Introduction

Many of us have found ourselves working in community settings gathering information from a variety of sources and then combining it into a more comprehensive overview. Often this produces walls covered in "newsprint" and voting sessions to determine what are the most popular responses. Conversely, recorded interviews can produce volumes of information that lead some of us to word recognition software or expert panels to conduct content analysis. The time, lack of preciseness or proliferation of what is popular at the expense of what is important hinder these and other methods for collecting and analyzing responses from diverse groups. Voting on shared items puts ideas and the people who generated them in conflict. How often does a group facilitator or the group itself go back and review and discuss those items that didn't garner broad group support? With Concept Mapping it is possible to collect and analyze participant data in ways that are respectful of all participants' views, use proven statistical analysis, and generate products that are easily understood by audiences of varying literacy.

Concept Mapping is a methodology that was developed by Cornell University Professor William Trochim and has been used by academics and professionals in both public and private organizations interested in program planning and evaluation for over twenty years. This methodology makes it possible to collect a broad array of ideas, organize and assign values to them using accepted statistical methods and produce a final product in a matter of hours. It also provides a means for examining the total populations' response or comparing and contrasting subgroups within the population. Concept Mapping presents an analysis of the majority point of view without losing the minority viewpoint.

In traditional planning, people often start by defining the categories of things to discuss. In concept mapping, individual ideas from stakeholders come first, and then the map shows an organizational structure of these ideas, to use for effective planning. This process gives people the ability to contribute independently - a critical ingredient for a successful group process. These maps show participants that their contribution to the process was actually used, and demonstrates how their work fits in with what others contributed.

For those of us working in situations where time, literacy levels and language are issues, Concept Mapping provides an ideal method of quickly producing a product that is credible and will be effective across audiences with a wide variety of abilities. Concept mapping projects frequently include government officials, business representatives, academics, farmers, and average participants—all of whom are able to contribute and discuss the results.

The Concept Mapping Process

A Concept Map is visual representation - a picture - of how different ideas are related to each other. Ideas that are located close together on the map are closely related in meaning, and ideas that are farther apart are considered to be less related in meaning. Similar ideas will often "cluster" together, which facilitates looking at them as a whole category and then assigning importance to them.

A Concept Map activity is a structured process that keeps a group on task and aware of where they are in the process. Depending on how a group leader decides to structure the "Mapping" steps an individual participant could complete their work on a map in 3-4 hours. At the same time Concept Mapping is supported by established statistical methods that give the final outcome credibility in even the strictest evaluations.

The key features of the Concept Mapping Process are:

1. Preparing for Concept Mapping. All Concept Maps begin with a "prompt" or focus question. This is the basis for generating the information that will be mapped. A focus question might be something like "One thing that will increase farm productivity is…". Once a prompt question is identified a timeline for completing the process will be established and the participants will be identified.

2. Generating ideas. Participants are asked to brainstorm ideas in response to the "prompt question". Brainstorming can take place in the traditional way, with the group in one room or people can generate ideas individually and submit them anonymously. After the responses have been gathered the list is edited for grammar, duplication and compound responses, and then a clean final list is produced.

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3. Structuring the Ideas

The final list (often a hundred statements) of ideas is given back to participants and they are asked them to "sort" the ideas into groups that make sense to them. These activities can be done online with simple "drag and drop" process or by using a deck of cards with each statement printed on its own card. There are three simple rules: participants cannot have one hundred piles of one statement each, nor one pile of one hundred statements or a pile/group called "undecided". Participants are asked to create their groups based on their perceptions so ideas are sorted by how similar they are in meaning to each other, not by how important they are. Participants are then asked to give a name to each group of statements that they have created.

A. Upon completion of the "Sorting" task participants are asked to rate each statement using two different "Rating Forms". All statements are listed and have two five-point scales associated with each statement (Good to Bad, Feasible to Not Feasible, etc.). While any metric can be used for this process a common pairing is "Importance" and "Feasibility".

B. The participants have engaged in this process for approximately three and a half hours total time often over the course of two meetings. One of the benefits of this methodology is the generation of a lot of data and meaningful engagement but done in a short period of time.

Figure 1: Concept Mapping Process
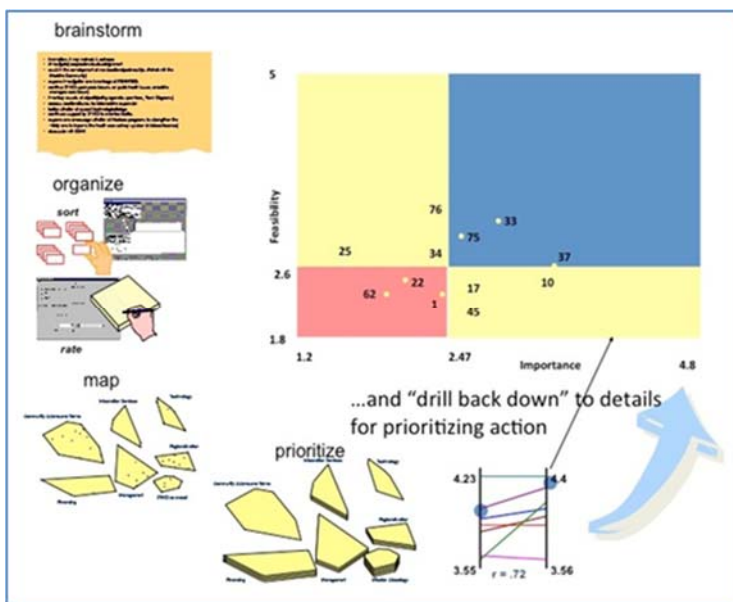
4. Concept Mapping Analysis

In this step, participants' contributions are aggregated to create the concept map. Statistical techniques, like multi-dimensional scaling, which locates each idea as a separate point on the map, are applied. The participants have generally grouped statements that are closer to each other on this map.

Hierarchical cluster analysis depicts where it makes sense to draw boundaries around groups of ideas, to make them into conceptual clusters. Finally, the ratings for each idea and each cluster of ideas are averaged. This produces a series of maps that are visual representations of the group participant input. In the map one sees the aggregate work of the group and makes it possible to compare sub-groups that are identified by any number of demographics, i.e., age, gender, etc.

5. Interpreting the Maps.

The created maps are shared with the group and are often the trigger for more in depth discussion of what they represent. The most common forms of maps are:

- **Point Map**. All statements are represented on one map and positioned on the map representing how the group saw their relationships to one another.

- **Cluster Map.** This map shows how the computer draws the boundaries around the points to create categories.

- **Rating Maps.** These maps overlay the rating data onto the map to show, for example, which ideas or clusters of ideas the participants thought were most important.

- **Go-Zones.** These reports compare the ratings of the statements within a cluster. Statements that fall in the upper right quadrant of High Importance & High Feasibility are excellent starting points.

Concept Mapping for MEAS Action Research

Concept Mapping has been used by federal and international policy makers to establish policies related to "Tobacco Control" (Trochim, et.al. 2003). Concept Mapping process has been applied in the creation of logic models for large research centers (Anderson, et.al, 2006). The process has been used to identify key metrics for designing evaluation programs for the National Institutes of Health and the National Science Foundation. An archive of Concept Mapping projects can be found at www.conceptsystems.com.

During the summer 2011 Concept Mapping methodology was used for MEAS action research on accessing the requirements for electronically linking farmers with markets in Ethiopia, Rwanda and Bangladesh. Participants were farmers, brokers, middlemen, traders, retailers, wholesalers, market managers, extension agents, government officials, faculty members, and representatives from private agro-enterprises. Participants brainstormed in response to the prompt statement "I would be much better able to market and distribute my products if…." and they generated 85-90 statements. Where there were literacy or language issues translators worked with participants or the materials where translated into their native language. These statements were sorted and rated by the group and produced a nine cluster map for each country.

A GO-ZONE Map is created for each Cluster. The X-axis represents the highest and lowest mean scores for statements rated for Importance within that Cluster and the Y-axis represents the highest and lowest mean scores rated for feasibility. The mean values for feasibility and importance are established and then intersecting lines form the four quadrants. Statements that fall in the green or upper right quadrant (GO-ZONE) are those statements that were rated above the mean in both "Importance" and "Feasibility". The statements that fall in either the brown or yellow quadrants are interesting but not as likely to be easily adopted or supported. The statements in the gray quadrant will be the most difficult to accomplish. Figure 2 shows the Go-Zone Chart for the Cluster "Mobile Phone & Agriculture".
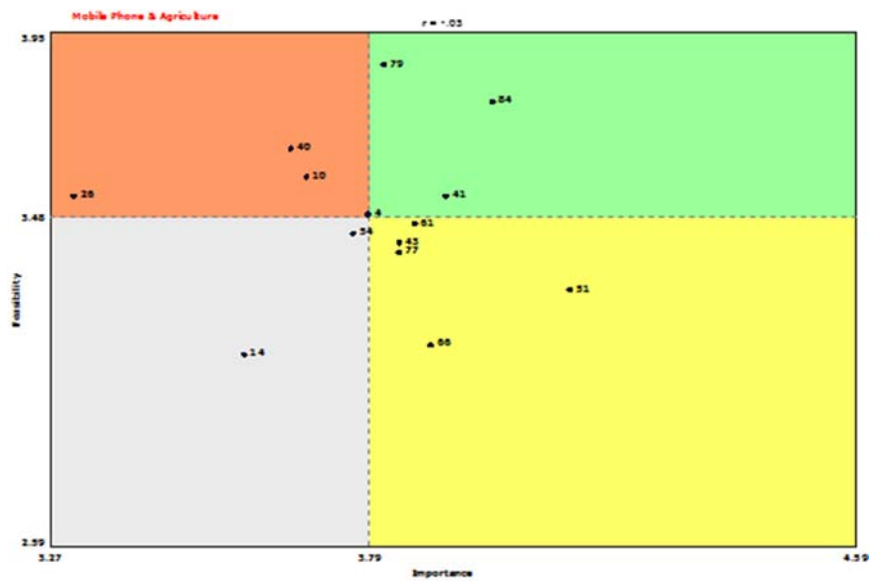

Figure 2: Go-Zone from the MEAS Project showing Average Ratings for Importance and Feasibility for Mobile Phone & Agriculture (Ethiopia)

Impact

The impact was different in each of the three countries where Concept Mapping activities were conducted. The differences are largely attributed to the fact that the countries were at different points relative to this form of communication.

In the first country there is already a public/private partnership in providing agricultural information using a SMS platform. The project was useful for funders, government officials and consultants as they prepared for a "second generation" of the existing system. Concept Maps both confirmed some of the plans and suggested additional opportunities for further development.

In the second country the findings were of interest to a large NGO that was considering development of information dissemination system using an SMS platform. Further the Concept Map highlighted necessary policy changes needed to unify service providers before moving ahead and confirmed a high level of readiness among potential users. In the third country the "Mapping" process indicated a high level of interest among users but a clear need for more preparation before launching a new system. However, academics saw the mapping process as indicative of new approaches that could complement current work in disseminating agricultural information.

The complete report is available at www.meas-extension.org/meas-offers/pilot-projects.

The MEAS Research Project using Concept Mapping was able to provide detailed information after two meetings with business representatives, farmers, wholesalers and retail distributors as well as government officials.

Participants are brainstorming to response to the prompt statement "I would be much better able to market and distribute my products if…."

Participants are focusing on sorting and rating.

Summary

Concept Mapping is a methodology that is very effective in working with groups that have disparate ideas that need to be organized. Disaggregating the map using demographic indicators make it possible to identify common interests across groups. Analyzing a map can also indicate where there are significant disagreements. These activities can lead to strategic discussions and potential negotiations when building coalitions. Maps are often the basis for designing evaluation criteria for a project. Using a map can quickly identify key metrics for data collection. Maps can be the basis for "social marketing" efforts. The Concept Mapping process can identify what aspects of a larger project have the most support and tailor our message to include references to those elements.

One of the learning outcomes from having used the Concept System process in various contexts is that at the completion of the project there is a very high level of " Buy In" among participants. The Concept System reports lend themselves to be easily understood and are powerful tools for recommendations. This ability to convey the work of the participants to non-participants is strength of the process. Concept Mapping projects in the past have often led to broader marketing discussions that produce policy changes and later serve as the foundation for program development. In the specific case of this project the Concept Mapping report will have the greatest impact if it is presented to and supported by key external stakeholders. Like any process that produces information about group preferences and choices the reports are most useful when integrated with ongoing policy and planning activities and become less useful over time if not acted on.

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