A Pragmatic Context Assessment Tool (pCAT): Using a think aloud method to develop a practical assessment of contextual barriers to change

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Research

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Abstract

Background: The Consolidated Framework for Implementation Research (CFIR) is a determinant framework that can be used to guide context assessment prior to implementing change. Though a few quantitative measurement instruments have been developed based on the CFIR, most assessments using the CFIR have relied on qualitative methods. One challenge to measurement is to translate conceptual constructs which are often described using highly abstract, technical language into lay language that is clear, concise, and meaningful yet generalizable. The purpose of this study was to develop a pragmatic quantitative context assessment tool based on the CFIR for use by frontline teams in a clinical setting.

Methods: Twenty-seven interviews based on the Think Aloud (TA) method (asking participants to verbalize thoughts as they respond to assessment questions) were conducted with frontline employees to identify areas of disconnect, misinterpretation, and misunderstanding of assessment questions. Interviews were recorded and transcribed verbatim. CFIR constructs were deductively applied as codes.

Results: Participants identified several areas where language in the assessment tool needed to be modified, clarified, or made more nuanced and thus more useful and applicable for frontline employees. Participants found it easier to respond to elements in the tool when they had a recent, specific project in mind. They found it much more difficult to give meaningful responses when being asked to answer questions based on an abstract, general change; barriers and facilitators tend to be unique to each specific implementation. Participants also identified new concepts they felt were missing from the tool or that were conflated, leading to refinements that made the tool more comprehensive, accurate, and useful.

Conclusions: Quantitative context assessment instruments must be designed to be practical and better align with everyday language used by frontline employees. The pCAT is short (14 items), freely available, uses accessible language, requires little proficiency or experience in assessment, and is designed to draw on the expertise and knowledge of individuals most familiar with their own clinical context. If rapid assessment tools are to have wide-spread use and utility, technical implementation science language must be translated using everyday language so frontline employees can capture accurate assessments of their context.

Contributions To The Literature

- Context assessment is a core function within implementation projects, but it is challenging to translate concepts that often use highly abstract, technical language into everyday language that is clear, concise, and meaningful to frontline clinicians.
- We developed a pragmatic Context Assessment Tool (pCAT) that is short (14 items), freely available, uses accessible language, requires little proficiency or experience in assessment, and is designed to draw on the expertise and knowledge of individuals most familiar with their own clinical context.
- The pCAT provides a practical tool that can be used by researchers or frontline teams to assess local context.

Background

Implementation scientists seek to accelerate use of evidence-based innovations (EBIs) by understanding what works where and why. Many implementation scientists coalesce around recognition that determinants (forces that act as barriers or facilitators) within local context impact implementation efforts. Assessing context before, during, and/or after implementation are optimal approaches so strategies can be selected and tailored to local context to minimize barriers and leverage facilitators either prospectively or to inform future scale-up and spread (1). Easy-to-use quantitative context assessment tools rooted in the concepts and evidence-base within implementation science need to be developed. Such tools rely on an accurate understanding of what is being asked by frontline clinicians and staff, but these individuals are often not familiar with the language of implementation science. When an assessment tool is not rooted in theoretical constructs or not conceptually clear using every-day language, its usefulness is greatly diminished, which undermines its validity and consequently, the successful and sustained implementation of EBIs.

The Consolidated Framework for Implementation Research (CFIR) is a determinant framework, designed to elicit perceptions of individuals involved in or influencers of implementation outcomes. It provides a set of 39 factors that have potential to be barriers or facilitators to implementation. Though frameworks like the CFIR seek to provide clarity and consistency in terms and definitions for each potential barrier or facilitator, the language used can be highly technical and abstract for frontline clinicians and staff who do
the work of implementation. The dominant approach for identifying barriers and facilitators has relied on researchers conducting assessments based on information elicited through qualitative interviews that are analyzed, interpreted, and used to develop tailored strategies with guidance for local practitioners to help them navigate their context for successful implementation (1–5). Some research has relied on survey instruments, but very few instruments have been validated and they are not practical to apply outside of research projects (e.g., they may be exceedingly long or require training) (6–11). Frontline practitioners may be more familiar with quality improvement language but bridging the language gap between implementation science and quality improvement can be challenging (12–15). This is true not only in clinical settings, but in fields such as occupational health and safety where implementation of EBIs is equally important (16).

Thus, pragmatic measures of context are needed. Glasgow and Riley define pragmatic measures as important to stakeholders, low burden (usually indicated by a low number of survey items), actionable, and sensitive to change (17). Stanick et al. add that pragmatic measures are feasible, low cost, and brief (18). The aim of this work was to develop a meaningful, pragmatic, quantitative instrument that frontline clinicians and staff could use to identify potential barriers and facilitators of implementation, based on theoretical constructs defined in the CFIR.

Methods

SETTING

Version 1.0 of a brief quantitative barrier and facilitator assessment tool rooted in CFIR constructs known to be present in successful implementations (19–22) was piloted with six frontline improvement teams, comprising 21 individuals, that were participating in the Learn. Engage. Act. Process. (LEAP) Program (23). LEAP is a 26-week, virtual, coach-led, structured learning program designed to develop competency in the application of quality improvement methods and techniques for frontline clinicians and staff. The goal was to have teams use the assessment tool to identify potential barriers and facilitators to implementation of improvements to better understand the context in which they were working to improve their processes and programs. However, concerns about the face validity and content validity arose when many responses didn't align with barriers and facilitators observed by and reported to the LEAP coaches. This offered a convenient opportunity to pause, reflect, and incorporate early findings into a simplified tool that was vetted with frontline staff (Version 2.0). Table 1 shows the CFIR construct name, short definition, and survey wording of each iteration of this assessment tool.
### Table 1
**List of CFIR Constructs Included in Think Aloud Survey Development**

<table>
<thead>
<tr>
<th>Survey Introduction</th>
<th>Survey Version 1.0</th>
<th>Survey Version 2.0</th>
<th>Final Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question Stem</strong></td>
<td>Please enter your problem area (area for improvement). This should reflect whatever topic you and your team are currently considering. It does not have to be final (e.g., The majority of patients fail to show up for scheduled orientation).</td>
<td>Please enter your problem area (area for improvement). This should reflect whatever topic you and your team are currently considering. It does not have to be final (e.g., The majority of patients fail to show up for scheduled orientation).</td>
<td>We've found that it's best to think concretely about a planned or on-going implementation (as opposed to the more general implementation environment). Include the specifics of the implementation/improvement project here.</td>
</tr>
<tr>
<td><strong>Identifying Barriers vs. Facilitators</strong></td>
<td>Overall, we are most likely to encounter more (check only one):</td>
<td>1 = Disagree</td>
<td>1 = DISAGREE: This means the item is a potential barrier</td>
</tr>
<tr>
<td>(item responses)</td>
<td>1 = Facilitating forces related to [construct]</td>
<td>2 = Neutral</td>
<td>2 = Neutral</td>
</tr>
<tr>
<td></td>
<td>2 = Hindering forces related to [construct]</td>
<td>3 = Agree</td>
<td>3 = AGREE: This means the item is a potential facilitator</td>
</tr>
<tr>
<td></td>
<td>3 = We cannot think of any facilitating or hindering forces related to [construct]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Effect on implementation</strong></td>
<td>1 = Low impact</td>
<td>1 = Low impact</td>
<td></td>
</tr>
<tr>
<td>(item responses)</td>
<td>2 = Moderate impact</td>
<td>2 = Moderate impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = High impact</td>
<td>3 = High impact</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = Weak/no effect</td>
<td>0 = Weak/no effect</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = Strong effect</td>
<td>1 = Strong effect</td>
<td></td>
</tr>
</tbody>
</table>

### CFIR-based Survey Items

<table>
<thead>
<tr>
<th>CFIR Domain</th>
<th>CFIR Construct</th>
<th>Short Definition</th>
<th>Survey Version 1.0</th>
<th>Survey Version 2.0</th>
<th>Final Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Characteristics</td>
<td>Relative Advantage</td>
<td>Stakeholders’ perception of the advantage of implementing the intervention versus an alternative solution.</td>
<td>The extent to which leaders and staff recognize the potential benefit of implementing a change to address your problem area, especially compared to other alternatives, may influence your success.</td>
<td>Key people will see the advantage of implementing the change versus an alternative.</td>
<td>People here see the advantage of implementing the change versus an alternative.</td>
</tr>
<tr>
<td>Survey Introduction</td>
<td>Survey Version 1.0</td>
<td>Survey Version 2.0</td>
<td>Final Survey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
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<td>--------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Outer Setting</strong></td>
<td><strong>Patient Needs &amp; Resources</strong></td>
<td>The extent to which patient needs, as well as barriers and facilitators to meet those needs are accurately known and prioritized by the organization.</td>
<td><strong>People here regularly seek to understand the needs of patients and make changes to better meet those needs.</strong></td>
<td>[NO CHANGE from V2]</td>
<td></td>
</tr>
</tbody>
</table>

**People here regularly seek to understand the needs of patients and make changes to better meet those needs.**

| **Inner Setting**   | **Structural Characteristics** | The social architecture, age, maturity, and size of an organization. | **The structures and policies in place here enable us to make the change.** | [NO CHANGE from V2] |

**The structures and policies in place here enable us to make the change.**

| **Networks & Communications** | | Quality and type of working relationships between people and the quality of communications may influence your success. | **I have open lines of communication with everyone needed to make the change.** | [NO CHANGE from V2] |

**I have open lines of communication with everyone needed to make the change.**

| **Tension for Change** | | The degree to which stakeholders perceive the current situation as intolerable or needing change. | **Key people will see the current situation as intolerable and that the change is needed.** | People here see the current situation as intolerable and that the change is needed. |

**People here see the current situation as intolerable and that the change is needed.**

| **Compatibility** | | The degree of tangible fit between meaning and values attached to the intervention by involved individuals, how those align with individuals’ own norms, values, and perceived risks and needs, and how the intervention fits with existing workflows and systems. | **The change is compatible with existing clinical processes.** | [NO CHANGE from V2] |

**The change is compatible with existing clinical processes.**
<table>
<thead>
<tr>
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<th>Final Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The change is aligned with clinician values related to weight loss among Veterans.</td>
<td>[NO CHANGE from V2] The change is aligned with clinician values related to weight loss among Veterans.</td>
<td></td>
</tr>
<tr>
<td>Goals &amp; Feedback</td>
<td>The degree to which goals are clearly communicated, acted upon, and fed back to staff and alignment of that feedback with goals.</td>
<td>The extent leaders clearly communicate goals and provide helpful feedback, as well as the extent feedback aligns with organizational and clinical goals, may influence your success.</td>
<td>The change is aligned with leadership goals.</td>
</tr>
<tr>
<td>Learning Climate</td>
<td>A climate in which: a) leaders express their own fallibility and need for team members' assistance and input; b) team members feel that they are essential, valued, and knowledgeable partners in the change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation.</td>
<td>The extent to which people feel encouraged to experiment, look for ways to improve current processes and programs, and learn from mistakes may influence your success.</td>
<td>Not assessed</td>
</tr>
<tr>
<td>Leadership Engagement</td>
<td>Commitment, involvement, and accountability of leaders and managers with the implementation.</td>
<td>The level of commitment and involvement of leaders in your charter aim may influence your success.</td>
<td>Higher level leaders are committed, involved, and accountable for the planned improvement.</td>
</tr>
<tr>
<td></td>
<td>Leaders here will be committed, involved, and accountable for the planned improvement.</td>
<td>Leaders I work with most closely are committed, involved, and accountable for the planned improvement.</td>
<td></td>
</tr>
<tr>
<td>Survey Introduction</td>
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<tr>
<td>---------------------</td>
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</tr>
<tr>
<td><strong>Available Resources</strong></td>
<td>The level of resources dedicated for implementation and on-going operations including money, training, education, physical space, and time.</td>
<td>The level of resources available to support your charter aim, including money, physical space, and time, may influence your success.</td>
<td>We will have sufficient time dedicated to make the change.</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Reflecting &amp; Evaluating</td>
<td>Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience.</td>
<td>Not assessed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

We will have sufficient space to accommodate the change.

We will have other needed resources to make the change.

[Table 1 should be inserted here]

Think Aloud Methods

Frontline clinicians who completed the LEAP program were invited to participate in a Think Aloud approach (24) using a telephone interview format. Version 2.0 of the assessment tool was used to elicit level of agreement with statements listed in Table 1 and the effect of each statement, on their ability to make program improvements. As participants responded to questions, we asked them to verbalize their considerations, interpretations, and ask questions or for clarifications, if needed. We encouraged participants to verbally identify areas of disconnect, misinterpretation, and misunderstanding with the language and concepts. Interviews were conducted 6-months after completing LEAP. Participants included LEAP team leaders or other clinicians who were members of a LEAP team.

Coding and Analysis

Interviews were conducted from March 2018 through August 2019, audio recorded, and transcribed verbatim. The interviews were divided into two parts: 1) a semi-structured check-in 6-months post-LEAP participation to assess barriers and facilitators to sustaining and spreading improvements made during LEAP and understanding subsequent improvements; and 2) the Think Aloud exercise focused on the development of the assessment tool. Qualitative descriptions of barriers and facilitators in the transcripts were coded using CFIR constructs as preliminary codes. Additional descriptive codes were added inductively that captured areas where CFIR constructs were unclear/insufficient/difficult to apply. NVivo 12 Pro was used to facilitate the coding process and running of reports (25). Interviews were conducted by (CHR). (CHR) and (LJD) examined the initial wave of data independently and participated in consensus discussions about the initial coding and assemblage of preliminary findings; all subsequent coding was done by (CHR) (26). The Consolidated Criteria for Reporting Qualitative Studies (COREQ) checklist was used to guide the reporting of qualitative data collection and analysis activities (27).
This work was developed as a non-research activity (i.e. without Institutional Review Board (IRB) approval under the authority of Veterans Health Administration (VHA) operations) and complies with the guidance about authorization of non-research manuscripts outlined in VHA Program Guide 1200.21: VHA Operations Activities That May Constitute Research (28). All authors attest that the activities that resulted in the production of this manuscript were conducted as part of the non-research activities conducted under the authority of the VHA National Center for Health Promotion and Disease Prevention.

Positionality

The authors have extensive experience applying the CFIR qualitatively across a range of studies. We are researchers embedded within and employed by the United States Veterans Health Administration (VHA), the largest integrated healthcare system in the US. VHA has over 1,000 medical centers, community-based outpatient clinics, and other entities, and serves 9.6 million enrolled US military Veterans. LJD was the lead developer of the CFIR; she has collaborated extensively with research teams across healthcare settings, including dozens of studies outside VHA. With nearly 20 years of experience in management consulting and other non-research settings, LJD brings a practical lens to implementation research. LJD and CHR helped lead development of the LEAP quality improvement learning program that engages frontline teams in hands-on execution of a Plan-Do-Study-Act cycle of change. The earliest forms of context assessment were used with LEAP teams. CHR was one of the first LEAP coaches, working closely with frontline teams. CHR also has 20 years of qualitative analysis experience and led data collection through semi-structured interviews as well as coding and analysis.

Results

Invitations to participate in an interview were sent via e-mail with up to 3 emails sent over the course of several weeks; 38 invitations were sent to individuals across 34 LEAP teams. A total of 27 interviews were completed (71% response rate). Two interviews included two interviewees – the team leader and one team member together – at the request of the team leader. The average length of the interviews was 47 minutes, ranging in length from 27 minutes to 63 minutes. An additional MS Word file contains the final version of our pragmatic context assessment tool based on input from participants [see Additional file 1]. We made iterative modifications to the tool as subsequent interviews were completed and content was synthesized. Thus, the assessment tool evolved as interviews progressed based on reactions of the first nine people interviewed. The remaining 18 people did not reveal any meaningful challenges in responding to the questions, indicating stability of the tool. The following sections highlight key themes that influenced changes made to the context assessment tool.

Specificity of the Change: Question Stem

The first task for participants was to describe the change or improvement being implemented. Initially, the guidance was, "Please enter your problem area (area for improvement). This should reflect whatever topic you and your team are currently considering. It does not have to be final (e.g., The majority of patients fail to show up for scheduled orientation)". However, participants found this guidance too broad and speculative, and they struggled to provide assessments. It was easier for participants when they anchored their responses to a specific, recent, or on-going improvement or implementation effort as they considered each construct. Participants observed that each construct could be a facilitator with one improvement effort and a barrier with another, affirming that context and knowing what the change is, matters. For example, communication may be a facilitator when the implementation involves people from the same service line but becomes a barrier when the change requires communication and cooperation across service lines. Attempting to rate CFIR constructs was much more difficult and far less useful than critically assessing the specific context of a specific planned or on-going implementation. For example, when asked about Relative Advantage, this dialogue ensued:

P: "...So, I don't know that I'm going to help you with my answer, but I'm kind of neutral on this because it's dependent on what that change is, implementing it versus an alternative. So, I'm kind of neutral on that question". (ID 74001)

Thus, we edited the "stem" to be more specific and concrete. The final guidance was developed as, "We've found that it's best to think concretely about a planned or on-going implementation (as opposed to the more general implementation environment). Include the specifics of the implementation/improvement project here." We allowed flexibility in interpretation of "changes" as "implementation" or "improvement" because both involve implementing a planned change.

Identifying Barriers versus Facilitators
For each construct, participants were asked whether they agreed or disagreed with each statement. Agreeing meant the construct was a facilitator and disagreeing meant that the construct was a barrier. Participants could also be "neutral." However, participants had difficulty indicating a level of agreement and instead wanted to answer with yes/no.

P: "Okay, let's start now. "People here regularly seek to understand the needs of patients and make changes to better meet the needs of patients," I will say, yes for the most part, yes". (ID 52801)

To address this, we added explanatory text for Agree (This means the item is a potential facilitator) and Disagree (This means the item is a potential barrier). This change helped participants answer more confidently and appropriately.

Assessing Impact on Implementation

After introducing explanations for assessing constructs as barrier versus facilitator (or neutral), participants were asked to assess the potential impact on implementation. Choices included, "Low Impact," "Moderate Impact," and "High Impact." Participants had difficulty applying the levels of impact (or influence) of the constructs and seemed more comfortable assessing the effect (or consequence).

I: And then what is the likely impact of this factor of space on implementing your 12-week program?

P: So, when you say moderate impact, is that, are you saying it's like a negative impact or a positive impact?

I: Well so this is a good question, what one of those comes to mind first when you read the options there?

P: So, I usually think of low impact meaning it has like minimal effect versus high impact having high or positive effect. So, when you say sufficient space to accommodate the change, yeah, I would kind of rate it as moderate impact. (ID 32401)

To address this challenge, we simplified responses to include "Weak/no effect" and "Strong effect" options only.

CFIR Construct Assessments

Six of the ten CFIR constructs included in Version 2.0 of the tool remained unchanged through the Think Aloud process (Patient Needs & Resources, Networks & Communications, Compatibility, Goals & Feedback, and Reflecting & Evaluating). The remaining four CFIR constructs all changed from future focus (e.g., “we will have...”) to immediate focus (e.g., “we have...”). Additional changes are described in detail below.

Relative Advantage and Tension for Change

Participants found reference to "key people" in the "Relative Advantage" and "Tension for Change" constructs overly vague.

I: ..."Key people will see the advantage of implementing the change versus an alternative."

P: Okay and key people, is that kind of a loose definition?

I: I'd like you to define key people for me.

P: So, I think the key people, I mean I kind of think first and foremost the key people would be the participants [...] The other key people may be our own team and referring providers [...] (ID 32401)

We revised this to refer instead to "people here", allowing more room for respondents to tailor the definition of those relevant to assessing relative advantage and appeared to resolve the difficulties in subsequent interviews.
Leadership Engagement

We started with a single question about “Leadership Engagement” that asked about “leaders here”, but participants found it difficult to assess this construct without first parsing out the levels and types of leaders they work with who may or may not have been involved in the improvement and determining what they knew about their degree of engagement.

P: “Leaders I work with most closely are committed, involved, and accountable for the planned improvement, okay so by leaders, people that I report to are leaders? Like up the chain? Like my Service Chief? Chief of other services? I guess the term leaders is kind of open there. So, I would say, it's hard to say, as a whole, all leaders. I mean of course the people that I work, you know the leaders that I work with, I feel they are committed, and they are held accountable for the work that they do”. (ID 30801)

Based on this feedback, we divided CFIR’s “Leadership Engagement” construct to ask about two levels of leaders: 1) leaders I work with most closely; and 2) higher level leaders, allowing respondents to assess their effect on implementation more appropriately.

Available Resources

V1 of the assessment included a single question about overall “Available Resources”. However, based on LEAP coach experiences interacting with LEAP teams and their feedback prior to our Think Aloud process, we separated a single item into three separate items in V2 of the assessment. Think Aloud respondents had no difficulty responding to the items related to time and space. For “other needed resources,” respondents revealed a range of “other resources” that might be needed like incentives for program participants and having a discretionary budget. The only change from V1 was changing the future focused language as described above.

Other Suggested Improvements

After assessing each construct in the tool, participants were asked if any potential barriers or facilitators to implementation were missing. One participant suggested adding consideration of sustainment instead of just focusing on short-term change:

P: “...I don't know if it would go in this tool, but I guess like sustainability where it's easy to make a change for this X amount of time, but then to continue the change when you're not gathering data, I don't know, I guess I'm kind of thinking about sustainability of the change. I guess this could also go under policy, like if there's not a policy on it, then you're not going to be held to keep doing it, but I guess I don't really necessarily think the policy question quite came to that...” (ID 85001)

Another participant suggested adding open-text space so respondents can explain and justify their responses and reflect on variation or disagreement among respondents.

P: “...Do you remember earlier I said sometimes you feel like you're boxed in with questions? [I: Yes] I feel like I'm almost boxed in. Like there would be, on some of these questions I would have more to say, and I don't have the ability to say it anywhere, so it's kind of like, I don't know, if I were doing this questionnaire with a group of folks, I would get the information, to some extent it would be helpful, but I wouldn't have answers to all my questions. Does that make sense?” (ID 74001)

This respondent also wondered about people not agreeing or having the same perspective:

P: “...if a situation is intolerable, what do people see as intolerable? If they agree that it's important, you know the facilitator has a strong effect, well okay, so now what? You know? Because what I interpret as intolerable may not be somebody else's they may not mean what I'm thinking, ...so I need more details”. (ID 74001)

Discussion

Our think aloud approach engaged frontline clinicians in the process of developing a practical context assessment tool with the goal of cultivating plain language by which to assess theoretical constructs included in the CFIR, one of the most widely used context assessment frameworks (29). Within healthcare, it is natural that frontline providers and staff play significant roles in implementing and delivering evidence-based innovations within clinical settings. In deference to their expertise and knowledge (30) of their own context of care, practical tools are needed to help guide assessments of those contexts that can be easily used by implementers, providers, and staff, as well as researchers who elicit responses from individuals on the frontline. Such assessments are important
because local context plays a key role in manifesting forces that heavily influence implementation success or failure (31). Context assessments are rarely done by practitioners within their own setting (32). One reason for this is that measurement instruments often require expertise and are burdensome to apply (18,33).

We are labeling this tool the Practical Context Assessment Tool (pCAT). This pCAT is brief, comprised of 14 questions assessing ten of CFIR’s thirty-nine constructs, which range across four of the five framework domains: Innovation Characteristics, Outer Setting, Inner Setting, and Process. The ten constructs in the pCAT are among those most frequently reported in other reviews of barriers and facilitators using the CFIR such as Leadership Engagement, Patient Needs and Resources, and Available Resources (2,34). Additionally, the pCAT includes constructs important to assessing barriers related to transforming culture based on Lean quality improvement principles such as Goals and Feedback (i.e., alignment with objectives), Reflecting and Evaluating (e.g., using data to track outcomes), and Networks and Communications (e.g., open lines of dialogue) (35).

Stanick et al, recognizing the need for pragmatic instruments that can be used by practitioners, developed objective criteria to by which to assess pragmatism of a measurement instrument (18). They propose using a six-point scale (-1 to +4) is to rate each of five criteria as shown in Table 2. The pCAT scores 3 or 4 on all items, indicating its pragmatism.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptability Category</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>4 - Excellent: The measure is free and in the public domain</td>
</tr>
<tr>
<td>Easy Category</td>
<td></td>
</tr>
<tr>
<td>Uses Accessible Language</td>
<td>3 - Good: The readability of the measure is between an 8th and 12th grade level</td>
</tr>
<tr>
<td>Assessor Burden (Training)</td>
<td>4 - Excellent: The measure requires no training and/or has free automated administration</td>
</tr>
<tr>
<td>Assessor Burden (Interpretation)</td>
<td>3 - Good: The measure includes a range of scores with value labels and cut-off scores, but scoring requires manual calculation and/or additional inspection of response patterns or subscales, and no instructions for handling missing data are provided</td>
</tr>
<tr>
<td>Length</td>
<td>3 - Good: The measure has greater than 10 items but fewer than 50</td>
</tr>
</tbody>
</table>

a. These items only include PAPERS items related to objective characteristics of measurement instruments. The PAPERS instrument includes additional items based on user ratings (e.g., usefulness) that are not included here.

The pCAT was designed to be focused and brief for ease of use by frontline providers and staff and, as such, is relatively short in length. The pCAT is freely available to the public online (36). The pCAT has a Flesch-Kincaid grade level of 10.3 when the opening paragraph is included. If just the table of constructs is assessed, the grade level is 8.9. It requires no specialized training to administer and can be completed electronically or on paper. The tool includes a range of scores with value labels, however no final overall score is provided and there are no specific instructions for handling missing data.

It is important to create pragmatic tools that are rooted in a robust framework comprised of constructs shown to influence implementation success (12,18). However, can such tools be useful to both frontline users and researchers? The more concrete an assessment is for frontline users, the less generalizable it may be for researchers. The more generalizable the assessment to meet research needs, the more abstract it may be for frontline users. With this work, we’re hopeful we’ve found middle ground that will be valuable for both communities.
A limitation of the pCAT, is that we do not clearly state what respondents are to do with the information that comes from use of the tool. Within the LEAP program (23), coaches work with teams and highlight the value of identifying barriers and facilitators when implementing improvements or changes, so that barriers can be avoided or minimized, and facilitators can be leveraged for success. One next step users can take, draws on the work of Waltz et al, who elicited recommended strategies from implementation researchers and practitioners that would best address each CFIR construct when they manifest as a barrier (1). Table 3 lists implementation strategies with the highest rate of endorsement for each of the pCAT’s ten constructs. The shaded cells indicate “Tier 1” strategies with the strongest endorsement by self-described implementation experts; the unshaded cells with checkmarks indicate “Tier 2” strategies that had at least 20% of implementation experts endorsing that strategy to address the respective barrier. Many of the strategies were endorsed for more than one potential barrier. For example, barriers related to Networks & Communications and Available Resources might be addressed by a strategy to “Capture and share local knowledge.”

Table 3: List of Implementation Strategies Recommended to Address pCAT Constructs

<table>
<thead>
<tr>
<th>ERIC Implementation Strategy</th>
<th>Patient Needs &amp; Resources</th>
<th>Networks &amp; Communications</th>
<th>Goals &amp; Feedback</th>
<th>Relative Priority</th>
<th>Compatibility</th>
<th>Available Resources</th>
<th>Tension for Change</th>
<th>Leadership Engagement</th>
<th>#Constructs Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct local consensus discussions</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Conduct local needs assessment</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Assess for readiness and identify barriers</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Identify and prepare champions</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3</td>
</tr>
<tr>
<td>Alter incentive/allowance structures</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3</td>
</tr>
<tr>
<td>Build a coalition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Capture and share local knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Develop a formal implementation blueprint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Facilitate relay of clinical data to providers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Facilitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Increase demand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Inform local opinion leaders</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Involve patients/consumers and family members</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Organize clinician implementation team meetings</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Audit and Provide Feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Obtain and use patients/consumers and family feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Promote Network Weaving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Access new funding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>1</td>
</tr>
<tr>
<td>Prepare patients/consumers to be active</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Promote Adaptability</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Change Physical Structures</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Involve executive boards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

a. ERIC Implementation Strategy names are from Powell et al. 2015 (37)

[Table 3 should be inserted here]

Another limitation of the pCAT, is that it includes only ten of CFIR’s thirty-nine constructs and has not been psychometrically evaluated. However, content of the tool is based on experiences of 27 respondents who expressed their considerations as they responded to questions. This provides nascent indications of face validity for the pCAT, especially given the last 18 respondents who expressed considerations and gave responses that were aligned with the intent of each question. All respondents were frontline clinicians, but we acknowledge the limitation related to them all either leading or participating in teams within VHA’s medical center-based weight management program. Next steps include establishing validity through psychometric analyses and expanding use into other settings and professions.

Conclusion
The Practical Context Assessment Tool is designed to address a gap in pragmatic approaches to efficiently assess context for both researchers and for frontline quality improvement or implementation efforts. It is short (14 items), free, uses accessible language, requires little proficiency or experience in assessment, and is designed to draw on the expertise and knowledge of individuals most familiar with their own clinical context.

Abbreviations

Consolidated Criteria for Reporting Qualitative Studies (COREQ)
Consolidated Framework for Implementation Research (CFIR)
Evidence-Based Innovations (EBIs)
Institutional Review Board (IRB)
Practical Context Assessment Tool (pCAT)
Think Aloud (TA)
Veterans Health Administration (VHA)

Declarations

All manuscripts must contain the following sections under the heading 'Declarations':

Ethics approval and consent to participate

This work was developed as a non-research activity (i.e. without IRB approval under the authority of VHA operations) and complies with the guidance about authorization of non-research manuscripts outlined in VHA Program Guide 1200.21: VHA Operations Activities That May Constitute Research (27). All authors attest that the activities that resulted in the production of this manuscript were conducted as part of the non-research activities conducted under the authority of the VHA National Center for Health Promotion and Disease Prevention.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available because qualitative and quantitative data are highly processed to support this study and to protect the identity of the individuals and locations who participated in the study. These data are, however, available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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**Authors’ contributions**

CHR collected the data. CHR and LJD wrote the first draft. CHR and LJD reviewed and commented on subsequent drafts of the manuscript.

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**Authors’ information (optional)**

See positionality statement in the Methods section.

**References**


25. NVivo qualitative data analysis software. QSR International Pty Ltd.; 2018.


**Supplementary Files**

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- AdditionalFilepCATFinalVersion.docx