

# Scriptapedia: A Handbook of Scripts for Developing Structured Group Model Building Sessions<sup>1</sup>

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## Abstract

*This paper describes a handbook of scripts—Scriptapedia—for developing structured group model building sessions. Andersen and Richardson (1997) have identified the importance of standardized protocols or “scripts” in group model building (GMB). GMB scripts have historically existed as undocumented structured small group exercises. Scriptapedia represents an effort to improve the practice of GMB as well the research into GMB effectiveness. We describe elements of scripts, case applications of Scriptapedia, and discuss uses, misuses, and misunderstandings of scripts. The handbook is included as an appendix to the paper.*

Keywords: group model building, scripts

## 1. Introduction

Over the past fifteen years, since the development of icon-oriented software such as *i-Think*, *Vensim*, and *Powersim*, Group Model Building (GMB) has emerged as one of several ways to construct policy-oriented system dynamics models working directly with client groups. We think of group model building as a form of group decision support that involves a group of

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<sup>1</sup> This work was partially supported by the Centers for Disease Control and Prevention through the Brown School Violence and Injury Prevention Center (1R49CE001510). Projects using *Scriptapedia* were supported by National Institutes of Health, Office of Behavioral and Social Science Research (HHSN 276200900017C) as part of the Comparative Modeling (CompMod) Network for childhood obesity; Foundation for Ecological Security (FES) in India; St. Louis Federal Reserve Bank, and the Social System Design Lab at the Brown School of Social Work, Washington University in St. Louis.

stakeholders working with a modeling team to solve a focused problem within a complex system. The classic components of group model building include key aspects of the model-building and refinement process in public view of the client group, developing and testing scenarios and strategic options with the client group, and facilitated discussion and analysis of results emanating from the system dynamics model. These group processes make extensive use of facilitation discussions and analysis with a diversified team of group facilitators and modelers typically present in the room.

Attempts to carefully define how to work with groups as part of the model building process have been a key component of the overall GMB effort for a long time. Stenberg (1980) described approaches for working with policy reference groups before GMB came to be defined as a formal activity and Roberts (1977) stressed the importance of interactions with client teams as a means to achieving effective implementation of model results. Richmond (1997) has described a Strategic Forum as a kind of small group whose purpose is to define and analyze a dynamic and complex problem around a formal system dynamics modeling effort. Vennix (1996) presented a classic statement of the Group Model Building method for system dynamics models. Soon thereafter a special issue of the *System Dynamics Review* edited by Vennix et al. (1997) gave an overview of the then state-of-the art of GMB. Eden and Ackermann (1998) have described formal procedures for using software tools such as Decision Explorer and Group Explorer to structure group processes around formal model-building activities and Howick et al. (2006) have documented procedures and scripts for formally integrating strategic scenarios into system dynamics models while working in formal GMB sessions with client groups. More recently, Andersen et al. (2007) presented a more comprehensive review of current research in GMB using system dynamics.

### 1.1. Themes in GMB

A number of consistent themes have characterized recent work on GMB. Several of these themes are described in more detail below:

**Teamwork in GMB.** Richardson and Andersen (1995) first defined their approach to using teams to support GMB. That early work concentrated on more clearly defining the various roles that must interact to create a smoothly functioning group modeling team. Five distinct roles (not necessarily connected to five distinct persons in the room) include (1) the facilitator/ elicitor who leads the group discussion and keeps a constant eye on the group process in the room, (2) the modeler/ reflector, the person or team in the room constantly paying attention to how the formal simulation model is emerging from the group discussion, often providing critical model-based comments and insights to the client group, (3) a process coach who is responsible for the creation of the overall script for the day and for designing changes to this script “on the fly” (often the role of the process coach is mostly performed before the GMB session begins and then handled by a person in one of the other roles during the meeting), (4) the recorder who makes a real time record of all the discussions and decisions being made by the group, and (5) the gatekeeper, a member of the client team who serves as a bridge between the modeling team and the client team, often serving as a voice and support for the meeting owner, the primary sponsor of the overall activity within the client group.

**Scripts as a Basic Unit of Behavior for Designing GMB interventions.** A second theme, basing GMB practice on pre-defined sets of scripted behavior, was first described by Andersen and Richardson (1997). The basic idea motivating scripts as an organizing framework for GMB activities was a need to be organized about interactions with a client team to make best use of group time and to assure that the overall process moved forward in an organized fashion, ultimately culminating in useful products and insights for the client team. The group agenda for the full duration of the planned meetings was to be divided into small segments of ten or fifteen minutes each with detailed plans for what the group would be doing within each such scripted time block. Typically the meeting would start with open-ended, problem-finding activities such as stakeholder mapping or group articulation of their “hopes and fears” for the overall project, or the formal introduction of simulation tools via the use of small “concept models” (Ghaffarzadegan, Lyneis, and Richardson 2011; Richardson 2006).

Subsequent scripted activities included exercises designed to draw out reference modes by drawing graphs of variables over time or various approaches to eliciting system structure from the client group. Scripts for a second or third meeting of the group would include ways to review progress made at previous meetings as well as scripts designed to facilitate the client group’s experimentation with a formal simulation model to discover policy conclusions constrained within the model’s structure. Zagonel (Zagonel and Rohrbaugh 2008; Zagonel et al. 2004) provided a detailed analysis of the genesis and practice of GMB activities within this school of work and Luna-Reyes et al. (2006) published a soup-to nuts description of how teamwork and scripted facilitation actually played out in a specific intervention focused on providing homeless shelters in New York State.

While the idea of using a script as a basic behavioral unit constituting GMB interventions had strong intuitive appeal, this same idea left open a number of conceptual and practical issues (that this current work on the Scriptapedia is designed to help remedy). Similar efforts, such as the work by Vreede, Briggs, and Kolfshoten (2006) to define “thinklets” as a basic unit of behavior of facilitated group meetings, defined a different boundary for the basic unit, for example paying more detailed attention to specific and contingent behaviors by the facilitator under different kinds of group response. Should scripts include only behaviors in public view of the group or should they also include activities undertaken by the modeling team more in private? Should scripts be thought of as best practices with prescriptive power or more as descriptions of behavior waiting to be improved upon by subsequent practice? These and other questions are gaining greater precision in this project aimed at defining an online catalogue of scripts.

**“ScriptsMap” as a Tool for Sequencing Individual Scripts into a GMB Plan.** Another question left open by defining scripts as a basic unit of analysis is the many relationships between a single script and a whole intervention. Should some scripts be done first, while others wait until later? Are some scripts properly seen as prerequisites for others? In general, what guidance, if any, exists for practitioners who wish to assemble a series of scripts into a whole intervention plan that makes sense. Ackermann et al. (2010) proposed a “Scripts Map” as a tool for addressing just these questions. As a basic definition they proposed that “the ScriptsMap itself is a framework for effectively combining particular sequences of scripted activities, products, and deliverables into a formal network to enable facilitators to construct appropriate combinations for workshops.” Their initial work laid out a map that combines scripts from traditional GMB practice with Eden and Ackermann’s (1998) approach to strategy development

working directly with client groups. Eden et al. (2009) further elaborated on a number of practical and more theoretical dilemmas associated with attempts to integrate group modeling projects using diverse analytic methods while Andersen et al. (2006) proposed pedagogical approaches to teaching such a blended approach to group-oriented problem solving.

**Evaluation of GMB.** In the last decade, evaluation of group model building has progressed beyond the systematic review of case studies described by Rouwette, Vennix and Van Mullekom (2002) in several ways. Rouwette et al. used the separation of context, mechanism and outcome elements common to evaluation research for describing differences between case studies. The first development in the last decade has been to group cases according to different contexts: public policy (Cockerill et al. 2009), Enterprise Resource Planning implementation (Rouwette and Vennix 2009), criminal justice (Rouwette 2011), environmental modeling (Beall and Ford 2010). The second development has been to use controlled settings to assess the impact of the modeling process (Dwyer and Stave 2008; McCardle-Keurentjes et al. 2009; McCardle-Keurentjes, Rouwette, and Vennix 2008; Hoppenbrouwers, Weigand, and Rouwette 2011).

**Process Diagrams.** An emerging theme is an attempt to visually represent the temporal sequence of group model building sessions. For example, Zock (2004) uses Luhmann's systemic theory of social systems to develop a standard intervention architecture for system dynamics based interventions. And, Straus (2002) uses process maps to design effective collaborations involving multiple stakeholder groups that has been used in the design of GMB sessions.

## 1.2. Using Scripts to Improve Practice

Modeling sessions are shaped by the interaction between a group of participants and a facilitation team. The facilitator has a crucial role in the interaction process, as he or she introduces key steps in the process to participants, provides guidance with regard to methods and techniques, summarizes intermediate results and proposes when to move on to another activity. This dependence on the facilitator is recognized in group model building as well as other forms of facilitated modeling (Franco and Montibeller 2010). A fundamental reason for introducing scripts is the fact that much of facilitation remains an art rather than a science (Andersen, Richardson, and Vennix 1997). Some practitioners go so far as to suggest that increased transparency is one of the key challenges for the field of facilitated modeling (Eden and Ackermann 2006; Westcombe, Franco, and Shaw 2006; Checkland 2006). Scripts are one approach to elicit facilitator expertise and organize it into explicit and manageable chunks. These explicit descriptions can then be communicated, discussed and reused. This allows us to document and archive methods and techniques used by different facilitators and across different modeling disciplines. We feel scripts have an advantage over existing modeling guidelines in handbooks, which rarely discuss the practical choices a facilitator faces over the course of an intervention and in a particular session. This is problematic as the 'method in use' can be very different from the 'espoused method' which is featured in textbooks (Eden and Radford 1990).

Dependence on the facilitator combined with a lack of concrete guidelines for facilitation, make life especially hard on novices that are trying to learn how to use group model building or other facilitated modeling approaches. Documenting scripts may increase the spread of group model building practice and its applicability for audiences that cannot enter into an apprenticeship with an experience modeler. Keys (2006) looks into differences between novice and expert users of

facilitated modeling and the support needed to move from one stage to the other. A central element of such support is identifying the core tasks that experts carry out in a problem structuring exercise and codifying these in some way. Codifying experiences in the form of scripts allows a greater spread of modeling practice and encourages its use in large impact problems.

Finally, because scripts offer a standard approach to codifying experience, they allow us to compare facilitator approaches and increase our knowledge on what works best in particular circumstances. Scripts may be adapted to fit local circumstances and community contexts. As scripts explicitly include inputs and outputs, they make it easier to identify how to move from one phase in the session to the next. It becomes possible to design a session on the basis of a string of scripts. An added advantage of the standard terminology in which scripts are captured, is that non-experts such as the gatekeeper and other clients are in a better position to understand what a session will look and feel like. This allows the facilitator to draw on the client's expertise in designing a session.

### 1.3. Learning and Reflection: Research into Modeling Effectiveness

In addition to practical advantages, explicitly capturing the modeling process in the form of scripts also offers advantages to research as well. Franco and Rouwette (2011) note that although the modeling session is central to facilitated modeling practice, as this is where the model is constructed and the benefits of directly involving participants are most evident, there is surprisingly little research on what actually happens in modeling sessions. Most research on modeling effectiveness takes the form of single cases studies, but these typically do not penetrate to the level of separate sessions. This is regrettable as small differences in the intervention process may lead to large differences in outcomes (Jarboe 1996). Scripts offer a way to open up the "black box" of modeling interventions, as they provide facilitators with a shared language to describe the intervention process which is detailed enough to capture essentials. Before we can explain differences in modeling effectiveness between cases we need to be able to adequately describe the context and process of our real-world applications (Rouwette, Vennix, and Van Mullekom 2002). In some cases a seemingly identical modeling process leads to different outcomes. Only by describing the process in adequate detail can we rule out that a subtle variation in the intervention caused the difference in outcomes. In doing so we increase our knowledge on the fidelity and robustness of modeling methods and techniques: the degree to which their effect is independent from contextual differences. A central tenet of science is the ability to replicate results. In the case of a complicated intervention such as group model building, any increase in insight as to which elements of the process are more and less important for creating results, is welcome.

## 2. Scriptapedia

*Scriptapedia* originated as idea for documenting and sharing GMB scripts based on Andersen and Richardson (1997). The original concept was for an online tool similar to Wikipedia and other forms of digital commons with the functionality to develop and share GMB scripts in a collaborative environment. After evaluating different approaches, an initial prototype for *Scriptapedia* was developed based on Joomla, an open source content management system. While the initial results were found to be promising, technical limitations in Joomla led us to

explore other platforms for *Scriptapedia* including Plone and Drupal. Again, each showed promise in some areas, but required a more significant and sustained design and development effort.

Meanwhile, the need to have a centralized collection of scripts led us to create a handbook that would be maintained and published online. This approach offered a number of advantages in the short to medium-term. First, the team felt that having *Scriptapedia* available as an online resource as soon as possible was important to stimulate the distribution, sharing, and creation of scripts. Second, it was already becoming evident from several projects that individuals new to system dynamics and GMB could readily engage with and create scripts using the template provided in *Scriptapedia*. Thus, we decided to pursue the creation of *Scriptapedia* as an online handbook that could easily be updated and distributed as an intermediate solution to launching *Scriptapedia*. In the following sections, we describe the script template, and provide an overview of the organization of the handbook included as a supplement to this paper.

#### 1.4. Elements of Group Model Building Scripts

The cornerstone of standardizing and disseminating GMB practice is the script template. Comprised of 19 separate fields, the script template creates a method for thinking about and documenting the nuts and bolts of GMB (see Figure 1). The script template has gone through multiple iterations to improve clarity and functionality. The goal was to create a template that would be easy to understand and use across different cultures and levels of group model building expertise.

**Name of Script.** The name of the script should clearly indicate the script's content. Frequently scripts are named after the output they produce or the type of activity they describe. For example, the "Hopes and Fears" script outlines how to conduct the "hopes and fears" exercise. As the number of scripts increases, proper naming will become more important.

**Description.** This field provides a brief synopsis of the activity and what the script is meant to accomplish. It serves as an abstract for the script.

**Script Status.** Since script creation is often a collaborative and iterative process, this field recognizes the different stages of script development as determined by the *Scriptapedia* editorial board. *Best Practice* scripts have been used multiple times and in multiple settings and are generally considered effective. *Promising Practice* scripts have been used in multiple settings, but have not been replicated enough or found sufficient utility within the field to be considered best practice scripts. *Under Development* scripts indicate initial ideas for a GMB activity or a script that is currently being developed by the authors.

**Context.** The context field specifies where in the GMB process this particular script fits. Since GMB projects are comprised of multiple scripts, the context explains whether the script should be used at the very beginning, after a particular script, to wrap a project up, etc.

**Figure 1 Script Template.**

Field	Description
Description	1-2 sentence brief overview
Script Status	Choose one and delete the bullets below that do not apply: <ul style="list-style-type: none"> <li>• Best practice: this script has been used many times and in different settings and has consistently produced the intended outputs.</li> <li>• Promising practice: this script has been used a few times with good results, but needs additional refinement and testing</li> <li>• Under development: this script still needs to be refined and tested</li> </ul>
Context	When should this script be used?
Purpose(s)	Define the purpose of the script (delete those that do not apply): <ul style="list-style-type: none"> <li>• Framing the problem</li> <li>• Initiating mapping</li> <li>• Eliciting variables</li> <li>• Deciding the reference modes for the study</li> <li>• Eliciting feedback loops</li> <li>• Eliciting stocks</li> </ul>
Primary nature of group task	Identify the primary nature of the group task (delete the bullets below that do not apply, and note that a group task should only have one primary purpose): <ul style="list-style-type: none"> <li>• Divergent: activity designed to produced an array of different ideas and interpretations</li> <li>• Convergent: activity designed to clustering and categorizing ideas and interpretations.</li> <li>• Evaluative: activity designed to rank and choose between options and idea.</li> <li>• Presentation: activity designed to educate or update participants.</li> </ul>
Time	Preparation time: Time required to complete steps in script: Follow up time:
Materials needed to complete script	List the materials needed to successfully complete the script (e.g. markers, overhead projector, flip chart): <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
Inputs from other scripts	List the inputs from other scripts needed for this scrip (e.g. behavior over time graphs, concept model) or indicate "none" if this is a starter script: <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
Outputs from this script	List specific products such as behavior over time graphs and system, and how these products will be used in the context of the whole project. Distinguish deliverables from products, where deliverables are physical outputs such as a electronic file or hardcopy of a system map, and products are interim outputs from a script that are of primary interest to the modeler. <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
Team roles required and expertise needed	List the team roles and minimum level of expertise required to complete the script (e.g. Facilitator - expert in SD): <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
Who is in the room?	List of people who should be in the room (e.g., "gatekeeper", "modeler", "clients") during the exercise: <ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>
Steps	List the detailed "how-to" sequence of actions in the script and who does them: <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> </ol>
Evaluation criteria	Describe the criteria for knowing whether or not the script is successful, that is, how would someone who had not seen this script used before know whether or not they did the script correctly?
Author(s)	Identify the authors of the script. It is important to note that a script is a unit of behavior, and the documentation of that behavior is separate. The author of the script is the person or collective that created the behavior, and this should be acknowledged by identifying the individual or collective as the author. If the author of a script is not known, simply write "unknown". For individuals or collectives with an email address, provide email contact information. Also include the date (if known) that the script was created.
History & Basis for Script	Describe the history and basis for creating this script including both the motivation (e.g., a specific need that arose during a project) and prior work that the script is based (e.g., other scripts, journal articles, traditions within an organization or community).
Revisions	Provide a list of revision changes and who made them. The description of the script itself should be the most recent version of the script and reflect the best use of this activity.
References	List any publications or references to additional documentation using this script and cited in the history of the script. For example, if this script is based on another script that was described in a journal, then mention this under the "History" field with an author/year citation, and provide the full reference here in the references field.

**Purpose.** A script's purpose distills its main goal into a few words. Multiple scripts may have the same purpose, essentially describing different ways to accomplish or build towards the same goal. The purpose frequently depends on the script's context. A script may have more than one purpose; however, if the script has too many purposes, this could be an indication that it needs to be divided into separate scripts. Examples of possible script purposes are: framing the problem; initiating mapping; eliciting variables; and, deciding the reference modes for the study.

**Primary Nature of Group Task.** This field comes from research on group tasks. Depending on the context and purpose of a script, the modeling team will engage participants in a different type of group task. Divergent activities produce an array of different ideas and interpretations (*e.g.*, Behavior Over Time Graph Script). Convergent activities guide participants through clustering and categorizing ideas and interpretations. In evaluative activities, participants rank and choose between options and ideas. Lastly, there are times when the modeling team must explain system dynamics concepts or update the group on products and deliverables; such activities fall into the presentation category. Although a script may include different types of group tasks, it should be defined as a small group exercise that *has only one primary group task*. A group exercise that has a significant emphasis on both convergent and divergent activities, for example, is likely actually involve two separate scripts, one that describes the convergent activity and another that describes the divergent activity.

**Time.** This field describes how long the script should take to complete. The field is divided into preparation time, execution time, and follow-up time.

**Materials Needed to Complete Script.** This list of supplies should be comprehensive and include everything that the facilitators or participants would need to complete the script. It is important to be precise about materials if this is important. For example, light colored markers are hard to read on standard office paper on a wall, so it is important to clearly indicate that dark tipped colored markers are needed (if this is important). Likewise, blue "painter's tape" is often used because it does not damage the walls of rooms. The important point here is to be specific.

**Inputs from other Scripts.** Scripts are meant to build upon each other so that the end goal of the GMB project can be attained. Thus, inputs represent the products or outputs of previously executed scripts or "offline" work by facilitators and modelers that are needed before the current script can be implemented. It should be noted that some scripts may not require any inputs, particularly if it is very early in the GMB process. Scripts that do not require inputs and can be used to initiate a project are often called starter scripts.

**Outputs from this Script.** Scripts produce outputs. An output may be of interest solely to the modeler or it may be something that is shared with the entire group. In addition to listing the script's outputs, this field should also include a description of how each output is relevant to the overall project and how it will be used in the future. Outputs that are of interest to the client group are called deliverables, while outputs that are of primary interest to the modeler are products.

**Team Roles Required and Expertise Needed.** When filling in this field, authors should refer to the definitions of GMB roles included in *Scriptapedia*. The system dynamic expertise required for each role can vary depending on the difficulty of the activities within the script.

**Who is in the Room.** This field also specifies which participants need to be present (e.g., is it the entire group or a subset of stakeholders?).

**Steps.** This field describes in detail each step of the activity and specifies who is doing what. For example, “*Facilitator* sets up task by asking *participants* to write short descriptions of resources available within the system.” Steps should be thorough so that anyone can follow them without needing additional explanation. If it is important to use specific language during the facilitation it should be included in the steps.

**Evaluation Criteria.** This field should outline indicators of a successful script implementation. That is, how would someone using this script for the first time know if they have done the script correctly? The evaluation criteria are often linked to the intended outputs and can also include behavioral changes in participants or the attainment of certain learning objectives.

**Author(s).** Authors are the individuals who created the script, not the person filling in the script template. This field gives credit to those individuals who came up with the ideas and activities captured in the script. Authors can be individual or collectives, but should be identified with a name, contact information, and date, “Jane Smith, [smith@university.edu](mailto:smith@university.edu) March 2, 2010”. In some cases, a script may have been created and used for some time before it is finally documented in *Scriptapedia*; in such cases, the date should reflect when the script was first created, not when it was entered into the template. Scripts that are in common use or without a known author have this field entered as author “unknown”.

**History & Basis for Script.** GMB practitioners often draw upon previous scripts, articles, other types of small group exercises, etc. when developing a new script. This field should capture this development process, providing a name and date citation for influential resources (complete citations should be entered in the *References* field below). As a script is revised or adapted, it is important to retain the entire history of origin, not just the previous version. For example, if the authors were motivated to create the script based on a community ritual, this should be clearly stated within the field.

**Revisions.** This field is used to keep track of the iterative process of script writing. It should describe any major differences between the current script and the original script, as well as the date the current revisions were made. If significant enough changes have been made between the original and the current version, then it may qualify as an entirely new script.

**References.** This field gives the full citation for any publications or resources referenced in the script, particularly in the history field. For example, if a script is based on another script that was described in a journal, then mention this history field with an author and year citation, and then provide the full reference in this field.

### 1.5. Handbook of Scripts

*Scriptapedia* is a digital commons, and its creation has evolved into multiple phases. *Scriptapedia* consists of a collection of scripts organized by their status (best practice, promising practice, and under development). It includes a glossary of terms, resources in system dynamics, a description of the different roles on a group model building team, the script template, and examples of session agendas using the scripts. Table 1 above provides an overview of the table of contents, and the most recent version of the handbook is included as a supplement to this paper.

**Table 1:** *Scriptapedia* table of contents

Scripts
Best practices
Promising practices
Under development
Appendix A: Glossary
Appendix B: Additional Readings in System Dynamics
Appendix C: System Dynamics Modeling Software and Online Resources
Appendix D: Roles in Group Model Building
Appendix E: Script Template

## 3. Case Examples

To illustrate the use of *Scriptapedia* and scripts, we provide four case examples. Each example highlights a different aspect of how scripts were used.

**Case 1: Documenting Scripts.** An expert in GMB used the script template for *Scriptapedia* to document a number of scripts routinely used in facilitating GMB sessions. The script template provided a means to organize the information in a structured form, and allowed others unfamiliar with the specific exercises to replicate several of the exercises with different groups.

**Case 2: Tailoring GMB Sessions.** A GMB team used scripts to develop a GMB process tailored to each stakeholder group in a multiple session GMB project. Stakeholder groups included three sets of residents from low-income communities, professionals in the banking industry, and representatives from the alternative financial institutes. The facilitation team for these sessions was relatively inexperienced in GMB and concerned about the appropriate fit between GMB and the community participants. The core modeling team designing the GMB sessions decided to use existing scripts from *Scriptapedia*, but tailor them to the specific audiences in each session. The tailoring of scripts was primarily in the use and definition of specific terms and probing questions that facilitators might ask during a GMB session. To accomplish this, each script was projected onto a screen using a data projector with the core modeling team reading and editing the script as a team. The result was a set of GMB scripts that the entire team understood and addressed reservations about the cultural appropriateness of GMB to sessions.

**Case 3: Training Professionals in GMB.** Scripts were used in several projects, training workshops and courses on GMB to introduce participants to the concept of GMB and GMB scripts. The script template was distributed to all participating in these sessions. By having a template and seeing how a structured small group exercise was structured in *Scriptapedia*, participants were quickly able to learn how to create or adapt/tailor GMB scripts to the specific local situation and language.

**Case 4: Documented a GMB Exercise.** An investigator led an unstructured GMB process. The investigator then used scripts as a way to describe what had transpired in the group after the session has been completed.

## 4. Discussion

In this paper, we have introduced *Scriptapedia* and scripts as a way to improve GMB practice, and reflection and learning. Through the two-and-half years of work in developing *Scriptapedia*, we have also encountered some issues related to the idea of using scripts and documenting. These fall into two broad categories: (1) uses, misuses, and misunderstandings of scripts, and (2) potential limitations.

### 1.6. Uses, Misuses, and Misunderstandings of Scripts

*Scriptapedia* presupposes certain benefits of scripts and how they can improve GMB practice and learning. Some of the intended uses include using scripts to create and use a behavioral protocol for small group exercises; comparing the protocol to what actually happened as a way to assess fidelity; teaching GMB using scripts; and, documenting what happened in a small group process that has already occurred.

However, the benefits from these intended uses of scripts are not without some controversy. One potential problem comes from facilitators following a script mechanistically, that is, without the right attitude (Vennix 1999). Scripts are not a substitute for the nonspecific factors involved with facilitating a group process. Failure to recognize this, attend to the nonspecific factors, and having the right attitude toward a group is a misuse of scripts.

Some may also object to the use of scripts as being too rigid, too reductionist or mechanistic, or taking the art out of GMB facilitation. The basic objection here is that a complex social interaction such as GMB cannot be distilled into linear sequence of instructions in any reasonable way without excluding the significant amount of professional judgment required to effectively do GMB.

There are two responses to this that parallel a similar discussion in evidence-based practice in medicine, public health, social work, psychology, and management. The first is that reducing the amount of discretion a facilitation team has in GMB is precisely the point of scripts. Discretion and professional judgment cut both ways—when given freedom to make decisions in complex systems we often make as many if not more incorrect decisions than correct decisions. Hence, the number of successes that may be attributed to facilitator discretion is often outweighed by an equal or greater number of failures. Scripts reduce the discretion and hence increase the likelihood that a GMB session can be more effectively facilitated. Consider, for example, other

areas where human performance has improved by limiting the amount of discretion individuals have in a complex situation such as the use of checklists for pilots and hospital procedures.

The second response to the concern that scripts take the art out of GMB is that there is still a lot of room for professional judgment and improvisation. In particular, groups are complex systems with unpredictable dynamics representing both opportunities and hazards for effective facilitation. GMB also involves many nonspecific factors for sessions to be effective, including the rapport between the GMB facilitation team and clients, facilitator characteristics, and clients' perception of the facilitators as experts in GMB and system dynamics. In this, the art of GMB is still present in structured group model building session. Importantly, scripts actually make it easier to delineate where professional judgment is required and applied. For example, improvisation or going off script only make sense if one has script to follow.

### 1.7. Potential Issues and Limitations

**Innovation versus System Dynamics “Lite”.** One of the main arguments for developing *Scriptapedia* is that by making scripts more accessible, more people will use and contribute scripts to *Scriptapedia*. However, there has been a long standing concern in the field of system dynamics about increasing access without developing deeper knowledge of system dynamics leading to situation where system dynamics “lite” is being promoted. *Scriptapedia* has been explicitly developed for system dynamics group model building, but using scripts from *Scriptapedia* does not mean that one is doing system dynamics. *Scriptapedia* is a tool that can have many uses beyond its intended use.

**Empowerment versus False Confidence.** Another area of concern is whether scripts are empowering or simply give teams a sense of false confidence in their methods. For example, scripts can make it easier for facilitators try a new role on a facilitation team or lead an exercise they have not done before, which would then create additional opportunities for learning and development of facilitation skills. However, there is also an inherent limitation to what can be conveyed in a script, and the success of a script could well depend on implicit knowledge of the facilitation team. Thus there is the potential that scripts can also contribute to a sense of false confidence and impede learning.

**Learning versus Reinforcing Attribution Errors.** Scripts provide way to explicitly identify the espoused theory of a group model building intervention and compare the espoused theory against the theory in use. As such, scripts can help practitioners engage in double-loop learning (Schön 1983). At the same time, limitations in how well a script documents the small group exercise and knowledge and skills on the facilitation team required to successfully lead the exercise may ultimately reinforce attribution errors instead of learning. Preventing this will require a combination of explicit documentation and empirical research.

**Digitizing Commons versus Appropriation.** *Scriptapedia* is a collection of scripts for common use by documenting structured small group exercises. While small group exercises can be developed by writing a script, many other scripts will essentially be online representations of exercises that have existing and been used for many years. The origin of the exercises documented in *Scriptapedia* may have a known creator or author, a routine practice or ritual within a specific culture, or not have a known author. A growing concern in digital commons has

been that efforts to digitize previously undocumented practices amount to a form of knowledge or cultural appropriation. Of particular concern are situations where a script based in indigenous knowledge and practices may have economic value in another context. As an open source commons, anyone could use the scripts for their own commercial gain, but the indigenous community that had practiced the ritual on which the script was based would not receive an economic benefit.

**Improving Practice versus Regulation, or Who Decides What is “best practice”?** The effort to improve practice through standardizing scripts in *Scriptapedia* and categorizing some scripts as best practice can also raise a concern about group model building becoming a regulated practice. Of particular concern is the question of who decides what best practice is and on what basis. If the criteria for determining best practice are not widely accepted, then disincentives for contributing and using *Scriptapedia* may limit participation and the benefits of having a digital commons for GMB scripts. To address this, it will be important to establish a governance structure based in the System Dynamics Society to establish the criteria for best practices and apply these criteria to scripts in *Scriptapedia*. As *Scriptapedia* develops, however, an evidence base should emerge about which scripts work best under what types of conditions.

## 5. Future Directions

Looking forward, the future development of Scriptapedia as an effective and well-supported tool in support of GMB efforts will require attention to a number of specific areas as discussed below.

**Editorial Control of Content.** We envision that in the early stages of populating the Scriptapedia some degree of editorial control, beyond what can be reasonably expected of a more automated content management system will be needed. As first round authors of content, the authors of this paper will seek to constitute themselves into some sort of an informal editorial board working both to encourage the creation of new content as well as work out new ways to train others in how best to use Scriptapedia. A problem for the longer term will be to locate a more permanent institutional host for this activity. For example, the System Dynamics Society could exert long-range control for this project much as it currently does for the System Dynamics bibliography, or the project could become archived and managed under the supervision of Wiley-Blackwell, the publishers of the *System Dynamics Review*. In addition to providing some control of content, such an institutional sponsor would help to insure that the project survives the transition from the first generation of authors/editors into a more sustainable format. These editorial matters, critical to the long-term success of this project, remain to be worked out.

**Online Content Collaboration and Management System.** Scriptapedia represents more than a collection of scripts and GMB definitions. Scriptapedia is also meant to be an online content collaboration and management system. While site design, hosting, and maintenance issues must be worked out before the site can launch, the following describes the vision for the full Scriptapedia site. At its core will be a digital version of the script template and a library of all documented scripts. After creating user accounts, authors will be able to write and collaborate on scripts from anywhere in the world. Documented scripts will be searchable by authors and other key fields. Message boards will allow registered users to comment and ask questions about scripts, best practice, or new developments in GMB. In addition, the site will contain a glossary

of GMB terms and a description of GMB roles, thereby creating a shared language for the GMB process. As more scripts are documented, sample agendas for GMB sessions or projects will also be posted to Scriptapedia. In this way, GMB practitioners can share how they have pieced together different scripts into a cohesive process. As the online version of Scriptapedia develops, accessibility and ease of use will be of utmost importance. Since collaboration and learning are key goals of Scriptapedia, the site platform must be appropriate for experts and novices in system dynamics and GMB from across the globe.

**Workshop and Training.** *Scriptapedia* allows for the dissemination of scripts by creating a space where they are documented, managed, and accessed. It also provides continuity and repetition within the field with the use of a generic script template to create new scripts and a place where existing scripts may be kept and referenced. It seems appropriate to conduct trainings or workshops on the use of scripts to increase their use and ensure script creation and use is done appropriately. Developing *Scriptapedia* and conducting training people in the use of scripts will help spread GMB and expand the successful application of system dynamics. We see this as one of the ways that *Scriptapedia* ultimately contributes to the field of system dynamics.

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