

## Additional File 7: Recommendations for Reporting Group Model Building Projects and Core Components

Construct (1)	Sub-Construct (1)	Characteristics to be reported (1)	Exemplar constructs to add, proposed adaptations to Rouwette et al. (2002) based on implementation science frameworks, literature
<b>Context</b>			
Geography		<ul style="list-style-type: none"> <li>- Continent</li> <li>- Country</li> <li>- State</li> <li>- City</li> </ul>	<ul style="list-style-type: none"> <li>- Rurality</li> <li>- Physical environment/landscape/resources (2)</li> <li>- Transportation infrastructure (2,3)</li> <li>- Environmental pollution</li> <li>- Community</li> </ul>
Organization Characteristics			<p><i>Note:</i> When multiple organizations involved, as is common in implementation efforts, reporting should include each organization involved. Depending on the implementation effort, reporting at the level of the community or service system (e.g., child welfare, hospital) may also be appropriate, in addition to organizations or instead of the organizational unit. When reporting on community or service system characteristics, organization characteristics may not be appropriately aligned and may require tailoring (e.g., staffing processes may be tailored to “community partner recruitment process”). Other constructs, such as culture, may still apply.</p>
Organization Characteristics (continued)	Structure	<ul style="list-style-type: none"> <li>- Functional</li> <li>- Team-based</li> <li>- Network</li> </ul>	<ul style="list-style-type: none"> <li>- Personnel hierarchy (e.g., leadership, middle management, team leaders, service providers) (4,5)</li> <li>- Inter-organizational networks (4,5)</li> <li>- Intra-organizational networks (relational connections) (5,6)</li> <li>- Physical Infrastructure (6)</li> <li>- Information technology infrastructure (6)</li> <li>- Work infrastructure (6)</li> </ul>
	Type	<ul style="list-style-type: none"> <li>- Profit (production, services, distribution)</li> <li>- Non-profit (e.g., teaching)</li> <li>- Governmental level (national, state, county, city)</li> <li>- Governmental type (defense, finance, economic affairs)</li> </ul>	<ul style="list-style-type: none"> <li>- Non-profit (e.g., advocacy)</li> </ul>
	Size	<ul style="list-style-type: none"> <li>- Number of people employed</li> <li>- Estimated (financial) returns</li> </ul>	
	<i>Processes</i>		<ul style="list-style-type: none"> <li>- Staffing processes (5)</li> <li>- Policies and procedures (4,5)</li> <li>- Funding/Contracting (4,5)</li> <li>- Fidelity monitoring (4,5)</li> <li>- Communications (6)</li> </ul>

<i>Culture<sup>+</sup></i>			<ul style="list-style-type: none"> <li>- Attitudes towards evidence-based practices (7,8)</li> <li>- Tension for change (6)</li> <li>- Leadership (5,8,9)</li> <li>- Climate (7,8)</li> <li>- Local attitudes, sociocultural values, beliefs (2,4,6)</li> <li>- Human Equality-Centeredness (6)</li> <li>- Recipient-Centeredness (6)</li> <li>- Deliverer-Centeredness (6)</li> <li>- Learning- Centeredness (6)</li> </ul>
<i>Outer Context</i>			
			<ul style="list-style-type: none"> <li>- Critical Incidents (3,6)</li> <li>- Partnerships and Connections (including community members, other organizations, knowledge brokers) (6,10–12)</li> <li>- Policies and laws (2,3,13,14)</li> <li>- Financing (6,15)</li> <li>- External Pressure (3,6)</li> <li>- Ethical (2)</li> <li>- Legal (2)</li> <li>- Socio-economic (2)</li> <li>- Epidemiological (2)</li> </ul>
<i>Inner Context relative to implementation and/or delivery of an innovation (6)</i>			<ul style="list-style-type: none"> <li>- Compatibility</li> <li>- Relative Priority</li> <li>- Incentive Systems</li> <li>- Available Resources</li> </ul>
<i>Problem</i>			
	Analytical	<ul style="list-style-type: none"> <li>- Situation uniqueness</li> <li>- Consequentiality (severity, duration of problem impacts)</li> <li>- Precursiveness (impact on subsequent decisions)</li> <li>- Number and diversity of interests involved</li> <li>- Openness to alternatives (whether decisions already made and finalized)</li> </ul>	<ul style="list-style-type: none"> <li>- Openness to alternatives: Opportunities for first-time or revisited decisions (16–18)</li> </ul>
	Social	<ul style="list-style-type: none"> <li>- Degree/Pressure of influence</li> <li>- External Pressure</li> <li>- Imbalance of pressure between different sources</li> </ul>	<ul style="list-style-type: none"> <li>- Inter-organizational networks (4,5)</li> <li>- External Pressure: <ul style="list-style-type: none"> <li>- Influence of other implementing sites (6)</li> <li>- Market (6)</li> <li>- Performance (3,6)</li> </ul> </li> <li>- Political (2,3)</li> </ul>

		- Contention of objectives (whether sources of influence attempting to influence in opposite directions)	
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<b>Mechanisms</b>			
<b>“process of the intervention itself” (1)</b>			
<b>“process or event through which an implementation strategy operates to affect desired implementation outcomes” (19)</b>			
<b>Activities that “must be tracked to link the elements and processes to outcomes”</b>			
<b>Pre-Project (<i>Preparation</i>)</b>			
	Initiation of Contact	- Modeling team or client organization	- Researchers, community members, or funders
	Expectations and goals of project	- Client’s initial expectations - Project goals (more insight, make decision, implement results, testing proposed strategies/policies) - Top management support level	- Project or policy vision (14,20) - Leadership buy-in (9,21) - Resource allocation (6,22) - Hybrid (23)
	Research/Modeling question type	- Exploratory - Explanatory - Descriptive - Prescriptive	- Effectiveness (24) - Implementation (25) - Implementation Process (e.g., planning, tailoring strategies, adapting) (6,18,26) - Hybrid 10/29/24 7:21:00 AM - Innovation- specific: (6) - Evidence base - Relative advantage - Adaptability - Complexity - Cost (6,28)
	Participating Management Team Composition	- Who/how team composition selected (client, consultant, both) - Size - Composition and heterogeneity of team (characteristics, roles) - Official gatekeeper	- Community/organization-academic partnerships (4,5) - Diversity with respect to demographics (e.g., race, ethnicity, age, experience), social and/or organizational/system power, professional or community-based roles (6,29,30) - Innovation adopter (e.g., clinicians, practitioners) characteristics (4,5) - Implementation champions (31,32)
	Modeling team	- Size - Roles (facilitator, recorder, content coach, process coach)	- Training - Role in community-academic partnership - Experience
<b>Model-building meetings (Sessions)</b>			
	Meetings and time investment	- Number of meetings and average duration - Total time invested by participants	- Time invested by modeling and facilitation team for preparation - Time elapsed between modeling sessions - Participant attrition

<i>Meetings and time investment (continued)</i>	<ul style="list-style-type: none"> <li>- Total time invested by modelers</li> <li>- Total time span of modeling project (initial contact to project close)</li> <li>- Stages of model building that involved participants; extent of participation (marginal → fully)</li> <li>- Extent and type of modeling work done with and without participants</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation phase(s) during which modeling conducted</li> <li>- Implementation phase(s) for which modeling intended to support/target</li> </ul>
<b>Model and modeling procedure</b>		
Introduction to system dynamics:	<ul style="list-style-type: none"> <li>- Type of introduction to system dynamics given</li> <li>- Whether “management flight simulators” used to introduce system dynamics thinking</li> </ul>	<ul style="list-style-type: none"> <li>- Whether health-related or non-health related simulations used to introduce system dynamics thinking</li> <li>- When in project introduction given</li> <li>- System dynamics concepts reviewed</li> <li>- References shared</li> <li>- Modality of introduction (e.g., didactic, lecture)</li> </ul>
Modeling Process:	<ul style="list-style-type: none"> <li>- Type and process of modeling (flow diagrams, causal loop diagrams, quantitative modeling, simulation)</li> <li>- How policies (e.g., potential real-world interventions) assessed</li> <li>- Modeling software used</li> </ul>	<ul style="list-style-type: none"> <li>- Scripts or other research activities conducted with participants to check structural and face validity (1,33,34)</li> </ul>
Model:	<ul style="list-style-type: none"> <li>- Size</li> <li>- Dynamic complexity (number of feedback loops)</li> </ul>	<ul style="list-style-type: none"> <li>- Size (35): <ul style="list-style-type: none"> <li>- Computer file size</li> <li>- Number of stocks, flows</li> <li>- Key feedback loop(s): variables, stories</li> <li>- Model boundary</li> <li>- Number of variables</li> </ul> </li> <li>- Implementation: <ul style="list-style-type: none"> <li>- Actors (25,36)</li> <li>- Actions/ interventions/strategies (36,37)</li> <li>- Targets (19,25,36)</li> <li>- Context (36,38,39)</li> <li>- Time (35,36)</li> </ul> </li> <li>- Innovation(s) modeled</li> <li>- Assumptions (35)</li> <li>- Implementation theory, model, or framework (25,40,41)</li> </ul>
<b>Elicitation of Mental Models</b>		
Sources of information	<ul style="list-style-type: none"> <li>- Sources besides participants’ mental models</li> </ul>	<ul style="list-style-type: none"> <li>- Secondary documents (e.g., contracts, bills, laws, meeting minutes, reports)</li> </ul>
Process of eliciting	<ul style="list-style-type: none"> <li>- Pre-meeting interviews</li> </ul>	<ul style="list-style-type: none"> <li>- Whether scripts tailored, adapted, or new</li> </ul>

	knowledge from participants	<ul style="list-style-type: none"> <li>- Preliminary model or model built from scratch</li> <li>- Specific group processes used? (e.g., nominal group technique, Delphi)</li> <li>- Specific scripts (e.g., feedback elicitation)</li> <li>- Questionnaires or workbooks used</li> </ul>	
	Facilitation	<ul style="list-style-type: none"> <li>- Degree of facilitators' neutrality (e.g., positionality)</li> <li>- Degree to which participants perceived facilitator as skilled</li> </ul>	<ul style="list-style-type: none"> <li>- Satisfaction with facilitators</li> <li>- Effectiveness of facilitators (42)</li> </ul>
<b>Practical processes</b>			
	Logistics	<ul style="list-style-type: none"> <li>- Where meetings held (in or away from organization)</li> <li>- Room design, layout</li> <li>- Materials (whiteboard, computer)</li> </ul>	<ul style="list-style-type: none"> <li>- Where meetings held: <ul style="list-style-type: none"> <li>- Physical location</li> <li>- Virtual, in-person</li> </ul> </li> <li>- Materials: paper, sticky notes, software (e.g., modeling)</li> </ul>
<b>Follow-up</b>			
	Official Report	<ul style="list-style-type: none"> <li>- Whether given</li> </ul>	<ul style="list-style-type: none"> <li>- Report characteristics (43): <ul style="list-style-type: none"> <li>- Information within</li> <li>- Dissemination method(s) and format (e.g., presentation, PDF)</li> <li>- Who has access</li> </ul> </li> </ul>
	Other		
	<i>Dissemination efforts</i>		<ul style="list-style-type: none"> <li>- Focal audience(s) (43,44)</li> <li>- Format/Product (e.g., social media post, website)</li> <li>- Modality (e.g., virtual, in-person, web-based)</li> <li>- Frequency of release (e.g., one-time, quarterly)</li> <li>- Benefits reported (clinical, community, economic, policy) (43)</li> <li>- Purpose (e.g., educate, shape policy design or implementation, persuade) (43,45)</li> </ul>
<b>Outcomes</b>			
	Sample (data source)	<ul style="list-style-type: none"> <li>- Modeling team</li> <li>- participants</li> </ul>	<ul style="list-style-type: none"> <li>- Innovation recipients</li> <li>- Implementers</li> <li>- Leadership/Middle managers</li> </ul>
	Data Collection Methods	<ul style="list-style-type: none"> <li>- Interviews</li> <li>- questionnaires</li> <li>- (in)formal observations</li> </ul>	<ul style="list-style-type: none"> <li>- Questionnaires: <ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Quantitative</li> <li>- Mixed-methods</li> </ul> </li> <li>- Secondary data (e.g., administrative)</li> <li>- Mobile (or other technology-based) (46)</li> <li>- Focus groups</li> </ul>

Assessment Timing	<i>e.g.</i> , Pre, Post, during	During: <ul style="list-style-type: none"> <li>- Modeling sessions</li> <li>- Course of modeling project</li> </ul>
Variables collected	<ul style="list-style-type: none"> <li>- Distal outcomes (shifts in participants' perceptions of problem, system changes)</li> <li>- Process variables (participant satisfaction)</li> </ul>	<ul style="list-style-type: none"> <li>- Anticipated Implementation (6)</li> <li>- Actual Implementation (25,47)</li> <li>- Process variables: <ul style="list-style-type: none"> <li>- Acceptability of modeling project elements (e.g., scripts)</li> <li>- Decision quality</li> <li>- Decision experience quality</li> </ul> </li> </ul>
Variable Types	<ul style="list-style-type: none"> <li>- Individual</li> <li>- Group</li> <li>- Organization</li> <li>- Method</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation (25,47)</li> <li>- Innovations adopted and considered (25,47)</li> <li>- Service (25)</li> <li>- Client Outcomes (25)</li> <li>- Policy (13,14)</li> </ul>

+ recommended but not required as part of Rouwette et al (2002) basic reporting guidelines due to measurement burden on modeling team and participants

Note: Information in the first three columns was taken verbatim from Rouwette et al. (2002) or slightly altered for brevity or consistency; Italicized text and column four (furthest right) were added by current authors.

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