A Review of SoTL Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning

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Abstract
Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning is a comprehensive and practical guide for educators, researchers, and graduate students engaged in the Scholarship of Teaching and Learning (SoTL), with relevance to those in engineering education. Authored by Michelle Yeo, Janice Miller-Young, and Karen Manarin, the book provides a structured approach to conceptualizing, conducting, and disseminating SoTL research. With a focus on both theoretical frameworks and practical applications, this resource addresses diverse research paradigms, from positivist and interpretive to transformative methodologies. It highlights a range of data generation methods, including quantitative surveys, qualitative interviews, focus groups, and artifacts, ensuring a balanced approach for both the theoretical and practical aspects of SoTL. The authors emphasize the importance of research-based assessment and innovation in teaching practices, offering guidance on research design and analysis that directly relate to improving educational outcomes in engineering programs. Ethical considerations are woven throughout the text, ensuring that SoTL research in engineering education maintains a focus on social justice and inclusivity. With sections dedicated to theoretical frameworks, data generation, and the dissemination of research, this book provides the essential tools for advancing both theoretical understanding and innovative practices in engineering education. It serves as a vital resource for those seeking to enhance their teaching through research and contribute to the development of engineering education through evidence-based innovation and assessment. Hence, this book review evaluates the book's key themes on methodological approach, theoretical foundations as well as implications for STEM Educators.

Keywords: scholarship of teaching and learning, innovation, assessment, educational research, teaching practices

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Introduction

This is a review of a book titled; Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning is a comprehensive guide that bridges theory and practice in the Scholarship of Teaching and Learning (SoTL). Authored by Michelle Yeo, Janice Miller-Young, and Karen Manarin (2023), this book offers an in-depth exploration of the methodologies and frameworks essential for SoTL research. The authors bring together a range of perspectives from diverse educational settings, providing a unique, inclusive view of SoTL while addressing important ethical considerations that often get overlooked in traditional academic research.

Michelle Yeo is a Professor and Director of the Mokakiiks Centre for the Scholarship of Teaching and Learning at Mount Royal University, Canada. With a deep commitment to advancing the Scholarship of Teaching and Learning (SoTL), her research focuses on improving pedagogical practices through evidence-based approaches. Dr. Yeo has played a pivotal role in fostering the integration of SoTL into university curricula and has contributed extensively to the development of resources and methodologies that support reflective teaching practices.

Janice Miller-Young is a Professor of Mechanical Engineering at the University of Alberta, Canada, where she applies her expertise in engineering education to advance the teaching and learning process within STEM fields. Her research focuses on how engineering students engage with complex concepts and how educators can design more effective

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learning experiences that promote critical thinking and problem-solving skills.

Karen Manarin is a Professor of English at Mount Royal University, Canada, and her academic interests lie at the intersection of SoTL, teaching, learning, and assessment in the humanities. With a strong background in literature and writing, Dr. Manarin has dedicated much of her career to improving the learning experiences of students in the humanities through innovative instructional strategies. Her work focuses on the role of assessment in fostering deeper learning and reflection, particularly in writing and critical thinking.

This book spans 296 pages and is divided into four key parts: Thinking About SoTL, Generating Data for SoTL, Analyzing SoTL Data, and Disseminating SoTL. It contains 14 chapters that cover the key aspects of SoTL research, from foundational concepts and ethical considerations to practical guidance on data collection, analysis, and dissemination. This structure ensures that readers not only grasp the theoretical underpinnings of SoTL but also gain hands-on experience in applying these methodologies to their own teaching and learning environments.

Outline of the Book

The book *Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning* is organized into four key parts, each addressing a critical aspect of the Scholarship of Teaching and Learning (SoTL) research process. Part I, *Thinking About SoTL*, introduces foundational concepts and frames the SoTL landscape.

Chapter 1, "Understanding SoTL," explores the history and significance of SoTL, distinguishing it from scholarly teaching and educational research. In Chapter 2, "Developing SoTL Inquiries," the focus shifts to how to generate research inquiries, refine research questions, and develop a theoretical framework. Chapter 3, "Thinking About SoTL Research Frameworks," introduces various research paradigms and methodologies, giving readers an understanding of how to align their research approaches with their worldview and research questions.

Part II, *Generating Data for SoTL*, discusses methods of data collection, both qualitative and quantitative. Chapter 4, "Generating Quantitative Data and Constructing Questionnaires," delves into the development and use of surveys and questionnaires for quantitative data generation. In Chapter 5, "Interviews and Focus Groups," the authors explore qualitative data collection methods such as interviews and focus groups, providing guidance on how to gather rich, self-reported data. Chapter 6, "Artifacts, Observations, and Reflections," extends the discussion to alternative data sources, including artifacts, classroom observations, and reflective practices.

Part III, *Analyzing SoTL Data*, provides essential tools for analyzing the data collected in SoTL research. Chapter 7, "Quantitative Research Designs and Statistical Analysis," focuses on common quantitative research designs and statistical methods. In Chapter 8, "Empirical Qualitative Approaches," the book provides an introduction to qualitative data analysis techniques such as content analysis and thematic analysis. Chapter 9, "Mixed Methods Research Designs," discusses the integration of both qualitative and quantitative methods to gain a deeper, more comprehensive understanding of research questions. Chapters 10 and 11 address interpretive and transformative research methodologies, exploring their philosophical foundations and how they can be applied to SoTL.

Finally, Part IV, *Disseminating SoTL*, focuses on how to effectively share research findings. Chapter 12, "Academic Genres," provides guidance on publishing SoTL research in academic journals and presenting findings at conferences. Chapter 13, "Communicating Visually," highlights the importance of visually presenting data in clear and engaging ways. Chapter 14, "Amplifying Your Research," discusses how to expand the reach of SoTL research beyond academic settings, promoting its impact on wider educational communities. The book concludes with *Final Thoughts* on the broader implications of SoTL and a *Glossary* that defines key terms used throughout the text.

Summary of Key Themes

The book offers a thorough yet accessible approach to SoTL research, with particular emphasis on the methodologies and frameworks that shape effective teaching practices. Several chapters stand out for their depth and relevance to both novice and experienced researchers.

Chapter 1: Understanding SoTL introduces the fundamental concepts of the Scholarship of Teaching and Learning, distinguishing it from both scholarly teaching and traditional educational research. This chapter provides readers with a critical historical perspective on the development of SoTL and highlights its increasing importance in higher education. The authors emphasize the ethical considerations central to SoTL, reinforcing its commitment to reflective and responsible teaching practices across disciplines. This chapter is crucial as it lays the groundwork for understanding SoTL's distinct role in education research and ensures that readers are aware of the ethical standards expected in this field. Without this foundational understanding, engaging meaningfully with SoTL research would be difficult. This chapter achieves a balance between theoretical foundation and practical significance, rendering it both accessible and intellectually rigorous. Consequently, it equips readers to engage more critically and confidently with subsequent chapters and their own SoTL projects.

Chapter 3: Thinking about SoTL Research Frameworks focuses on different research approaches used in SoTL. It helps readers understand the range of methods, from more traditional positivist approaches

to transformative and interpretive ones. The key takeaway is that researchers should choose a methodology that fits both their research questions and their personal perspectives. This alignment is crucial for answering the right questions and conducting effective SoTL research. The chapter guides readers in selecting the best frameworks to support their SoTL goals, making their research more meaningful and rigorous.

Chapter 5: Interviews and Focus Groups stands out in Part II, Generating Data for SoTL, as it addresses the importance of qualitative data in SoTL research. Interviews and focus groups provide rich, in-depth data that can reveal insights into the lived experiences of students and educators. This chapter is significant because qualitative data can often uncover nuances that quantitative methods might miss, particularly in complex educational settings where student perceptions and experiences are central to the research. The chapter offers practical advice on when and how to set up these methods, as well as basic data management practices, making it especially useful for those conducting qualitative research. This approach is critical for capturing the subtleties of teaching and learning processes, particularly in disciplines where experiential learning plays a key role. This chapter offers crucial instruments for elucidating the nuances of events where experiential and reflective learning are paramount. Overall, it provides readers with both the theoretical rationale and practical skills for conducting interviews and focus groups in SoTL projects.

Chapter 11: Transformative Methodologies discusses methodologies that aim to create social change, empowerment, and inclusivity in education. It introduces critical, postmodern, and Indigenous research methods that challenge traditional power structures in education and promote fairness. The chapter is especially useful for educators interested in using SoTL to address issues of inequality and social justice. It offers valuable insights for those working in diverse and underserved communities, helping them to conduct research that is both impactful and socially conscious.

Chapter 12: Academic Genres in Part IV, Disseminating SoTL, is important because it helps readers navigate the complex landscape of academic publishing and presenting SoTL research. For many new researchers, the process of disseminating their findings can be daunting. This chapter provides practical guidance on how to present research at conferences and publish in academic journals, which is crucial for those seeking to share their work with a broader academic community. By offering clear strategies on how to engage in scholarly dissemination, the authors provide readers with essential skills for sharing their research and contributing to the academic conversation. This chapter is key for researchers who want to ensure their work has an impact beyond their own classrooms and institutions, and for those aiming to advance the broader field of SoTL. For researchers who are interested in enhancing the impact of their work, this chapter is essential, as it ensures that their findings contribute to broader pedagogical conversations and institutional change. Its lucidity and pertinence render it an essential element of the book's comprehensive worth.

Theoretical Foundations

The book stands out for its robust theoretical foundations that underlie the authors' approach to SoTL research. One of the book's key strengths is how it integrates diverse research paradigms with practical research methodologies, offering readers both a deep understanding of the theory behind SoTL and the tools to implement it effectively in their own teaching contexts.

The authors provide a broad conceptual framework that encourages researchers to critically engage with the different epistemologies and ontologies that shape SoTL. In *Chapter 3: Thinking About SoTL Research Frameworks*, the book introduces a continuum of research paradigms, from positivist and post-positivist approaches to transformative and interpretive frameworks. By clearly delineating these paradigms, the authors empower readers to understand how the researcher's worldview influences the research process. This exploration of different approaches is essential in SoTL, as it enables researchers to select methodologies that best align with their questions, context, and ethical commitments (Haigh & Withell, 2020; Hamilton & MCollum, 2024).

The emphasis on transformative methodologies in *Chapter 11: Transformative Methodologies* is another strength. This chapter introduces readers to critical, postmodern, and Indigenous research methodologies, with a strong focus on issues of power, social justice, and inclusivity. The book highlights the potential of SoTL research to address inequalities within educational systems by using research as a tool for transformation. This is particularly relevant for educators looking to make their research more socially impactful and inclusive, bridging gaps between academic research and broader societal change (Freire, 1970; Simmons & Taylor, 2019).

Additionally, the book doesn't just introduce theoretical concepts—it encourages readers to apply these ideas in the context of teaching and learning. The discussion in *Chapter 2: Developing SoTL Inquiries* on how to ground research questions in learning theories reflects the book's strength in integrating established pedagogical frameworks. By focusing on how theoretical frameworks inform research questions and methodologies, the authors reinforce the importance of theory-driven inquiry in improving teaching practices (Gascon, 2007; Jolly et al., 2013; Lautenbach, 2014; Pan & Cheng, 2023).

This integration of theory with practice allows the book to cater to a broad audience. It is not only useful for researchers looking to conduct academic studies

but also for educators seeking to reflect critically on their own teaching practices. The clear connection between theoretical foundations and practical application is a core strength of the book, making it a powerful tool for advancing research in both higher education and STEM disciplines.

This book is distinguished by its pragmatic and approachable methodology regarding the Scholarship of Teaching and Learning (SoTL), assisting educators in both executing SoTL projects and formulating them from inception. This guide integrates theory and practice, providing explicit frameworks, reflective prompts, and practical examples across various disciplines. Its focus on inclusivity, contextual significance, and iterative investigation renders it particularly advantageous for educators in varied environments, including those in developing academic frameworks such as those present in the ASEAN region.

In comparison, Becoming a SoTL Scholar (Edited by Janice Miller-Young and Nancy L. Chick, 2024) takes a more reflective approach, focusing on the personal development of SoTL scholars. While the 2023 book is deeply rooted in research methodology and provides step-by-step guidance for conducting SoTL projects, the 2024 book emphasizes the cultivation of a SoTL identity and the process of integrating SoTL into one's scholarly career. Both books aim to support educators in their SoTL journeys, but the 2023 book offers more practical, research-focused advice, while the 2024 book focuses more on the personal and professional growth required to fully engage in SoTL. Together, these resources complement each other by addressing both the technical and reflective aspects of SoTL scholarship.

Implications for STEM Educators

Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning offers valuable insights and methodologies that are particularly relevant for STEM (Science, Technology, Engineering, and Mathematics) educators who are seeking to enhance their teaching practices through evidence-based research. The book's practical and theoretical foundations provide STEM researchers and educators with essential tools for conducting research that improves both teaching effectiveness and student learning outcomes in STEM disciplines.

One of the book's key strengths for STEM education is its wide-ranging approach to both qualitative and quantitative research methodologies. In *Chapter 4: Generating Quantitative Data and Constructing Questionnaires*, the authors emphasize the importance of valid and reliable data collection, which is a cornerstone of STEM research. STEM educators can apply these principles to construct effective surveys and questionnaires that assess learning outcomes, evaluate teaching effectiveness, and gather student feedback. The book's discussion on how to design robust quantitative research aligns well with the data-driven nature of STEM education, where statistical analysis is often used to measure learning gains and the impact of teaching interventions (Outhwaite et al., 2020; Rogaten & Rienties, 2021).

In addition to quantitative methods, the book also provides valuable guidance on qualitative research in *Chapter 5: Interviews and Focus Groups* and *Chapter 6: Artifacts, Observations, and Reflections*. For STEM educators, qualitative data can provide deep insights into students' learning experiences, especially in understanding how students engage with complex, abstract concepts. This focus on qualitative methods is important for disciplines where student understanding can vary widely, and educators are keen to explore how students internalize theoretical concepts, approach problem-solving, or collaborate in group settings. These insights can inform more effective teaching strategies, helping instructors to better address common misconceptions and learning challenges in STEM fields.

The emphasis on transformative methodologies in *Chapter 11: Transformative Methodologies* is particularly relevant for STEM education, as it encourages educators to think critically about issues such as diversity, equity, and inclusion. STEM disciplines have historically been criticized for their lack of diversity and inclusion, particularly among underrepresented groups such as women, racial minorities, and people from low-income backgrounds. By applying transformative methodologies, STEM educators can design SoTL research that not only examines teaching practices but also addresses how STEM education can become more inclusive and equitable. This aligns with ongoing efforts to improve access to STEM fields for diverse populations and to create a more supportive learning environment for all students (Siregar et al., 2023). Transformative methodologies provide effective instruments for advancing equity and inclusion in STEM education; however, educators may encounter numerous obstacles, such as institutional opposition to unconventional research methods, insufficient support for critical or socially engaged inquiry, and a deficiency in familiarity or training regarding these methodologies. Furthermore, tackling systemic issues like bias, power dynamics, or curriculum inequities can be challenging or politically sensitive, necessitating that educators approach these complexities with caution and fortitude.

Furthermore, the book's guidance on mixed methods research in Chapter 9: Mixed Methods Research Designs offers a powerful approach for STEM educators who wish to combine quantitative and qualitative data to capture a more holistic view of student learning. STEM education benefits from mixed methods research, as it allows for the combination of numerical assessments (such as test scores or experimental results) with qualitative insights (such as student reflections or interviews). This provides a richer understanding of the factors influencing student

success in STEM courses and how teaching strategies can be improved (York et al., 2024).

Lastly, *Chapter 12: Academic Genres* provides valuable advice on how to disseminate SoTL research within STEM communities. STEM educators often face unique challenges when trying to publish their pedagogical research due to the emphasis on disciplinary research outputs rather than teaching and learning scholarship. This chapter equips STEM educators with the tools to navigate academic publishing, present at conferences, and ensure that their research reaches a broad academic audience. It also encourages STEM educators to share their research in ways that influence both teaching practice and educational policy, extending the impact of their work beyond the classroom (Gardner et al., 2019).

Highlighted Chapters

Chapter 3: Thinking About SoTL Research Frameworks stands out as one of the most important chapters in *Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning*. This chapter provides a comprehensive exploration of the different research paradigms available to SoTL researchers, making it a critical resource for anyone seeking to conduct meaningful and impactful SoTL research.

The chapter introduces a continuum of research paradigms, ranging from positivist and post-positivist approaches to more transformative and interpretive methodologies. What makes this chapter particularly valuable is its clear explanation of how a researcher's worldview impacts their choice of research methodology. By discussing the philosophical foundations of various paradigms, the authors help readers understand the significance of selecting the right research approach that aligns with both their research questions and their broader ethical commitments (Omodan, 2024). For STEM educators, this chapter is especially important because it encourages researchers to think critically about how their research design can be influenced by both their personal beliefs and the context of the educational environment.

In addition, the chapter addresses the application of these paradigms in SoTL research, providing readers with concrete examples of how different methodologies can be applied in practice. This not only helps to clarify abstract theoretical concepts but also empowers researchers to make informed decisions about the research approaches they choose, ensuring that their methodology is well-suited to their specific SoTL inquiry.

The inclusion of transformative research methodologies in this chapter is another standout feature. By encouraging researchers to adopt approaches that challenge traditional educational paradigms, the authors advocate for SoTL research that goes beyond assessing teaching effectiveness to consider issues of power, social justice, and inclusivity. This aligns with the increasing focus on diversity and equity in education, making this chapter especially relevant for those looking to address issues of underrepresentation and inequality within their teaching practices (Corsino & Fuller, 2021).

Ultimately, *Chapter 3: Thinking About SoTL Research Frameworks* is highlighted because it provides the theoretical foundation necessary for readers to understand the full range of research approaches available to them. It encourages thoughtful reflection on the philosophical underpinnings of their research, making it an essential resource for anyone engaged in SoTL research, especially those in STEM education who seek to critically examine their teaching practices and improve student learning outcomes.

Conclusion

Research Methodologies: A Guide to Conceptualizing and Conducting the Scholarship of Teaching and Learning is a comprehensive and invaluable resource for educators, researchers, and graduate students interested in enhancing their teaching practices through research. The book provides readers with a clear, structured approach to conducting SoTL research, offering both theoretical foundations and practical methodologies. By integrating various research paradigms, data generation methods, and analysis strategies, the authors equip readers with the tools necessary to undertake high-quality, evidence-based research that can improve teaching and learning.

The book's strengths lie in its ability to offer a holistic view of SoTL. The detailed exploration of different research frameworks, from positivist to transformative methodologies, ensures that readers can approach their research with a deep understanding of the philosophical underpinnings of their work. The emphasis on ethical considerations throughout the text highlights the responsibility of researchers to engage in practices that are inclusive, socially just, and reflective of diverse perspectives. Moreover, the book's discussion on both qualitative and quantitative data generation techniques ensures that researchers have the tools to collect rich, meaningful data that informs their teaching practices and improves student learning outcomes.

The inclusion of practical advice on disseminating SoTL research, especially in academic genres and through visual communication, makes this book particularly valuable for those looking to share their findings with a broader audience. It emphasizes the importance of not just conducting research but also ensuring its impact on teaching practices and educational policy.

This book is especially important for STEM educators, as it provides insights into evidence-based teaching and learning that are critical for improving student engagement, understanding, and success in technical fields. The guidance on using both qualitative

and quantitative methodologies, along with the application of transformative research approaches, is particularly relevant for STEM educators looking to enhance their research and teaching through a holistic and inclusive lens. Besides, it also endorses localized research, promotes innovation in accordance with educational reforms, and fosters collaborative practices among ASEAN institution, in which those elements are essential for enhancing the quality of engineering education.

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Conflict of Interest

The authors declare no conflict of interest.

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