Module 5

Tips for Synthesizing Data

Through the analytic process you have pulled apart the data and looked for key themes within that data. In synthesizing data you bring those parts together into an understandable whole and look for relationships between the parts. You bring together information from multiple data collection tools and sources of data.

Keep in mind that the analysis, synthesis, and interpretation of data are not discrete activities but ones that inform each other. Work back and forth across these activities.

In synthesizing data you are looking at the interplay between the parts; between the parts and the whole; and between the micro and macro. Attempt to explain the varied ways in which contextual conditions, actions, and consequences affect each other. In doing so consider the different perceptions and standpoints of those involved and the multiple and diverse patterns of connections.

Diagrams are especially helpful tools for synthesizing data. By visually representing relationships you are seeing, you can communicate many concepts on one page. The depiction of the CLIP process given in the overview to these modules is an example of a synthesis of how CLIPs operate and what impact they have.

Concept Map: A concept map (see download for Module 3 page 045) is a way of showing the conceptual connections among events, activities, results, and conditions.

Action and Inquiry Map: A special type of concept map that can be useful for a CLIP is an Action and Inquiry Map (AIM)[1]. (See Parsons, 2002.) An AIM is usually presented as a series of boxes and arrows that shows the relationships between activities and outcomes. It may show the sequence of moving from early outcomes to mid-range outcomes and on to long term outcomes. Figure 1 below contains an AIM that the STEM CLIPs might create to continue to follow the impact of peer study groups in the future.

[1] These diagrams are also referred to as Logic Models.

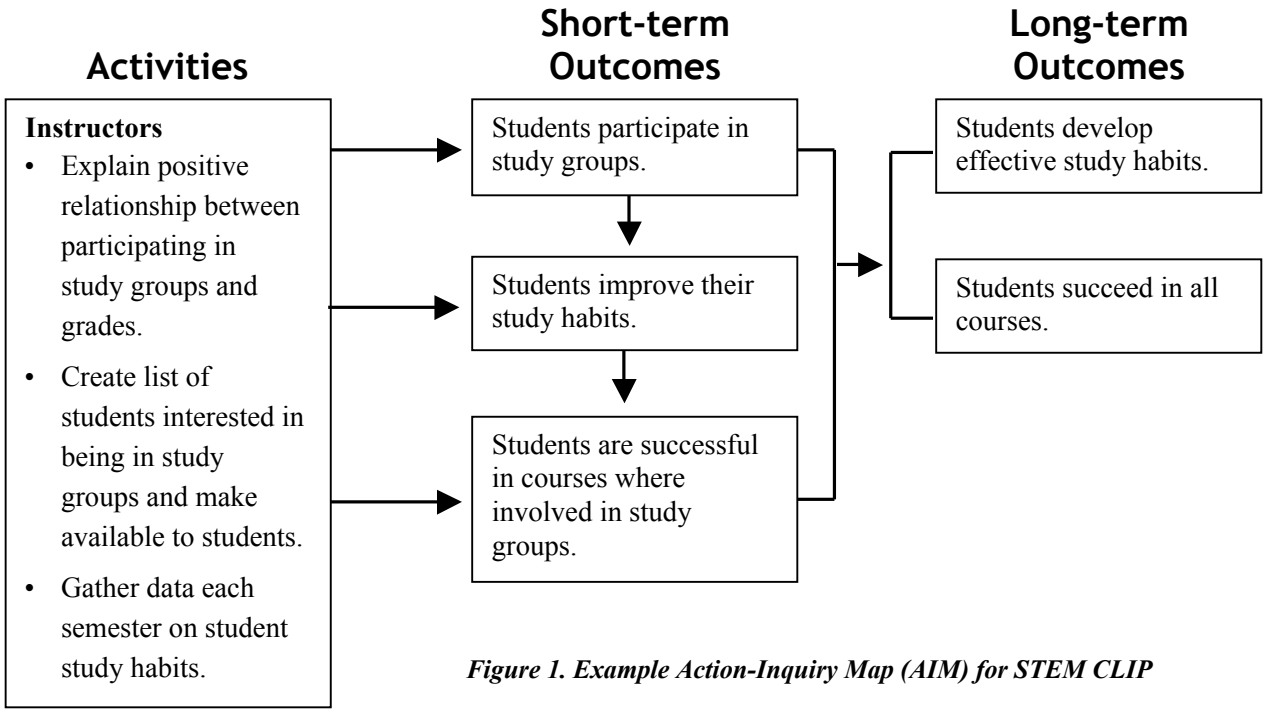

Figure 1. Example Action-Inquiry Map (AIM) for STEM CLIP

System Dynamics Diagrams: Another type of diagram is a systems dynamics diagram. It shows multiple causal loops showing how a variety of factors accelerate or inhibit movement in certain directions. Peter Senge popularized these types of diagrams. (See Senge, 1990; Senge et al, 1994)

Complexity Patterns: Not all relationships can be shown as causal relationships. Researchers in many disciplines are involved in studying what are known as "complex adaptive systems". A complex adaptive system consists of a large and diverse number of agents that interact in adaptive and nonlinear ways. In a densely intertwined web of interacting agents (e.g., subgroups, individuals), each agent is responding to other agents and the environment as a whole; it is continually adapting in the context of its relationships with other agents. Although patterns form that can provide understanding, the complexity of the systems prevents predictions using models based on a few variables as might be shown in an Action and Inquiry Map. Complex adaptive systems can be thought of as self-organizing systems in which a new order or pattern can emerge with no preplanning.

When a system is self-organizing, it exhibits unexpected properties. It doesn't gradually move to being either stable or unstable. Rather it is continually in a state of disequilibrium. This is a state characterized by contradiction and contentions, simultaneous cooperation and competition, and the coexistence of interdependence and independence. However, general patterns emerge in these situations that can be helpful to describe. Here are a couple examples of such patterns.

- **Life cycle pattern:** A natural life cycle would be birth, maturity, destruction, and renewal. A pattern might be that certain teaching and learning processes stop at the maturity stage and are not renewed because people resist the destruction phase. (See Zimmerman, Lindberg, & Plsek, 2001, for more details.)
- **Stretch and fold pattern:** The name of this pattern comes from kneading bread. Stretching builds tension, reveals differences, incorporates diversity, and brings in new energy. Folding consolidates new connections and lets change settle in. Communication may be difficult during stretching, but growth and opportunity arise. Folding reveals common values and releases the tension of the stretch. (See Eoyang, 2007.) A pattern of this type is seen in how groups often operate. They may explore new ideas (stretch) for a period of time and then are exhausted by the exploration and need to consolidate and rest before pursuing additional ideas or changes.

Fractals are another type of pattern that might be found in complex adaptive systems. For more information on such systems and their relevance to inquiry processes see W.K. Kellogg Foundation (in press).

References

Eoyang, G. (2007). *Attractors*. Circle Pines, MN: Human Systems Dynamics Institute. Vol. 4.3

Parsons, B. (2002). *Evaluative inquiry: Using evaluation to promote student success*. Thousand Oaks, CA: Corwin.

Parsons, B. (in press). "The State of Methods and Tools for Social Systems Change". *American Journal of Community Psychology*. New York: SpringerLink.

Senge, P. (1990). *The fifth discipline*. New York: Doubleday/Currency.

Senge, P., Kleiner, A., Roberts, C., Ross, R., & Smith, B. (1994). *The fifth discipline fieldbook*. New York: Doubleday.

W.K. Kellogg Foundation (in press). *The W.K. Kellogg Foundation Initiative Evaluation Guide*. Battle Creek, MI: W.K. Kellogg Foundation.

Zimmerman, B., Lindberg, C., & Plsek, P. (2001) *Edgeware: Insights from complexity sciences for health care leaders*. Irving TX: VHA, Inc.