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Analyzing Qualitative Data

P ROGRAM ADMINISTRATORS AND TEACHERS
collect all kinds of qualitative data—inter-
views, observations, documents. In order for such
data to be useful in improving programs, solving
problems, or explaining what happened, data must
be turned into results. Transforming data into research
results is called analysis. Big piles of data are trans-
formed into succinct statements that describe, explain,
or predict something about what the researcher has
studied (LeCompte & Schensul, 1999).

Analysis is a bit like taking apart puzzles
and reassembling them (LeCompte & Preissle, with
Tesch, 1993). However, puzzles cannot be complet-
ed if pieces are missing, warped, or broken. Similar-
ly, if pieces of data are incomplete or biased, research
results cannot provide a complete picture of a pro-
gram or a good solution to problems. A first step in
analysis, then, is identifying sources of bias.

Some Rules for Unbiased Data Analysis

Good qualitative data are as unbiased as pos-
sible. However, because such data are collected by
human beings, and because people are interested
in certain things and not others, selections are made.
People tend to record as data what makes sense to
and intrigues them. Selectivity cannot be eliminat-
ed, but it is important to be aware of how it affects
data collection, and hence, the usefulness and credi-

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bility of research results. To develop such aware-
ness, people collecting data should be aware of the
effects of both *tacit* and *formative* theory. These
are the sources of selectivity (and bias) because
they create something analogous to a filter that
admits relevant data and screens out what does not
seem interesting—even if, with hindsight, it could
have been useful.

Tacit theories guide daily behavior, explain the
past, and predict what will happen next. People rely
on tacit theories to help them decide to carry umbrel-
las on cloudy days (theorizing that it might rain), or
investigate when children act oddly (theorizing that
they might be depressed, associating with undesir-
able peers, or doing drugs). Tacit theories also guide
teachers' ideas about which children are good learn-
ers. Such theories could bias investigation if other
kinds of children are overlooked.

Formative theories also guide behavior, cre-
ate explanations, and predict the future, but they
are more formal, and found in research. As the
basis for data collection and analysis, they gener-
ally derive from the disciplines in which research-
ers, program developers, and practitioners are
trained. They guide development of research ques-
tions, ideas about what data to collect, and which
units of analysis should be used in investigations.

LeCompte and Holloway (1997) built their
study of an intensive middle-school arts program
around discipline-based theories suggesting that if

teachers and children had opportunities to observe, talk about, and engage in behavior that differed from traditional gender and occupational roles, they might define their own identities in novel ways. These formative theories (Schensul, Schensul, & LeCompte, 1999) were based on theories about gender and identity in sociology (Goffman, 1959, 1960), activity theory in psychology (Vygotsky, 1978), and anthropological notions of cultural transmission (Bourdieu, 1993; Bourdieu & Passeron, 1977). They influenced what the researchers looked for while observing and recording data, especially during teacher-pupil interaction and interviews. Later, they created the large conceptual categories into which raw data were sorted for preliminary analysis (see discussion of Vadeboncoeur's use of such conceptual categories later in this article).

Tacit theories are identified to avoid bias in data collection, analysis, and interpretation. Formative theories are identified to develop research questions and guide data collection and initial analysis (Schensul, Schensul, & LeCompte, 1999). Thus, researchers must make both tacit and formative theory clear and then delineate their role in data collection. Having done that, analysis can begin.

Thinking About Analysis

Thinking of analysis as assembling a jigsaw puzzle is helpful. Jigsaw puzzles cut up a whole picture into fragments. Van Gogh's painting, "Crows Over a Wheatfield," has a golden wheatfield at the bottom, above which is sky, ranging from light blue near the wheatfield to nearly black at the top. Stylized crows fly through the darkening sky. To assemble a jigsaw puzzle of this painting, people might:

—Put all the similar pieces (all the edges, or the blue sky pieces, or those that might be parts of the wheatfield) in piles, then

—Assemble the sky chunks, the wheatfield chunks, and the outside borders, and finally,

—Identify the linking pieces so that the big chunks can be tied together into a coherent facsimile of the painting.

Players can "cheat" by stealing a glimpse of the picture of the painting on the puzzle box, just as researchers can get some idea of their research findings by looking at research done by other peo-

ple on the same or similar subjects. But even the completed picture reveals little about the real meaning of the painting. It presents nothing of the personal or cultural meaning of the piece of art it represents: that it is the last picture Van Gogh painted before committing suicide; that it represents a dramatic break from current artistic traditions; that the artist never sold a single painting during his lifetime. It also says nothing about the social and cultural standing of European artists in the late 19th century.

Making such statements requires interpretation, which is beyond the scope of this article (see LeCompte & Schensul, 1999). The task of analysis, which makes interpretation possible, requires researchers first to determine how to organize their data and use it to construct an intact portrait of the original phenomenon under study and second, to tell readers what that portrait means.

Countable data, such as test scores or the number of males and females or persons of different ethnic affiliation in a group, are relatively easy to analyze by feeding them into a computer program for "analysis." Computers manipulate data mathematically to count items, display variance, and identify relationships between characteristics.

Unfortunately, qualitative data sets are more complex and ambiguous than test scores. Less straightforward qualities such as "sexual orientation," "coping skills," "depression," or "resilience" are not always defined clearly and cannot always be measured with pre-existing instruments. Clearly, educators faced with increasing violence in schools have not defined key qualities that explain its cause or devised ways to measure them. They first must find out how teenagers (as well as parents and other relevant adults) define such problems and issues of violence, learn what students say causes the initial stages of violent behavior and what they look like, and devise ways to measure them by collecting qualitative data.

Because these kinds of data have no initial intrinsic organizational structure or meaning by which to explain the events under study, researchers (or in this case, educators) must then create a structure and impose it on the data. The structure is created in stages, and forms the basis for assembling data into an explanation or solution. Creating the structure is analogous to the strategies used to assemble puzzle

pieces; the pieces are like units of analysis in the data. Both are assembled using specific rules, except that in research, the rules set out how data are assembled to answer research questions.

Doing Analysis

Step one: tidying up

The first step in analysis is "tidying up" (Romagnano, 1991). Researchers may think that the time they spend arranging data in neat boxes and files is wasted. However, tidying up is an absolutely necessary first step to coding and analyzing data. Tidying up involves the following:

1. Make copies of all data.
2. Put all field notes and interviews into a file in order of their dates of creation.
3. Create other files based on type of data (e.g., interviews, questionnaires, field notes, artifacts), participants (e.g., data separated into files for students, teachers, staff development workers, parents), or organizations (e.g., data separated into files for health agencies, foundations, schools, labor unions, and clinics), subject or topic (e.g., data separated according to materials on recruitment of students, recruitment of teachers, parent involvement, curriculum characteristics, school board politics). The files to be created depend completely on what is reasonable and necessary, given the research questions.
4. Catalog and store all documents and artifacts.
5. Label all files and boxes according to their contents.
6. Create an index or table of contents for all data.
7. Review research questions, comparing them against the data collected.
8. Identify any holes or missing data chunks by determining if data actually were collected to answer each research question.
9. Return to the field to collect additional data to fill gaps in the record. Holes in the record sometimes cannot be avoided. Data initially thought desirable may turn out to be unnecessary; or collecting it may be too difficult, expensive, or dangerous. If the latter, then researchers must develop a rationale for why missing data cannot or will not be acquired.

Tidying up permits researchers to make a preliminary assessment of the data set. The next step in analysis involves finding items.

Step two: finding items

Items are the specific things in the data set that researchers code, count, and assemble into research results. In this article, they will be called items or units of analysis. Finding items in data sets resembles sifting and sorting, somewhat analogous to sifting flour to remove weevils. At first, the flour may appear quite acceptable, but sifting it concentrates the weevils so that they appear in the remaining raw flour. Data are sifted by repeated readings through field notes, interviews, and text to identify items relevant to the research questions. Concentrating these items in data involves systematic processes of looking for frequency, omission, and declaration.

Frequency. Items sometimes can be identified because they are numerous. Data might show that high school seniors in their final semester often are late or absent without excuses. Tardiness and truancy could then be identified as items in a study of alienation from school.

Omission. Items also can be identified because they *never* appear, even though researchers might think it reasonable that they would. LeCompte (1974, 1978), for example, thought it reasonable to look for behavior used by teachers to stress the intrinsic value of learning. However, in a year of observing four different fourth grade teachers, that behavior never appeared once—a fact LeCompte thought important, even though it involved the absence, rather than the presence, of a phenomenon.

Declaration. Items sometimes are identified as present or significant by study participants who tell researchers they exist. For example, teachers in a Learning Circle program told researchers that they always made appointments before visiting parents (LeCompte, Aguilera, Wilks, Fordemwalt, & Wiertelak, 1996). Researchers then must verify whether or not the items really do exist in the data, and if not, why not, even though participants say they do.

Step three: creating stable sets of items

Once initial items have been identified, researchers must organize them into groups or categories by comparing and contrasting items (Glaser &

Strauss, 1967), or mixing and matching them, somewhat like the reading readiness tasks in workbooks that elementary school children use to compare and contrast like and unlike objects. The purpose of these activities is to clump together items that are similar or go together. Researchers look for things that are exactly alike, things that differ slightly—therefore modifying initial descriptions—or things that either differ a great deal or negate one another, all so that clear-cut distinctions can be made between different kinds of items.

Using meaningful criteria or rules helps make these comparisons easier. Such rules can be created just for the study, or a set of guidelines can be used, such as Spradley's (1979) semantic relationships, displayed in Figure 1. Spradley's list fits any culture or situation. Items in a data set can be substituted into the phrases in it so as to organize them into sets of like and unlike items.

1. X is a kind of Y	7. X is a place for doing Y
2. X is a place in Y	8. X is used for Y
3. X is a part of Y	9. X is a way to do Y
4. X is a result of Y	10. X is a stage or step in Y
5. X is a cause of Y	11. X is a characteristic of Y
6. X is a reason for Y	12. X is a place for doing Y

Figure 1. Spradley's semantic relationships.

For example, substituting the names of individual items for the "X" in Spradley's phrases, and the names of potential categories of items for the "Y" (e.g., "vocational training is a kind of education," "high school is a stage in education," "libraries are a place in schools," "theater arts is part of the arts curriculum") permits researchers to identify and clarify description of items systematically. The resulting lists constitute a taxonomy, category, or classification scheme. Below are presented several examples of how items might be identified within a given data set.

Assembling a taxonomy. Suppose an anthropologist began asking informants to show her what they ate. After looking at and tasting various foods, she might notice that informants repeatedly showed her things that tasted sweet. Table 1 illustrates how she might display the things (items) that tasted sweet, using the semantic relationship, "X is a kind of [sweet]."

Table 1.
Identifying a Taxonomy of Items
Using "X is a kind of Y"

Individual Items (X's)	Taxonomic Name (Y)
Chocolate	
Lollipops	
Taffy	Sweets
Raisins	
Candied fruit	
Honey	

These initial groups could be subdivided further: "Sweets" could be divided into naturally occurring sweets, such as fruits and honey, and those that need processing, such as lollipops, chocolate, or taffy. They also could be divided into sweets that are hard, soft, or liquid; arranged by color, shape, and size; or categorized in order of preference by the local people or by their nutritional value, price, or scarcity. How they were divided would depend on what the anthropologists were studying (general consumption, nutritional habits, or food preferences) or what people choose to tell her (females may not be permitted to eat some kinds of sweets) or share with her (chocolate may be very scarce, and local people may not want her to have any). In addition, local people might describe as "sweet" some foods that do not taste sweet at all to western anthropologists—such as sea urchins or nuts.

The constituent items for another taxonomy were noticed in a study of the Learning Circle Project, an enrichment program for urban American Indian elementary school children (LeCompte et al., 1996). Learning Circle is a program for urban American Indian students in kindergarten through grade 3. It operates as an after-school language arts and social studies enrichment program, and includes both home visitations and a resource library from which parents can borrow educational resources to use at home with their children. Table 2 shows a set of behaviors with regard to parents whose occurrence was frequently noted in interviews with parents and teachers, as well as in field notes of observations.

These were radically different behaviors from those usually experienced by low-income people

Table 2
A Taxonomy of Items From the Learning Circle, Developed Using "X is a Way to [Respect Parents]"

Taxonomic Name (Y)	Items (X's)
Respecting parents	Contacting them in advance for meetings
	Sending certified teachers, not social workers, on home visits
	Providing a meal or refreshments at parent meetings
	Asking for parents' input on curriculum and actually using it

of color when interacting with public school programs. Parents said never before had school personnel made appointments for home visits, and never before had "real" teachers come to their homes. Parents were encouraged to provide ideas for the curriculum, and those ideas were incorporated into lesson plans. In keeping with American Indian norms that important events should be accompanied by sharing food, the significance of Learning Circle parent meetings was marked by their association with substantial refreshments or a potluck dinner. Taken together, these items created a taxonomy that the researchers called "Respecting Parents."

Constructing sets of taxonomies. Other taxonomies also began to emerge, consisting of individual items of behavior and belief, just as "Respecting Parents" did. Each of these taxonomies was constructed using large sheets of butcher paper and self-stick notes. Taxonomic names were written on each sheet, and then each data set was sifted through for relevant items (e.g., a sheet for all the ways of respecting parents from teacher interviews, all the ways of respecting parents found in observations, all the ways mentioned in parent interviews, all the items found in program documents). The items were written on notes and moved around until their location within a taxonomy was confirmed.

Using research participants to create taxonomies. Research participants can help investigators sort data into meaningful sets. A useful sorting strategy is called the "pile sort" (Borgatti, 1999).

Pile sorts involve writing down on cards the names of (or providing unambiguous pictures for) each of the items to be sorted, giving the deck of cards to research participants, and asking them to sort the cards into sets that "go together." Pile sorts permit researchers to determine how the people they are studying assemble items, rather than relying on researcher categories alone. Conducting data collection strategies such as these, using them to create the "rules" for identifying items and creating taxonomies, helps to assure that the researchers' categories are meaningful to the people studied.

If researchers studying food, for example, selectively ignore those products they do not think are sweet, or fail to include them among items grouped together by the local people as sweets, they may fail to develop a full taxonomy of delectables defined *as the local people see them.* This would be a source of bias in the data, one resulting from the researchers' unexamined tacit theories about what is tasty. Similarly, studies relying on behavior identified by *adults* as problematic to identify potential teen suicides might miss those teenagers find more important as sources of alienation and despair—with concomitant programmatic failure to arrest a serious social problem!

Step four: creating patterns

After stable taxonomies of "things that go together" are created, patterns need to be identified. Identifying patterns involves seeing how taxonomies can be clumped together in meaningful ways. Patterns are made up of taxonomies that seem to fit together or be related to one another. The process is analogous to linking all the sky pieces in the Van Gogh jigsaw puzzle together with the bird pieces, so that the whole picture begins to emerge.

Collecting data and finding items involves taking things apart and identifying their constituent parts. Locating patterns involves reassembling them in ways that begin to resemble a coherent explanation or description of the program, event, or phenomenon under study. Because it establishes the regularities within a cultural scene, identifying the most important patterns can help to clarify key ways to solve problems in a program or begin creating explanations for what happened during its duration.

Assembling patterns involves looking for some of the same characteristics that were used to identify items—such as frequency of occurrence, omission, and declaration—as well as looking for:

—similarity and analogy, or sets of items that are identical or serve the same purposes (students who drink often use drugs as well, because both drugs and alcohol make them high);

—co-occurrence, or sets of things that occur at the same time or place (students who smoke often drink as well);

—sequence, or groups of things that appear in series, usually temporally (girls who get pregnant drop out when their transportation or child-care arrangements fail);

—hypothesized reasonableness or patterns researchers think *should* exist, based on prior research, experience, or hunches (children who exhibit sudden shyness, hostility, and/or unexplained bruises and injuries may be abuse victims), and

—corroboration or triangulation, or patterns whose existence is confirmed by other pieces of data or information (observations of students smoking in stairwells, confirmed by interviews with students identifying stairwells as smoking venues).

Researchers assemble patterns by looking at each set of data, asking of it the same kinds of questions. In a study of an arts enrichment program, for example, LeCompte and Holloway (1997) asked, "How is the concept 'being an artist' manifested in a) student interviews, b) teacher interviews, c) school documents, d) classroom observations?" They also asked, "To what extent is art skills training evident in a) student interviews, b) teacher interviews, c) classroom observations, d) program documents, e) student products?" Answers to those questions were then triangulated, or compared and contrasted, across data sets. When it became clear that "being an artist" was emphasized frequently, in many ways, and across data sets, the researchers could confirm that it constituted a pattern in the study site, just as "respecting parents" was a pattern in the Learning Circle.

Step five: assembling structures

Once patterns have been identified, groups of them are then assembled into structures, or groups of related or linked patterns that, taken together, build an overall description of the program or problem being studied. If the data are good and analysis skillfully done, such descriptions can help participants see more clearly how to solve problems, improve programs, assess their effectiveness, or develop theories explaining what happened.

To summarize: In the item stage of analysis, researchers create taxonomies of "things" at different levels of abstraction. To the extent that these taxonomies are pervasive, they are grouped into patterns in the pattern stage of analysis. In the structural stage, patterns are grouped into structures, which help to describe or explain the whole phenomenon.

In the Learning Circle, a series of patterns were linked together in a structure that explained why the program was uniquely reflective of American Indian cultures, and pointed to steps other such programs could take to become more effective. Figure 2 displays in two columns the several patterns which, taken together, created a structure called "Privileging Indian Culture."

Respecting Indian parents	Providing choices
+	+
Hiring Indian teachers	Creating a safe place to be Indian
+	
Making Learning Circle rigorous	+
	Privileging Indian cultural knowledge
+	

Figure 2. Patterns assembled to create a structure called "Privileging Indian Culture" in the Learning Circle data.

Each of the six patterns in Figure 2 consisted of taxonomies of related items. There were, for example, several different taxonomies of items that denoted "ways of respecting parents" and "creating a safe place for Indian children." Concretely, Learning Circle teachers all were certified or licensed teachers (an item), and they all were American Indians (another item). These teachers believed Indian children should feel no stigma in identifying as Indians and celebrating their tribal heritages (two more items)—including mixed Indian and European or Mexican background. Learning Circle also never forced students or parents to engage in activities they felt were culturally inappropriate (an item). An emphasis on choice of activities (another item) facilitated celebrating multiple heritages (an item) while still being true to American Indian

norms respecting the dignity of individuals. Each of these taxonomies was grouped with related patterns.

Taken together, the six patterns in Figure 2 created a structure by which researchers characterized Learning Circle. They considered this structure, "Privileging Indian Culture," to be one of the principle reasons Learning Circle was such a success with participants. Other important indicators of success were structures demonstrating academic achievement, expansion of the program to upper grades, and increased program enrollment.

Assembling structures—or analysis leading to the creation of structures—such as "privileging Indian culture," involves a laborious process of cutting and pasting, mixing and matching, triangulating, and assembling, similar to that used in creating taxonomies and patterns. Structural analysis also is facilitated by creating graphics. Miles and Huberman (1984) suggest that researchers really know only what they can display visually. Doodling is one way to begin creating displays, by creating diagrams, conceptual maps, taxonomic trees, flow charts, and causal maps to display relationships among patterns.

Another strategy involves developing rough conceptual categories, such as those Vadeboncoeur (1998, p. 148) used for her longitudinal study of attitudinal change among students experiencing an innovative teacher training program (see Figure 3). Vadeboncoeur's data consisted of interviews with students, students' journals, field notes taken while observing students in their classes and during student teaching, and interviews with professors teaching the classes. Concepts stressed in the program were forms of evaluation using the students' own personal experiences ("understanding the self"), their relationships with other people ("understanding other people"), and their understandings of social, economic, and political structure ("understanding the environment") as bases for judgment. These bases roughly corresponded to Freire's (1970) notions of semi-intransitive, transitive, and transformative forms of consciousness—concepts emphasized heavily in the teacher training program.

Vadeboncoeur went through all her data sets, sorting all material relating to "self," "self in relation to other people," and "self in relation to the environment" into separate piles. After this rough sorting procedure, she then examined each separate pile, looking for items, patterns, and structures within each one. Later she could look at how students changed over time with reference to each individual pile and then compare across the piles to look for evidence of growth or changes in level of consciousness.

Structural analysis often begins with such handwritten diagrams. These then can be transferred to a neater, computerized version. Such graphic representations may closely match the way informants think or create linkages. They can be used as preliminary sketches from which to solicit informant feedback.

Making Sure Data is Credible and Useful

Analysis that is meticulously done, based on clearly articulated theories, and responsive to research questions can be good analysis. However, to create good research findings, analysis also must yield results that are meaningful to the people for whom they are intended and described in language they understand. Unless this is done, results cannot be used to improve programs and practice or solve problems in which participants are interested. Creating meaningful results involves *validity*, or whether or not research findings seem accurate or reasonable to the people who were studied. It also refers to whether or not results obtained in one study can be applied to other studies with similar or identical people or situations.

Validity is critical to the "goodness" of analyzed data, because no matter how elegant a researcher's own model building is, results lack credibility, utility, or validity if the cultural whole presented by the researcher makes no sense to the persons or groups whose cultural whole is, in fact, being portrayed. Therefore, researchers must continually ask the question: Do I, the researcher, really understand and describe what I am studying in the same way that the people who live it do? Did I really "get it right"?

Just as researchers should solicit input from local participants to make sure that they have properly identified and classified items, they also must seek input once they have achieved a more or less coherent structural analysis. Key people in the research site can assess whether or not the relationships and
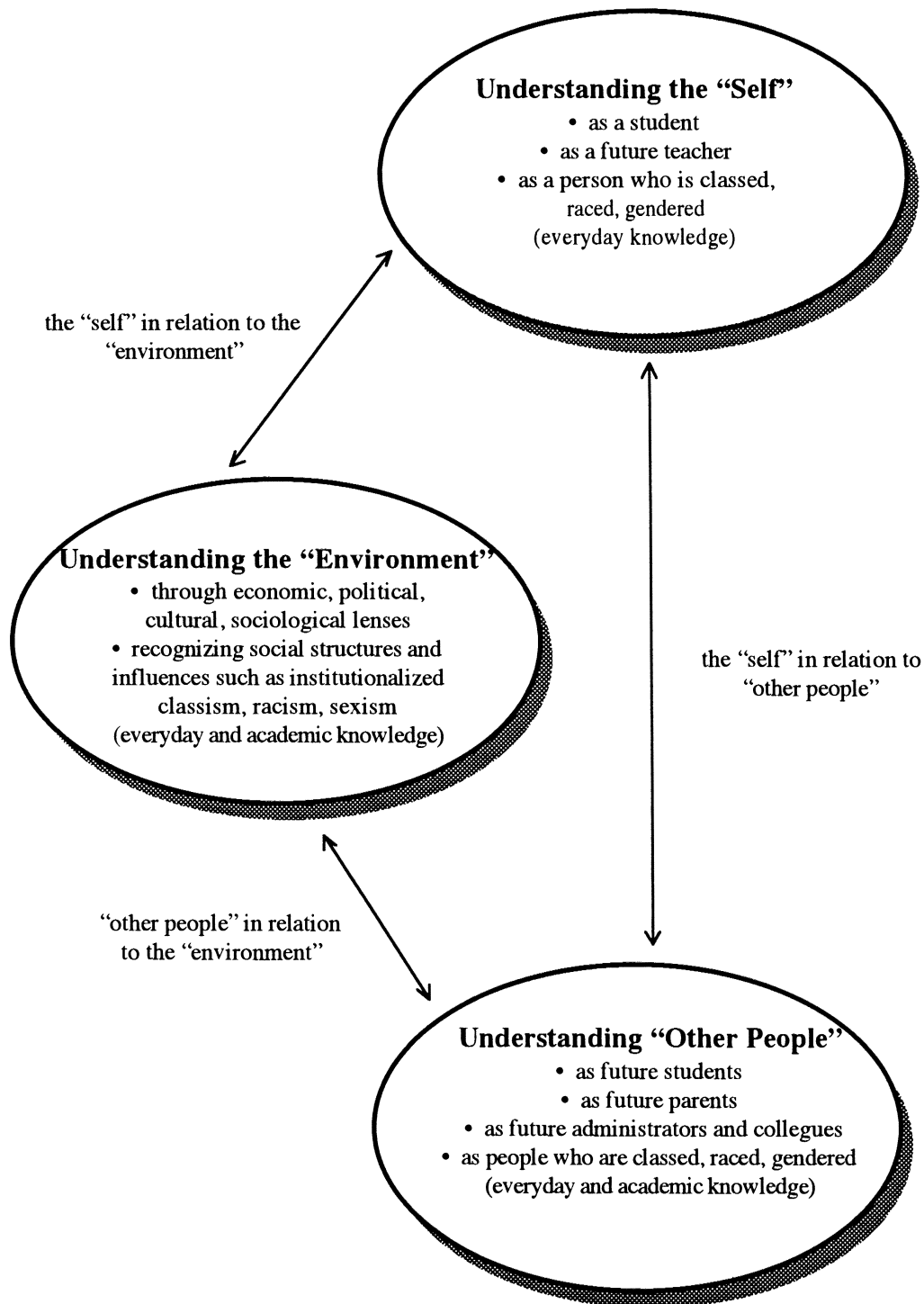
Understanding the "Self"
- as a student
- as a future teacher
- as a person who is classed,
  raced, gendered
  (everyday knowledge)

the "self" in relation to the
"environment"

Understanding the "Environment"
- through economic, political,
  cultural, sociological lenses
- recognizing social structures and
  influences such as institutionalized
  classism, racism, sexism
  (everyday and academic knowledge)

the "self" in relation to
"other people"

"other people" in relation
to the "environment"

Understanding "Other People"
- as future students
- as future parents
- as future administrators and collegues
- as people who are classed, raced, gendered
  (everyday and academic knowledge)

Figure 3. A model of emancipatory knowledge construction (Vadeboncoeur, 1998, p. 148).

patterns displayed are ones they also recognize as valid. If they are not, the research results will be neither intelligible nor useful. By contrast, if local people think the results make sense, they will be able and willing to use the analyzed data to improve their practice and programs. Researchers then can feel comfortable with the "goodness" of their analytic strategies and the credibility and utility of their efforts.

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