



**Concept Mapping as a Research Tool for Knowledge Users’ Engagement: A Tutorial**



**La cartographie conceptuelle (*concept mapping*) comme outil pour intégrer les utilisateurs des connaissances au processus de recherche : un tutoriel**

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**Abstract**

Engaging knowledge users throughout the research process has been suggested to be an effective way to reduce or eliminate the gap between research and clinical practice. Within communication sciences and disorders, there is a growing interest in engaging knowledge users, particularly clinicians and patient partners, throughout the research process. This tutorial contributes to an emerging literature that offers guidance on how knowledge users can be engaged in research projects. We emphasize how knowledge users can be engaged in ways that facilitate shared responsibilities in decision making. This tutorial describes a six-step research methodology, concept mapping, as a candidate methodology for knowledge user engagement in research. To illustrate the steps involved in the concept mapping methodology, we share two of our own research projects that engaged audiologists and speech-language pathologists. We further discuss how knowledge user engagement can vary along a continuum in each of the six steps in concept mapping in order to promote authentic partnership practices. Last, we reflect on our own experience to highlight the strengths and limitations of the concept mapping research approach and offer some recommendations.

### Abrégé

Un moyen qui a été suggéré comme étant efficace pour réduire, voire éliminer, l'écart entre la recherche et la pratique clinique est l'intégration des utilisateurs des connaissances dans le processus de recherche. Dans le domaine des sciences et troubles de la communication humaine, on remarque par ailleurs un intérêt grandissant envers l'intégration des utilisateurs des connaissances au processus de recherche, tout particulièrement les cliniciens et les patients partenaires. Le présent tutoriel contribue ainsi à une littérature émergente et a pour objectif d'offrir des conseils quant à la façon d'impliquer les utilisateurs des connaissances dans des projets de recherche. Nous mettons l'accent sur la façon dont les utilisateurs des connaissances peuvent être intégrés pour faciliter le partage des responsabilités lors de la prise de décisions. Nous décrivons une méthodologie composée de six étapes, soit la cartographie conceptuelle (*concept mapping*), à titre de candidate pour l'intégration des utilisateurs des connaissances au processus de recherche. Afin d'illustrer les étapes de cette méthodologie, nous présentons deux de nos projets de recherche ayant intégré des audiologistes et des orthophonistes. Nous discutons également de la façon dont la participation des utilisateurs des connaissances peut varier sur un continuum au cours de chacune des six étapes de la cartographie conceptuelle, et ce, afin de promouvoir l'émergence de partenariats authentiques. Finalement, nous revenons sur nos propres expériences afin de souligner les forces et les limitations de la cartographie conceptuelle à titre d'approche méthodologique et nous proposons quelques recommandations.

One guiding principle for audiologists and speech-language pathologists (S-LPs) is to provide evidence-based assessment and interventions to individuals with communication disorders. However, it is estimated that it takes 17 years for research evidence to be absorbed and adopted into clinical practice (Morris et al., 2011). A major contributor to this long research–practice gap is the way in which research is being conducted. Crooke and Olswang (2015) contrasted two ways in which research is being conducted—the traditional research approach and a practice-based research approach. In the traditional research approach, research begins in controlled environments, often within laboratories, then the research results are “pushed” or implemented into real-world practice. In contrast, in a practice-based research approach, knowledge users (e.g., clinicians) are actively engaged in the research process to answer questions that arise from practice, and research is conducted within practice (Epstein, 2002). In other words, knowledge is created at the point of implementation (i.e., with clinicians) to minimize the research-to-practice gap (Vollebregt et al., 2018).

A major benefit of a practice-based research approach is that it closes the research–practice gap and eliminates the many barriers known to restrict implementation of evidence into practice (Crooke & Olswang, 2015). A close partnership between researchers and knowledge users throughout the research process is also central to many other research approaches, such as integrated knowledge translation, co-production, and participatory research (Gagliardi, Kothari, & Graham, 2016; Moodie, Bagatto, et al., 2011; Nguyen et al., 2020). At a philosophical level, engaging knowledge users as research partners acknowledges the value of practice experience and expertise in the research process (Crooke & Olswang, 2015; Moodie, Kothari, et al., 2011). From a practical standpoint, when research knowledge is jointly produced with knowledge users, it enhances the external validity, awareness, and appreciation of the research product, thereby improving the likelihood of research being adopted into practice by knowledge users (Gagliardi, Kothari, & Graham, 2016; Kothari & Wathen, 2013).

Recognizing the importance of engaging stakeholders is the first step. Knowing how to engage stakeholders within the research process is the next step. There is emerging literature that discusses different techniques or methodologies to engage stakeholders during the research process (i.e., Baumbusch et al., 2018; Peters et al., 2017). More reflection on the practical aspects of these methodologies may offer guidance for researchers, particularly trainees, who are beginning to develop knowledge and skills to engage stakeholders (Boaz et al., 2018; Gagliardi, Berta, et al., 2016). In addition, there is

an increasing recognition to focus on the nature in which stakeholders are engaged in research. Evidence suggests that stakeholders are often engaged in the role of a consultant rather than a partner or collaborator during the research process (National Institute for Health Research, 2015; Tritter, 2009). This type of inauthentic engagement, sometimes called “tokenism,” occurs when stakeholders are engaged but not given the power to direct decisions (Arnstein, 1969; Black et al., 2018; Hahn et al., 2017; Jagosh et al., 2012; Ocloo & Matthews, 2016). Authentic stakeholder engagement maximizes the potential of bridging the research–practice gap. It is therefore essential for researchers to consider the nature of stakeholder engagement in their research approach or methodology (Goodman & Thompson, 2017; Ocloo & Matthews, 2016).

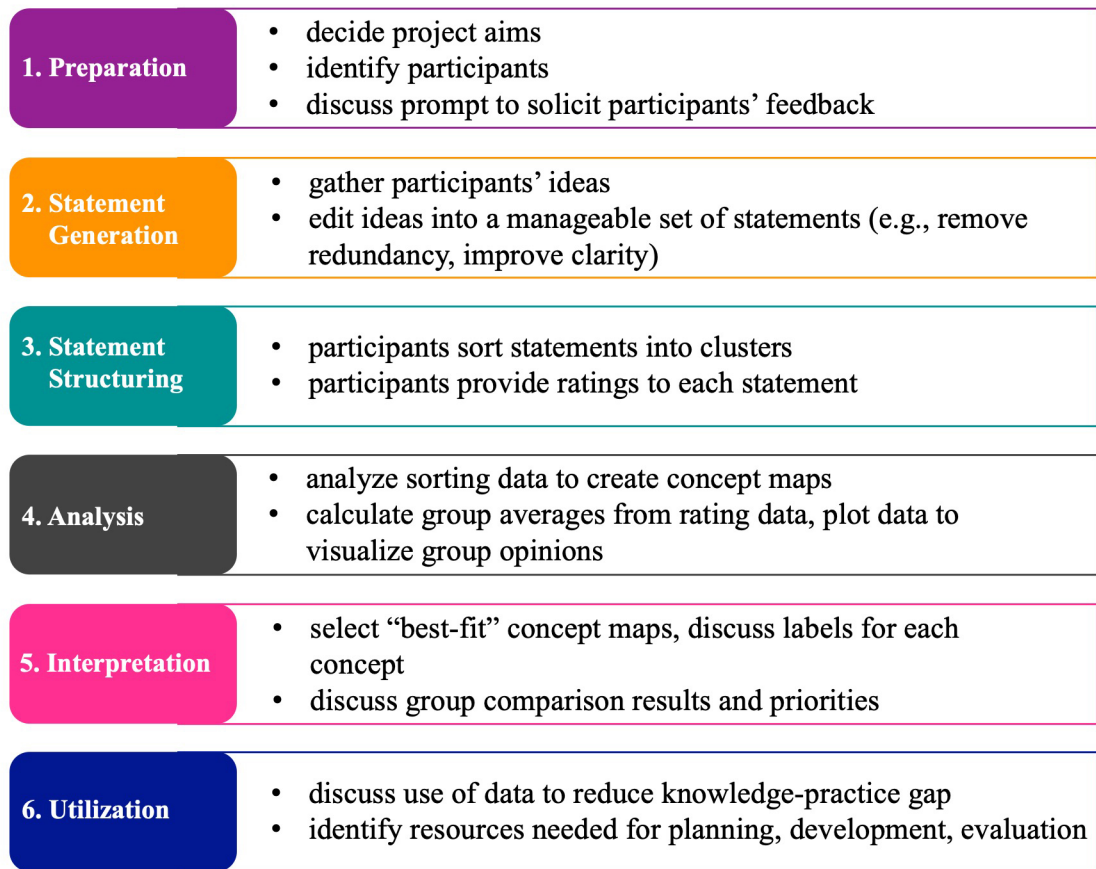
The goal of this tutorial is to share our experience in order to expand the dialogue on the “how to” of stakeholder engagement in the research process. We acknowledge that there are multiple ways in which stakeholders can be engaged in research, and this article will be introducing only one of them. In this tutorial, we will describe the steps in one research methodology, concept mapping, that we have used to engage stakeholders in research. We will contextualize the concept mapping research method using two of our own projects as examples—one conducted with speech language pathologists, one with audiologists. Then, we will discuss the synergies between concept mapping and one knowledge-user engagement research approach, the practice-based research approach. Importantly, to encourage more explicit considerations of the nature of knowledge users’ engagement, we will illustrate how each step of the concept mapping approach may appear on the continuum of engagement. Finally, we will reflect on our own experience using the concept mapping methodology to engage stakeholders and discuss the promises and drawbacks of the methodology.

### What is Concept Mapping?

Concept mapping is a research method that “can be used by groups to develop a conceptual framework which can guide evaluation or planning” (Trochim, 1989, p. 1). It is a mixed-methods research approach that has evolved to include six sequential steps (Kane & Trochim, 2007), shown in **Figure 1**.

To illustrate the specific tasks in each of these six steps, we provide a summary of our two research studies in **Table 1**. The objective of the study shown in the first column was to develop a conceptual framework around the factors that influence audiologists in the uptake of remote follow-up hearing aid support services (Glista et al., 2021). The objective of the study shown in the second

Figure 1



Six steps in concept mapping.

column was to develop a conceptual framework and to prioritize different strategies that could be used to improve the implementation of an outcome measurement tool (i.e., the Focus on the Outcomes of Communication Under Six [FOCUS]; Thomas-Stonell et al., 2010) in speech-language pathology practice (Kwok et al., 2020). In both studies, Statement Structuring (Step 3) and Analysis (Step 4) were completed using a proprietary software (i.e., Concept Systems Incorporated, 2018).

### Synergies Between Concept Mapping and Practice-Based Research

Crooke and Olswang (2015) summarized five distinctive features of practice-based research (Table 2). In several ways, concept mapping embodies these features, making it a useful approach for practice-based research and other research methodologies that seek to engage knowledge users (Rosas, 2013). Table 2 illustrates the parallels between

the concept mapping methodology and the five features of practice-based research.

It is important to understand that despite the many synergies between the concept mapping methodology and practice-based research, merely using the methodology does not automatically characterize a study as practice-based research—or any other knowledge-user engagement research approaches (e.g., integrated knowledge translation). Practice-based research is, by definition, collaborative in nature where knowledge users are engaged throughout the research process (Crooke & Olswang, 2015). It is important to understand that knowledge users' engagement can vary on a continuum based on the level of power in decision making. At one end of the continuum, knowledge users are involved but have little power to direct project goals or decisions (Ocloo & Matthews, 2016). At the other end of the continuum, a true partnership is formed between researchers and

<b>Table 1</b>		
<b>Example Applications of Concept Mapping in Communication Sciences and Disorders</b>		
	<b>Case 1: Glista et al. (2021)</b>	<b>Case 2: Kwok et al. (2020)</b>
Project setting	Audiologists in Ontario, Canada who (a) work in different practice settings (e.g., private practice, hospital, university); (b) had been exposed to the onset of remote service delivery in audiology in different ways; (c) shared an interest in identifying the implementation considerations related to remote hearing aid fitting.	S-LPs in Ontario, Canada, who work in the publicly-funded preschool speech and language intervention program and who have been mandated to implement an outcome measurement tool. S-LPs had been interviewed in an earlier study to identify barriers to tool implementation.
Step 1: Preparation	<p>Research team: Three clinician-scientists (primarily working in academic settings, with clinical training and licensure in audiology), and one research associate (CDA).</p> <p>Project aims: (a) to identify the main concepts that influence the use of remote hearing aid fitting support services in clinical practice; (b) to explore where these concepts differed across pediatric-versus adult-focused clinicians.</p> <p>Participants: Clinician audiologists (<math>n = 42</math>), some with executive-level and managerial roles within their organization.</p> <p>Focus prompt: One thing that may influence my use of tele-audiology for remote follow-up hearing aid support is...</p>	<p>Research team: Four clinician-scientists (three S-LPs, one audiologist). Two of the team members had clinical experience administering the outcome measurement tool in clinical practice.</p> <p>Project aims: (a) to generate a conceptual framework of different strategies that could be used to improve the implementation of the outcome measurement tool; (b) to prioritize a list of strategies that are feasible and important to all knowledge users.</p> <p>Participants: Policy makers (<math>n = 3</math>), S-LPs working in the preschool programs (<math>n = 37</math>), and researchers who developed the outcome measurement tool (<math>n = 6</math>).</p> <p>Focus prompt: One specific thing that will help me complete and submit the FOCUS regularly is...</p>
Step 2: Statement generation	Audiologists generated 106 unique statements in face-to-face brainstorming sessions ( $n = 5$ ).	S-LPs generated 90 unique strategies over telephone interviews.
Step 3: Statement structuring	Occurred online with all participants sorting the 106 statements into categories and rating each statement according to importance level.	Occurred online with all participants sorting the 90 statements into categories and rating each strategy statement for feasibility and importance.
Step 4: Analysis	The research team completed the analysis using online statistical software to generate concept maps and to calculate average ratings for each factor identified.	The research team completed the analysis using online statistical software to generate concept maps and to calculate average ratings per participant group for each strategy statement.
Step 5: Interpretation	The research team reviewed the different concept maps and found that a six-cluster concept map best categorized the factors perceived to influence use of remote service delivery. A label, a definition, and subthemes were identified for each of the six clusters. Data were analyzed to identify group-level differences according to practice speciality (i.e., pediatric- versus adult-focused audiologists). A member checking step was used to validate the results with the participants.	The research team reviewed the different concept maps and found that a six-cluster concept map best categorized the strategy statements. A label and a definition were given to each of the six clusters. Fourteen strategies were found to be rated as highly important and feasible by all groups of participants. A survey step was used to validate these results with participants (85% agreement).
Step 6: Utilization	Results indicated that there was a need to support the implementation of remote audiological services through the creation of knowledge tools (guidance documents and assessment tools). Subsequent grant funding was obtained to continue this co-creation work with end-users being included.	Additional literature review revealed 13 strategies (out of the 14 endorsed by participants) were evidence-informed and could be used to improve implementation. A subsequent grant proposal was submitted to continue this collaborative work with end-users in order to move the strategies into a clinical implementation plan.

Note. CDA = Communicative Disorders Assistant; FOCUS = Focus on the Outcomes of Communication Under Six; S-LPs = speech-language pathologists.

**Table 2**

**Synergies Between Practice-Based Research Approach and Concept Mapping**

Features of practice-based research	Concept mapping
Driven by practice or emerges from practice	Particularly suited to complex real-world issues/experiences that requires collective wisdom
Research questions are primarily seeking descriptive/correlational knowledge (rather than causal).	Concept mapping seeks to organize ideas of a group into a common conceptual framework (i.e., describing and organizing complex ideas).
Data informed by or gathered through routine practice and includes both qualitative and quantitative measures based on practice needs	Concept mapping is inherently a mixed-methods approach. Data are collected from knowledge users.
Formative in nature (i.e., results inform practice, assist planning/evaluation)	Results from concept mapping are often used to support planning, implementation, and evaluation.
Collaborative in nature (knowledge users engaged throughout the research process)	Knowledge users can participate in every step of the methodology. Knowledge users' participation (e.g., through generating, sorting, and rating statements) is the source of data.

*Note.* Features of practice-based research were discussed by Crooke & Olswang (2015).

knowledge users and decisions are made where “all perspectives/expertise are considered equally valuable – but different” (Nguyen et al., 2020, p. 13). To help illustrate how different steps in the concept mapping methodology may appear on this continuum of engagement, we have created **Table 3** where we conceptualized knowledge users’ roles in three levels of increasing engagement: (a) consultation, (b) involvement, and (c) partnership and shared leadership (Ocloo & Matthews, 2016).

**Discussion**

This tutorial aims to contribute to a growing body of literature that explores the methods (i.e., “how to”) for engaging knowledge users throughout the research process (Baumbusch et al., 2018). We have introduced concept mapping and discussed that it offers a structured methodology that can be used to engage knowledge users throughout the research process. We illustrated how the methodology has been applied in communication sciences and disorders using two of our own projects as examples. We have also described the application of the methodology along a continuum of stakeholders’ engagement.

It is not the intention of this tutorial to argue that concept mapping is the most appropriate approach to engage knowledge users. We emphasize that concept mapping is merely one of the many available approaches to engage knowledge users. For example, readers may find the Patient-Centered Outcomes Research Institute (2019) and the Point of Care Foundation (2013) offer many useful approaches and resources (e.g., meeting templates) to support knowledge users’ engagement in research. In

addition, it is also not the intention of this tutorial to suggest that all studies that use a concept mapping approach fully engage knowledge users during the research process. To emphasize this, we have explicitly discussed how the concept mapping methodology can be used to form a “true” partnership with clinicians in a research project. We need to further emphasize that in a “true” partnership, the roles of knowledge users and researchers in each of the concept mapping steps should be openly discussed to meet the partnership’s needs. For example, knowledge users may not have the capacity (nor the interest) to lead or be involved in data collection steps (e.g., conducting interviews). Rather, engaging knowledge users in the design of interview questions may be sufficient to satisfy the partnership’s needs in the project. We hope this tutorial provides a framework to help readers consider authentic partnership practices at the outset of a project. In the next section, we will reflect on our experience and discuss the benefits and limitations of concept mapping to provide the readers with additional support when making methodological decisions for their practice-based research project.

**Benefits of Concept Mapping**

A major benefit of concept mapping is its inherent participatory and group consensus characteristics. As a methodology, concept mapping is useful for understanding complex ideas that require consideration from multiple perspectives. Kane and Trochim (2007) described concept mapping as a method that helps knowledge users “think more effectively as a group, without losing the uniqueness of their individual contribution” (p. 4). Rosas (2013) further described that concept mapping elicits “not only each



**Table 3**

**Concept Mapping Steps on a Continuum of Stakeholders' Engagement**

Concept mapping step	Knowledge user engagement continuum (increasing engaging from left to right column)*		
	Consultation	Involvement	Partnership and shared leadership
1. Preparation phase: reasons for involving knowledge users in the research process	To understand the practice context and/or perspectives of the knowledge users.	To identify research questions based on knowledge users' needs. To build relationships with knowledge users, so they can help interpret and contextualize findings.	Knowledge users and researchers collectively decide the research questions, methods, interpretation of data, and dissemination of findings.
1. Preparation phase: deciding research question, project aims	Researchers generate a research question of interest to them. Knowledge users' perspectives are not consulted when deciding the research question.	Researchers generate a research question based on their understanding/ observation of knowledge users' perspectives. The research question is reviewed/validated by knowledge users.	Research question originates from knowledge users' discussion. Research question is important and meaningful to knowledge users. Researchers can offer methodology suggestions to help answer knowledge users' research question. A formal partnership is formed between the researchers and the knowledge users to pursue the research question.
1. Preparation phase: deciding participant, recruitment methods, and logistics	Researchers identify the target participant groups and approach to recruit participants.	Researchers identify target participant groups with help from knowledge users. Researchers recruit participant groups (maybe with help from knowledge users).	The research team (including knowledge users and researchers) decide who and how to engage knowledge users. The research team can be engaged as the participants.
2. Generating statement phase	Participants brainstorm the statement based on a prompt generated by researchers. Researchers create instructions for the sorting and rating phases. Ideas generated by participants will be edited into a set of statement by the researchers.	A brainstorming prompt, and instructions for the sorting and rating phases are created by the researchers and validated by the knowledge users. Ideas generated by participants are edited into a set of statements by the research team. This edited set of statements will be validated by knowledge users for clarity and completeness.	The brainstorming prompt, instructions for sorting and rating questions are created by the research team. Participants provide their ideas and ratings to these prompts and questions. Ideally, the research team will facilitate the statement generating phase so that participants are engaged in real-time to help with editing their ideas into statements (i.e., ideas are summarized into succinct and clear statements as they are generated).
3. Structuring statements phase	The edited set of statements are returned to participants, who will group statements into categories and provide ratings for each statement.	The edited set of statements are returned to participants, who group statements into categories and provide ratings for each statement.	The edited set of statements are returned to participants, who will group statements into categories and provide ratings for each statement.

**Table 3 (Continued)**

**Concept Mapping Steps on a Continuum of Stakeholders' Engagement**

Concept mapping step	Knowledge user engagement continuum (increasing engaging from left to right column)*		
	Consultation	Involvement	Partnership and shared leadership
4. Concept mapping analysis phase	Researchers analyze the data to determine the best categorization for the concept map and labels for the concept map.	Researchers analyze the data to determine the best categorization for the concept map. Labels of the concepts are derived from participants' responses. A member-checking step is included to validate the data analysis results.	The research team analyzes the data collectively. The research team provides the technological support and explains the analysis step. The team co-constructs the best categorization for the concept map and labels for the concept map.
5. Interpretation phase	Researchers interpret the data and provide a description for the clusters on the concept map and interpret the importance rating graphs.	Researchers interpret the data and provided descriptions for the clusters on the concept map and interpret the rating graphs. As a member-checking step, the interpretation will be reviewed by knowledge users whose comments are incorporated into the data interpretation.	Interpretation is completed as a team. Knowledge users are presented with the concept maps and the statements within each of the clusters on the concept maps. Knowledge users will offer their perspectives to help interpret the concept map (e.g., by suggesting names and definitions for each cluster on the concept map).
6. Utilization phase	Research findings are disseminated via journal articles or in social media groups involving clinicians.	Researchers prepare results to be disseminated to knowledge users. Knowledge users may be engaged to help disseminate findings.	The research team decides on the main findings from the project that will be useful for knowledge users. These findings are tailored for the various knowledge user groups and disseminated in ways that ensure they are appropriate for and reach knowledge users.

Note. \*Continuum of engagement (i.e., consultation, involvement, partnership and shared leadership) was adopted from Ocloo and Matthews (2016).

person's understanding of a phenomenon, but how that understanding relates to others' views" (p. 15). This means that when knowledge users are engaged in the concept mapping process, each individual's opinions are incorporated in the final group consensus.

Clearly, knowledge users' participation and group consensus are not unique to concept mapping, as other research methods (e.g., Delphi; Dalkey & Helmer, 1963) also share these properties. An additional advantage to concept mapping is that it offers a structured set of methodological steps to follow that end with a focus on the utilization of the research product(s). From a practical perspective, our experiences show that knowledge users found the concept mapping steps intuitive. The proprietary software

available to support concept mapping was user-friendly to both knowledge users and researchers and facilitated the off-site engagement of participants (Concept Systems Incorporated, 2018). In one of our studies (i.e., Kwok et al., 2020), all stakeholders were engaged virtually throughout the project, making the concept mapping approach suitable to be used in international collaborations or to facilitate collaboration during a public health crisis (e.g., the recent COVID-19 pandemic). Because concept mapping offers a step-by-step guide, researchers and trainees may find this structure useful while learning to engage stakeholders appropriately.

The utilization step in the concept mapping approach focuses on how the research products (i.e., concept map



or the prioritized statements) can be applied in practice. This final step of concept mapping is often undervalued and underutilized, even in our own experiences. A true practice-based research partnership collectively plans how to move the knowledge created into practice, therefore, reducing the research–practice gap. To maximize the benefits of concept mapping, we recommend dedicating sufficient time to this final step. Compared to other consensus approaches, concept mapping also generates a visual representation of the way in which participants conceptualize a complex idea. This concept map can be a useful way to report the shared perspectives and may provide a common language amongst stakeholder groups to facilitate true partnership (Kothari & Wathen, 2013). The literature on concept mapping has described various uses of the results from a concept mapping study. For example, the concept map can be used to design comprehensive protocols/programs (e.g., by ensuring clinical guidance is developed and implemented for each cluster of the created concept on the concept map) and then uses these in pre- and post-quantitative or mixed-methods studies to evaluate protocol/program implementation (e.g., by having survey items that evaluate each cluster on the concept map; Trochim et al., 1994).

### Limitations of Concept Mapping and Some Suggestions

There are some cautionary notes that we can provide based on our experiences implementing concept mapping in research. The first consideration is in deciding if concept mapping is the appropriate methodology for the research/practice question. As a mixed-methods research approach, concept mapping recognizes that both qualitative and quantitative data contribute uniquely to offer a more complete understanding (Creswell & Plano Clark, 2007). Specifically, concept mapping methodology draws on both qualitative and quantitative methods of data collection, analyses, and presentation. Take data collection as an example, qualitative methods are used to solicit participants' ideas (i.e., participants brainstorm statements using a prompt) while quantitative methods are used to gather participants' views of these ideas (i.e., participants provide ratings to each idea statement).

Compared to qualitative methodologies, concept mapping can be useful for complex questions where different knowledge users with different practice and research experience levels can contribute to improve understanding (i.e., gathering a breadth of understanding from different perspectives). From our experience, concept mapping allowed us to engage over 40 stakeholders. For research/practice questions that do not necessitate input from a large and diverse group of stakeholders, researchers may find a

focus group discussion more efficient and cost-effective. At the same time, concept mapping uses a specific, focused prompt to elicit participants' feedback, which limits the detail knowledge users will provide in their responses. As such, concept mapping is more suited when the scope and purpose of the research project is more specific (e.g., as opposed to exploratory). For example, because of the specificity of the prompt and ways in which data are collected and analyzed we could not use the concept mapping approach to both investigate real-world facilitators and barriers to practice while simultaneously gathering participants' view of various strategies that would help implementation. Because of this, we found other qualitative methodologies (e.g., interviews or focus groups) may be more appropriate for projects that aim to explore or understand participants' experience (i.e., obtaining a deep understanding of participants' perspective). At the same time, collecting qualitative data may not be pertinent to all research questions (e.g., if previous work already generated a list of ideas or if a conceptual framework is already available), in which case, quantitative data collection alone (e.g., gathering ratings data through a survey) may be more suitable.

Compared to quantitative methodologies, concept mapping methodology is a mixed-methods approach that facilitates the collection of data that can be analyzed using quantitative methods (e.g., multidimensional scaling and hierarchical cluster analyses). These quantitative analyses are used to create a series of maps that depict the participants' composite thinking (i.e., brainstorming and structuring of statements) and can support comparisons of ratings from different participant groups. The benefit of the outputted maps has been discussed in the previous section (e.g., supports the development of protocols and evaluation surveys). Nevertheless, the quantitative analyses used in concept mapping may not be relevant or sufficient to all research/project questions. For example, quantitative analysis in concept mapping cannot support hypothesis testing or understanding changes in participants' views over time. Concept mapping can be used as a first step to help generate items in a survey measure, but to explore participants' perspectives over time on the survey items, a longitudinal survey approach with inferential statistics (e.g., regression) is more suitable. That is, repeating the concept mapping approach (i.e., from brainstorming to analysis sorting and rating data) may not be necessary. Moreover, researchers might also consider the number of participants they wish to engage in a study. Concept mapping was originally designed to engage 40 participants or fewer in live discussion (Kane & Trochim, 2007). This is because there are practical challenges in qualitative data collection (e.g., scheduling, amount of data) and there are diminishing

returns in the amount of data collected (Trochim, 1993). For analyses or projects/purposes that require large sample sizes (e.g., conducting item response analyses to validate items on a measurement tool), implementing the concept mapping approach can be challenging and a quantitative methodology may be a better fit.

From our experience, we found that it is imperative to pilot the concept mapping prompt with a small group of knowledge users to help determine if the prompt will gather sufficient data to address the research question. We also found that it is important to specify the purpose of the study and to articulate the reason for collecting both qualitative and quantitative data.

A second consideration is the time commitment required to thoroughly complete each step in the concept mapping methodology. To complete the six steps in the concept mapping approach, Kane and Trochim (2007) recommended committing minimally to 8 hours of in-person discussion sessions with knowledge users. The in-person meeting time varies with the participant number. Allowing sufficient meeting time encourages discussion and knowledge users' engagement. In-person discussions are best facilitated initially by someone on the team with experience in managing/moderating in-person discussions. From our experience engaging with knowledge users by telephone or in off-site visits, this required a significant time commitment from the research team to schedule, travel, interview, transcribe, and analyze the statements. As a result, there was a delay of several months between the generation of statements and structuring of the statement phase. In both project examples, this time commitment and/or time lag between phases may discourage the on-going participation required from some knowledge users. This limitation is perhaps not surprising; true partnerships and practice-based research are often time-consuming but usually deliver rich results (Flinders et al., 2016; Oliver et al., 2019).

### Applications of Concept Mapping Beyond Practice-Based Research

Thus far, this tutorial considered the application of concept mapping in practice-based research, a research approach that aims to bridge research and clinical practice. We focused on practice-based research as we believe it is most meaningful to research exploring clinical practice issues within communication sciences and disorders. It is, however, important to acknowledge that the concept mapping methodology can be widely applied to other research/project purposes (i.e., those that do not aim to bridge research and clinical practice) and even in projects unrelated to clinical practice. Concept mapping has been used to support organizational strategic planning, needs

assessment, program evaluation, and measurement development (Kane & Trochim, 2007). Therefore, the discussion on meaningful stakeholder engagement in this tutorial will broadly apply to projects that use concept mapping as a methodology.

### Summary

Concept mapping offers a mixed-methods, step-by-step approach to engage knowledge users in research. Reflecting on the synergies between concept mapping and practice-based research, and in discussing our experiences, this tutorial aims to expand the dialogue on how to meaningfully engage knowledge users in the research process.

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