TOWARDS A FRAMEWORK OF FACILITATION IN PARTICIPATORY INNOVATION: GROUP COLLABORATION THROUGH VISUAL GUIDANCE

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ABSTRACT

The aim of this agenda setting paper is to outline first elements to a future conceptual framework of facilitation in participatory innovation, that is to say a systematic body of knowledge that explains how groups can collaborate and innovate through facilitation. Many of today's challenges can only be tackled by the combined skills and experiences of a group as group knowledge surpasses any individual's expertise or domain of influence. We aim to make a conceptual contribution to the field of facilitation in participatory innovation by explicating and more particularly delineating the use of visual templates for group facilitation (MacInnis, 2011). Following the suggestions by MacInnis (2011), we will (1) provide a rationale why visual templates should be studied, (2) we will describe what visual templates are, by classifying functions and genres of visual templates, (3) present conducive contextual parameters, such as the facilitator and corresponding roles and interventions as well as necessary skills to play those roles and enact interventions, and (4) provide a roadmap for future research.

RATIONALE FOR FACILITATION TEMPLATES

In this paper, we start our attempt to formulate a research agenda on visual facilitation by giving a brief overview of facilitation and clarify terms such as facilitator and group facilitation by providing definitions. We then present the notion of visual templates and argue how such visuals might be beneficial for group facilitation through their constitutive features and corresponding affordances. Further rationale is given by understanding visual templates and their benefits through multiple theoretical lenses. A glance at empirical investigations of visual templates motivates a more profound and systematic inquiry and development of a conceptual framework.

A BRIEF OVERVIEW AND DEFINITIONS

Facilitation is rooted in the Latin word "facilis", which means easy or easily done (Swinton 2006). The term had a broader meaning, suggesting that facilitation is making things easier for someone. In connection with groups, facilitation means making the group's work easier and overcoming obstacles to group performance (Blair 1996).

The person in charge of the facilitation is the facilitator who is "…a self-reflective, process-person who has a variety of human, process, technical skills and knowledge, together with a variety of experiences to assist groups of people to journey together to reach their goals" (Hogan 2002, p. 57). Schwarz (2002, p. 5) defined group facilitation as "a process in which a person whose selection is acceptable to all members of the group, who is substantively neutral, and who has no substantive decision-making authority diagnoses and intervenes to help a group improve how it identifies and solves problems and makes decisions, to increase the group's effectiveness." This original definition can be extended to current practices in which either an external

facilitator does the facilitation, as described by Schwarz, or it could also be facilitated by an internal facilitator who is part of the group.

Group facilitation encompasses many techniques used by a large community of practitioners. There are numerous facilitation handbooks and guidelines (e.g., Hogan 2002; Schwarz 2002; Schuman 2012), consulting firms that offer facilitation, and communities of practice such as the International Association of Facilitators (Schuman 2012). Facilitators' interventions stem from systems of practice (e.g. structures for continuous quality improvement), philosophies and models of organization learning (e.g., the belief that groups benefit from taking a break from their work to have a discussion about their group process), or standards of good practice (e.g. the use of ice breakers to help members get to know each other). Facilitators learn to apply skills, theories, personal qualities, and/or awareness of the political nature of group process and facilitation (Thomas 2005). Facilitators assess and influence variables that researchers have found are important for effective group functioning.

VISUAL TEMPLATES FOR GROUP FACILITATION

One of these variables is the use of visual templates for group facilitation. A visual template provides a graphical structure onto which information and knowledge can be meaningfully mapped, related, and put into perspective (Eppler and Platts 2009). Visual templates can support face-to-face and virtual meetings, in which one person acts as a facilitator and moderates the discussion by documenting the participants' inputs to the templates themselves (Eppler and Burkhard 2007). Very well-known examples of visual templates are the BCG matrix, the SWOT diagram, Porter's five forces diagram or recently the development of Canvases such as the Business Model Canvas, the Meeting Canvas or the Empathy Map used in design thinking.

The graphical structure of visual templates, made up of boxes, arrows and labels, offers 'affordances' (Demir 2015; Gibson 1986; Jarzabkowski and Kaplan 2015) – i.e., cues as to how the visual template could be used in practice. For example, empty boxes on a strategy map afford the filling in of strategic issues, whereas arrows afford reflection on relationships between such issues. Those affordances stem from the constitutive features of visual templates (Gibson 1986; Kress 2010) which enable and constrain potentials for action and meaning-making realized between the visual template, its producer and its recipient (Meyer et al 2017). Meyer distinguishes three types of constitutive features of visuals based on social semiotic theory: semiotic features enabling meaning construction, cognitive features helping understand how visuals are perceived and processed by individual cognition, and cultural features concerning the social organization and regulation of visuals within a specific social setting

(Meyer et al 2017). In terms of the semiotic features, visuals structure information, and thereby suggest meaning, primarily in a spatial manner (Tversky 2005) while verbal's structure principle is sequential and linear (Jewitt and Oyama 2001). In terms of the cognitive features, visuals have a more immediate effect on perception and comprehension than verbal (Barthes 1991). Perceptual information is assigned equal importance (Coltheart 1980) and material is stored in our visual short-term memory in the form of coherent objects (Luck and Vogel 1997). This makes the perception of visuals much more immediate than verbal. In terms of the cultural features, the character of visuals is influenced by their status and social regulation within a specific community (Kress 2010). For example, in the community of creativity and innovation, the use of visuals in the form of sketches as well as visual templates, such as the Business Model Canvas, is more accepted than in other communities such as banking and finance.

Based on those constitutive features, a set of affordances can be distilled for visuals. Social semiotics borrows the concept of *affordances* from Gibson (1986) to denote the potential of visual and verbal in representation and communication. Affordances, which are derived from the constitutive features of visuals and verbal, are relational rather than inherent. They manifest themselves only in specific interactions between audiences, particular modes (visual or verbal), and contexts (McDonnell 2010). The potential of affordances for meaning-making can be both enabling and constraining. Their relational character and cultural quality imply that the properties of visuals invite, but never determine, possibilities for interpretation and action in relation to these texts (Hutchby 2001). Inspired by Kress (2010, p. 96), identifying the affordances of visual templates is equivalent to answering the questions 'what can be done with visual templates?' (Meyer et al 2017).

The affordances of visuals are labelled as verbs as they suggest particular processes of interpretation and possibly action. Visuals carry, according to Meyer and colleagues, four particular affordances: infiltrate, spatialize, captivate, and materialize (Meyer et al 2017). Infiltrate means that visuals are subjected to less scrutiny than verbal due to the weaker social regulation that applies to visuals in Western culture (Kress and van Leeuwen 2006); spatialize means that visuals are especially well-suited for communicating complex and multidimensional relationships, in addition the spatial setup of visuals allows for bridging of individual elements through composition and positioning (Höllerer et al 2013); captivate means that the immediacy of perception of visuals has the potential to captivate audiences, more specifically, visuals are perceived rapidly, attract attention quickly, and have the potential to express attitudes and emotions with powerful impact

that surpasses a purely cognitive processing of its content whereby audiences become affectively, aesthetically and corporeally engaged (Hill 2004); materialize means that visuals give novel ideas tangibility and shape (Meyer et al 2017). The materialization of visuals helps overcome language barriers and establishes visuals as a kind of 'global language' (Machin 2004).

Looking at all three types of constitutive features and their corresponding affordances, visuals are characterized by their own 'grammar' (Kress and van Leeuwen 2006), but those rules of expression are less explicit compared to verbal which makes the interpretation of visuals more open-ended. Elaborate rules exist on the use of verbal arguments, however, rules for visuals are less elaborate on how and when to use them (Meyer et al 2017). This calls for a development of a visual "syntax" for visual templates and also for the guidance of the use of visual templates through a facilitator. In addition, those affordances make visuals and particular visual templates good candidates to support group facilitation as they support the structuring and spatially arranging of complex information, allowing for immediacy of perceiving and processing content, and communicating attitude and emotions which engages audiences affectively, aesthetically and corporeally.

In fact, the use of visuals in management and organizations is increasing rapidly over the past ten years. Visual artefacts are omnipresent in modern societies and are not just add-ons to verbal but have become an elementary for the construction, maintenance, and transformation of meaning (Kress and van Leeuwen 2001). Visual artefacts materialize, organize, communicate, store, and pass on knowledge (Raab 2008) and are objectified within social groups and communities in order to enable mutual and shared 'readings' (Raab 2008). It is surprising that visuals and their mode of meaning making has remained largely unexplored in organization and management research (Meyer et al 2013). A better understanding of the role and the effects on visuals in general is necessary. However, visuals should not be investigated in isolation, especially since their function is only realized in the interactive contexts in which they are embedded and by the verbal expressions they may accompany them (Van Leeuwen 2007).

THEORETICAL LENSES AND BENEFITS

In order to fully understand how a group can benefit from using facilitation templates in participatory innovation, we need to understand the role of facilitation templates through different theoretical lenses. The human brain processes visual information more efficiently compared to written information: when the same information is provided both in written and visual form (such as with a key-word and a

corresponding icon), performances are enhanced. According to *Dual Coding Theory* (Paivio 1991) this effect is due to the fact that our brain processes visual information and verbal/textual information in two different areas of the brain. Visually displaying ideas through a graphi template offers the benefits to enable participants to externalize thoughts and their connections using both their verbal and visual channel (Paivio 1978), thus making it easier for the discussants to build on each other's ideas (Mengis and Eppler 2008) and to remember the discussed topics better (Mengis and Eppler 2006). Mapping the dialogue visually can help overcome cognitive constraints, such as information overload (O'Reilly 1980) and the finite amount of working memory claimed by cognitive load theory; visual templates help to unload our working memory to have more capacity for sense making (Simon 1972). In addition, visual templates provide established categories according to the *theory of law encoding* (Cheng 1996), they help to foster a productive exchange among group members by providing *representational guidance* (Suthers 2001) and enable new insights and 'aha' moments at no cognitive costs in line with the *free ride* effect (Shimojima 1999).

THE NEED FOR A THEORETICAL UNDERPINNING FOR A MORE PROFOUND UNDERSTANDING

Visual templates have proven useful for group work not only in analogic format (such as on paper and posters) but also in digital formats, using computer-supported collaborative systems (Suthers 2001; Hundhausen 2005; Bresciani and Eppler 2009), generally referred to as "collaborative systems." Further investigations have shown that the use of visual templates can increase the quantity and quality of ideas developed in group work; as well as the number of ideas being recalled by group members (Perez Garcia and Bresciani 2015).

Looking at the features, affordances and other benefits of visual templates and their potential to enrich group facilitation, a more structured and organized understanding of the effects of visual templates for group facilitation should be investigated based on the development of a conceptual framework of facilitation. For this, we begin with a classification of the functions and types of visual templates, as this is still missing in the literature and provides a structure for more systematic observation and investigation.

CLASSIFICATION OF THE FUNCTIONS AND GENRES OF FACILITATION TEMPLATES

Through the evaluation of the empirical use of visual templates in team contexts (see for example Eppler and Platts 2009) we have identified the following 12 cognitive functions of visual templates supporting *divergent* and *convergent* thinking in group facilitation:

VISUAL TEMPLATES SUPPORTING DIVERGENT
THINKING IN GROUP FACILITATION
1) Associate, lateral thinking (connecting unrelated
   information), talking, and deliberating through
   visually provided categories, cues and visual
   structures
2) Configuration (recombination, playing, simulating,
   and experimenting) for idea composition
3) Perspective and level switches
4) Compilation space for data, opinions, and
   experiences

VISUAL TEMPLATES SUPPORTING CONVERGENT
THINKING IN GROUP FACILITATION
5) Roadmap for deliberating future options
6) Insight enabler by making patterns visible
7) Showing missing information and data needs
8) Filter function, selector, and separator
9) Conflict mediator (contrasting opposing views)
10) Testing and feedback space
11) Consistency check
12) Documentation, summary, tracking device

BEYOND COGNITION: EMOTIONAL AND SOCIAL
FUNCTIONS

In addition to these cognitive functions, visual templates
carry the potential for social functions, such as
integrating different perspectives, assisting mutual
understanding, and showing interdependencies as well
as emotional functions, such as creating involvement
and engagement, providing inspiration and providing
convincing communication (Eppler and Platts 2009).
Since group facilitation is not only concerned with
cognitive content-related outcomes but also with
emotional and social outcomes, a future conceptual
framework of facilitation should consider the emotional
and social functions of visual templates and their effect
on group facilitation process and outcome measures.

GENRES OF VISUAL TEMPLATES

Next to the functions of visual templates, we have
identified two genres of visual templates in line with the
taxonomy of visual formats established by Eppler and
Burkhard (2007) and have focused on two formats:
conceptual diagram and *visual metaphor*, as they are
omnipresent in creativity and warrant benefits for
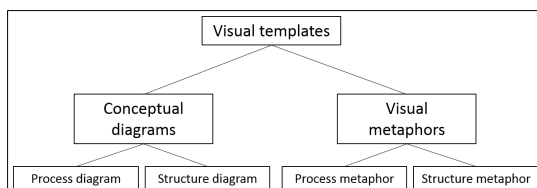facilitation and collaboration in groups:

Figure 1: Early classification of visual templates for group facilitation

Conceptual diagrams
Main function: Compilation, consistency check,
roadmap, insight enabler
• Process diagram – Example: Value-chain-template
• Structure diagram – Example: Roper diagram
  (Eppler, Kernbach and Pfister 2015), Business
  Model Canvas (Osterwalder and Pigneur 2010)

Visual metaphors
Main function: Compilation, perspective and level
switch, insight enabler
• Process metaphor – Examples: Mountain trail, river
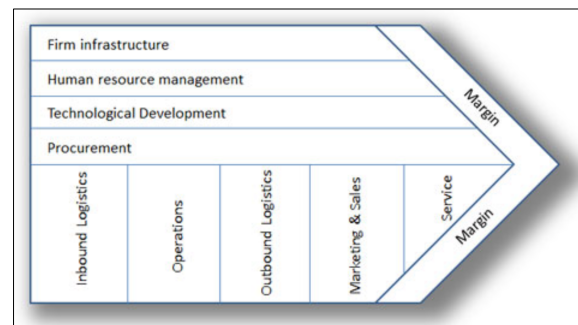• Structure metaphor – Examples: Iceberg, temple,
  tree

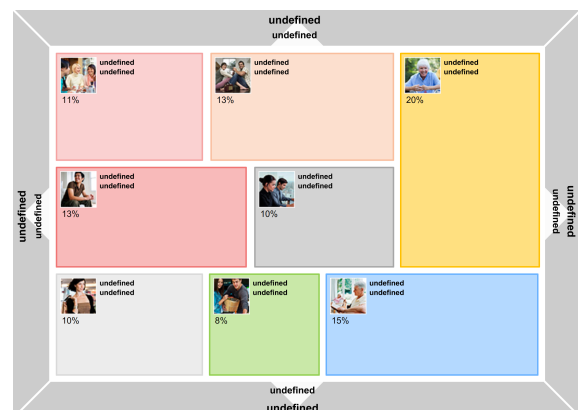Figure 2: Value-chain template (Process diagram)

Figure 3: Roper diagram (Structure diagram)

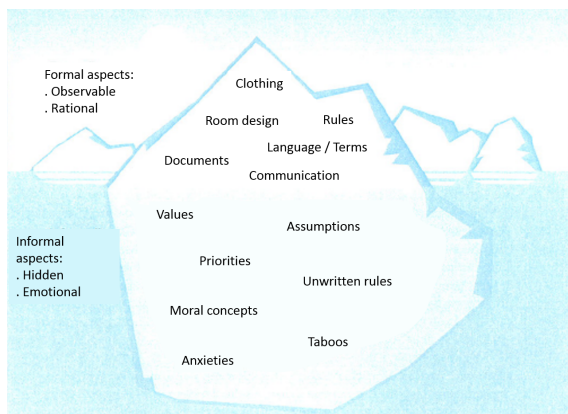Figure 4: Mountain trail (process metaphor)

Figure 5: Iceberg (structure metaphor)

These lists provide a starting point in the sense of an early classification and build the basis for further exploration of the functions and genres of facilitation templates.

IDENTIFICATION OF CONDUCIVE CONTEXTUAL PARAMETERS

To understand the contextual parameters of facilitation we draw on the model of task group effectiveness by Gladstein (Gladstein 1984) and combine it with the temporal process model of facilitation (Wardale 2013). Gladstein modelled group behaviour with the following variables: Input variables on a Group level (Group composition, Group Structure) and Organizational level (Resources available, Organizational structure), followed by Process operationalized by Group Process and Output as Group Effectiveness moderated by Group Task (Gladstein, 1984). Wardale investigated facilitation through a temporal process model including four phases: preparation, intervention/event, outcomes, and transfer. Figure 6 presents an adaptation of these two models and leads to the following contextual parameters:

1 THE ORGANIZATIONAL CONTEXT

The use of a visual template is influenced by its status and social regulation within a specific community (Kress 2010). The acceptance of visuals can differ depending on the culture of the group or community.

2 THE GROUP

The characteristics of the group affect the visual template's use. For example, the group size, location (co-located or virtual) as well as intercultural composition. In a recent study, groups with a heterogeneous group composition in terms of their cultural background needed a high level of structuration and restrictiveness provided by the visual template to work efficiently on the task (Bresciani and Comi 2017).

3 THE PHYSICAL SPACE

The physical space including the size and shape of the room, the arrangements of tables and visual devices as well as the lighting and air conditions can moderate the use of visual templates in group facilitation (Tuecke 2006).

4 THE VISUAL TEMPLATE

Whether the visual template is used as a physical poster with post-it and pens or through a digital system such as Group-Support-Systems (GSS) or Computer-Supported-Collaborative-Systems (CSCW) can have a strong effect on group facilitation processes and outcomes (Anson, Bostrom and Wynne 1995). According to *Adaptive-Structuration-Theory* (AST), the structures provided by the visual template can affect group facilitation and are affected by the fit of the structure with the task, the actual and perceived restrictiveness of the visual template and the flexibility of the visual template (Anson et al 1995). In addition, visual templates can appear as frozen or flexible (DeSanctis and Poole 1994; Bresciani and Comi 2017) according to their level of perceived finishedness and further dimensions for visual collaboration such as clarity, visual impact, modifiability, discourse management, inference support, and directed focus (Bresciani, Eppler, and Blackwell 2008).

5 THE FACILITATOR

The skills, roles and behaviour of the facilitator plays an important role in high quality facilitation and in supporting the fruitful use of the visual template. In a study on the use of a GSS with a facilitator, the facilitator had a significant effect on how the GSS was perceived. The facilitation appeared to have strongly, and positively influenced perceptions of GSS efficacy. In other words, a good facilitator increases the perception of the visual template efficacy. The own comfort of the facilitator with the template was found to be the key issue. Those facilitators who felt uncertain about how to use the tools and how to best fit the tools to the group dynamics could not increase the efficacy. It appears likely that the facilitators' attitudes towards the tool were influenced by their preparation. The assumption is that adequate training with the tool would have encouraged facilitator perceptions of restrictive-ness and build constructive skills and attitudes. If a facilitator does not adequately comprehend or feel comfortable with a tool or visual template the group will likely feel the same (Anson et al 1995).

6 THE TASK

The task plays a moderating role as well in group facilitation. Gladstein proposes task complexity, environmental uncertainty and interdependence as important features of tasks (Gladstein 1984). In addition, the type of task will affect the use of visual templates in group facilitation, even within creative tasks, such as idea generation, idea elaboration, idea championing, idea implementation (Perry-Smith and Mannucci 2017).

7 THE GROUP PROCESS

At least two areas determine the quality of a group processes. They are provided by the International Association of Facilitation (Schuman 2012) and have been enriched with elements from group creativity. Those two areas or success factor are: *Guidance towards appropriate and useful outcomes* (supporting the task/issue/content-related outcome) and *Creation and Sustainability of a participatory environment* (supporting the emotional/affective-related outcome and the social-relationship-outcome). These two areas can be further described and distinguished by the conversational process provided by Mengis and Eppler to manage knowledge-intense conversations (2008). Guiding groups to useful outcomes requires macro-conversational structures, such as the five patterns of collaboration by Briggs et al. (2003) and Kolfschoten et al. (2006): Diverge, Converge, Organize, Evaluate, and Build Consensus. In addition, Wardale (2013) suggests three elements for the production of effective results: assessing and communicating progress, synthesizing different points of view, guiding the group to consensus ultimately enabling decision-making. Creating and sustaining a participatory environment requires micro-interaction processes to encourage active listening and participation, to manage group conflict and to evoke group creativity, e.g. by linking new statements to previous ideas (Schuman 2012; Mengis and Eppler 2008; Kolfschoten et al 2012). In one study, facilitators were assessed by group members on a 13-item-scale, those facilitators who reached high quality outcomes with group were significantly better than other facilitators on four of these 13 items: prevent individual domination, encourage listening, facilitator listening, and constructively using conflict (Anson et al 1995).

8 THE OUTCOMES

Group outcomes can be organized into three typical types of outcomes mentioned by scholars and practitioners in group facilitation, group effectiveness and group creativity: (1) *Task/issue/content-related outcome*, also referred to as performance, productive outcome or task accomplishment, (2) *emotional/affective-related outcome*, also referred to as satisfaction, experience and perceived quality of group interaction processes, and (3) *social-relationship-related outcome*, also referred to as group maintenance and relationship and group cohesion, the degree to which members are attracted to each other, take pride in group membership and have commitment to the group (Gladstein 1984; Anson et al 1995; Wardale 2013), or as the editor of the IAF Handbook of Group Facilitation (Schuman 2012) put it: Getting work done, increasing well-being and connecting with others.
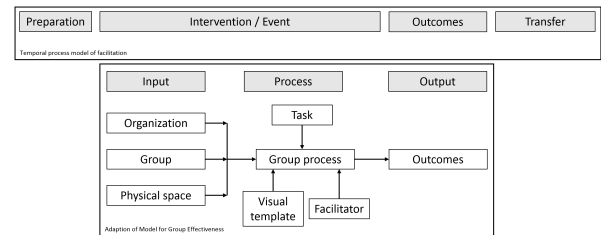

Figure 6: Adapted model of group effectiveness with temporal process model of facilitation

The model using these contextual parameters is focusing on the group process and the corresponding outcome, therefore we extend this model by adding the temporal process model of facilitation underlying the importance of both *preparation* of the facilitation, e.g. with identifying the best fit of task and template, as well as the *transfer* of the outcomes into the workplace. Visual templates have the potential to not only support the group process leading to better outcomes but also help transfer those outcomes into the workplace. Having described the conducive contextual parameters of visual templates in group facilitation, the next section presents a roadmap including proposals for future research activities as well as methods and variables to consider.

ROADMAP FOR FUTURE RESEARCH

Innovation studies have so far neglected the crucial role of visual facilitation. Although first attempts have been made to understand the effects of visual templates for collaboration contexts. Evidence suggests that they lead to more and better quality of ideas (Perez Garcia and Bresciani 2015), increase constructive teamwork, and improve team creativity and process satisfaction (Eppler, Oste, and Bresciani 2013) when compared to collaboration with verbal discussion only or content displayed as list of text and not in a visual format. In addition, they enhance task precision (Bresciani and Comi 2017). Future research on the role of visual template in group facilitation should consider the conducive *contextual parameters*, either in quantitative enquiries by keeping them stable or compare different variables, or in qualitative studies when observing meetings and interviewing participants. These parameters are organizational context (e.g. with or without "visual culture"), the physical space (e.g. considering room layout including furniture arrangement, light, air), the visual template (e.g. analogue vs. digital templates), the facilitator (skills, interventions), the group (small, medium or large-sized, ad-hoc vs. ongoing, cultural homogeneous vs. heterogeneous, co-located vs. virtual), the task (complexity, level of conflict, diverging- or converging-nature) and measure according to the proposes process and outcomes measures presented in the third section of this paper. In doing so it will be crucial to conduct task-template fit analyses during the preparation phase of studies. Another challenge will be to isolate variables in

lab experiments, while keeping other variables fixed to better understand the effects of visual templates in group facilitation. Varying single variables among conditions helps to understand the cause-effect-relationship between facilitation modes and outcomes. In this context it may be a useful research approach to study specific aspects of visual facilitation, such as task precision or a template's effect on idea ownership in a group, rather than overall impressions or effects.

CONCLUSION

The field of group facilitation has a long history with a strong emphasis on application. The time has now come to move from this type of practical iteration, to scientifically evaluate visual facilitation for innovation purposes. Scientific rigour in evaluation is crucial, as new innovation methods rely heavily on visual facilitation. Typical such methods are design thinking (with templates such as empathy maps, personas, or customer journeys), agile and scrum (with their respective task board templates). Research needs to build a better and more thorough understanding of the effects and prerequisites of such facilitation approaches. This can lead the way to a conceptual framework, including how facilitation works (descriptive), why certain effects come about (explanatory) and how facilitation should be planned and conducted to foster innovation (normative/predictive). This paper is first attempt to start such a conceptual framework by providing the rationale for visual templates for group facilitation, by proposing a first overview of the functions of visual templates and how they can be classified in the context of group facilitation. Finally, it represents an early attempt to identify key process and outcomes measures as well as variables that are conducive to facilitation. We hope that other researchers will use these variables to design (in a focused manner) the much-needed evaluation studies on visual facilitation in innovation contexts.

REFERENCES

Anson, R., Bostrom, R., & Wynne, B. (1995). An experiment assessing group support system and facilitator effects on meeting outcomes. Management Science, 41(2), 189-208.

Barthes, R. (1991). Mythologies. New York: The Noonday Press.

Blair, M. G., (1996). Group Facilitation – What is facilitation? University of Edinburgh, http://www.see.ed.ac.uk/~gerard/MENG/MECD/topics.html#I. Accessed Oct. 30 2017.

Bresciani S., Eppler M., and Blackwell A. (2008). A Collaborative Dimensions Framework: Understanding the Mediating Role of Conceptual Visualizations in Collaborative Knowledge Work. In Proceedings of the 41st Hawaii International Conference on System Sciences (HICSS 2008).

Bresciani, S., & Eppler, M. J. (2009). The benefits of synchronous collaborative information visualization: Evidence from an experimental evaluation. IEEE transactions on visualization and computer graphics, 15(6).

Bresciani, S., & Comi, A. (2017). Facilitating culturally diverse groups with visual templates in collaborative systems: Increasing structuration to improve precision. Cross Cultural & Strategic Management, 24(1), 78-98.

Briggs, R. O., De Vreede, G. J., & Nunamaker Jr, J. F. (2003). Collaboration engineering with ThinkLets to pursue sustained success with group support systems. Journal of Management Information Systems, 19(4), 31-64.

Cheng, P. C. H. (1996). Scientific discovery with law-encoding diagrams. Creativity Research Journal, 9(2-3), 145-162.

Clark, J. M., & Paivio, A. (1991). Dual coding theory and education. Educational psychology review, 3(3), 149-210.

Coltheart, M. (1980). Iconic memory and visible persistence. Perception & Psychophysics, 27(3), 183–228.

Demir, R. (2015). Strategic activity as bundled affordances. British Journal of Management, 26(1), S125-S141.

DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. Organization science, 5(2), 121-147.

Eppler, M. J., & Burkhard, R. A. (2007). Visual representations in knowledge management: framework and cases. Journal of knowledge management, 11(4), 112-122.

Eppler, M. J., Kernbach, S., & Pfister, R. (2016). Dynagrams-Denken in Stereo. Mit dynamischen Diagrammen schärfer denken, effizienter zusammenarbeiten und klarer kommunizieren. Schäffer Poeschel.

Eppler, M. J., Oste, H. F., & Bresciani, S. (2013). An experimental evaluation on the impact of visual facilitation modes on idea generation in teams. In Information Visualisation (IV), 2013 17th International Conference, 339-344.

Eppler, M.J., & Platts, K.W. (2009). Visual Strategizing: The Systematic Use of Visualization in the Strategic-Planning Process. Long Range Planning, 42(1), 42-74.

Gibson, J. (1986). The Ecological Approach to Visual Perception, Houghton Mifflin, New York, NY.

Gladstein, D. L. (1984). Groups in context: A model of task group effectiveness. Administrative science quarterly, 499-517.

Hogan, C. (2002). Understanding facilitation: Theory & principles. London, UK: Kogan Page.

Höllerer, M. A., Jancsary, D., Meyer, R. E., & Vettori, O. (2013). Imageries of corporate social responsibility: Visual re-contextualization and field-level meaning. Research in the Sociology of Organizations, 39(B), 139-174.

Hill, C. A. (2004). The psychology of rhetorical images. In C. A. Hill & M. Helmers (Eds.), Defining visual rhetorics, 25–40. New York: Routledge.

Hundhausen, C. D. (2005). Using end-user visualization environments to mediate conversations: a 'Communicative Dimensions' framework. Journal of Visual Languages & Computing, 16(3), 153-185.

Hutchby, I. (2001). Technologies, texts and affordances. Sociology, 35(2), 441-456.

Jarzabkowski, P. and Kaplan, S. (2015). Strategy tools-in-use: a framework for understanding 'technologies of rationality' in practice. Strategic Management Journal, 36(4), 537-558.

Jewitt, C., & Oyama, R. (2001). Visual meaning: A social semiotic approach. In T. van Leeuwen, & C. Jewitt (Eds.). The handbook of visual analysis, 134-156. London et al.: SAGE Publications.

Kolfschoten, G. L., Briggs, R. O., De Vreede, G. J., Jacobs, P. H., & Appelman, J. H. (2006). A conceptual foundation of the thinkLet concept for Collaboration Engineering. International Journal of Human-Computer Studies, 64(7), 611-621.

Kolfschoten, G. L., Niederman, F., Briggs, R. O., & De Vreede, G. J. (2012). Facilitation roles and responsibilities for sustained collaboration support in organizations. Journal of Management Information Systems, 28(4), 129-162.

Kress, G. (2010). Multimodality: A social semiotic approach to contemporary communication. Abingdon et al.: Routledge.

Kress, G., & Van Leeuwen, T. (2001). Multimodal discourse: the modes and media of contemporary communication. London: Hodder Education.

Kress, G., & van Leeuwen, T. (2006). Reading images: The grammar of visual design (2nd Ed.). London et al.: Routledge.

Luck, S. J., & Vogel, E. K. (1997). The capacity of visual working memory for features and conjunctions. Nature, 390, 279–281.

Machin, D. (2004). Building the world's visual language: The increasing global importance of image banks in corporate media. Visual Communication, 3(3), 316-336.

MacInnis, D. J. (2011). A framework for conceptual contributions in marketing. Journal of Marketing, 75(4), 136-154.

McDonnell, T. E. (2010). Cultural objects as objects: Materiality, urban space, and the interpretation of AIDS campaigns in Accra, Ghana. American Journal of Sociology, 115(6), 1800-1852.

Mengis, J., & Eppler, M. J. (2006). Seeing versus arguing the moderating role of collaborative visualization in team knowledge integration. Journal of Universal Knowledge Management, 1(3), 151-162.

Mengis, J., & Eppler, M. J. (2008). Understanding and managing conversations from a knowledge perspective: an analysis of the roles and rules of face-to-face conversations in organizations. Organization Studies, 29(10), 1287-1313.

Meyer, R. E., Höllerer, M. A., Jancsary, D., & Van Leeuwen, T. (2013). The visual dimension in organizing, organization, and organization research: Core ideas, current developments, and promising avenues. Academy of Management Annals, 7(1), 489-555.

Meyer, R.E., Jancsary, D., Höllerer, M.A., & Boxenbaum, E. (2017). The role of verbal and visual text in the process of institutionalization. Academy of Management Review (in print).

O'Reilly, C. A. (1980). Individuals and information overload in organizations: Is more necessarily better? Academy of management journal, 23(4), 684-696.

Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. Wiley.

Paivio, A. (1978). A dual coding approach to perception and cognition. Modes of perceiving and processing information, 39-51.

Perez Garcia, M., & Bresciani, S. (2015). The Role of Visual Templates on Improving Teamwork Performance. IEEE.

Perry-Smith, J. E., & Mannucci, P. V. (2017). From creativity to innovation: The social network drivers of the four phases of the idea journey. Academy of Management Review, 42(1), 53-79.

Phaal, R., Farrukh, C. J., & Probert, D. R. (2004). Technology roadmapping—a planning framework for evolution and revolution. Technological forecasting and social change, 71(1), 5-26.

Raab, J. 2008. Visuelle Wissenssoziologie: Theoretische Konzeption und materiale Analysen. Konstanz: UVK.

Schwarz, R. (2002). The skilled facilitator: A comprehensive resource for consultants, facilitators, managers, trainers, and coaches. San Francisco: Jossey-Bass.

Schuman, S. (Ed.). (2012). The IAF handbook of group facilitation: Best practices from the leading organization in facilitation. John Wiley & Sons.

Shimojima, A. (1999). Derivative meaning in graphical representations. In Visual Languages, Proceedings, IEEE Symposium, 212-219.

Simon, H. A. (1972). Theories of bounded rationality. Decision and organization, 1(1), 161-176.

Suthers, D. D. (2001). Towards a Systematic Study of Representational Guidance for Collaborative Learning Discourse. Journal of Universal Computer Science, 7(3), 254-277.

Swinton, W. (1879). New word-analysis: School etymology of English derivative words. The Project Gutenberg. www.gutenberg.org. Accessed October 30, 2017.

Thomas, G. J. (2005). Dimensions of facilitator education. The IAF handbook of group facilitation: Best practices from the leading organisation in facilitation, 525-541.

Tuecke, S (2006). The Architecture of Participation. In The IAF Handbook of Group Facilitation, Schuman, S. (eds.), 73-88.

Tversky, B. (2005). Visuospatial reasoning. The Cambridge handbook of thinking and reasoning, 209-240.

Van Leeuwen, T. (2007). Legitimation in discourse and communication. Discourse & Communication, 1(1), 91-112.

Wardale, D. (2013). Towards a model of effective group facilitation. Leadership & Organization Development Journal, 34(2), 112-129.