinking about a topic; (2) to describe historical progressions and patterns in the literature; (3) to discuss how such modern perspectives have evolved over time; and (4) to propose a direction the field could take moving forward. Further, the SotA review presents an argument for how the literature *could* be interpreted; it is not a

#### BOX The Case of Dr. Smith

Dr. Smith, a program director, has been tasked to develop an interprofessional education (IPE) experience for the residency. Dr. Smith decides that conducting a literature review would be a savvy way to examine the existing evidence and generate a publication useful to others. After running a quick Google search using the term “interprofessional education,” she finds more than 11 million hits, and a similar PubMed search generates 24 000+ matches—far too many to review. Dr. Smith begins to randomly sample articles and notes the huge diversity in how IPE is conceptualized and in the types of articles, from randomized trials to qualitative investigations to critical perspectives on issues of concern.

As Dr. Smith is interested in learning how IPE is currently conceptualized, how the field came to hold this conceptualization, and where the field should go next, she decides to complete a State-of-the-Art review. This will allow Dr. Smith to identify the seminal moments when thinking about how IPE has changed in graduate medical education, to understand today's conceptualization of IPE, how that conceptualization came to be, and to offer new ideas about where IPE should go next.

definitive statement about how the literature *should* or *must* be understood. The purpose of the SotA review is to engage in this critical summary at a specific point in time; it highlights the pivot points shaping the historical development of a topic, the factors that informed those changes in understanding, and the ways of thinking about and studying the topic that could newly inform the generation of further insights. Ultimately, the purpose of SotA literature reviews is to create a 3-part argument: *This is where we are now in our understanding of this topic. This is how we got here. This is where we could go next.*

To illustrate, Schuwirth and van der Vleuten's article, “A History of Assessment in Medical Education,”<sup>9</sup> offers a temporally organized overview of the evolving thinking in medical education about learner assessment. The authors describe how learner assessment was originally perceived as a problem of measurement, where the goal was to differentiate competent learners from incompetent ones. Historically, assessment was concerned with tool validity and replicability; human judgement was largely ignored. Even when assessment moved to include workplace-based assessment methods, the field continued to foreground assessment as a measurement problem. When human judgment was considered, the field focused on training assessors to minimize bias. Modern perspectives conceive of assessment as a whole system. Today, assessment data are integrated together to meaningfully triangulate data into a fair and defensible whole. Human judgement is recognized, but not as a bias to be mitigated. Instead, learners and assessors work together “to create a meaningful holistic narrative rather than a set of

**TABLE**  
Resources for Conducting a State-of-the-Art (SotA) Literature Review

Resource	Description of the Article
Barry ES, Merkebu J, Varpio L. State-of-the-art literature review methodology: a six-step approach for knowledge synthesis [published online ahead of print September 5, 2022]. <i>Perspect Med Educ</i> . doi:10.1007/s40037-022-00725-9	This article addresses the gap of methodology for SotA literature reviews. SotA reviews published in the past 5 years were analyzed to: (1) identify any methods-related resources informing the syntheses; (2) examine the foundational principles and techniques underpinning the reviews; and (3) combine the findings from (1) and (2) to articulate the methodology, process steps, and markers of rigor for SotA literature reviews.
Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. <i>Health Info Libr J</i> . 2009;26(2):91-108. doi:10.1111/j.1471-1842.2009.00848.x	This article provides an overview of 14 different review types. Strengths and weaknesses of SotA literature reviews are included.
Berven S, Carl A. State of the art review. <i>Spine Deform</i> . 2019;7(3):381. doi:10.1016/j.jspd.2019.03.006	This editorial article by the deputy editors discusses what SotA literature reviews should address.

individual measurements.”<sup>9</sup> The authors suggest that the future of learner assessment will continue to focus on determining if a learner possesses and can apply appropriate knowledge and skills; in addition, information technologies and the availability of big data will shape future assessment considerations. These technologies will also require a reexamination of the knowledge and skills that will be required of future clinicians. Schuwirth and van der Vleuten’s article thus offers a SotA review by providing an interpretation of the past, present, and future of learner assessment.<sup>9</sup>

### Strengths and Weaknesses of SotA Reviews

#### Strengths

A significant contribution of a SotA review is the historical overview of how thinking about a phenomenon has changed over time. Such descriptions are particularly valuable for those exploring a new phenomenon or field of inquiry, and for those seeking to identify contemporary best practices and conceptualizations. Further, a SotA review provides a comprehensive time-based overview of a body of knowledge. Educators and researchers have an opportunity not only to assess past, present, and future trends, but also to characterize the unique shifts and patterns occurring over a specific period of time. Finally, the scope of a SotA review can extend beyond peer-reviewed literature.

#### Weaknesses

The purpose and foundations upon which SotA reviews are built constrains them from providing a direct answer to specific, narrow research questions. They do not offer definitive answers to readers; instead, they are subjective reviews offering one

interpretation of how the literature could be interpreted. Alternative interpretations exist. Moreover, the moment in history when the review is conducted and the specific review team engaging in the synthesis will shape the SotA review. Thus, reflexivity considerations by the team should be provided so that readers fully understand how the research team reached their conclusions.

#### Markers of a SotA Review’s Rigor

While many knowledge syntheses have reporting standards, no such guidance exists for SotA reviews. SotA reviews offer interpretations of a specific body of literature; therefore, appraising the quality of the literature and preserving objectivity of the analysis processes is not relevant. Instead, indicators of the quality of a review are connected to its *transparency*, including considerations such as: How was the collection of articles included in the synthesis created? What inclusion and exclusion criteria controlled the selection? What reflexivity considerations shaped the perspectives of the authors? What contextual factors contributed to shaping the analysis? The final search strategy must be included in the manuscript so that others can replicate the process. The purpose of a replication would not be to confirm the interpretations offered in the SotA review; instead, it would be for another team of researchers to offer their unique interpretations and insights. Another consideration is the breadth of literature included in the review. It is advisable to incorporate a wide range of papers (eg, commentaries, research articles, grey literature) since part of the purpose of a SotA review is to identify how and when a field of inquiry took on its current state. Such information is not necessarily found only in peer-reviewed journal articles.

A SotA review can be deemed a success if it offers a coherent description regarding the current state of knowledge of a phenomenon: *This is where we are now in our current understanding of this topic. This is how we got here. This is where we could go next.*

## Conclusions

Until very recently, SotA reviews were highly used but underdescribed: no robust methodologies were offered, and no information existed about their epistemological and ontological backgrounds. We hope to redress this gap. It is important when reading older SotA reviews to look for the 6 stages presented in the accompanying short article<sup>8</sup> to help make meaning of the findings (additional resources are provided in the TABLE). We recommend that the structure of future SotA reviews clearly articulate these 6 stages so that researchers can more easily assess the interpretations offered within.

## References

1. Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J.* 2009;26(2):91-108. doi:10.1111/j.1471-1842.2009.00848.x
2. Berven S, Carl A. State of the art review. *Spine Deform.* 2019;7(3):381. doi:10.1016/j.jspd.2019.03.006
3. Barry ES, Merkebu J, Varpio L. State-of-the-art literature review methodology: a six-step approach for knowledge synthesis [published online ahead of print September 5, 2022]. *Perspect Med Educ.* doi:10.1007/s40037-022-00725-9
4. Elsevier. A guide for writing scholarly articles or reviews for the educational research review. Accessed March 3, 2020. [https://www.elsevier.com/\\_data/promis\\_misc/edurevReviewPaperWriting.pdf](https://www.elsevier.com/_data/promis_misc/edurevReviewPaperWriting.pdf)
5. American Academy of Pediatrics. Pediatrics author guidelines. Accessed March 3, 2020. <https://pediatrics.aappublications.org/page/author-guidelines>
6. Journal of the American College of Cardiology. JACC Instructions for authors. Accessed March 3, 2020. <https://www.jacc.org/pb-assets/documents/author-instructions-jacc-1598995793940.pdf>
7. Thorax. Authors. Accessed March 3, 2020. <https://thorax.bmj.com/pages/authors/>
8. Barry ES, Merkebu J, Varpio L. How to conduct a state-of-the-art literature review. *J Grad Med Educ.* 2022;14(6):663-665. doi:10.4300/JGME-D-22-00704.1
9. Schuwirth LWT, van der Vleuten CPM. A history of assessment in medical education. *Adv Health Sci Educ Theory Pract.* 2020;25(5):1045-1056. doi:10.1007/s10459-020-10003-0



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