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The WiderNet Project
School of Library and Information Science
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I Evaluation Overview

During the past year, the WiderNet Project has developed and conducted an evaluation process to investigate three major aspects of its off-line eGranary Digital Library: use, usability, and usefulness. With the growth of the library, both in terms of the number of installations and the increased amount of capacity, the WiderNet Project felt a need to take time to evaluate the current library and to develop on-going reliable mechanisms for evaluating the library’s impact in the field and improving the patron experience and feature set.

The Rockefeller Foundation’s Evaluation Grant has allowed the WiderNet Project to develop, field test, and refine an evaluation system that can be used for the foreseeable future to meet the needs of a variety of project stakeholders. This report will outline our evaluation process; synthesize our findings from the four modes of data collection we used; discuss our business model including utility, efficiency and sustainability as supported by the data; cite ‘caselets’ that describe observations, speculations and field experience; discuss what we have learned and how we will shape future management of our product; reflect on the process; give our recommendations; and outline what we have developed as an on-going evaluation system for the eGranary Digital Library.

The eGranary Digital Library is an off-line educational information store. Also called “the Internet in a Box,” it is a high-capacity hard drive that contains more than ten million digital educational resources that can be accessed at extremely high speeds over wired and wireless local area networks without using any Internet bandwidth. It enhances library infrastructures dramatically, often multiplying a university or school collection by powers of ten. Most importantly, it allows access to millions of resources in areas where access to the Internet is non-existent, undependable, or inadequate. Statistics show that one out of every eight people in the world has no access to the Internet. The eGranary Digital Library is designed to address this problem, particularly in the developing world. It is a potential, practical, pragmatic solution to this digital divide.

First developed in 2001, the eGranary has grown from a 250GB capacity to a 750GB capacity to the newest 2TB version that will be launched this month, February, 2010. This newest version will have a Community Information Platform (CIP) as part of the digital library allowing subscribers to make their own web sites and enter their own information onto the library. At this point, more than 300 eGranary Digital Libraries have been installed throughout the developing world (see Appendix 18, Graphics: Maps of eGranary Sites).
The objectives of the evaluation process were to investigate the use, usability, and usefulness of the eGranary Digital Library, improve the library and set priorities for future development, and set up an on-going evaluation system that would be used for the foreseeable future.

Formerly, the Project has relied on informal feedback from subscribers to evaluate the eGranary. With this evaluation process, however, we have been able to garner feedback from a wide variety of stakeholders through four modes of data collection:

Online and paper surveys of administrators, librarians, and technicians in the field that were not anonymous,

Paper and online surveys of everyday users and administrators that were anonymous,

Face-to-face focus groups conducted in several countries, and

Log analysis from eGranary Digital Libraries installed in the field.

In deciding which data gathering modes would best meet our needs, the Project has had to consider the connectivity constraints (most subscribers do not have any Internet connection or the connection is not reliable) as well as cultural barriers such as different interpretations of common words and the fact that many of the eGranary subscribers are not accustomed to participating in evaluation processes. Therefore, the Project needed to develop survey methods that would

- accommodate the myriad of communication challenges that its subscribers face
- be as transparent, sustainable and as uncomplicated as possible
- use incentive schemes to increase subscriber participation
- employ field contractors to encourage participation
- make the results useful to stakeholders so that they would be encouraged to continue their participation.

An evaluation team of staff and students plus an advisory group of faculty, outside professionals, and doctoral level students helped to develop our survey instruments, conduct the focus groups and serve as interpreters. (See Appendix 9, List of Evaluation Team, Advisory Committee and Analysis Sources). Survey data was compiled online using WebSurveyor software as well as WiderNet Project staff, graduate-level students and their advisors, and other professionals at the University of Iowa.

The evaluation process has pointed up several things. When the eGranary Digital Library sites are up and running and successful, it is because there is a person or persons who take ownership and responsibility in developing a computer lab with a digital library and making sure people know what it is and how to use it. When the eGranary site is not functioning well it is usually because of the following:

1. There is no one managing the lab and library on a daily basis,
2. Many subscribers do not automatically contact us with their problems as there is a real reluctance to admit that they have technical problems,
3. Many subscribers are often not aware that they can contact us with their technical problems,
4. Once the eGranary Digital Library is installed, there is often a lack of training of staff and users on how to navigate and use the digital library, and
5. There is a lack of knowledge as to just how much content is in the digital library and thus its possibilities.

Through this process we have learned many things including:

1. How valuable it would be to establish a more regular communication pattern with subscribers,
2. How beneficial constant contact with customers is in keeping abreast of technical questions and problems and how well this function is carried out by local representatives,
3. That personnel changes are on-going and quite often and that keeping up a current database is essential, and
4. That subscribers respond better to a request from the Director than they do to a request on behalf of the WiderNet Project.

Caselet

We worked with a librarian at a major university to install an eGranary Digital Library in her library. Several months later, the WiderNet Project director stopped by to see how things were faring. The first thing he noticed when he walked into the door was a large hand-drawn poster near the check-out desk that advertised the existence of the eGranary. Clearly the librarian was doing some social marketing to promote the innovation.

The librarian reported that the eGranary was an incredibly useful tool to her. It was a resource she used every day and that it was an invaluable asset to their collection. When asked about how many people she had trained to use the eGranary, however, she just shook her head and said, “none.”

She escorted the director to the eGranary poster by the front desk and there, on the counter beneath the poster, were a set of forms that people could fill out if they wanted information. They would fill out a questionnaire on their topic area, the librarian would take this hand-printed form and sit down with it to do a search for her patron, and then she would print out the results that she thought were most appropriate to their request.

Her years of training as an area librarian and her patrons’ expectations of library services had converged to create a new model of digital information access.
II Objectives/Steps of the Evaluation Process

Objectives

The objectives of this evaluation process were threefold: 1) to conduct an evaluation of the eGranary Digital Library investigating it’s use, usability, and usefulness; 2) to improve the digital library system and help identify priorities for developing new features; and, 3) to develop on-going reliable evaluation mechanisms both within the eGranary and online that could be used for the foreseeable future.

Formerly, the Project relied on informal feedback from subscribers to evaluate what was going well and what needed improvement. With this evaluation process the Project now has the capability to gather hard data from a wide variety of stakeholders, synthesize this data, and with some authority move forward in improving and developing new features.

Scope

Three major aspects of the eGranary Digital Library were investigated: Use, Usability and Usefulness. (See Appendix 13, Use, Usability and Usefulness)

The 'Use' aspect included how many eGranary Digital Libraries are out in the field, what kinds of information is accessed on these libraries, how many resources are used on a daily/monthly basis, what was required to install and maintain a Library, and what are the major constraints to using the Library fully.

The 'Usability' aspect included how easily patrons find information, how confident patrons are in using the Library, how much is the search engine used, does the catalogue aid in locating resources, and how satisfied patrons are with the selection of resources on the Library.

Finally, the 'Usefulness' aspect included how the eGranary Digital Library impacts the core institutional missions of teaching, research, and service, how often eGranary materials are used in classroom lectures or student papers or patient care, how the patrons rate the benefits of the eGranary versus the Internet, and the fiscal impact of the Library versus the Internet.

Methods Used

After discussions with its Advisory Committee, with the Rockefeller Foundation program officers, as well as many in-depth discussions within the evaluation team itself, the WiderNet Project made the decision to conduct a four-pronged evaluation process to investigate the use, usefulness and usability of the eGranary Digital Library. Given the connectivity constraints of its subscribers (a majority do not have any Internet or very unreliable Internet connections), the potential language barriers in terms of surveying subscribers from thirty-seven different countries, and the fact that many subscribers are not accustomed to doing evaluations, the Project had to develop survey methods that would accommodate the myriad of communication challenges that its subscribers face, be as transparent and uncomplicated as possible, and promote as wide-spread a participation as possible.
Four types of evaluation mechanisms were eventually developed as well as an incentive scheme aimed at prompting more users to participate in the evaluation survey.

1. **Survey for administrators, librarians, and technicians**  
   (See Appendix 1, Administrator Survey)

   This survey was intended for individuals associated with the purchase or installation of an eGranary and was not anonymous. It was intended to gather facts and figures about eGranary installations as well as general observations about the installation, support, and use of the system within the target organization.

   The 45 survey questions were developed by WiderNet Project staff and volunteers and then tested with several groups within and outside the Project before being implemented. Invitations to participate in the survey were sent to over 500 persons from our subscriber database.

   Collection of responses was done online using WebSurveyor software provided by the University of Iowa.

   After several months, paper copies of the survey were sent to those contacts that had yet to respond to the online survey.

   Quantitative and qualitative data analysis reports were undertaken by graduate students in a research methodology course at the University of Iowa, a member of the Advisory Committee, as well as by a departmental statistician with 25 years of experience. The graduate student class approached the WiderNet Project in the fall semester, 2009, requesting to use the Administrative Survey data for their Graduate Research Methodology course taught by Dr. Tarrell Portman. Since part of the WiderNet Project's mission is to support the educational process of the University, it offers internships to students on a regular basis and works whenever possible with classes and professors. The research methodology class analyses are included in the Appendices as is the data report from Nicholas Wyant, a member of the Advisory Committee. (See Appendices 6 and 7, Analyses). A more extensive and in-depth analysis was undertaken by Kevin Kelly of the College of Public Health. (See Appendix 5, Statistical Analysis)

2. **Survey for everyday users**  
   (See Appendix 2, User Survey)

   This survey addresses eGranary use and usability questions in a format where people could express their opinions more openly without fear of being identified.

   The 27 survey questions were developed by WiderNet Project staff and volunteers and then tested with several groups within and outside the Project before being implemented.

   Since we have no direct link to users of the eGranary, invitations to participate in the survey were sent to over 500 persons from our subscriber database, along with digital versions of posters and other promotional materials so they could encourage their patrons to participate. Those who participated in the Administrator’s Survey were offered the opportunity to take the User’s Survey after completing the former.

   Collection of responses was done online using WebSurveyor software provided by the University of Iowa.
After several months, paper copies of the survey were sent to those contacts that had yet to respond to the online survey.

3. **Face-to-face Focus Groups conducted in three different countries.**
   (See Appendix 10, Focus Group Format and Questions)

The intent of the Focus Groups was to gather data through discussions where questions and answers could be discussed and interpretations noted.

The three geographical areas were selected in order to get a good cross section of locations, of length of period of installation, and of type of administrative individual (university, hospital, NGO). The three countries selected were Ethiopia, where several of the oldest installations of the eGranary are located, Zambia, where the installation was done just a year ago, and Nigeria, where there are both older and newer installations.

Each Focus Group followed a format developed by the Evaluation Team and had a recorder present to take notes and write the final report of the Focus Group.

4. **Server Logs from eGranary Digital Libraries installed in the field.**
   (See Appendix 3, Log Reports)

Each eGranary keeps a meticulous log on every document and search request made to the hard drive, including information about when the device is turned on and off.

By analyzing these logs, we can determine the number of pages accessed, the amount of bandwidth saved, and understand the types of files being used.

To alleviate concerns about their eGranary use being made available to others, we adopted a privacy policy and included this in log requests made to stakeholders. We created a password-protected intranet site for subscriber institutions to view their results, placing only aggregated and anonymous results on a public Web site.

These four modes of evaluation were developed as a way to accommodate as many respondents as possible and overcome the communication constraints and several cultural barriers that were identified at the start.

Since many subscribers do not have easy access to the Internet, we adapted the surveys so that they could be taken online as well as on paper. We kept the surveys short (45 questions to administrators and 27 questions to users), and made sure that all surveys could be taken within a period of 30 minutes. In many countries, particularly African, electricity often goes out without warning. If there is an Internet connection, it is well known that there are certain times of the day when everyone is trying to use it and it is best to stay off if you have something that takes a while to do. So, a survey that was fairly short, could be done easily with multiple choice or short responses, and did not ask for much in the way of personal data, was developed.

By allowing the User surveys to be anonymous, we hoped to counteract the very real barrier of respondents feeling that they had to be careful in their answers, particularly if it impacted a boss or an administrator higher than themselves.
Along with surveys, we sought to use Focus Groups as another way to gather data which would allow for one-on-one discussion that would perhaps overcome cultural barriers such as misinterpretations of words or misinterpretations of problems.

And finally, we sought to gather data from the logs of the eGranary Library itself in order to give us quantitative information about user preferences and what sites were logged onto most frequently.

Since many eGranary subscribers were not accustomed to participating in evaluation processes, an incentive was developed for both administrative and user surveys. Through a wonderful gift from Seagate Technology, the WiderNet Project was able to offer two free eGranary Digital Libraries and two free flash drives. With each administrative survey that was sent in, the institution of the person filling out the survey was entered into a drawing for a free hard drive. For every user survey sent in, the individual filling out the survey was entered into a drawing for a free flash drive. Two drawings were scheduled assuring that two institutions and two individuals would be named as winners. (See Appendix 14, Congratulatory Letters Sent to Winners)

**Process**

1. **Pre-Survey Census Work**

Two pre-survey emails were sent out in order to confirm and update contact information for the various locations.

The first email was very general as the goal was to confirm that email addresses were working and to request updates to contact information and eGranary status. The second email was more specific and each email was personalized. All contacts for a specific eGranary/location were sent an email explaining “this is the contact information we have for you and your organization” and requesting any corrections or additions.

There were many updates to our contact information and eGranary statuses, many bad emails and many no-responses. Often we had people who said they were no longer professionally responsible for the eGranary and we then had to find completely new emails for people or organizations on an individual basis. This proved to be very time-consuming, labor-intensive work but absolutely necessary.

We learned immediately that we must be in constant touch with our subscribers so that we remain on top of current information about each installation. We cannot assume that any site remains the same for very long. We found, also, that the most effective way to get results in requesting correct information and updates was to send a personal email signed by the Director of WiderNet rather than a request on behalf of the organization, or a phone call.

2. **Administrative Survey**

To track responses, all subscribers for the administrator/librarian/technician survey had to be entered into WebSurveyor first. All contacts entered into WebSurveyor were assigned an individual code number based on their eGranary and the individual. Initially, a person connected to multiple eGranaries had multiple numbers, so an administrator for two eGranaries would be in the system twice. Unfortunately, this meant that subscribers who
were connected to more than one eGranary received email notices multiple times -- especially when reminders were sent.

Once a subscriber was assigned a code number from the WiderNet database, another random number was assigned by WebSurveyor giving the subscriber a unique ID.

Administrative surveys were sent out in batches as code numbers were assigned and contact identifiers were entered into the WebSurveyor database. There were five mailings in all before the contact database was completely updated. The first batch went to only five people, because we were testing the system.

Below is a table tallying the initial mailings, the number of mailings that actually went through, the number of contacts that actually clicked onto the survey, and the number that actually submitted a survey.

As shown, also, many contacts opened the survey but for one reason or another, did not complete and submit it. This could be because the electricity shut off in the middle of completing the survey, the survey was opened to take a look and the contact was going to get back to it at a later date, or the contact was interrupted during the process and never returned to finish.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Sent</th>
<th>Recipients</th>
<th>Received</th>
<th>Clicked</th>
<th>Submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5/13/09</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>5/26/09</td>
<td>98</td>
<td>89</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>6/11/09</td>
<td>109</td>
<td>100</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>6/12/09</td>
<td>186</td>
<td>175</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>6/17/09</td>
<td>133</td>
<td>126</td>
<td>50</td>
<td>27</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>531</strong></td>
<td><strong>495</strong></td>
<td><strong>147</strong></td>
<td><strong>82</strong></td>
<td></td>
</tr>
</tbody>
</table>

Reminders to submit the survey were sent out three times after the initial mailing. They consisted of a thank you to those who had already submitted a survey and a reminder to those who had not to please do so. The third and final reminder also announced the two winners of the first ‘incentive’ drawing and stated that there was still time for subscribers to fill out a survey and be entered into the second drawing for a free hard drive or a free flash drive.

By the third reminder mailing, all duplicates from the mailing list had been weeded out and removed so that the number of actual recipients (362) was much less than the original 531. Of the 362 mailed, 332 were successfully sent, 22 clicked on the email for more information and 6 submitted the survey. The total number of administrative survey responses with Unique IDs as of December 22, 2009, was 82.
3. User Survey

Much of the work done for the pre-census and administrative survey was reused for the User’s survey. The first invitation to participate in the User survey was emailed to those subscribers on the updated mailing list of 362 contacts on November 25, 2009. We hoped to increase the number of responses by sending an email specifically for and about the anonymous User Survey.

(From the beginning, those taking the Administrator’s survey had the option to click onto and take an anonymous User Survey after they finished the Administrator Survey.)

Only 23 surveys were received by mid-November.

In late November, paper surveys in packets containing the surveys, survey posters, instructions, and a CD to run off more posters and surveys were sent to 53 sites that had not responded to updating their information. (See Appendix 17, User Survey Posters)

Since the User Surveys are anonymous, there is no way to track how many of the initial recipients responded.

4. Focus Groups

While online and paper surveys elicit valuable information and data, conducting face to face discussions with administrators, librarians, technicians and users allows different information to be collected. Some of the cultural barriers dealing with wording and language in the surveys themselves can be addressed; participants can discuss answers more thoroughly than with surveys that allow little space to give more than a few sentences to open ended questions. A focus group format allows free flowing discussion among several people and questions tailored to the group itself. Problems with interpretation of words or language can be identified and talked through. Participants can talk as long as needed and can raise any issue or concern they want to put on the table.

A focus group format and a series of questions and topics were developed. Each focus group was set up with a leader, another person acting as recorder to take notes and write a report afterward, name tags for everyone, food, and small thank you gifts for those who participated. Each focus group was led by a WiderNet staff member. Recorders wrote their final reports the day after the focus group in order to keep notes and comments fresh in their minds.

An initial focus group was conducted as a test group via a web conferencing venue called Elluminate. Six long-time supporters and users of the eGranary Digital Library were identified and asked to participate in this test group. The format and series of questions were tested and a precursor of what might emerge from future groups was established.

In order to gather data and responses from a broad cross section of eGranary sites, focus groups were identified by several criteria: a good cross section of older to newer sites, sites that had several eGranary installations close to each other, and sites that represented different venues such as medical facilities, universities/schools, and NGO organizations. Six focus groups altogether were organized and held in Ethiopia, Zambia, and Nigeria.
5. eGranary Server Logs

The eGranary Digital Library keeps a detailed log of every document requested and served. From these logs we can determine traffic patterns and usage data, like number of visits, number of files requested, size of files downloaded, number of clients, hourly use, day of the week use, and popular queries made of the search engine.

However, traditional server logs store data on requests made to a single Web server, whereas the eGranary serves up the contents of hundreds of Web servers. Hence, the logs generated by the eGranary cannot be analyzed by any commercially available software.

While some stakeholders are interested in the usage patterns of hundreds of Web sites in a single eGranary installation, other stakeholders want to know about the usage patterns of a single Web site across all eGranary installations. For example, the librarian of a university might want to see how many pages have been downloaded by her patrons from her eGranary, while the publisher of Wikipedia will want to see how many times Wikipedia pages have been viewed by all eGranary users worldwide.

To accomplish this, we created a larger database to store all of the log records and the ability to then select records based on the eGranary installation, the time frame, and/or the Web site.

Then we had to make major modifications to an industry-standard log analysis software (AWStats) to generate a series of reports from each type of custom set of records.

Finally, we built a complex Web interface so that WiderNet Project staff and individual subscribers could set up and run custom reports. Then we built a second Web interface that would allow subscribers to log into a secure portal to request and view their institution-specific reports.

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Caselet

A third party had sponsored a set of eGranaries at a number of institutions in their country, but was disappointed that one particular institution’s eGranary was reported to not work properly. Communications with this institution were difficult because of connectivity constraints and frequent staff changes, so for months we had a difficult time trying to connect our technical support people with the technical support people at this institution.

Finally almost a year later, the WiderNet Project director is scheduled to visit the country. We contact the institution and offer to stop by and help get their eGranary working properly. At this point, the institution contacts their sponsor and divulges a little more information about the state of their eGranary. The critical piece of information they’d neglected to report earlier was that the eGranary’s hard drive had been stolen in transit to their university a year earlier.

This is another example of when cultural barriers complicate technical support. For a host of potential cultural and political reasons, no one wanted to be the one to break the news.
III Outcomes

Administrators, Librarians, and Technicians Survey

A total of 82 Administrative surveys were collected by the end of November 2009. (See Appendix 12, List of Countries submitting Surveys). This represents 29% of the 300 installations in the field. Surveys continue to come in and the assumption is that over 100 will be received by the end of January.

It has been a very time consuming process to prepare and use these administrator surveys. The subscriber database had to be updated before any surveys could be sent. Several requests had to be sent out per subscriber in order to get the response that we did. Very quickly we found out that many of our database records were out-of-date as subscriber personnel changes were many and on a regular basis. We had little problem updating our database for the years 2006-2009 but those eGranary Libraries installed in the period 2002-2005 proved much harder to update.

A great deal of time was spent on word selection and sentence structure of the questions used in the surveys. There was concern that questions could be interpreted differently according to culture. Eventually, 45 questions were chosen with the understanding that in the end these would be evaluated as to their effectiveness across cultures just as the data of the answers would be evaluated.

To try and attract more people to take the surveys, an incentive was included. Every Administrator, Librarian, or Technician taking the survey would automatically have their respective institution entered into a drawing for a free hard drive. There would be two such drawings.

Several lessons were learned: we must stay in constant touch with our subscribers to keep up with internal changes, perhaps duplicate surveys with slightly different wordings should be considered when surveying such diverse cultures, and direct appeals from the Director of the organization garnered more surveys than requests sent out on behalf of the organization.

Significant Numbers

Basic Infrastructure

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median number of computers per institution</td>
<td>88</td>
</tr>
<tr>
<td>Median number of computers with access to eGranary per institution</td>
<td>21</td>
</tr>
<tr>
<td>Percent of institutions with no Internet</td>
<td>10</td>
</tr>
<tr>
<td>Percent of institutions with more than 2Mbit Internet bandwidth</td>
<td>36</td>
</tr>
<tr>
<td>Median monthly cost for 1Mbit of Internet bandwidth</td>
<td>$1,200</td>
</tr>
<tr>
<td>Percent who reported having electricity “all day, every day”</td>
<td>33</td>
</tr>
<tr>
<td>Percent who reported having electricity less than 6 hours a day</td>
<td>17</td>
</tr>
<tr>
<td>Percent who report daily breaks in electricity service</td>
<td>35</td>
</tr>
</tbody>
</table>

The bulk of the responding institutions report having little or no bandwidth. (Anything less than 2 Mbit of connectivity shared to more than a handful of computers will be extremely
The average amount of bandwidth per computer was 8Kbit in Africa and 20Kbit in India. (For comparison, a typical connection at a U.S. university would be 25,000Kbit while the eGranary provides more than 50,000Kbit.)

Clearly, reliable electricity is a problem for a large number of the institutions represented in this survey. This supports our field observations that a battery-powered wireless eGranary system would be worth developing for many areas.

**eGranary Purchase, Set-up, Support**

- Percent of those who heard about the eGranary through a colleague ........................................ 45%
- Percent who were very or somewhat satisfied with order/sales process ..................................... 92%
- Percent who think the price of the eGranary is fair ................................................................. 31%
- Percent who approved increasing the price to improve the eGranary ........................................ 29%
- Percent of those spending less than 2 hours a month supporting their eGranary .................... 54%
- Percent who supply eGranary access to patrons with their own laptops ..................................... 32%
- Percent reporting no technical difficulties installing their eGranary .......................................... 50%
- Percent reporting that their eGranary is not currently functional ............................................. 20%
- Percent who contacted the WiderNet Project for technical support .......................................... 52%
- Percent who were “somewhat” or “very” satisfied with technical support ................................. 85%

While not ideal, the bulk of respondents reported that the WiderNet Project sales and technical support services were very good. Half reported no problems installing their eGranary, while most problems were addressed by contacting technical support. A non-functional rate of 20% may seem high, but considering the inherent difficulty supporting technology in some developing countries, these numbers might indicate that the eGranary attracts significant attention and care.

**Usability**

- Percent who ranked their Internet connection as “very reliable” .............................................. 22%
- Percent who ranked their eGranary as “very reliable” .............................................................. 42%
- Percent who thought reliability was very important ................................................................. 81%
- Percent who ranked their Internet connection as “fast” .......................................................... 27%
- Percent who ranked their eGranary as “fast” ......................................................................... 64%
- Percent who thought speed was very important ................................................................. 85%
- Percent who ranked Internet content as “fresh” ................................................................. 57%
- Percent who ranked eGranary content as “fresh” ................................................................. 4%
- Percent who thought freshness was very important ......................................................... 81%
- Percent who say they “often or “too often” find resources too old to be useful .................. 14%
- Percent who report being “somewhat” or “very” satisfied with the eGranary .................. 70%
About twice as many respondents see the eGranary as more reliable and faster than the Internet. While a mere 4% thought the eGranary content as “fresh”, still it draws a 70% approval rating overall – with only 14% reporting often finding resources too old to be useful.

A few questions were open-ended questions allowing respondents to write comments. Comments on these open-ended questions are in the appendix. (See Appendix 11, Responses to Open-Ended Questions on Surveys)

Caselet

I am at a university doing an eGranary installation and training the librarians in its use. We decide to put on a course for the decision-makers at the university so they can see first-hand what they’ve just purchased and implemented for their students.

These are all well-respected individuals with 15 to 25 years of service teaching subjects like agriculture, veterinary science, medicine, finance, mathematics, and literature. They’re real heroes, people who have sacrificed through three decades of political turmoil, who have endured months without salaries. They have survived political purges and academic feuds. They have taught an entire generation of the nations’ leaders.

After respectful greetings and formal introductions, the elders each sit down at a computer, some of them eyeing it warily.

Pointing to my projected image on the screen, I say “Now, as each of you can see, there's an eGranary icon on your computer's screen. I want you to take your mouse and click on it.”

Around the room, I see at least four mice being picked up and raised toward the screen.

Two lessons can be drawn from this:

-- many of those in the position to make decisions about the implementation of information technology in their institutions are of another generation and, while individually brilliant and professionally capable, simply do not have a lot of experience with IT (those in the North need only to cast their minds back about 15 years to remember this phenomena);

-- thousands of years of dramatic and profound human progress took place before computers even existed. Those of us enamored with information technology should remember its limited role in the greater picture.
**Users Survey**

Online User surveys were available from the beginning but the response was very low. Users were asked to take the survey and an incentive was added - at the end of the survey they could enter a contest for a free flash drive. Subscribers could take the survey online or on paper. As of mid-November, we only had 23 responses to the user survey.

To increase the response rate, in November and December, we sent out a survey promotion package to 53 sites, (some via email, many via postal mail) encouraging librarians and administrators to promote the survey to their end users. By the end of November, 2009, a total of 27 User surveys were collected. While responses have doubled in the last month, we are waiting to see the results of the mailed surveys before embarking on the analysis. This is too small a sample from which to draw significant conclusions. As Librarians begin to put up the evaluation posters that were in the packets, (see Appendix 17, User Survey Posters) and encourage their patrons to take the survey, our hope is that many more surveys will be submitted.

**A Snapshot of the Survey Respondents**

Of the 57 survey respondents as of 12/31/2009...

- **Percentage who are male**: 91
- **Median age**: 36
- **Percent who have completed university or graduate school**: 80
- **Percent who own a desktop computer**: 18
- **Percent who own a laptop computer**: 28
- **Percent who own a mobile phone**: 90
- **Percent who have Internet access in their homes**: 40
- **Percent who rate their general computer knowledge >8 on a 1-10 scale**: 69
- **Percent of respondents from Africa**: 75
- **Percent who have used the eGranary for less than one year**: 50
- **Percent who have attended a class on the basic use of the eGranary**: 41

The results of the survey seem to represent a narrow demographic: well-educated African males with a high degree of computer skills, a better than average income, and good access to the Internet. This is probably most informed by the fact that all of the surveys so far have come from the Web-based WebSurveyor tool and that most of the respondents were recruited through email and our previous administrator survey.

It is ironic that a project that promotes an off-line information store should use online surveys to assess its work. Clearly we need to do more to collect surveys from those who do not have easy access to the Internet.

So far we have received no response from paper surveys distributed to dozens of sites. Nor have we seen a significant increase in WebSurveyor responses since pushing for more user surveys via email and postal mail.
We will investigate incentive programs to have field representatives and librarians conduct on-site paper surveys and return the results to the WiderNet Project. The new version of the eGranary Digital Library will include a version of the survey that can be taken from any client attached to the eGranary, which we hope will dramatically increase participation.

However, for this narrow demographic, the results are informative.

The respondents reported using the eGranary at various locations...

Percent who used it at work ................................................................. 51
Percent who used it at school .............................................................. 38
Percent who used it at a community library ........................................ 12
Percent who used it at home............................................................... 4

The respondents reported learning about the eGranary from numerous sources...

Percent who learned about it from a librarian........................................ 35
Percent who learned about it from friend ............................................. 26
Percent who learned about it from an instructor................................. 14
Percent who learned about it from a poster ....................................... 7

The respondents characterized the frequency of their eGranary use as...

Percent who used the eGranary daily ................................................. 13
Percent who used the eGranary once a month or more ..................... 18
Percent who used the eGranary several times a year ......................... 11
Percent who used the eGranary several times .................................. 47
Percent who used the eGranary once or twice .................................. 13

The respondents reported using the eGranary for multiple purposes ...

Percent who used the eGranary for educational purposes .................. 49
Percent who used the eGranary for work purposes ............................ 39
Percent who used the eGranary for personal interests ....................... 28
Percent who used the eGranary for health information .............. 21
Percent who used the eGranary for leisure purposes ........................ 11
Percent who used the eGranary for games .................................... 2
The respondents reported the following obstacles to using the eGranary...

- Percent who were stymied by **unreliable electricity** ......................................................... 44
- Percent who were stymied by **too few computers with eGranary access** ......................... 37
- Percent who were stymied by **lack of user training** ........................................................... 28
- Percent who were stymied by **lack of administrator training** ......................................... 28
- Percent who were stymied by **a broken eGranary** ............................................................ 18
- Percent who were stymied by **eGranary being used by others** ....................................... 11

The respondents reported sharing eGranary materials with others...

- Percent who shared resources through **verbal exchanges** .................................................. 60
- Percent who shared resources through **printing resources for others** ............................... 58
- Percent who shared resources through **lectures** ............................................................... 37
- Percent who shared resources through **copying to CD or flash drive** ............................... 26
- Percent who shared resources through **research papers/citations** ................................... 26
- Percent who shared resources through **community outreach** ......................................... 11
- Percent who **did not** share resources with others............................................................. 4

The respondents reported various favorite types of resources founding the eGranary ...

- Percent who favored **textbooks** ............................................................................................. 65
- Percent who favored **Web sites** ............................................................................................ 60
- Percent who favored **software** ............................................................................................. 37
- Percent who favored **video** .................................................................................................. 37
- Percent who favored **audio** ................................................................................................... 19

The respondents reported various favorite topics...

- Percent who favored **science** ................................................................................................ 63
- Percent who favored **education** ........................................................................................... 56
- Percent who favored **development** ..................................................................................... 42
- Percent who favored **engineering** ...................................................................................... 39
- Percent who favored **medical information** ......................................................................... 35
- Percent who favored **literature** ............................................................................................ 21
- Percent who favored **music** .................................................................................................. 9
The respondents ranked eGranary interface elements for helpfulness on a scale of 1-10...

Median score for “Search” (the word search engine) ............................................................... 9
Median score for “Categories” (the subject catalog) ............................................................... 8
Median score for “Types” (lists resources by format) ............................................................... 8
Median score for “Help” (the online documentation) ............................................................... 8
Median score for “Social Marketing” (rotating advertisements) ............................................ 5.5

The respondents ranked the utility of eGranary to other sources of information...

Median score for Internet ................................................................................................... 9
Median score for eGranary ............................................................................................... 7
Median score for Peers/Teachers ....................................................................................... 7
Median score for Print Materials ....................................................................................... 6
Median score for Radio ...................................................................................................... 5

The respondents ranked ease of use very highly...

Percent who rated eGranary ease of use as “easy” or “very easy” ........................................... 78
Percent who rated ease of use as “hard” ................................................................................ 2

And, finally, the bulk of users would recommend the eGranary to others:

Percent who would recommend the eGranary to others ........................................... 91

There were three distinct themes in response to an open ended question, “what would you like to add to the eGranary?”

The most common response (70%) had to do with adding more resources on a particular topic (information technology, maths, song lyrics, African history and cultures, reports from international science agencies, music lessons, etc.).

The second most common request (5%) was to update the content more regularly.

The third most common request (5%) was to make it easier to upload local content.
A good crowd of participants have joined our focus group meeting, many of whom had been through a training the year before with the eGranary and others who had adopted and used the eGranary in the subsequent year. The technical staff for the computer center was in the room as well. Everyone was cordial as the focus group commenced.

Many of the responses to the questions we posed were pretty common, but there were a few that kept grabbing my attention. We asked, “how important it was that the eGranary was still in operation even when the Internet connection went down?” and someone said, rather pointedly, that the eGranary always went down with the Internet. I made a note of this to follow up on it to see if they meant that the eGranary went down with the electricity.

Later when we were talking about the eGranary interface, people were complimenting the eGranary’s interface as being a very fast way to find the material that they were seeking, but someone noted, and another person concurred, that the eGranary was actually as slow as the Internet. This is radically contrary to all of the other reports we’ve received, so I made a note to myself to follow up on this later.

But I didn’t have to. A few minutes later someone else again pointed out that the eGranary was as slow as the Internet and mentioned this in a rather pointed way. Being the impartial interviewer, I just wrote down this report and moved on with the conversation.

Finally, the issue of the eGranary’s speed was brought up again a few minutes later, this time with two or three people concurring rather urgently.

At this point I was confused and I felt compelled to take off my “focus group leader’s hat” and simply ask, “Is the eGranary really that slow?” There was an audible sigh of relief around the room and a couple of people said, “Yes it is very slow.” “And it only works when we have the Internet,” said another.

Now, I had switched to being a troubleshooting technician. I asked a few pointed questions about the speed and how the browser behaved and what the users were seeing and sure enough, everyone in the room reported rather resoundingly that the eGranary appeared to be as slow as the Internet and just as unreliable.

As I was piecing this puzzle together, the head technician then rather defensively started to explain how he had customized the eGranary. He was challenged by a conundrum faced by institutions that have both the Internet and the eGranary: to make the two of them operate together in such a way that, if someone clicked on a link that was not available in the eGranary, they would automatically be redirected to the Internet. While this is possible, something we call a play-through proxy, it is not always desirable to the end user because such a configuration also slows down all eGranary usage.

We had sent the technician information on how to set up a play-through proxy, but as it turns out, he decided to go one better and change a few more settings on the server. The net effect of this was that the users could use the eGranary menu, catalog and search tools to find resources, but when they went to click on the resource, it was served up from the Internet instead of the eGranary. This would explain the focus group’s affection for the eGranary search tools and their observation that the eGranary was as slow as the Internet.

There are some interesting cultural observations to make here as well. More than half the people in the room had been through the training program a year earlier and had, for the first several months of its installation, experienced a very fast eGranary on their campus, so they knew how it should behave, and, as I asked them later, they seemed to know that something had been done by the technicians to cause it to go slow.

For six months they had endured an eGranary that was essentially as slow as the Internet and were not able collectively to push for a resolution to the problem. Instead they waited for an outsider to come and help resolve the issue.

Later, one of the participants informally reported that he had raised the issue with the computer technicians, who then grew defensive. The reporter felt it was more important to maintain his relationship with the technicians than to challenge their work.
Focus Groups

Focus Groups Summary

Conducting these focus groups gave the WiderNet Project a valuable opportunity to explore broad ideas and themes with more than 50 librarians, technical support staff, and program administrators who had a role to play in procuring and deploying the eGranary Digital Library.

The first focus group was a test group, a virtual focus group held, via Elluminate online conferencing software, with six individuals from across the U.S. and Canada who have incorporated the eGranary into their work in developing countries. The second group was conducted in Ethiopia by Cliff Missen, Director of the WiderNet Project, during his visit March 13-21, 2009. Five university campuses and NGO representatives were represented in the focus group. The third focus group was conducted in Zambia at Beit Cure Hospital by Mary White, a PhD. candidate in Public Health and a member of the evaluation team, on June 30, 2009 during her visit to Lusaka, Zambia. Three hospital administrators were involved. The fourth through seventh focus groups were held in four places in Nigeria - the University of Jos, the American Corners Project in Abuja, Kaduna Polytechnic College, and Bayero University in Kano. All of the Nigerian focus groups were conducted by Cliff Missen and the Project’s Field Associate, Jennifer Abagyeh, between November 19 and 29, 2009.

Participants in the focus groups ranged from 5-15 people, all involved in administrative or librarian work. Written reports for all seven focus groups were submitted. (See Appendix 4, Focus Group Reports). The general attitude of the participants was positive and forward looking, with many expressing a desire to improve the eGranary so they could deploy it more widely or improve its impact. As one participant said, “The eGranary MUST succeed. It brings information closer to us.” Another pointed out that, "Off-line information is important with the poverty situation. <The eGranary> is highly valuable and essential.”

Still, there were robust conversations regarding complaints rising from malfunctioning or absent features of the eGranary, the occasional lack of WiderNet Project support (including a couple complaints that more “regular visits should be made by WiderNet group”), and a host of local infrastructural and administrative conundrums that made it hard for participants to provide wide-scale, consistent access to the information resources in the eGranary.

The biggest issue facing those who participated in the focus groups is common around the world: what are the best ways to effectively harness these technologies for the core missions of teaching and research when it means changing people’s attitudes and information seeking behaviors? The “war stories” of the participants mirrored those of innovation advocates everywhere. They explicitly requested that the WiderNet Project help to provide them with tools to promote digital information literacy, to train librarians and patrons alike, and provide a means to verify that use is occurring and training is being taken. The emphasis on this aspect of eGranary deployment came as a surprise to us.

The second most common theme had to do with making the millions of resources on the eGranary more accessible and useful to specific disciplines. The participants widely believed that a focus on area librarianship and the development of topic-specific interfaces, which we call “portals”, would lead to broader uptake in their institutions. This ties into the most
commonly requested new feature: an improved facility to upload and share locally-generated content.

We have come away from this process with both a laundry list of improvements to make to the eGranary and, more importantly, a better sense of how to prioritize our development efforts to best serve the needs of our partners.

Focus Groups Full Report

So far, focus group evaluations have been conducted at six sites, one in Zambia, one in Ethiopia, and four in Nigeria. In the beginning, and as a test group, an additional focus group was held online with US-based implementers of eGranary installations using Elluminate conferencing software. The procedures followed and the questionnaire are included in the appendix, although the focus groups were allowed to meander as seen fit by the leader.

Out of transcripts and notes, 192 statements have been extracted, eliminating repetitive statements from the same individuals or group as well as observations about home institutions, regional culture, personnel, and politics that had no relevance to the implementation and use of the eGranary.

Analysis of the statements revealed 16 distinct areas of concern, with Usage Promotion, Functionality, and Content drawing the highest number of comments.

- Usage promotion.............................. 42
- Content............................................. 27
- Functionality...................................... 26
- State of the Internet......................... 18
- Application................................. 14
- Support: server.............................. 11
- Access to computers........................ 9
- Features.......................................... 9
- Power issues.................................... 8
- Institutional impact........................... 7
- Support: other................................. 6
- Local content................................. 5
- Assessment................................. 3
- Cost.............................................. 3
- Installation................................. 2
- Updates................................. 2

Usage Promotion 42 comments, 21% of total

With a preponderance of librarians and IT staff in the focus group sessions, it is no wonder that the challenge of getting patrons to use the eGranary was a top concern. In casual conversation after one session, a participant described feeling like she had “seen the promised land” but could not get her people to follow her. There was no lack of passion in
the participants, many of whom reported putting significant effort into promoting digital resources on their campus. Some who had Internet in their institution reported a patron preference for the Internet – when it was functional – but related how they were still challenged to get users to use it for more than personal messaging and recreation.

This topic was further broken down into four categories:

**Awareness Building:** 18 comments in this category focused on the need perceived by IT staff and librarians to raise the general awareness of their patrons in the use of digital resources in general and the eGranary Digital Library in particular. One comment, “it’s hard to make students aware of ALL the library services, let alone the eGranary...” pointed up a general frustration many expressed in moving their patrons into the digital age. Librarians recounted how they had made flyers, given presentations to first-year students, or done demonstrations in departments. Generally, they report that people are very impressed when seeing the eGranary for the first time, “Their eyes are bugging out,” reports one librarian. But then the patrons spend little time learning the system.

Several participants pointedly requested more promotional materials and instructional modules to assist them in this task.

**Equipping Librarians:** 11 comments in this category focused on frustrations that the librarians in all the groups felt about not having the tools at hand to learn, use, and teach digital information literacy skills. Several librarians complained that they lacked access to the local area network in their offices, while a few pointed out that they simply lacked access to a computer. One participant seemed to sum up the general sentiment by pointing out that digitization requires librarians with hands-on experience. “Only a photographic brain,” he pointed out, “can capture all the material presented in classroom training.” They need computers on their desk so they can try their hands immediately afterwards. They need laptops and projectors to carry their training into classrooms and departments.

**Training End Users:** 7 comments focused on the trials and tribulations of training end users. “Many students coming into university from secondary school have never seen computers,” reports on participant. “They are told to use Moodle without any formal training. They need more help.” Other participants point out that both the Internet and the eGranary require significant training, and the preferred method is hands-on.

**Area Librarianship:** 4 comments from 4 sites focused on the need for librarians to learn their subject area(s) of the eGranary and prepare course or discipline specific collections to ease their patrons’ adoption of the technology. Said one, “Subject librarians should have a list of all relevant content to their areas for publicizing. This is important for accreditation.”

**Content** 27 comments, 14% of total

Besides complaints (3) about African Journals OnLine where one participant indicated his institution would be willing to pay more for an eGranary with full text articles, the feedback in this area largely consisted of requests for more resources in one field or another. Specific topical needs (14) were across the board, however, largely aligned to the participant’s institutions mission. One participant said, “the relevance of materials to polytechnics is only about 40%.” Another wanted more resources around, “issues we deal with here. Orthopedics in children and adults. General neurosurgery. HIV/AIDS. Maybe you should also include infection prevention.” Others wanted more resources in medical, textile technology, history, theater arts, library science, etc.
Several participants (4) identified topic areas where they had seen success on their campuses, like literature, business management, and linguistics. In two of these instances the participant identified a teacher who had taken the time to mine the eGranary for materials and come away with a wealth of relevant materials.

**Functionality** 26 comments, 14% of total

Participants reported a number of functional problems with the eGranary Digital Library itself (as opposed to external problems that reduce the use of the eGranary, which will be covered in another section of this report.) Some of these, like most of those having to do with the search engine, stem from a simple malfunction of early versions of the eGranary where subsequent software updates were not installed while others point out specific flaws (2 comments) in the search engine and the proxy server (2 comments) that remain a challenge to the WiderNet Project programmers. Three participants wished the interface would allow them to save their searches and store their history and links to favorite resources.

Still, the chief complaints have to do with computer viruses (8 comments) and our long-term problem child: African Journals Online or AJOL(3 comments.) The bulk of the times someone reported "links not working" they would identify AJOL as the "broken" site. AJOL is a wonderful resource for researchers in Africa. However, their site provides indexes and abstracts but not full text articles. Typically, we would avoid adding this sort of “eye candy” (Web sites that do not provide full-text resources), but we made an exception in this case and have heard numerous complaints over the years.

The eGranary’s speed was well recognized in the focus groups, although mostly via concurring smiles and laughter.

Finally, 3 comments were made about how difficult it can be to use the eGranary with other, especially online, digital resources. Where institutions have CD-ROM and/or Internet resources, they would like to be able to present patrons with links to all from the same menu.

**State of the Internet** 18 comments, 9% of total

Invariably participants would lapse into comparing the eGranary and the Internet. While the Internet was the preferred medium for most users, there were clear problems with the Internet, some of which the eGranary addresses.

The most common complaint – lack of speed – was succinctly put by one participant, “Bandwidth is soooo slow. Sometimes it takes a whole day to download a single something. Then, after 15-20 minutes the power goes off.”

Three participants commented on the reliability of their Internet connection. One participant ranked the reliability of the campus Internet connection, “at 45%. Not so effective.” Several made comments similar to this one: “Everyday there’s some <good> periods. Usually, from noon to 3PM, the network is too choked to be useful.”

Three comments focused on the inability to use campus information resources outside of campus. Participants described programs that provided free access to Internet databases, but, since access is based on the IP number of the computer, these databases can only be used inside the university proper (where the connectivity may not be so reliable.)
Some described internal restrictions that block access to some types of media downloads, like software and video. One reported a limit of 7MB per download while another reported that departments charged faculty and students for use.

One participant reported that his university purchases 5MBit bandwidth at $13,000/month. “If they <students> go outside the university for Internet, it won’t be better than here.” Still, he said, even when network is at its best the users experience less than 100k throughput.

One participant reported, “When faculty come, particularly with Internet frustrations, we show them the eGranary.”

**Application** 14 comments, 7% of total

Only a few participants (3) could identify users who were using eGranary materials in the classroom, although one said, “Lecturers are increasingly using references and databases for assignments.”

Three comments focus on the popularity of software that can be installed from the eGranary. Several participants indicated, and their colleagues concurred, that most users would download eGranary content onto USB memory devices, while others prefer to print their gleanings.

**Server Support** 11 comments, 6% of total

Several participants (4) expressed frustration with the technical support of their eGranary servers. One reported lacking a trained support staff while others criticized the central support staff of their institution. One reported their eGranary was kept, “safely in the nurse’s office” and out of circulation. Another said, “The library should operate its own server so as not to jeopardize relationship between campus ICT and the library.”

Two reported that troubleshooting the server’s electrical source, including the uninterruptible power supply, was a significant issue. We were counseled to, “provide an eGranary that cannot be messed up. <WiderNet> should make eGranaries to withstand Nigerian issues.”

Three reported no problems, one thanks to the WiderNet Project’s Field Associate in their country who responded to any trouble.

**Access to computers** 9 comments, 5% of total

Patron workstations can be used to access the eGranary but are in short supply in many of the locations we surveyed. One participant said, “If <the eGranary> is failing, it’s because of lack of access. Too few computers, sever down, power failures, etc.”

Three participants observed a lack of physical space to host those who bring laptops to the library. “Many people bring in laptops, but there’s not enough space. Some students go to internet cafes or other spaces on campus.” One participant estimated that 40% of their university’s students carried laptops. While this number was debated by others in the group, there seemed to be a consensus that more students were procuring laptops.
Features 9 comments, 5% of total

Two campuses reported using Moodle learning management software. (Which will be included in future eGranaries.)

Desired new features:
- Improved search engine .................................................................(2)
- Discussion forums for classroom use and user feedback. .......................(3)
- Real-time communication like tweets and chats........................................(1)
- Tools to upload articles, books, exam questions... ....................................(4)
- Make it easier to switch between the eGranary and the Internet ..................(3)
- Provide regular updates both offline and online .......................................(1)

Power issues 8 comments, 4% of total

Six out of eight comments address the unreliable power supply in their area. “Some <patrons> feel they are wasting their time because of the power problems,” says one participant.

Two sites reported having powerful standby generators. Between the grid and the generator, one was, “effectively up about 70% of the time” while the other was likely to be “available 9-2 and 4-10.”

Institutional impact 7 comments, 4% of total

Most of the participants felt that the eGranary had a positive impact on their institution. “The eGranary, against all odds, is steadily improving academic levels across campus,” was one representative’s comment.

Three participants reported that there was a sense of pride in the institution having an eGranary. “We are always proud of our eGranaries. There are many successes.” Although two participants stressed that “the politics side of things needs more help.” Librarians, who want to avoid conflict, need outside help to push things along.

Another participant complained that “outside auditors came and only looked at books on shelves. They didn’t take time to look at our digital collection.”

Support: other 6 comments, 3% of total

Only two participants had contacted the WiderNet Project for support. One wanted training in building topic specific portals (and did not receive a response) and the other sought an upgrade to their search software (which they received but did not implement.)

Three participants complimented the desktop technical support they received from their institution.

Local content 5 comments, 3% of total
These comments uniformly requested that the WiderNet Project make it easier to upload and share local content. “We have an institutional repository and would like to publish it,” said one.

**Assessment** 3 comments, 2% of total

Two participants would like to see more local evaluation of impact to understand challenges and problems, including reports generated on how many people access the eGranary at their location.

**Cost** 3 comments, 2% of total

The price of the eGranary seemed to be a non issue. Very few people commented when asked. “It depends. Some might say it’s too expensive. We think it’s alright.” Most seemed to concur with comments like, “We can pay more for the service if satisfaction is guaranteed,” and, “services rendered well will strike the difference between the costs <of the old and new eGranary.>”

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**Caselet**

At one medical school, the director of the new computer center was locking the computer center, which had the eGranary and six computers, as a ploy to get the college administration to follow through on a previous promise to supply more computers to the center.

The students were caught in the crossfire of this political battle and simply wanted access to the eGranary. Their solution: hook up some wireless equipment -- previously donated to the school for another purpose -- so that they could connect to the eGranary using notebook computers from their dormitory nearby and from a few clinics in the area.
Server Log Analysis

Only ten logs have been collected to date, while a complex system to gather, synthesize, and display reports of all logs has been developed.

Gathering these logs has been difficult as some subscribers have felt that the procedure for gathering them and sending them back to the WiderNet Project was too complicated. Requests and reminders were sent out multiple times with instructions on how to send logs back to the WiderNet Project. A few sites reported confusion as to how to accomplish this and, after much discussion, a program was made that would capture and ZIP the logs automatically, letting the subscriber just email the compressed ZIP file back to the Project. This did not solve the confusion and so a review and rewrite of the instruction manual for sending in logs was done and tested. We have now received more of them in the last two months than in the rest of the year. Lessons learned: that a training manual is needed so that all navigating of the eGranary system is easy and simple, and that a less complicated procedure for the gathering of a log needs to be devised.

In signing a license agreement with the WiderNet Project, subscribers agree to send in their logs at least once a year. However, in practice very few subscribers feel compelled to send in their logs. Requests may be agreed to, but the logs simply do not materialize. In the majority of the cases where we have gotten a log, it is because a representative of the WiderNet Project physically showed up at the eGranary site to copy the logs onto a flash drive.

We have had numerous conversations with administrators and technicians in the field about this conundrum and have heard various concerns about privacy and authority. In fact, the logs can be very revealing in unexpected ways: virtually every log we’ve analyzed reveals large gaps in service, sometimes lasting months. The logs frequently contradict reports from technicians to their supervisors, divulge inappropriate activities (like searching for pornography or downloading games from the server’s console), and demonstrate when and how the eGranary is available to patrons. The logs produce a startling amount of transparency in situations where people are unaccustomed to accountability or easily embarrassed. In fact, in a couple cases, supervisors have asked us not to reveal to their staff that they knew what was learned from the logs.

But the logs can also be an effective tool to understand usage and develop strategy for decision makers and those promoting better information access in their institutions. One of the things we have tried to do in the development of our log processing and analysis is create a quick turnaround in a password-protected site where administrators can see clear reports generated from their submitted logs.

As of December 22, 2009, we have received ten logs from Ethiopia, India, Nigeria, Malawi, an Iowa shelter, and Iowa prisons.
For these ten installations, the aggregated raw data shows more than 1.2 million “hits” and more than 122GB worth of downloads. Considering that many of these logs were partial reports, some covering just a month or two, these numbers are impressive.

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</table>

**A Sample Log Report**

This sample dataset represents 11 months (Jan-Nov) of use at one institution.

The chart and table below illustrates several points about the log analysis and environmental factors. The peaks and valleys of usage correspond with the university vacation (Apr-Jun) and a national strike (Aug-Oct.)
The following chart shows the various types of files that were downloaded during this time period. Video files (highlighted in “Bandwidth” column) account for 82% of the bandwidth, while PDF and audio files account for another 9%. These are the file types most likely to be avoided by those using a slow Internet connection.

A good area for future research would be to find a comparable proxy log for an institution’s Internet connection to determine if there are measurable differences in browsing behaviors. Ample reports from individuals on their browsing habits indicate that video, audio, and PDF files are routinely avoided in low-bandwidth situations. (In some cases users will disable the automatic download of images while others use proxies that reduce Web pages to nothing but text, like Google Mobile. http://www.google.com/gwt/n)
The site sample below, listing of top phrases entered into the search engine, gives us a general idea of what sorts of items users seek. Such phrases are only moderately helpful, because the likelihood of users using the exact same terms in the exact same sequence is low. For example, we don’t know if the search for “composite flour of wheat and cassava” was a single individual pressing the “search” button too enthusiastically or a classroom assignment.

<table>
<thead>
<tr>
<th>Search Keyphrases (Top 10)</th>
<th>Search</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>composite flour of wheat and cassava</td>
<td>28</td>
<td>1.7 %</td>
</tr>
<tr>
<td>cooperative societies</td>
<td>20</td>
<td>1.2 %</td>
</tr>
<tr>
<td>library</td>
<td>20</td>
<td>1.2 %</td>
</tr>
<tr>
<td>malaria</td>
<td>18</td>
<td>1.1 %</td>
</tr>
<tr>
<td>reprography</td>
<td>18</td>
<td>1.1 %</td>
</tr>
<tr>
<td>duplicating machine</td>
<td>16</td>
<td>0.9 %</td>
</tr>
<tr>
<td>cocoa yam - domain wikipedia</td>
<td>16</td>
<td>0.9 %</td>
</tr>
<tr>
<td>enviromental chemistry - domain wikipedia - domain who</td>
<td>16</td>
<td>0.9 %</td>
</tr>
<tr>
<td>the african child</td>
<td>14</td>
<td>0.8 %</td>
</tr>
<tr>
<td>malaria - domain wikipedia - domain who</td>
<td>14</td>
<td>0.8 %</td>
</tr>
<tr>
<td>Other phrases</td>
<td>1442</td>
<td>88.9 %</td>
</tr>
</tbody>
</table>

The most visited pages are the eGranary search page, followed by the eGranary catalog pages. This correlates with reports from focus groups and survey comments, where we were told that many users found it easier to locate resources using the menu of catalogued items (which only represents a tiny fraction of the resources on the eGranary) followed by a word search. The advanced search page, where users can construct more complex queries, was used infrequently. (In one sample, 116 times versus 1,700 for the simple search.)

The most visited sites are Wikipedia, one of several World Health Organization servers, one of many Bioline journals, and African Journals Online (AJOL.)

Undertaking the analysis of the logs, we have identified several areas for improvement. We will alter the way that the logs are created to store data that will allow us to better determine the speed at which files are served so we can understand the dynamics of a user’s session.
For example, in the following graph from a sample site we can see that 32% of the visitors to the eGranary spent more than 30 minutes browsing. On a slow Internet connection, this might barely be enough time to open a search engine interface and download a few Web pages. On the eGranary, it might likely include perusing of hundreds of pages and viewing of a couple videos.

<table>
<thead>
<tr>
<th>Visits duration</th>
<th>Number of visits</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0s-30s</td>
<td>99</td>
<td>25.5%</td>
</tr>
<tr>
<td>30s-2mn</td>
<td>28</td>
<td>7.2%</td>
</tr>
<tr>
<td>2mn-5mn</td>
<td>39</td>
<td>10%</td>
</tr>
<tr>
<td>5mn-15mn</td>
<td>53</td>
<td>13.6%</td>
</tr>
<tr>
<td>15mn-30mn</td>
<td>38</td>
<td>9.8%</td>
</tr>
<tr>
<td>30mn-1h</td>
<td>64</td>
<td>16.5%</td>
</tr>
<tr>
<td>1h+</td>
<td>65</td>
<td>16.7%</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Since customizing the log analysis software and developing the Web interface took much longer to develop than planned, we have only recently sent the results to those who submitted their logs. We look forward to receiving their feedback so we can improve the system and highlight the results they determine are most critical.

Finally, the Web logs do not reflect the use of hundreds of CD-ROMs and other materials, like executable programs, that do not get doled out by the Web server. We need to investigate how to log these resources which are served up to the users by other means.
IV Reflections on the Evaluation Process

This evaluation process has been an extremely valuable tool for the WiderNet Project at this point in time. Currently, there are over 300 eGranary Digital Libraries in sites throughout Africa and Asia. The WiderNet Project is just about to launch its newest version of the eGranary – a 2TB library with a Community Information Platform (CIP) that will allow individual sites to add their own information and data to the eGranary Digital Library such as curriculum, meeting dates, web sites, and so on. This is a perfect time to have conducted an intensive, in-depth evaluation of our product and to refine our service processes. Many of the lessons we have learned in this evaluation have been incorporated into the new eGranary and certainly many of the customer service lessons will be incorporated into the conduct of our everyday business dealings.

What We Took For Granted or Did Not Think of When Designing the Evaluation Process

We took several things for granted and have learned from this:

1. We assumed that people would send in their logs on a regular basis because it was part of the license agreement that they signed. Reminding people that they were contractually required to respond had almost no effect.

2. We assumed that subscribers felt part of the WiderNet Project. Patterns emerged from this evaluation process, however, that told us we needed to do a better job of keeping in touch with our subscribers and to developing mechanisms in which to do this such as monthly newsletters, contact at specific intervals of time and so on.

3. We assumed that the instructions sent out with each new eGranary for installing and operating it were sufficient. And, that if they were not, that the technicians would call us for help in fixing the problem. We did not think about cultural barriers that might limit people from seeking help or admitting they have a problem. We found, in many cases, a real reluctance to ask for help as that might jeopardize one’s job or damage one’s status.

4. We assumed that contacts stayed awhile in one position, but have learned that people move quickly and often.

There were certain questions that we did not include in the surveys, which on further reflection should have been included. They would have given us some very helpful information. We needed to find a better way to ask about bandwidth. Knowing the number of students or people at a particular institution or organization would have been helpful, also. Comparing the number of people, to the small amount of available bandwidth or the number of computers would give a much better picture. Having information on what kind of facility they represented or how long they had been involved with the eGranary would have been helpful, as well.

What Worked and What Did Not Work

Reflecting back on this process, we can see many things that worked and several things that did not work. Throughout this process, we were continually refining our approaches,
figuring out how to elicit more responses to requests, and in a few instances jettisoning some things that just did not work. Following are some examples:

1. Paper surveys have not worked at all. Two months have gone by since we sent out packets with paper surveys and we have not received even one back. There could be several reasons for this including cost to mail back the surveys, packets never getting to the right people, or the fact that we sent the packets out by standard mail rather than Federal Express which would have been prohibitively expensive. Never the less, it raises questions about using this method again.

2. Telephone calls, as a means of updating contact information, were not successful. Time zone issues, electricity failures, and reluctance to give out information over the phone to strangers were common and we ended up not using this method as little information was procured. In the beginning, we thought this method would be an easy way to update our contact information, that sites would recognize the WiderNet name and update immediately but not so.

3. Sending requests out under the organization’s name did not generate the kind of response that requests sent out under the Director’s name generated.

4. We found that there was a certain email etiquette involved in generating good responses to our requests for information and taking the surveys:

   The more detailed and specific to each individual that the email was, the more responses were received.

   While sending many emails often helped people remember the survey and significantly aided the total we received, it also irritated many others -- particularly if they were connected to several eGranary Digital Libraries and thus received duplicate emails. We had to redo our mail lists so that each person received only one email (not counting reminders), regardless of whether they're connected to multiple eGranaries or not. Multiple emails were sent in the beginning for many of the sites until we were able to track down what was a generic email versus an individualized email for each site.

   Formula emails from the Director as a collective was not a universally understood concept. Even if the email was made to sound as if it was going to a group, people responded as if the Director sent the email just to them. That meant receiving (1) irrelevant responses to the Director, (2) reminders of which parts affected only that particular individual and (3) sometimes very personal information.

   When sending an email to multiple people, we found it absolutely necessary to use BCC, because someone is always going to respond to everyone, no matter how personal his/her response.

5. For the most part, the survey questions provided the information that we were seeking. Several questions on the survey, however, need to be reworked or reworded to deal with cultural differences in the meaning of certain words (some have suggested that duplicate surveys with slightly different wording should be sent out when surveying such diverse cultures), or in wanting to overstate the answers to certain questions because it makes their institution look good.
Lessons learned

The important things we have learned from this evaluation are many.

1. We must stay in touch with our subscribers on a regular basis and develop a system that assures contact every six months with each of our sites. This evaluation has shown us how valuable regular communication with subscribers is and how beneficial constant contact with customers is in keeping abreast of technical questions and problems. In some instances we found that subscribers were not even aware they could call WiderNet with their technical problems. Developing an on-going system will do much in the way of effective trouble shooting. The surveys indicate that we have been very successful in the area of sales and dealing with new customers. Now, we need to extend that good performance to the follow-up and to the on-going relationship with our subscribers.

2. We have found that the turnover for administrators, librarians, and technicians, particularly at African universities, is quite high and contact names quickly become outdated. eGranary purchases from 2002-2005 had had little follow up from our office and so most contact information needed updating. In these instances, we found that having generic emails for the organizations was quite useful. It is absolutely imperative that we keep up to date information on all our subscriber sites and contacts. The maintaining of contact names, emails and phone numbers is an ongoing, time-consuming process but vital.

3. We have found that there is often a real lack of computer knowledge or training in the field and that this lack affects how the e-Granary is perceived and used. There is sometimes a lack of training in how to navigate the eGranary and a lack of knowledge as to how much is in the eGranary and thus its possibilities. Certain sites suffered from this lack of knowledge and training and that has led us to begin work on developing a core of roving field representatives/trainers/installers that would cover specific countries or sites on an annual basis. We are also exploring the idea of franchises.

4. We have found that Area Librarians are one of the most effective groups of people in advocating for the eGranary, training people in how to use the eGranary, and in maintaining these digital libraries. We need to work more closely with these Librarians and give them tools/manuals/training so that they can be more effective.

5. We have found that successful eGranary sites are ones where there are one or more people willing to step up and take ownership and responsibility for developing a computer lab, maintaining the site, advocating for the library, and training people in how to use the library. Those sites where no one steps forward to take on this responsibility are usually sites that are not functioning very well.
V Conclusions

This year-long evaluation of the eGranary Digital Library is precisely what we needed if we are going to build a sustainable non-profit organization to support the Library’s use and growth and to develop the eGranary concept into something that has a meaningful impact for information access around the developing world.

As a product that is meant to be a substitute for Internet connectivity, the eGranary automatically faces a significant amount of suspicion and scrutiny. As a new and innovative technology, the eGranary must succeed on many levels to be embraced and utilized to its fullest potential.

Improving the Technology

An established company with a sizable capitalization can adopt a model where their product will not be deployed unless all the costs for deployment, customer support, and training are covered in advance. But the WiderNet Project, a small service program serving a very price-conscious set of customers, has chosen to produce the device at the lowest possible price and thus can only afford to provide a little technical support.

This sink-or-swim model works well for some (as we find out in our evaluations, about 60 percent), but not so well for others.

It does not serve the overall eGranary project, though, if the eGranary grows a reputation for not being a very reliable technology. This survey shows that about 70 percent of the eGranaries that have been deployed are still functional. Knowing the contexts and the tough environments, this number could be perceived to be good, but others might find it off-putting.

Several stakeholders have raised the issue of creating an eGranary that could withstand all of the conditions of the developing world. It’s a tall order, considering all of the technical things that could potentially go wrong and how impossible it would be to build a computer that would operate perfectly in developing countries. Indeed, from the surveys and focus groups, it appears that the reported problems that sideline many installations are not eGranary-related so much as they are simply a function of operating a simple computer (not just a server) within the usual conundrums of tough environments like those found in the developing world.

However there are a few technical things we can do to make a more bulletproof eGranary that can be set up and run without a lot of maintenance or user intervention. Especially one that would run on a 12-volt battery for 24 hours (to better withstand electricity supply interruptions) and provide plug-and-play wireless service. (At about triple the cost of the current eGranary.)

But, as we’re finding with all the non-functional eGranaries that have been investigated, technical issues per se are not the problem: rather the problems are a little bit technical and a large part logistics and management. More than half the time that end users report that their eGranary isn’t working, it’s because it’s sitting in the bottom drawer of someone’s desk, being protected by an overzealous librarian, or not deployed because of fear, uncertainty and doubt (FUD).
In the bulk of the situations where the eGranary has been deployed but then has fallen into disrepair, the solutions are often outside of the WiderNet Project’s immediate control.

For example, one respondent reported that their eGranary was constantly running a hard drive check whenever it was turned on. Since the check would take days, the eGranary had been abandoned. Our technicians recognized this problem immediately. After a computer gets turned off unexpectedly (power outage, for example), upon the next startup it scans its hard drives for signs of corruption. In most situations, this makes sense; except that the eGranary’s hard drive is so massive that the check can take days. If our technical support people have been contacted, they would have instantly recognized the problem and sent back a solution that would have taken less than five minutes to implement.

We see this as a systemic problem. What can the WiderNet Project do to foster an environment where an attendant’s first and unfettered response is to ask for technical support from a WiderNet representative? It’s heartbreaking to think that something that could be so useful is idling away for lack of a simple and very available solution.

Yet as we talk with people doing installation and technical support in the field, we see the other side of the story as well. New and unfamiliar technology is scary to everyone. Some people resist it, some people are suspicious of it, technical people especially worry that the new unfamiliar technology will make them look bad, and some are simply put off by having an unfamiliar technology foisted upon them by a decision maker at a higher level. As well, in our experience all over the world, young technicians want to be seen as an expert and are highly resistant to asking questions or seeking help.

All of this adds up to more FUD and few requests for technical support.

Finally, we have experienced -- and many sociologists in the field have observed -- that notions of customer service and customer rights are only beginning to take root in many developing countries. There is a long history of new technologies being introduced that simply fail without recourse. We see this at every university that we visit in Africa — new servers languishing unused in the corner, software unboxed, expensive equipment left to waste for lack of a simple replacement part. We’ve also experienced the frustration of waiting for weeks to have permission to purchase a ten-dollar spare part, so we know what support people in Africa must go through to make their systems work and how futile it sometimes seems to get things working, especially when one doesn’t have a lot of expertise or training.

So not only do we need to make an eGranary that is technically hardier and requires less intervention, but we also need to address the issue of getting past the fear, uncertainty and doubt, building a good relationship with the technical support person and working very hard to increase the likelihood that they will feel comfortable seeking technical support.

The efforts of our solitary Field Associate in Nigeria to provide on-the-ground technical support has made a difference in a lot of situations, but the challenge is making it a consistent intervention in the sense of having someone like her visit the sites on a more regular basis — maybe annually, maybe every six months — to create a personal relationship with the librarians and to encourage open dialog about the systems and their use and state of repair.

We’ve worked up a scheme where we now encourage everyone in Nigeria who purchases an eGranary to also purchase the installation services of our Field Associate. This way she visits
the site, makes sure the eGranary is set up properly and, more importantly, she does training so people aren’t starting from scratch in their understanding of how to use the eGranary. Part of her incentive system is that she gets paid the larger portion of her installation costs during set-up, but gets paid the remainder six months later when the subscriber indicates they’re satisfied with their installation.

This experiment appears to be working well and there are members of our advisory group who insist this is the model that we should adopt for all future eGranary installations – mandatorily increasing the costs to our subscribers, but reducing failure and technical support requests.

The next challenge is to develop sustainability and consistency with this service beyond the initial six-month installation and verification period. We are debating about simply charging a much higher cost for installation and having the support service last for two years... or giving people the opportunity to purchase annual support contracts. A number of our subscribers have said it’s a lot easier for them to come up with a much higher initial one-time payment then it is for them to arrange for multiple payments over several years.

**Accountability and Use**

But then we face our next and probably most daunting hurdle: once the technology is set up and running correctly, how do we get people to use it well and how do we make sure they are using it?

Some of the technical issues that we encounter in the field would be resolved with a bit more accountability. If the persons responsible for setting up and supporting the system had actually used it and reported the problems or had been turning in their logs to us, we would have known that there were problems and could have designed interventions that would fix the problems. Most installations are successful and/or technicians work with us to solve problems. These are sites that are managed well and have people who are responsible on a daily basis. There are, however, problem sites such as the ones cited below.

At one site where the eGranary wasn’t working, it was reported that the eGranary had stopped working just that morning. It’s funny as this happens to us a lot when we travel around the world to visit eGranary sites. The eGranary “just stopped working this morning” for some reason. Later, when we review the logs of the server, which are an absolute record of everything done on the server, we see that the server actually hasn’t been booted up for months.

With one site we visited, the server would not boot because of a corrupted operating system. We were not able to fix the operating system when we visited because we hadn’t been told in advance that it was a problem (it appears that it had been a problem for a while) so we did not have the CDs we needed to effect the repair. We had to feel some sympathy for the person responsible for maintaining it because she was not confident in her technical skills and did not want to appear incompetent, so she didn’t raise the issue with her immediate supervisor – again, the culture of fear, uncertainty and doubt. As we were examining the machine, the librarian gave us more information that indicated that the server had been operating without the UPS (a battery backup) because the UPS had been recruited to run someone’s laptop and that the server had crashed during a power outage and the operating system did not recover. Likely this would take an hour or less to fix. It’s not a big deal, but it is a problem. It could have been fixed very easily with just a little bit of
notification. But that advanced notification would have meant an atmosphere of trust and support, not FUD.

When we visited another site, we again had no information about its operational status and found that it wasn't configured correctly. Upon reviewing the server log we found that it had only been turned on for three or four days in the year that it had been deployed there -- and even then only for an hour or two at a time.

Some might see this as an integrity issue and say, “Ok, why hasn’t the librarian spent more time on this machine and how can we be sure that it’s being used and people are taking their training?” However, it’s more of an accountability issue, not personal accountability for each of the librarians, but systemic accountability. There’s a whole chain of parties who have measurable goals to achieve and need reliable verification: those who provide the eGranary; those who procure and distribute the eGranary; those who deploy the eGranary; and those who train end users of the eGranary.

In practically every example where the eGranary is not working and we didn’t know about it, the issue would have been addressed much earlier if the attendants were required to submit a monthly report along with the logs. These logs would provide concrete, quantitative evidence of how well the eGranary is being used. They can also be used to track up-time, attendance, and other aspects of the center’s management.

**Training to Build Capacity across the Spectrum**

Other levels of accountability involve training and education around the eGranary. For this, we need to make sure that there’s consistent training across the board and that we can verify that the training is taking place.

In a recent focus group, one of the participants, who had been to a two-day training on the eGranary, made the point that “only someone with a photographic mind” could be expected to absorb and understand everything presented in an intensive classroom training. What was needed was more hands-on time with the eGranary, walking through the various techniques and mastering good digital information literacy behaviors.

Others have pointed out the need to train hundreds of users, sometimes thousands of incoming students who have had no prior computer experience, every year.

We need to build into the eGranary a set of self-paced computer-based training modules that can provide the foundation for digital literacy and capacity building in new eGranary installations. For example, modules customized for four groups: technicians who are going to manage the eGranary Digital Library (4 hours); librarians who will be training others to use the eGranary (20 hours); area librarians who need to master particular topics to support end users (20 hours); and end users of the eGranary (2 hours.)

With the new interactive features of the 2TB eGranary, which includes Moodle, the learning management software, we can provide both training modules and quizzes, making it possible to walk users through exercises with various eGranary technologies and certify that they have spent the time and proven their skills.
The goal would be a program wherein an organization or third-party sponsor can deploy eGranaries to a location and know that they will see monthly reports on:

- the eGranary’s up-time and technical support activity
- the number of visits and pages the eGranary has served up
- the progress of support staff towards their certification
- the number of users who have earned certificates

This kind of accountability would move us towards the ideal of a digital library that could withstand all the “conditions” of developing countries and improve the chances of the information being delivered to those who need it most.

**The Bottom Line**

We have identified several areas for improvement:

- More effort to create an atmosphere to encourage reporting of technical problems
- Consistent use of field associates or roving technicians/trainers to install, follow-up, update, and train staff
- Program to track timely reporting and log submissions
- Training modules to certify varying levels of eGranary proficiency
- Development of training materials for librarians to use in encouraging use of the eGranary Digital Library and in training users

These are all valuable lessons to learn. These same lessons have been learned all over the world with various forms of technology, so we should view these as systemic failures rather than personal ones.

Someday we hope that the eGranary Digital Library (or something like it) is in every school, hospital, and library in areas around the world that are underserved by the Internet.

Understanding the constraints and opportunities are critically important. This experiment has yielded a great deal of good information. We hope to continue to learn as we move forward with the installations of the next generations of the eGranary Digital Library.

This Rockefeller Foundation grant has provided us with a wonderful opportunity to build a set of feedback mechanisms that will serve us for years.
Response and Recommendations to the Findings

Our recommendations

We need to build into the eGranary a set of self-paced computer-based training modules that can provide the foundation for digital literacy and capacity building in new eGranary installations. For example, modules customized for four groups: technicians who are going to manage the eGranary Digital Library (4 hours); librarians who will be training others to use the eGranary (20 hours); area librarians who need to master particular topics to support end users (20 hours); and end users of the eGranary (2 hours.)

With the new interactive features of the 2TB eGranary, which includes Moodle, the learning management software, we can provide both training modules and quizzes, making it possible to walk users through exercises with various eGranary technologies and certify that they have spent the time and proven their skills.

We have identified several areas for improvement in the process of analyzing logs. We will alter the way that the logs are created to store data that will allow us to better determine the speed at which files are served so we can understand the dynamics of a user’s session.

For some of our subscribers, we need to make an eGranary that is technically harder and requires less intervention. Along with this, we need to address the issue of getting past the fear, uncertainty and doubt, building a good relationship with the technical support person and working very hard to increase the likelihood that they will feel comfortable seeking technical support. There are a few technical things we can do to make a more bulletproof eGranary that can be set up and run without a lot of maintenance or user intervention such as the development of a library that would run on a 12-volt battery for 24 hours (to better withstand electricity supply interruptions) and provide plug-and-play wireless service.

We need to focus on the ability to load local information onto the library. This was something that was highly desired by subscribers when asked the question "What else would you like to see in the eGranary". We have addressed the need for the ability to upload local content with the development of the Community Information Platform in all new 2TB eGranaries starting February, 2010; now we need to continue refining it and working with our subscribers to make it as easy as possible to upload local content.

Certainly we need to develop different means of collecting surveys from those who do not have easy access to the Internet. It is ironic that a project that promotes an off-line information store should use online surveys to assess its work.

We are in the process of developing a program to provide a more regular schedule of updating content.

We need to develop sustainability and consistency with the eGranary service and training. We are discussing several possibilities such as charging a much higher cost for installation and having the support service last for two years, giving people the opportunity to purchase an annual support contract, increasing the cost of the eGranary and building into the initial cost the installation/training/yearly check-up visits, developing a core of roving technicians/trainers that visit each site once a year, or perhaps going to a franchising system. We need:
• More effort to create an atmosphere to encourage reporting of technical problems
• Consistent use of field associates or roving technicians/trainers to install, follow-up, update, and train staff
• Program to track timely reporting and log submissions
• Training modules to certify varying levels of eGranary proficiency
• Development of training materials for librarians to use in encouraging use of the eGranary Digital Library and in training users

We need to develop an on-going system of keeping in contact with our subscribers via newsletters, email contact every 6 months, focus groups held every so often, roving field associates or ambassadors making site visits at least once a year, and annual surveys. The new 2 TB eGranary will have both the administrative and user surveys and we are hoping to be able to collect these once a year along with the logs.

**Product Business Model**

Our past business model has been predicated on providing a good off-line information store at the least possible cost. Our intention has always been to provide the eGranary Digital Library at a price that covers its unit production costs, minus the overall development costs, which have been covered by grants.

The more business-minded WiderNet Project stakeholders have long argued that our model of simply adding the cost of a blank hard drive, a couple hours of a technician’s time, and shipping and handling costs was too simplistic and meant that the WiderNet Project was, in effect, subsidizing the per unit cost of every eGranary we shipped.

At the onset of this process we commissioned a study by graduate students in the UI School of Business who researched all of the unit costs associated with creating and distributing an eGranary. Besides calculating the cost or purchasing and shipping equipment, they interviewed all the WiderNet Project staff to determine how much time and effort were spent advertising, processing transactions, providing documentation, developing promotional materials for end users, providing installation and on-going technical support, answering usage questions, and dealing with inevitable equipment and shipping failures. It turns out that we were charging new subscribers about half of what it cost us to create and support an eGranary. And our greatest expenditure in time and person-power is after the sale in the form of technical support and follow-up.

The hard lesson for us is this: long-term customer support and training is a critical component to the success of the eGranary Digital Library.

It is not enough for us to blithely distribute drives with an installation manual and the hope that people will “figure it out.” Many do, as clearly indicated in our survey results, but to various degrees while some simply do not.

As a product meant to be a substitute for the Internet, the eGranary Digital Library faces a great deal of suspicion and scrutiny. If it is available, the Internet remains the preferred medium and it is not always easy to convince people that the eGranary is a valuable tool for their institution or organization and can be used in place of the Internet. The eGranary must be seen as an easy to navigate, easy to use alternative that offers a wealth of information
and materials. This means easy-to-use training manuals, on-site training, and easy access to technical support.

The major successful solution we have identified to-date has been the employment of field associates who can provide on-the-ground promotion, demonstrations, installations, and customized training for staff and end users. Our challenge is to grow this program to cover more countries and employ more local entrepreneurs.

VI On-Going Evaluation System for the eGranary

Throughout this process we have focused on creating tools that could be used for years to continue this evaluation process.

The Administrator and User surveys have been tested and tweaked and will undergo further updates. They are online and available for the foreseeable future. We have set up a tracking system so we can easily send requests for feedback to those implementing new installations in six months intervals.

Both surveys will be added to the new 2TB eGranary, which supports local interactive database applications. The records generated will be retrieved along with log files updates.

We have developed a mechanism for processing survey results quickly and will continue to improve the reporting as we collect further responses.

The server log processing application is perhaps the most complex of the tasks we’ve undertaken. It streamlines the processing of logs and makes it very easy for a clerical staff member to manage the entire task, from tracking compliance with log submission, to entering logs in to the database, to generating conventional and custom reports, and then reporting the results back to the submitter.

We have developed a protocol for conducting focus groups and have trained several student staff and one field representative in the art. We will continue to conduct focus groups while visiting the field for other purposes. In fact, two are already planned for St. Lucia and Zambia in the near future.
Caselet

Planning to travel to a city, I called a local school that had the eGranary to see if I could visit and see how the installation was performing. The subscribers indicated that they would like this very much and said that they had someone working on a report that would be finished before my appointment.

Upon arriving at the campus for what I thought would simply be a drop-in informational visit, the host announced that six people would be attending the meeting to give the report on the eGranary.

We met in a nice boardroom and after introductions and formalities were observed, the Dean of Education indicated to the head technologist that it was time to give his report. The technologist handed out a six-page report and then read it verbatim to the group.

It turns out that the eGranary had only performed for a short while on the campus before it started to give them serious grief. The technician reported that after turning on the eGranary in the morning, the network would start to slow down until finally the entire campus network was largely non-functional.

Turning off the eGranary fixed the problem and so, after several attempts to troubleshoot and retest their hypothesis, the group determined that the eGranary did not function as advertised and was a threat to the entire campus network.

I was simultaneously humbled and perplexed, humbled by the sincerity and the kindness of my hosts and perplexed by the technical problem.

In context, there were significant cultural issues underlying the meeting and the presentation. I had encouraged this school to purchase an eGranary Digital Library a year earlier. Their financial situation being poor, I had agreed to hand-carry the eGranary to their institution, saving them the shipping costs from the United States. And I helped to install it. For this my hosts, I know, felt a deep sense of gratitude, having saved them hundreds of dollars in the transaction.

As well, in many African cultures, it is considered rude to criticize an elder or a distinguished visitor directly. The eGranary Digital Library, being my baby, would be a delicate thing to criticize even though it had wreaked so much havoc on their campus network. The solution, therefore, was to come up with a formal group meeting with an elder representative at the table. The formal report, with the clear evidence that the technical team had done their best to isolate the eGranary as the cause of the network slow-down, was the honorable way to present this criticism of my beloved invention.

On one hand, I had to appreciate their thoughtfulness. On the other hand, it was frustrating to think that something that could have been resolved with a phone call or email had turned into such a cumbersome event.

From the technical side of things, this problem was intriguing. For even though there are many potential ways for an eGranary to fail, that it should affect the entire network of the school was extremely unusual.

I asked if we could look at the eGranary and several of us wandered over to the library to look at the server. Turning on the server, I found a host of errors while trying to read the eGranary hard drive - very peculiar errors that were sending bizarre codes across the computer screen.

The next step was to open the computer to see what was going on inside. However, it took us more than 45 minutes to find a screwdriver to open the computer.

I don’t relate this to embarrass my hosts. I highly respect and admire the work that they are doing and understand the very serious constraints in which they operate. I cite this to remind us all of the scarcity and the awkward logistics that inform a lot of these sorts of projects in the developing world.

Hand tools are rare and highly treasured in Africa and they have the habit of wandering off and becoming lost. To many people’s thinking, a tool that is lying around unused could, and should, be deployed for whatever business is at hand. So this library IT group had assigned the tools to one of their members whose job was to keep them under lock and key and only check them out when required.

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Unfortunately, this individual was not at work that day, so the tools were not accessible. Someone was sent to fetch the man who, it turns out, was not available, but the man gave directions on how to get the key from his wife so we could open the toolbox.

Upon opening the server, the problem was readily apparent. The original cable that connected the eGranary hard drive to the computer’s motherboard had been replaced. The new cable, which was a flat ribbon cable (comprised of 80 wires running in parallel) had a cut, a very thin razor-like cut, penetrating about a dozen of the wires on the ribbon. The cut cable was clearly from another computer at the school, as it had a brand name “Compaq” written on the edges of the cable.

I immediately pieced together what might have happened.

When technicians are troubleshooting a failed component in a computer, the easiest thing to do is switch similar components from one computer to another to determine which part is not functioning. The Compaq computer was probably not even booting up, since the damaged cable was connected to the single hard drive containing its operating system. Having swapped the good cable from the eGranary hard drive to the Compaq, the Compaq computer would have started working.

The technician would then probably have been delightfully surprised to find that the eGranary was still working even with the damaged Compaq cable installed. Or at least this would appear to be the case, because the faulty cable would have been hooked up to the eGranary hard drive -- the second hard drive in the computer -- and the primary hard drive containing the operating system, on a separate cable, would have booted normally. The eGranary drive, with the bad Compaq cable, would only show trouble later.

So that was it. A damaged hard drive cable had been placed into the machine and, when pressed into service, created all kinds of spurious signals that would progressively slow the machine and cause it to generate unusual signals that would eventually slow the network.

The solution was, obviously, to replace the cable with one that was in good repair. But again, we ran into the problem of scarcity and logistics.

In the US, these cables are so common that we often discard the extras that come with every new hard drive. Even in the country, this cable could be procured for $10. But getting permission to purchase the part, as well as getting an advance to pay for it, could take days. The school’s bursar, the chief financial officer, was home sick and no one knew how soon he would return and if they could bother him at home to approve this purchase. For an employee who makes $100 a month, purchasing a $10 part out of his pocket would be asking a lot. I offered to pay for the part if someone could locate one. So we set about our next adventure which was arranging for someone to go to town to purchase the part.

Luckily a member of our group had a cell phone and made a few of calls to find a friend who ran a computer store who had the cable. Now, on the surface, that sounds like a casual thing, except we must remember that all cell phone service in Africa is paid on a per-minute basis, so this gentleman had just spent 15 minutes on the phone, probably more than a dollar’s worth of his credit to make these calls; a sacrifice that could not be made on a daily basis.

Luckily the friend who had the cable was also willing to have it delivered to campus for another $2. This worked out well, because, like many African colleges, this school was located far away from the city and it would have cost much more in taxi fees to have someone from the campus go to town to fetch the cable. So, by the end of the day the eGranary was working and people were happy. The torn Compaq cable had been relegated to a dustbin (although more than one person looked at it wistfully after it had been deposited there.)

Again, I mention this not to embarrass my friends, but to underscore how difficult day-to-day logistics are in these kinds of situations. I want to emphasize to all of us working in the field how difficult and challenging it is to support technology in poorer areas of the world and remind us to be cognizant of the cultural, financial, and logistical constraints that our colleagues in developing countries must overcome every day to succeed with information technology.
VII Appendices

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