EthnoNotes: An Internet-Based Field Note Management Tool

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This report describes a field notes database management tool, EthnoNotes. Ethno-Notes makes the process of writing, sharing, and analyzing field notes easier and more systematic. Text can be indexed, coded, and integrated with quantitative data or images, all accessed from the same database system. EthnoNotes can be used by individual researchers or be fully Internet-based, accessible online by teams collaborating in empirical studies. Field notes are easily entered on the Web, then are immediately accessible to other researchers for interpretation and analyses. Built on the FileMaker Pro relational database software, EthnoNotes addresses many practical tasks of multiuser, multisite projects. EthnoNotes text and quantitative data are readily exportable to word-processing and other software for further analysis and integration into research papers.

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Ethnography and the fieldworkers who do ethnography are in more demand than ever in the social research community. There has been an explosion of methodological literature on qualitative and ethnographic research, including an entire publication series (see www.sagepub.com). The political and epistemological ferment regarding the nature of ethnographic representation has not led to social science turning away from qualitative data and ethnography. Rather, it is our impression at least that the debates and critiques over ethnographic inquiry have led to more, better, and more varied

ethnographic research, often undertaken by teams working in collaborative and multidisciplinary research projects.

Along with this theoretical and empirical activity, a variety of software packages have been developed to help with the management and analysis of texts from interviews and ethnographies (Miles and Huberman 1994). In this report, we discuss a field notes management tool, EthnoNotes, developed for easy use in collaborative and individual qualitative research. We designed and developed this system to address needs we identified in our and others' research that were not fully met by other tools.

Field notes take a variety of forms and depend on the time and circumstances in which they are written (Sanjek 1990; Bernard 1995). There are many kinds of field notes as well as data that emerge from them. Field notes can include scratch notes (done on the fly, quick mnemonics, phrases, brief quotes), a diary or journal, a log recording the events of a visit, and final field notes written in organized fashion along the lines of a summary report in sentence/paragraph form.

EthnoNotes is designed for what fieldworkers, and fieldwork teams in particular, actually do in much of their work that relies on field notes and related data (quantitative data, photos or videos, etc.). Fieldworkers, of course, write notes both on topics that emerge from fieldwork and on topics based on prior theory and hypotheses. Fieldworkers want to write, place, retrieve, share, relate, and analyze their notes. They want other team members to have ready access to their notes. They want at least some of their notes to be shared for use within the research team or among colleagues or research participants, and they want to read others' notes on certain topics. They want to be able to retrieve their notes by topics, keywords, and categories that are meaningful to the community being studied and to the research program they are following. Fieldworkers write books, articles, chapters, presentations, and papers using notes selected in systematic ways and insert those notes in the form of vignettes, quotes, interview excerpts, photos, frame grabs, and so on into their reports. Of course, no fieldworker "wants" all of these things at once, but it is fair to say that most fieldworkers engage in these kinds of tasks.

Fieldworkers also want to link their notes to other data such as questionnaires, surveys, administrative records, assessments, and other quantitative scores associated with the participants in field studies (e.g., families, children) or neighborhoods (e.g., census data). Fieldwork teams in particular need access to notes linked to the project's theories and relevant literature, to individual families and/or individuals within families (a particular child in a family, for instance), by date/time, by a range of social address categories (ethnicity, immigrant status, age, neighborhood, etc.), or tied in other ways unique to a project. They want to do so easily, using standard, intuitive search

procedures. Fieldworkers want to be able to create and revise codebooks and coding summaries and define their field note topics as well as create codebooks for ratings of field notes and interviews directly—that is, they want to be able to say what a numerical code or a nominal category means based on their field data.

Fieldworkers want to focus mostly on the people, situations, and notes they write, using standard word-processing software, rather than spending a lot of time on learning the software. And they want to depend more on the computer expertise they already have rather than invest time and money in learning new software. This means that fieldworkers should not have to learn too much more than what is needed to use word-processing software, with additional data-management assistance being straightforward and easily available. The easier it is to flow transparently back and forth across word processing, field note storage, spreadsheets, and statistics packages, rather than having field notes locked into a new program-specific format, the better.

EthnoNotes assists with all these tasks and can be hosted entirely on server software for access via internal networks or the Internet. The various forms of data can be incorporated into EthnoNotes as needed and referenced in a variety of ways. EthnoNotes is organized around enhancing everyday thinking and tasks—the activities that fieldworkers actually do. It is also designed with the principle of least differences in mind. That is, it should be as much like other software fieldworkers might already be using as possible and be as transparent as possible as the researcher moves from word processor to EthnoNotes and back.

EthnoNotes assists in searching for patterns in field note data as well as storing and retrieving the notes themselves. Hence, the system can help the researcher who is "findings oriented" (Wolcott 1994:31). EthnoNotes is useful not only for the primary fieldworker but also for researchers analyzing others' data. EthnoNotes aids in making field notes more public and transparent. It also makes *quantitative* data more transparent by making scores clearly contextually linked to the cases and situations the scores are measuring.

EthnoNotes assumes that Internet-based systems for storing and retrieving information will become increasingly common (Tornatzky 1986). Internet-based collaborative work environments are ideal for any project executed by a geographically distributed team and just as helpful for a team in the same town or university research lab who are out in the field a lot of the time and only together for occasional meetings. Indeed, Pelto and Pelto (1981:221) talked about fieldwork "teams" under the heading "Communication among Fieldworkers." The Internet sharing of EthnoNotes system files

actually enhances the communication and transparency of field note data and codes for a fieldwork team.

The evolution of the World Wide Web has led to a greater sophistication of available collaboration tools in general. Initially, only basic common gateway interface (CGI) custom applications were available. Creating an Internet-based collaborative environment at first required a dedicated programming team to build and a network administrator to support. Over the past several years, however, more and more applications have started to provide easy publication of data onto the Web. The ubiquity of the Internet browser and a mature set of standards for Web publishing have contributed to the popularity of online collaboration. The evolution of Web portals such as Yahoo! and Excite has provided easy access to shared, hosted collaboration tools such as calendars and scheduling applications.[1]

ETHNONOTES AND FILEMAKER PRO

The EthnoNotes system provides shared and easy use of notes and interviews by fieldwork teams using either the Internet or microcomputers. Built on the FileMaker Pro Version 5 (FM Pro) (FileMaker, Inc. 2000) database software, EthnoNotes is designed to serve primarily as a relational database manager. FM Pro's flexibility and features allow for development of a creative system design. This system solves a number of practical challenges faced by a multiuser, multisite project, including text-based data management, basic coding and retrieving, within-system integration of qualitative and quantitative data, centralized control and administration, and accessibility to a range of users from multiple locations.

EthnoNotes takes advantage of FM Pro's capabilities of having files hosted on an Internet server. This alleviates the need for customized, local computer expertise for deploying and hosting the EthnoNotes system. Functionally, it foresees the day when researchers will be able to access libraries of field notes and the codes derived from them. There already are libraries of "video ethnographies" and surveys of this kind, such as for teacher development and educational research (Stigler, Gallimore, and Hiebert 2000). Imagine, for example, a series of projects using a particular kind of interview, all being accessible for secondary analysis. Imagine an interlinked Web-based library where one could go and read notes about different kinds of families and children and communities from around the world, organized into easily searchable domains—and see video of the community, families, key informants, ceremonies, and clinics that were being studied!

Where does EthnoNotes fit into the wide range of qualitative software packages that already exist? Weitzman and Miles (1995) described a set of characteristics for distinguishing the various qualitative data analysis software. They distinguished between software designed to serve as text retrievers, textbase managers, code-and-retrieve programs, code-based-theory builders, and conceptual network builders. While many of these varied software packages are designed primarily for one or another particular purpose (e.g., coding, search and retrieval, database management, memoing, data linking, matrix building, theory building), most typically include tasks more central to packages in other categories. A challenge to investigators is to identify the software package (or packages) that most efficiently meets the needs of their project, since many functions can be served at least to some degree by numerous packages.

EthnoNotes benefits from the strengths of FM Pro as compared to other text retrievers and textbase managers retrievers, yet has its strengths and weaknesses compared to other software. EthnoNotes is less powerful than high-end text retrievers like Metamorph (Thunderstone Software 1991) or WordCruncher (Brigham Young University 1993a, 1993b) and more limited in sophistication of code structure design, code structure management, and conceptual model building as compared to code-and-retrieve or code-based-theory-building programs like ATLAS.ti (Muhr 1997) or Nvivo (Fraser 1999). EthnoNotes, therefore, is not intended to replace or directly compete with such software. Rather, the system focuses on practical multiuser, multisite projects using FM Pro and the Web, since FM Pro is a widely used and available software application for this purpose. Furthermore, EthnoNotes is better prepared to integrate various forms of data and support multiuser applications than other textbase managers like askSam (Tyk and Mohler 1993) and Folio Views (Folio Corporation 1993). EthnoNotes balances a set of desirable features in a single solution and is customized to the unique needs of new projects incorporating its use. FM Pro provides a multiuser collaborative system that provides an Internet-based interface. The underlying database also handles the concurrent access to data in EthnoNotes, properly synchronizing data access as necessary. Thus, unlike other dedicated qualitative data analysis packages, multiple users can concurrently enter data, perform analyses, and generate data for use in reports and papers.

One of the principal strengths of EthnoNotes is the flexibility of its data model. Subjects, fieldworkers, and codes can be dynamically added into the system. Coding schemes are a central part of the data model, and the content and structure of these schemes can be modified at any time. Furthermore, the EthnoNotes administrator (or team leader, or individual researchers if there

is no team) can always alter the underlying structure of the model by directly editing it through the system's keyword file. Searches can be quickly specified in the EthnoNotes search layouts, allowing researchers to efficiently analyze different types of relationships between the data. This kind of flexibility of EthnoNotes is demonstrated through its history of successful applications to a variety of projects, each having different data-modeling and analysis requirements and substantive research problems (Weisner 2000; Axia and Weisner 2002; Bernheimer and Matheson 2002; Lowe 2002; Reese 2002; Daley and Weisner 2003). These include studies of children with disabilities and their families (www.npi.edu/centers/culture/research_transtoadoles.html), Latino youths' academic experiences and transitions to adulthood (www.npi.ucla.edu/homeproj), and the prevention of HIV/STD transmission in mainland China (www.rti.org/U10).

ILLUSTRATION:
THE NEW HOPE ANTIPOVERTY INITIATIVE

We will use a single research project, New Hope, to illustrate EthnoNotes. New Hope was an antipoverty intervention experiment to help working poor families. A fieldwork team of seven ethnographers worked in the Milwaukee, Wisconsin, area with their project families and wrote field notes and did ratings on family and child adaptation. In addition to those based in Milwaukee, other fieldworkers drove in from Chicago, Madison, and Evanston. The director and other staff of the study were in Los Angeles. The survey, child assessment, and policy analysis teams also working on the New Hope evaluation study were directed from the University of Texas, Austin; New York City; and Northwestern University in Evanston.

New Hope was based in two low-income neighborhoods in Milwaukee, Wisconsin, and active between 1994 and 1998 (Bernheimer, Weisner, and Lowe forthcoming; Bos et al. 1999; Weisner et al. 2000; Huston et al. 2001; Gibson and Weisner 2002; Lowe and Weisner 2002; Weisner et al. 2002). Those who volunteered for the program were randomly assigned either to New Hope or to a control group. The New Hope program offered a suite of benefits to eligible participants: a wage supplement keeping income significantly above the poverty threshold, subsidies for affordable health insurance, child care vouchers, and a full-time community service job opportunity for those unable to find work on their own. Members of control and experimental groups were free to seek out any federal or state public assistance programs, but only individuals in the experimental program in addition had access to New Hope benefits. After two years of New Hope, a Child and

Family (CFS) subsample of 745 families who had at least one child between the ages of one and ten at baseline was surveyed for study of the impacts of New Hope on child development and family functioning. Although New Hope was an antipoverty program to help low-income workers and their families, it was implemented during the welfare reforms of the mid-1990s. Hence, the questions central to the assessment of New Hope are also relevant to families and children facing welfare change, as is the fundamental principle of the group who created New Hope: "If you work, you should not be poor." Can benefits such as child care, health care, and wage subsidies that are tied to work help families make the transition from public assistance to a mix of work and New Hope–style supports? What are the impacts of New Hope for parents and children? What was the experience like for parents and children to be in the New Hope study, and how did they adapt? EthnoNotes was developed to help manage the ethnographic study of the impacts of New Hope on families and children and assist in gaining a richer, more detailed understanding of the impact of New Hope on participating families than could be gained from the CFS survey alone. The ethnographic study was also linked closely to the quantitative data from the surveys and child assessment data, with ongoing conversations among the group.

EᴛʜɴᴏNᴏᴛᴇs SYSTEM BACKGROUND

Logistically and technologically, managing and analyzing field notes in projects with multiple fieldworkers, like New Hope, is an arduous task. This challenge becomes greater when trying to coordinate the work of multiple researchers across sites in a multisite project. The EthnoNotes system was developed to capitalize on available technology to effectively meet the demands of research projects and, at the same time, function via an interface that could efficiently, accurately, and effectively be put to use by all project personnel. Training in EthnoNotes was necessary, but it was focused on individual tasks and responsibilities, so it was relatively simple compared to other options.

The New Hope project illustration includes issues common to many multisite research projects in the social sciences. We have mentioned some of the logistics and personnel issues already. Logistical issues include the use of multiple computer platforms and operating systems; project tasks needing to be carried out in various locations; and centralized design, control, and administration of data files. Personnel issues include the large number of research team members; the organization of project responsibilities and their

distribution across personnel; and the wide range of computer comfort, skill, and sophistication across project personnel.

FM Pro was the most desirable foundation on which to build for a variety of reasons. It is available on Macintosh, Windows, and Microsoft NT server platforms, has a *very* large data field size (i.e., its limitation on the number of characters allowed in any single field), and has a relative ease of use for less computer-savvy individuals once the system is customized to meet the needs of project tasks. FM Pro is a simplified database management application similar to Microsoft Access in terms of sophistication although somewhat easier to use. It is not considered by database engineers to be a fully relational database or appropriate for large-scale data management and does not compare in power to industrial-strength database management systems such as Oracle or IBM's DB2. However, FM Pro is relatively inexpensive, requires only modest hardware, is much easier to set up and manage, and does not require dedicated engineers to run and maintain. It is primarily for end-users with small to medium databases of simple to moderate complexity.
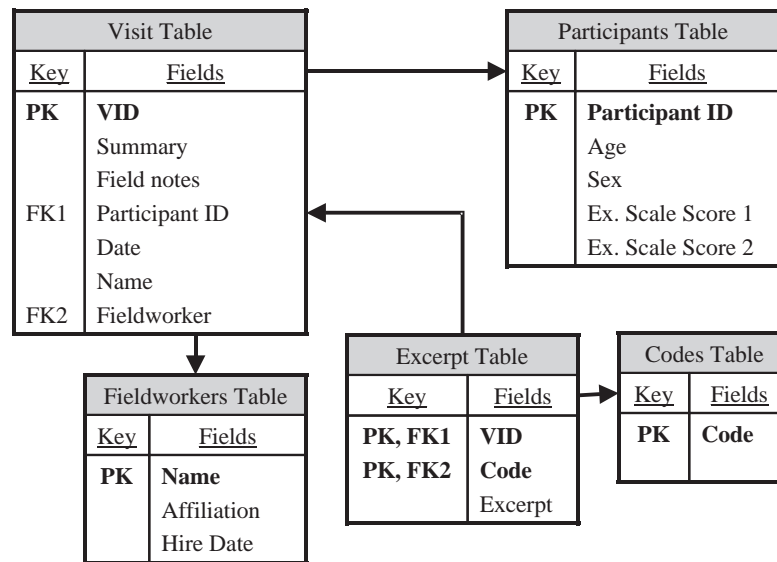
THE ETHNONOTES SYSTEM[2]

Overview

At the core of EthnoNotes are five main functions: accessing project database files, entering data, searching for and retrieving search results from the database(s), exporting search results, and working with exported results.[3] EthnoNotes integrates a set of database files, each containing different sources of data necessary for full system operation: keywords or codes, research participant information, field visit or interview information, and coded excerpts. Users interact with the system via a network of layouts. These layouts are the user interface "windows" through which users view data. This interface provides a seamless coordination of the data, system tasks, and access to different sources and types of data without users being required to navigate these aspects of the system. Figure 1 illustrates a simplified view of the data schema used by EthnoNotes.

The EthnoNotes administrator can modify this schema on a per-project basis. An important aspect of this schema is that the files (referred to as "Tables" in Figure 1) must be related in a particular configuration through key variables—primary (PK) and foreign (FK)—allowing information to be shared throughout the system. Primary keys are unique identifiers contained within a data file that can be broadcast throughout the system to link up data

FIGURE 1
EthnoNotes Data Schema

Visit Table	
Key	Fields
PK	**VID**
	Summary
	Field notes
FK1	Participant ID
	Date
	Name
FK2	Fieldworker

Participants Table	
Key	Fields
PK	**Participant ID**
	Age
	Sex
	Ex. Scale Score 1
	Ex. Scale Score 2

Fieldworkers Table	
Key	Fields
PK	**Name**
	Affiliation
	Hire Date

Excerpt Table	
Key	Fields
PK, FK1	**VID**
PK, FK2	**Code**
	Excerpt

Codes Table	
Key	Fields
PK	**Code**

NOTE: PK = primary key; FK = foreign key; VID = visit identifier. Bold text indicates key variables.

from various files. When a secondary file reads that primary key, it is then considered a foreign key for that file to use in coordinating its other relationships. Each file contains any number of fields, some of which are designated as key variables (noted in bold text). For example, a record for each visit is held within the Visit file. However, since multiple coded excerpts are needed for each visit, a separate Excerpt file is used to store the excerpts for visits. Each record in the Excerpt file has a VID (visit identifier) field that is a foreign key to a record in the Visit field. When displayed, a visit is generally shown along with all of the corresponding excerpt records (see Figure 4).

Any other type of data that must be associated with a visit through a one-to-many relationship can be added in a similar manner. For example, information about a study participant can be linked to information from any number of other sources (e.g., family member, teacher), thereby expanding the

variety of data available about the target within the system. Searches are often performed against the Excerpt file because it contains the coded excerpts. Found records can be related back to their corresponding visit through the relationship defined between the Excerpt file and Visit file. Finally, note that each excerpt is assigned one or more codes from the Codes file.[4] Placing possible codes (and similarly participant and fieldworker data) in a table prevents data entry errors due to misspellings and allows the project to add and modify these data dynamically without interrupting access to the system.

Layouts using these relationships then make it easy for the user to search and display results. Data searches are specified via search layouts that allow the user to set parameters based on participant, excerpt, and/or code information (see Figure 5). Search results present the user with data from these same, or other, sources within the system (see Figure 6).

Accessing the Files

Transparent to the fieldworker/user for New Hope and other projects that have implemented the EthnoNotes system, project files reside on an Internet server and so the user must access them via an Internet connection (note that this is not a necessary aspect of the EthnoNotes system, as project files are fully functional on a microcomputer). The Internet allows users to share files dynamically to large numbers of project personnel at many different locations. Project files hosted by a server version of the FM Pro software require the user to establish connection through a microcomputer (Windows or Mac system) version of FM Pro. Project users are provided with a "system access" file that contains a script automating the access steps. With such a file, the user simply double clicks the "system access" file icon and then only need provide his or her password to open and enter the project file system.

Once the user has accessed the system files (and entered the password when prompted), she or he is presented with the project's system home window (see Figure 2). This window serves as the system's "Home" and the starting point from which the user can carry out any task within the system. By using the buttons on this layout, the user is guided through the steps of each task by scripts, eliminating the need for most users to learn the FM software and increasing the reliability and efficiency with which tasks are carried out. In the example presented here, the user can click any of the task buttons to initiate codebook tasks, data entry, data searching, search results preview, or search results printing for either of two aspects of the New Hope project: field visit data or ecocultural family interview (EFI) data (Weisner 2002). The nature of the data within any project determine the tasks users will wish

FIGURE 2
Example Project Home Window
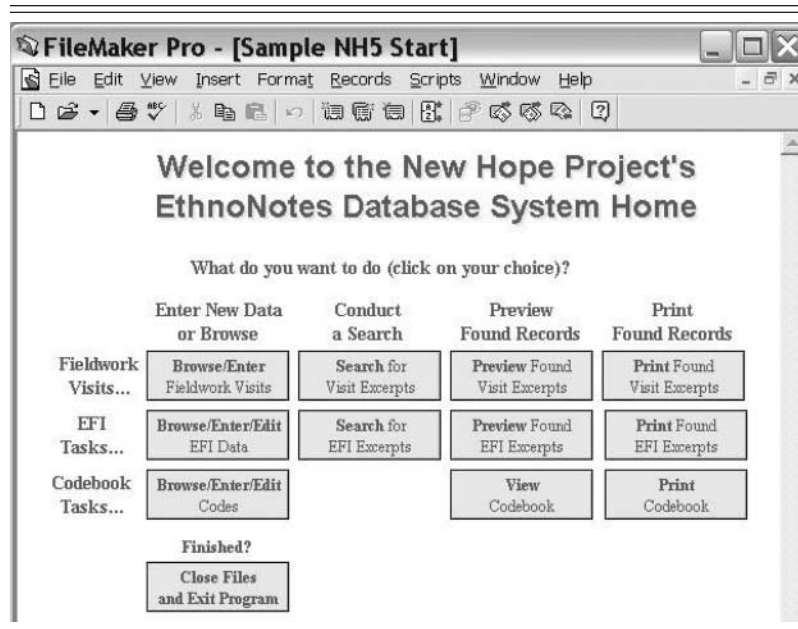
NOTE: EFI = ecocultural family interview.

to conduct, and the format of this and many other layouts within the system are customized to meet specific project needs.

Codebook Features

The EthnoNotes coding system makes it easy to see and change codes. Code systems should be structured, include clear code definition and description, and be flexible and open to modification as a project evolves (Miles and Huberman 1994). The New Hope project uses a two-level hierarchical code system—these levels are referred to in the New Hope example as categories (e.g., the topic "children") and subthemes (e.g., the subtopic "child care issues"). EthnoNotes codebooks list the codes being used and include mechanisms for creating new codes and hierarchical organizations of codes, layouts for documenting full definitions, descriptions, code exemplars, and scripts for viewing and printing the codebook information (see Figure 3).

FIGURE 3
Example Codebook Record

The Data Entry Process

There are two main steps to the data entry process. The first step is simply to click the button labeled "Browse/Enter Fieldwork Visits"; the user is presented with the fieldwork visit layout (see Figure 4). From this layout, the user can browse previously entered visit records or use the buttons at the top of the screen to initiate entry of a new visit.

To enter new interview or participant information into the database, the user clicks the "Enter a New Record" button and is then presented with a blank visit record with three main sections: information about the fieldworker and participant, notes about the visit and full visit transcript, and visit excerpts with their associated codes. The user then enters basic information about the field visit and any notes or comments about the data record. The entire field note can either be typed directly or pasted into the "Fieldnotes" field. To ensure complete processing, many of the data fields are defined to require entry—users will be prompted to provide these data should they attempt to leave the file without entering data in these fields. Furthermore, to ensure accuracy and convenience with entering data such as participant IDs or other key information, drop-down lists are preprogrammed to help prevent data entry errors to these key data.

FIGURE 4
Visit Data Entry Layout

The task of coding selected chunks of text is carried out in a lower section of the visit layout (see Figure 4). Although the text resides in the Excerpts file, these records are accessible through a portal field within the Visit file. There are an infinite number of excerpts that can be coded for any visit record. In the example here, up to three codes (shown in the first excerpt as Life/Goals/Ambitions, Child Care as Barrier, and a more general code—

Children) can be applied to a given field note or interview text, but this is entirely adjustable. Codes are selected from drop-down lists drawing from all the codes defined in the current codebook. New Hope project users assign up to three main category codes or more specific subtheme codes for each excerpt from an organization of codes developed specifically for the New Hope project. Other applications of EthnoNotes utilize three-level hierarchical code structures with ten or more codes assigned per excerpt. Note that the corresponding superordinate category code will automatically appear and be applied to the excerpt when more specific codes or subcategories are assigned. And as described below, searching the excerpt database can be carried out at any level of the coding structure.

Searching the Database

Initiating a search routine also begins from the "Home" screen. On clicking the "Search for Visit Excerpts" button, the user is presented with a search layout. In this example, the layout offers variables selected to meet a broad range of user needs (see Figure 5).[5] This layout affords users the opportunity to search the visit excerpts based on a number of characteristics: general code category, subtheme (specific code), participant ID, a set of participant/family characteristics, and/or a text string. The New Hope data are linked to quantitative information on children (e.g., teacher reports, grades, child assessments) and families (e.g., parental survey responses, administrative records of wages and work hours). The qualitative excerpts also can be searched using those data. EthnoNotes takes advantage of all more sophisticated Boolean search operations that are available within FM Pro.

This example illustrates much of the search range and flexibility possible within the system. Searching by main code category captures all excerpts coded along with any more specific code organized beneath it in the coding system. (Searching by a particular subtheme code is more restrictive and captures only those excerpts coded with that specific code.) Searches also can be specified based on particular participant(s), participant characteristic(s), and/or a text string within excerpts. Searches based on participant characteristics can be of substantial use for projects integrating categorical or other quantitative data. Participant-specific data can be imported into the system and set up for use as search parameters (both discrete and ranges of variable values). Finally, by using Boolean operators (e.g., "and," "or"), more complex searches using combinations of parameters (values of various fields) can be specified. Most imaginable queries crossing both qualitative and quantitative data within system files can be carried out within EthnoNotes.

FIGURE 5
Sample Search Layout

Working with Search Results

Search results can be sorted, manipulated, displayed, and printed within the FM Pro software on layouts designed for the project (see Figure 6) or exported for work within a word processor. From the system "Home" window, users can review the excerpts found after any search and print the output as presented in a predesigned preview layout. Again, such layouts can be customized to suit user preferences and include any number and variety of fields on the output. Alternatively, users can choose to export search results for use in a word processor. This makes it easier to integrate data into manuscripts and other presentations.

FIELD CONDITIONS

The New Hope project illustrates many of the practical issues in team ethnographic fieldwork and analysis. Central control over the database files and file structure and server administration protected the data. Once the

FIGURE 6
Example Search Results Preview
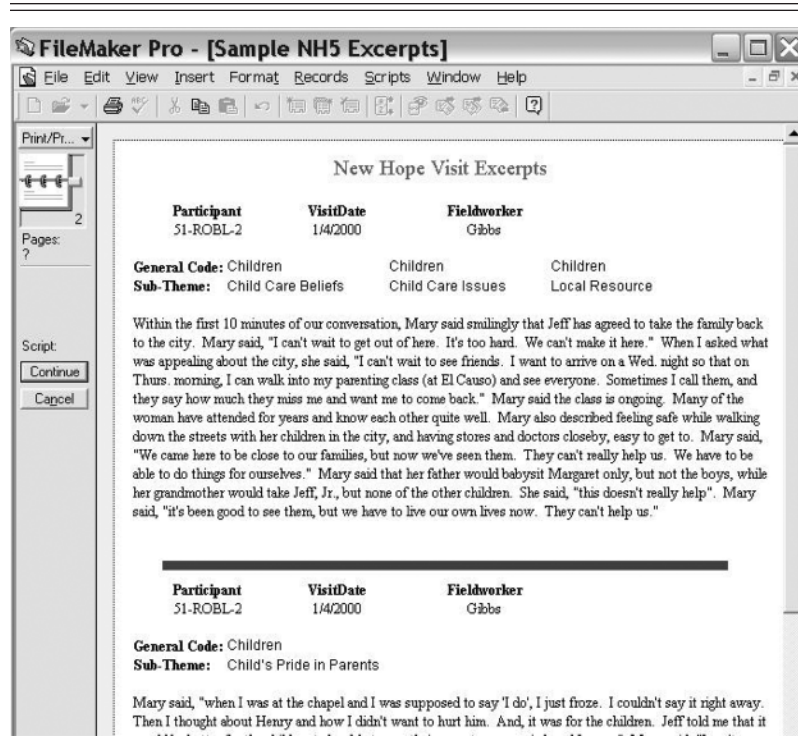
EthnoNotes files were customized for project tasks, Internet file sharing was accomplished through the use of FileMaker Server software via a Microsoft NT server. All server files are backed up nightly and, aside from infrequent (and typical) interruptions in service, there have been no incidents of data corruption or loss. Remote access and administration of the files was assigned to a single person responsible for all core database modification. Some fieldworkers required guidance in FM Pro installation and configuration. A project startup script requiring only a "double-click" for system access minimizes this problem. All team members were assigned passwords restricting their file access privileges to those required to carry out their project tasks. Fieldworker passwords allow new record creation in the interview and excerpt files, adding new excerpts and codes to existing interview records, searching the database, and exporting found records for use in other

applications. Fieldworkers are restricted from deleting or editing existing records (except when the record was created during the same session in which they wish to edit it). Researchers can all search and export from the database. Decisions about any modification to the codebook (e.g., creating new codes, combining existing codes, adding new branches to the code structure) were discussed via e-mail and other communications among team members.

EthnoNotes records are quite easily exported. The simplest method is to create a "merge" format export file containing the desired EthnoNotes data and then import these data via a mail-merge procedure into MS Word or other word processor. This approach allows for flexible formatting and data display preferences and access to the data in a convenient and familiar program. Records have also successfully been imported into NUD*IST (Richards 1998) for more sophisticated coding and model building.

The design of the system (features and data layouts) was influenced by numerous suggestions from New Hope project members. As the New Hope project matured (e.g., code system stabilized, necessary tasks fully integrated, user comfort increased), the database system functioned without need for administrative attention.

DATA SECURITY FEATURES

Password protections are programmed into the FM Pro files themselves. FM Pro allows administrators to establish groups of passwords that can be differentiated on a number of parameters that place limitations on levels of access to the files, including the ability to enter new data records, modify or delete existing data, search data records, export records, and even view particular fields and layouts within the system. Designers, fieldworkers, researchers, and visitors all have different levels of access.

CONCLUSION

EthnoNotes was developed to make what fieldworkers do easier. It can make many steps in the process of doing fieldwork, writing notes, and sharing them more transparent. It is useful to the individual researcher but even more valuable to teams coconstructing an empirical study and jointly developing a shared interpretive story and analyses. It is transparent in using either the qualitative and quantitative data needed to understand a family, community, and research problem. Such integration of methods and measures has

always characterized anthropology. As Bernard (1998:15) put this, "Anthropology was built by empiricists, including many who understood that reducing people to words was no better than reducing them to numbers and who did both with aplomb." EthnoNotes encourages this integration.

Designed to serve primarily as a relational database manager, FM Pro's flexibility and features allowed for great creativity in designing the EthnoNotes system. This system provides solutions for many practical challenges faced by multiuser, multisite projects. EthnoNotes serves needs related to textbase data management, basic coding and retrieving, integration of qualitative and quantitative data, and accessibility to a range of users from multiple locations.

One of the exciting future possibilities involves the use of handheld computers to access EthnoNotes. While high-speed Internet access for roaming users remains an obstacle, a FM Pro version is already available for the Palm and Pocket PC. Consider the fieldworker entering data directly into a Palm, Sony, or Compaq handheld device with a wireless connection to the Internet. The fieldworker's data would be immediately available in EthnoNotes, eliminating the need to reenter data after returning to the office. Photos and video also could be transferred directly; digital cameras feed directly into laptops and handheld devices. As handheld computers already have wireless connection and Web browsers, possibilities to further enhance EthnoNotes with such capabilities exist today. Laptop entry of survey data also could be directly coordinated with field notes on cases or focus groups.

EthnoNotes has already been adapted for a variety of projects, and this article may lead to its use by others. More detailed information about system operation can be found by clicking the "EthnoNotes" link at http://www.mrrc.npi.ucla.edu/field-lab/.[6]

NOTES

1. Of course, as any Internet user will appreciate, accessing complex sets of information requires higher speed connections—T1 line or equivalent for efficient use of EthnoNotes via the Web.

2. Examples and illustrations here represent the PC version of FileMaker Pro Version 5 (FM Pro). With some small variations in procedures and appearance, there are no inconsistencies in system functions when using Mac versions of FileMaker. There were Mac and PC users in the New Hope research team. Additionally, the majority of system functions and layouts are consistent in FM Pro version 4.x.

3. More detailed information about programming and system functions is available on the Internet by clicking the "EthnoNotes" link at http://www.mrrc.npi.ucla.edu/field-lab/. A shell version of EthnoNotes, which can be expanded and adapted by the user, is available from the UCLA Fieldwork Lab free of charge, and this version may be freely copied and distributed. The

EthnoNotes system can be used on any Mac or PC microcomputer running a copy of FM Pro v.5 or higher and can be hosted on any Web server running FM Server v.5 or higher.

4. Layouts can be modified to allow the assignment of up to one thousand codes for each excerpt.

5. Other layouts can be designed to meet more specific needs, and frequent searches can be programmed for automated use.

6. Additional limited questions not covered by the website can be answered at the UCLA Fieldwork and Qualitative Data Research Laboratory (e-mail the first author at elieber@ucla.edu).

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