



Activity Illustrating Making Meaning from Data

Analysis

To illustrate the analysis of qualitative data we are using responses to a focus group question from a CLIP inquiry. This CLIP focused on peer study groups among STEM (science, technology, engineering, mathematics) students. One of the primary inquiry questions explored by this CLIP was: How can faculty facilitate the formation of study groups?

After gathering data in several classes through a questionnaire, the CLIP conducted interviews and a focus group to get more detailed information. The student CLIP member conducted phone interviews with a few students from selected STEM classes using an interview protocol consisting of seven questions. The same questions were used for the focus group. Below are the focus group responses of eight students to question seven. These data build on the actual focus group responses but with some modifications to illustrate the analytic process. The focus group responses were entered into a word processing program as described in *Tips for Analyzing Qualitative Data*. The responses of the participants (P) were then sorted by question (Q).

Q7. What role should an instructor have in encouraging study groups?

P	Q	Response	Code
1	7	The instructor could offer points as an incentive. They could have a sign in sheet that someone in the group would manage if the instructor wanted to know if people attended or to give incentive points. Also, share the names and email addresses of those that attend so others can find out if it is a useful group or just social.	
2	7	The instructor could offer to lead a study group during office hours. Participation from the instructor is good.	
3	7	Get the names and email addresses of people in the class who want to be in study groups and then circulate that information. That way they can contact each other.	
4	7	In a history class the professor pointed her out as someone who takes good notes and would be a good person for other students to talk to. One student came to talk with her who got a D on the first exam. Then with her help moved to a B and finally an A on the last exam. She didn't mind helping other students but she didn't think it was good for the professor to point her out without first asking her if it was OK.	
5	7	A key thing for professors is to simply make it known that it is a good thing to be in study groups. Some students don't realize that the professors value this. Make sure it is known that it is a good thing.	
6	7	Professors could designate a time and place each week where groups could meet to study. Then whoever wanted to show up could. Professors should attend some of the groups to help them get started.	

P	Q	Response	Code
7	7	The instructor should ask students to notify him/her if they are doing a study group. That way the instructor can make it known to the rest of the class that such a study group is going on. Make clear that these groups are for studying, not socializing.	
8	7	The instructor should make participation in a study group a requirement of the course. He/she could allow time in one of the first classes for students to form these groups. This would show that he/she thinks that study groups are important. It would help students to connect.	

Here are steps for analyzing this type of data.

1. Skim through the data to get a sense of the responses and whether interviewees seemed to understand the questions and the level of detail of the responses. In this instance, you see that a few of the respondents provide background information and/or the reasoning for their comments; others simply state their ideas.
2. Develop a set of codes using both codes that you predefine and ones that emerge from the data. Predefined codes are designated for categories and themes that you expect to see based on your prior knowledge, or for specific topics/issues that you want to track, sometimes simply to find out that they did not appear in the responses. Create a code for topics you expect to see or want to track. For example, in this inquiry since the CLIP members expected to see a theme related to how instructors facilitated the formation of study groups, they predefined a code (F) for this theme. Emergent codes are created for those themes that emerge as you review the data. Create a two-column table for listing the codes and what each code represents. Use the same code across the focus group questions, interview questions and other forms of data. It may be used to create a master list of the codes across all data.

Code	Description of Code
C	Clarify purpose of study groups
F	Facilitate organization of study groups
I	Instructor participation
P	Point out strong students
V	Acknowledge value of study groups
O	Other outcomes
NR	No response

3. Read and reread the responses for a question, and identify themes that appear in the data. Add the selected code(s) in the code column.

P	Q	Response	Code
1	7	The instructor could offer points as an incentive. They could have a sign in sheet that someone in the group would manage if the instructor wanted to know if people attended	V

P	Q	Response	Code
		or to give incentive points. Also, share the names and email addresses of those that attend so others can find out if it is a useful group or just social.	F
2	7	The instructor could offer to lead a study group during office hours. Participation from the instructor is good.	V I
3	7	Get the names and email addresses of people in the class who want to be in study groups and then circulate that information. That way they can contact each other.	F
4	7	In a history class the professor pointed her out as someone who takes good notes and would be a good person for other students to talk to. One student came to talk with her who got a D on the first exam. Then with her help moved to a B and finally an A on the last exam. She didn't mind helping other students but she didn't think it was good for the professor to point her out without first asking her if it was OK.	P
5	7	A key thing for professors is to simply make it known that it is a good thing to be in study groups. Some students don't realize that the professors value this. Make sure it is known that it is a good thing.	V
6	7	Professors could designate a time and place each week where groups could meet to study. Then whoever wanted to show up could. Professors should attend some of the groups to help them get started.	F I
7	7	The instructor should ask students to notify him/her if they are doing a study group. That way the instructor can make it known to the rest of the class that such a study group is going on. Make clear that these groups are for studying, not socializing.	F C
8	7	The instructor should make participation in a study group a requirement of the course. He/she could allow time in one of the first classes for students to form these groups. This would show that he/she thinks that study groups are important. It would help students to connect.	V F

Initial codes often are quite broad and not sufficient to show the various ideas contained within the theme. Create subcategories as needed. For example, the code F may be too broad to acknowledge the different ways that instructors could facilitate the organization of study groups. The table shows subcategories created for two codes that were too broad.

Code	Description of Code
C	Clarify purpose of study groups
F	Facilitate organization of study groups
FCI	Facilitate by sharing contact information
FIG	Facilitate by sharing information about existing groups
FT	Facilitate by designating and/or allowing time for students to organize groups
I	Instructor participation in study group
P	Point out strong students
V	Acknowledge value of study groups
VI	Offer incentives
VL	Lead a study group

Code	Description of Code
VR	Require study groups
O	Other outcomes
NR	No response

Return to the data and add the specific codes as appropriate.

P	Q	Response	Code
1	7	The instructor could offer points as an incentive. They could have a sign in sheet that someone in the group would manage if the instructor wanted to know if people attended or to give incentive points. Also, share the names and email addresses of those that attend so others can find out if it is a useful group or just social.	V FCI
2	7	The instructor could offer to lead a study group during office hours. Participation from the instructor is good.	VL I
3	7	Get the names and email addresses of people in the class who want to be in study groups and then circulate that information. That way they can contact each other.	FCI
4	7	In a history class the professor pointed her out as someone who takes good notes and would be a good person for other students to talk to. One student came to talk with her who got a D on the first exam. Then with her help moved to a B and finally an A on the last exam. She didn't mind helping other students but she didn't think it was good for the professor to point her out without first asking her if it was OK.	P
5	7	A key thing for professors is to simply make it known that it is a good thing to be in study groups. Some students don't realize that the professors value this. Make sure it is known that it is a good thing.	V
6	7	Professors could designate a time and place each week where groups could meet to study. Then whoever wanted to show up could. Professors should attend some of the groups to help them get started.	FT I
7	7	The instructor should ask students to notify him/her if they are doing a study group. That way the instructor can make it known to the rest of the class that such a study group is going on. Make clear that these groups are for studying, not socializing.	FIG C
8	7	The instructor should make participation in a study group a requirement of the course. He/she could allow time in one of the first classes for students to form these groups. This would show that he/she thinks that study groups are important. It would help students to connect.	VR FT

Note that the responses for Participants 1, 2, 6, 7, and 8 now have two codes. In order to sort the responses by code, you can only have one code per row. To address this, copy the response or the relevant part of the response, and paste it as a new row in the table, as shown below. Give the appropriate code for each row.

P	Q	Response	Code
1	7	The instructor could offer points as an incentive. They could have a sign in sheet that someone in the group would manage if the instructor wanted to know if people attended or to give incentive points.	VI
1	7	Also, share the names and email addresses of those that attend so others can find out if it is a useful group or just social.	FCI
2	7	The instructor could offer to lead a study group during office hours.	VL
2	7	Participation from the instructor is good.	I
3	7	Get the names and email addresses of people in the class who want to be in study groups and then circulate that information. That way they can contact each other.	FCI
4	7	In a history class the professor pointed her out as someone who takes good notes and would be a good person for other students to talk to. One student came to talk with her who got a D on the first exam. Then with her help moved to a B and finally an A on the last exam. She didn't mind helping other students but she didn't think it was good for the professor to point her out without first asking her if it was OK.	P
5	7	A key thing for professors is to simply make it known that it is a good thing to be in study groups. Some students don't realize that the professors value this. Make sure it is known that it is a good thing.	V
6	7	Professors could designate a time and place each week where groups could meet to study. Then whoever wanted to show up could.	FT
6	7	Professors should attend some of the groups to help them get started.	I
7	7	The instructor should ask students to notify him/her if they are doing a study group. That way the instructor can make it known to the rest of the class that such a study group is going on.	FIG
7	7	Make clear that these groups are for studying, not socializing.	C
8	7	The instructor should make participation in a study group a requirement of the course. This would show that he/she thinks that study groups are important.	VR
8	7	He/she could allow time in one of the first classes for students to form these groups. It would help students to connect.	FT

4. After coding the data, group data with similar themes. To sort the table by code, select the entire table, choose the *sort* function from the table menu, and sort on the code column. The responses are now alphabetized and the categories related to facilitating organization of groups and valuing groups are in proximity to each other.

P	Q	Response	Code
7	7	Make clear that these groups are for studying, not socializing.	C

P	Q	Response	Code
1	7	Also, share the names and email addresses of those that attend so others can find out if it is a useful group or just social.	FCI
3	7	Get the names and email addresses of people in the class who want to be in study groups and then circulate that information. That way they can contact each other.	FCI
7	7	The instructor should ask students to notify him/her if they are doing a study group. That way the instructor can make it known to the rest of the class that such a study group is going on.	FIG
6	7	Professors could designate a time and place each week where groups could meet to study. Then whoever wanted to show up could.	FT
8	7	He/she could allow time in one of the first classes for students to form these groups. It would help students to connect.	FT
2	7	The instructor could offer to lead a study group during office hours. Participation from the instructor is good.	I
6	7	Professors should attend some of the groups to help them get started.	I
4	7	In a history class the professor pointed her out as someone who takes good notes and would be a good person for other students to talk to. One student came to talk with her who got a D on the first exam. Then with her help moved to a B and finally an A on the last exam. She didn't mind helping other students but she didn't think it was good for the professor to point her out without first asking her if it was OK.	P
5	7	A key thing for professors is to simply make it known that it is a good thing to be in study groups. Some students don't realize that the professors value this. Make sure it is known that it is a good thing.	V
1	7	The instructor could offer points as an incentive. They could have a sign in sheet that someone in the group would manage if the instructor wanted to know if people attended or to give incentive points.	VI
2	7	The instructor could offer to lead a study group during office hours. Participation from the instructor is good.	VL
8	7	The instructor should make participation in a study group a requirement of the course. This would show that he/she thinks that study groups are important.	VR

- When you have completed the coding, begin to develop a summary of the data. This is not your interpretation of the data, but simply what it has revealed. For example, list how many respondents responded to the question, the number of responses that were given, and the number of respondents who provided each response. For each code, indicate the percentage of responses assigned to that code and the percentage of respondents who gave that response.

Summary Table

Number of respondents – 8

Number of responses – 13

Code	Description of Code	# of responses	% of responses	% of respondents*
C	Clarify purpose of study groups	1	8%	13%
F	Facilitate organization of study groups			
FCI	Facilitate by sharing contact information	2	15%	25%
FIG	Facilitate by sharing information about existing groups	1	8%	13%
FT	Facilitate by designating and/or allowing time for students to organize groups	2	15%	25%
I	Instructor participation in study group	2	15%	25%
P	Point out strong students	1	8%	13%
V	Acknowledge value of study groups	1	8%	13%
VI	Offer incentives	1	8%	13%
VL	Lead a study group	1	8%	13%
VR	Require study groups	1	8%	13%
O	Other outcomes	0	0	0
NR	No response	0	0	0

* Total can exceed 100% as respondents could give more than one response.

Creating subcategories for codes that are too broad is useful for seeing the variety of ways in which, for example, instructors can facilitate the organization of study groups or acknowledge the value of study groups. However, when summarizing key themes, it is helpful to collapse those back into the broad code. Doing this helps to reveal key themes, such as we see in the following table. Sixty-three percent of the students thought that instructors could encourage study groups by facilitating the organization of the groups, and fifty percent noted the importance of instructors acknowledging the value of study groups. These are two themes that appear to be key points in the focus group responses.

Code	Description of Code	# of responses	% of responses	% of respondents*
C	Clarify purpose of study groups	1	8%	13%
F	Facilitate organization of study groups	5	38%	63%
FCI	Facilitate by sharing contact information			
FIG	Facilitate by sharing information about existing groups			
FT	Facilitate by designating and/or allowing time for students to organize groups			
I	Instructor participation in study group	2	15%	25%
P	Point out strong students	1	8%	13%

Code	Description of Code	# of responses	% of responses	% of respondents*
V	Acknowledge value of study groups	4	31%	50%
VI	Offer incentives			
VL	Lead a study group			
VR	Require study groups			
O	Other outcomes	0	0	0
NR	No response	0	0	0

* Total can exceed 100% as respondents could give more than one response.

In this inquiry, students were asked about the role an instructor should have in encouraging study groups on the student questionnaire, in phone interviews and in a focus group. Create a summary for this question in each set of data to help uncover key themes within the various data sources. With your data coded and summarized you are ready to look across the various data and synthesize your findings. See *Tips for Synthesizing Data*.

Synthesis

In your synthesis of the data you are attempting to uncover the interplay of the parts and the whole, and the relationships and patterns that exist among the parts. Look for key themes across the sources of data. Two key themes that emerged from Question 7 of the focus group session were facilitating the organization of study groups and acknowledging the value of study groups. Look at the student questionnaire responses and phone interview responses to see if these same themes emerged in those data as well. Were these two themes key in the other data? Were the other coded themes, such as instructor participation in study groups, included in responses to the questionnaire and phone interviews? If so, was this a stronger theme in the other data sources than it was in the focus group responses? Compare and contrast the themes that emerged in the various data sources including the apparent strength of the response in each of the sources.

Instructors also were asked about their role in the formation of study groups. In your synthesis of the data consider the similarities and differences in responses from faculty members and students. Are instructors doing the types of things that students indicate will encourage them to participate in study groups? In what ways are instructors and students relating to each other about study groups? Are students forming study groups without assistance from instructors? If so, which students are included and which are not included in study groups? These are some of the questions you can ask of the data as you look for patterns and relationships across the various data sources.

Interpretation

Once you have identified some of the patterns, relationships and interconnections across the data sources, you need to probe for the meaning of these within the context of your inquiry. As noted in *Tips for Interpreting Data*, consider the data from various points of view. What do these patterns and relationships mean for students? For instructors? For CLIP members? If the

importance of instructors facilitating the organization of study groups and acknowledging the value of study groups are themes that also emerged in the other data sources, what does this mean for faculty members? Are faculty members in a position to help to organize study groups? What additional resources, if any, do they need to do this? Also consider data that would lead to other interpretations. Even though students in the focus groups indicate that it would be helpful for instructors to encourage participation in study groups, do students give evidence that they would join study groups? Do students cite reasons that they would not participate in study groups in spite of instructors' encouragement to do so? What would need to be done to overcome students' resistance to participation in study groups? It is important to interrogate the data from multiple perspectives in order to make meaning of the data within the context of the inquiry.

How you interpret the data is based partially on your assumptions. For example, if an interpretation indicates a need for action related to study group participation it likely is based on the assumption that STEM students' participation in peer study groups will increase their learning and achievement and the assumption that instructors' acknowledging the value of study groups and facilitating the organization of study groups will increase student involvement in study groups. It is important to specify these assumptions and engage in dialogue with CLIP members and other faculty and students to clarify these assumptions. Also engage in dialogue about data that seem to contradict these assumptions as useful, e.g. insights and actions can result from such data.