

# Using a Knowledge Management System to Herd Cats: Florida ExpertNet

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## INTRODUCTION

University faculty members are glorious and notorious for independent minds and self-direction. So, when the Clearinghouse for Applied Research and Public Service (the Clearinghouse) was given the task of developing a system that would capture the applied research expertise contained within the 10 universities that make up the State University System (SUS) of Florida, the analogy of herding cats seemed appropriate. The logical approach to this problem was to develop a knowledge management system that would allow individuals to access a unified system where they participate autonomously. The challenge in building such a system is getting faculty members to participate in a meaningful way.

This paper describes the intellectual and technical process of designing and developing ExpertNet—a searchable network connecting business/industry and the public sector with thousands of individual faculty members with proven expertise. The paper will provide all the steps in building a successful knowledge management system and share the lessons learned.

## START WITH THE BIG PICTURE

In 1998 the Clearinghouse for Applied Research and Public Service was given the challenging task of creating ExpertNet to identify expertise within the SUS. The first step in any development process is to define what the end product will look like and what it will do. We asked ourselves the following four questions:

- **Who are the users?** The primary users of ExpertNet are government agencies (local, state, and federal), business and industry, and community-based organizations needing help with applied research (results-oriented) projects. ExpertNet would attract the users by putting all of the faculty members in one place.
- **How will users access the system?** In an age where information is one click away, the most efficient way of providing access would be via the Web. By creating a searchable, database-driven Web site, users would have access to quick, easy, and real-time data on individual faculty members or centers/institutes with “proven expertise.”
- **How will we define an “expert”?** Because users would be seeking individuals within the SUS to assist them in solving practical applied research problems, it was important to populate ExpertNet with individuals willing to share knowledge and work outside the university community. Research indicates that when end-users encounter success, they will become repeat users. If end-users encounter failure, then they will not use the system again.

So to create a successful system it was important that the end-user not encounter an unwilling expert. Contacting an expert needed to be a positive experience. In Florida, university faculty members are expected to do research, but are not required to do externally funded applied research. ExpertNet needed faculty members who had served as principal investigators (PIs) on projects funded by external sources. This would show that the individual had sufficient expertise in his/her field to receive external funding. The designation also showed a willingness to work outside the university community. So it was decided that the criteria for “expert” status within the ExpertNet system was a faculty member who had served as a PI on a project funded by an external source.

There are approximately 484 university-based centers and institutes within the SUS of Florida. The goal and mission of these organizations is to provide research and service in a particular field. The majority of these organizations are funded externally, therefore meeting the criteria of an expert. As part of the ExpertNet system, these organizations would further enhance access to expertise within the SUS.

- **Where will we get the data?** The criteria of “every expert a PI” also provided the Clearinghouse staff a clear line to who manages that information for each university—the office of sponsored research. Although the sophistication of the databases and software used to document externally funded projects varied among the 10 universities, all of the offices of sponsored research had the data for at least several years. The Board of Regents (BOR) for the SUS governs all of the university-based centers/institutes. They had all of the baseline data on these organizations needed for ExpertNet.

## **WHY A KNOWLEDGE MANAGEMENT SYSTEM**

The baseline data collected from the offices of sponsored research and the BOR provided ExpertNet with 6,104 PIs and 484 centers/institutes. Data on principal investigators included PI name, department, project title, funding amount, sponsoring agency, begin date, end date, and E-mail. Data on centers/institutes included organization name, university, director name, mission, phone, and address. But what became clearly evident was the lack of subject matter content (other than the proposal title for PIs and organization name or mission for centers/institutes) to allow a user to identify the expertise they needed. If the keywords chosen by the end-user weren't included in the title, then the search results would be null. We needed to build a system to include multiple subject-related fields for successful search results. The only way to get additional information from each PI and center/institute director in an efficient and cost-effective manner was to create a fully interactive (add, edit, search) Web-based knowledge management system. ExpertNet must allow faculty members and directors of centers/institutes to access their records via a pass-code Web-based system and populate it with content rich data (i.e., publications, honors, review panels, descriptors, etc.).

## **DESIGN AND DEVELOPMENT**

### **Identifying Cat Herding Systems**

As with any design and development project, the first step in the process should always be to identify what already exists. A search of the literature on knowledge management systems revealed several that focused specifically on university faculty. Reviewing the data structure of these systems provided a good starting point for selecting data fields. All fields selected provided a more comprehensive profile of the expert and helped to further validate individual expertise. Most importantly, additional fields enhanced the capabilities of ExpertNet to provide meaningful results to the users.

### **Adopting an All-Cat Taxonomy**

Successful searching is always the result of a controlled vocabulary system that includes either a thesaurus or taxonomy. Creating a system that would be searchable only by free-text would not guarantee that users would be able to find what they were looking for and would produce hit or miss search results. The job of creating and validating a multidisciplinary taxonomy would be time-consuming and costly. So, instead of reinventing the wheel, we reviewed taxonomies used by similar systems. One of the systems identified in our search was InfoEd International. The InfoEd system included a multidisciplinary taxonomy. The next step was to contact InfoEd and ask their permission to use their taxonomy. Luckily, InfoEd granted our request. This entitled us to use the terms but not the system. Because the selection of appropriate research descriptors using a taxonomy was key to the quality of the system, it was imperative that we develop a user interface that would be as user-friendly (point and click vs. cut and paste) as possible.

Developing the taxonomy system included creating a database to house the terms and a Web interface. The database was created using InMagic software. One file was created that included major subject headings and subheadings. The Web-interface was developed using Cold Fusion. See figures 1-3 to view screen captures of the taxonomy interface.

Initially, there were problems with Web browser compatibility with various platforms. Netscape and Mac had more problems than Internet Explorer and PCs. What we learned was that we had not tested the system thoroughly and that it was critical to test across browsers/platforms.

### **Creating a Deep Cat Data Structure**

After careful review data fields were selected that would enhance the search capabilities to provide meaningful results to users. The following outlines the various linked files, data structures, baseline data fields, and data fields to be populated by experts (PIs, directors). See figure 4 to view the data structure and fields within each file..

## **Technical Specifications**

The technical specifications for the system included the following:

- Database development software - InMagic DBTextworks
- Web publishing software - InMagic WebPublisher and Cold Fusion
- Server software - NT Server

## **POPULATING THE SYSTEM WITH BASELINE DATA**

Staff members visited the vice president and director of sponsored research in each of the 10 universities to explain the role and mission of ExpertNet and to solicit their cooperation and participation in helping to build the system. Each office agreed to provide the Clearinghouse with the baseline data on PIs and their funded projects.

The data provided by each university included the PI, proposal title, sponsoring agency, funding amount, beginning date, end date, E-mail, and department. The BOR of the SUS provided the data on the 484 centers/institutes within the SUS.

## **PUBLISHING TO THE WEB**

### **Creating a Database-Driven Web Site**

There are two sides to the ExpertNet Web site: Internet and Extranet. The Internet is the public site that allows end-users access. The Extranet is a pass-code protected site that allows only the experts to populate the site. Both the Internet and the Extranet sites are database-driven.

A user-friendly, descriptive, and easy to remember URL was an important consideration. Because the scope of the system was inclusive of all publicly funded universities, it was important that the URL not contain a Florida State University address; thus, the URL [expertnet.org](http://expertnet.org).

Usability was the key to the design of the Internet front page (see figure 5). Market research shows that people want immediate satisfaction or success when accessing a Web site. They want immediate information. With this in mind, we created a quick search feature on the front page. The quick search allows users to enter keywords that search the experts', research projects', and centers'/institutes' databases. The display for search results provides data from all three databases (see figure 9). Each of the three databases may be accessed using an advanced feature that searches every field and supports boolean.

The Extranet side of ExpertNet asks the expert for a username and password and when entered correctly, provides the expert with his/her record. The expert can then add new data or edit/revise current data. The expert can access his/her record at any time (see figure 6).

## **Publishing Databases**

To publish ExpertNet databases to the Web, the following applications were used:

- NT Server
- IIS (Internet Information Server)
- Cold Fusion and WebPublisher

The four areas of publishing are

- Querying the system - The quick search feature on the ExpertNet front page was created using Cold Fusion. When a keyword or phrase is entered, the query is processed using a Cold Fusion script that runs the query against all ExpertNet databases and selected fields (see figure 7). The advanced search feature was created using WebPublisher. ExpertNet allows users to view the indexes of each field, eliminating guesswork and assisting the user in keyword selection (see figure 8).
- Navigation/Web Flow - The Web flow structure is designed to optimize usability of the system. This process outlines how a user will navigate the system.
- Search Results/Reports - To view the results of your search a report is created. The quick search feature on the front page provides a search result report that includes data from three different databases (see figures 9-14).
- Forms - Forms are created for data entry/editing. Every expert has a record that is published as a form on the Web. After the expert selects the submit button, a screen appears telling them that the data has been submitted (see figure 6).

## **IF YOU BUILD IT, WILL THE CATS COME?**

### **Knowledge Builders**

Once the system was built and the baseline data was collected and imported, the plan for contacting individuals within the system was created. To get cats to participate, you need to provide them an incentive and make getting to it easy, with as few steps as possible. The incentive is the faculty member's self-interest in getting external funding. ExpertNet makes it possible for the government agency users to provide the catnip to bring faculty felines into one location.

In order to contact the experts, it was important to follow the chain of command within the SUS. The protocol for contacting appropriate administrators at the 10 universities, as well as the experts included the following:

- 1) The Vice Chancellor of the SUS sent an E-mail to the vice-presidents for research and vice-presidents for academic affairs/provosts (with copies to the directors of sponsored research) containing the key information. It also described the procedures ExpertNet staff would use to contact center/institute directors and PIs (experts).
- 2) Approximately one week before contacting the experts, an E-mail was sent to the directors of sponsored research notifying them of pending contacts.

- 3) Experts were sent an E-mail introducing them to ExpertNet and outlining the advantages of participation.
- 4) A week after experts received the initial E-mail, they were sent an E-mail that included an introduction to ExpertNet and a request asking them to view their records and either edit or update them. Again, based on usability studies the more steps required to get a user into the system and their record the greater the chance that we would lose their participation. Therefore, embedded in the message was a direct link to their record (no password/username needed), a user name, and a password (for future use).

### **D-day—Launching the System**

On August 22, 2000, ExpertNet was formally launched. Approximately 6,580 (PIs/directors) experts were contacted by E-mail. Within a week, ExpertNet had approximately a 20% participation rate, a success by any standards. The greatest success wasn't in the numbers but rather the content rich data the experts provided. The following are the statistics describing the level of participation by university and type of data provided to the system:

|  | <b>Experts</b>    | <b>Centers and Institutes</b> |
|--|-------------------|-------------------------------|
| <b>No. of Experts Contacted via E-mail</b> | 6,104             | 484                           |
| <b>Expert Participation</b>                | 966               | 54                            |
| <b>Delivery Failures</b>                   | 733               |                               |
| <b>Vacation/Away Messages</b>              | 30                |                               |
| <b>Replies</b>                             | 114               |                               |
| <b>Participation Rate</b>                  | 20% (approximate) | 10% (approximate)             |

| <b>Universities</b>              | <b>No. of Experts in ExpertNet</b> | <b>No. of Experts Participating in ExpertNet</b> |
|----------------------------------|------------------------------------|--|
| Florida A&M University           | 213                                | 0 (E-mail not available - not contacted)         |
| Florida Atlantic University      | 134                                | 14   |
| Florida Gulf Coast University    | 39                                 | 11   |
| Florida International University | 187                                | 26   |
| Florida State University         | 1739                               | 149  |
| University of Central Florida    | 705                                | 400  |
| University of Florida            | 2438                               | 228  |
| University of North Florida      | 36                                 | 4  |
| University of South Florida      | 1124                               | 123  |
| University of West Florida       | 226                                | 10   |

| <b>PI Web Submissions per Field</b> | <b>Records</b> | <b>Individual Entries</b> |
|-------------------------------------|----------------|---------------------------|
| Research Descriptors                | 256            | 1,039                     |
| Publications                        | 632            | 957                       |
| Honors                              | 561            | 562                       |
| Speaker                             | 113            | 283                       |
| Member                              | 122            | 270                       |
| Peer Review Panels                  | 112            | 223                       |
| Public Service                      | 143            | 322                       |
| Degrees                             | 844            | 898                       |
| Title                               | 434            |                           |
| Department Home                     | 943            |                           |
| City                                | 874            |                           |
| State                               | 874            |                           |
| Zip                                 | 867            |                           |
| Phone                               | 884            |                           |
| <b>I/C Web Submissions</b>          |                |                           |
| Research Descriptors                | 496            | 637                       |
| Staff                               | 27             | 122                       |
| Projects                            | 31             | 169                       |
| Publications                        | 16             | 62                        |
| Honors                              | 13             | 35                        |
| Expenditures                        | 20             | 57                        |

### **Follow-up**

Many people disregard E-mails if they are not certain what they are about or are just too busy to deal with them at the moment. That's the disadvantage of having an E-mail contact system. The advantage of this type of system is that it makes follow-up easy and inexpensive. User habit research also points to the fact that if a message is sent often enough, the recipient will eventually open it. An E-mail letter schedule was created that outlined the various Expert categories (new expert, non-participants, and participants who participated but had not selected research descriptors), the type of letter they would receive, the subject line for each E-mail, and the query for pulling the correct set of experts for each. A schedule was also created for which universities would be contacted and when.

The follow-up has been less problematic than the initial contact, specifically because many of the unforeseen technical issues have been worked out. The most time-consuming part of this process is researching returned E-mails (a change in address, the individual is no longer employed at the university, or they are deceased). Policies and procedures were created on how to handle the various types of bad E-mails and for those experts who are deceased, resigned, or retired, or those who requested not to be contacted. The data collected from the offices of sponsored research is public information so if an individual requested not to be contacted, he/she was coded so as not to be sent any further E-mails. However, his/her record would remain active in the system.

## **MARKETING AND AWARENESS**

### **Creating a Plan**

In terms of building the system, ExpertNet can be considered a success. However, the real success lies in individuals using the system to identify expertise. It's not good enough to build it and hope everyone will hear about it; it has to be proactively promoted. As with any system or service, it is important to develop a marketing/awareness plan. The marketing plan for ExpertNet includes the following: target population, targeted population segments, image, position, challenges and advantages, strategies, theme, and activities per year.

### **Promotional Products**

To promote ExpertNet, a brochure was developed using the slogan "Finding Expertise Just Got Easier." The brochure provides an introduction to ExpertNet, how ExpertNet makes it easy to find an expert, who could benefit from using ExpertNet, how much can ExpertNet narrow a search, and what else does ExpertNet offer. The brochure will be sent to every member of identified target groups.

A floor display was created that looks much like the homepage. The more we show the ExpertNet Web site image the more user recognition it will receive. With the Clearinghouse strategically located in Tallahassee, we are in a unique position to provide marketing/awareness to state government as well as two universities. The floor display is scheduled to be in the lobbies of almost all state agency buildings in Tallahassee.

## **DEVELOPMENT TEAM**

The majority of development team members has a degree in library science/information studies with the exception of the computer support specialist, writer/editor, and graphic designer. The development team for this project including the following:

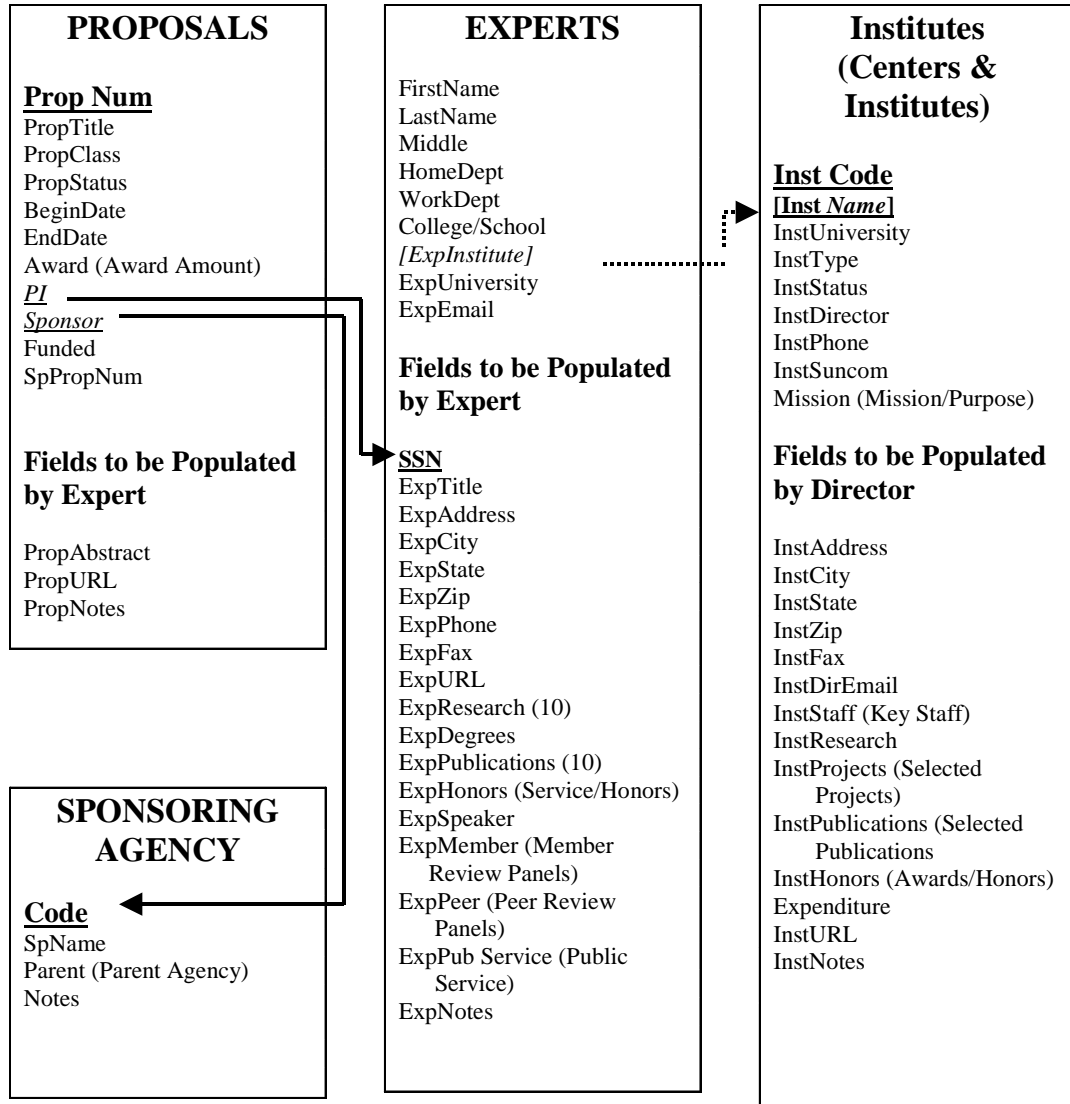
Project Director - Rebecca Augustyniak  
System Designer - Amy Finley  
Software Engineer - Chris Sham  
Graphic Designer - Bob Burke  
Computer Support - Alan Jarvis  
Data Managers - Scott Rogers, Tracy Brown, and Dorothy Bailey  
Writer/Editor - Andi Reynolds

## **LESSONS LEARNED**

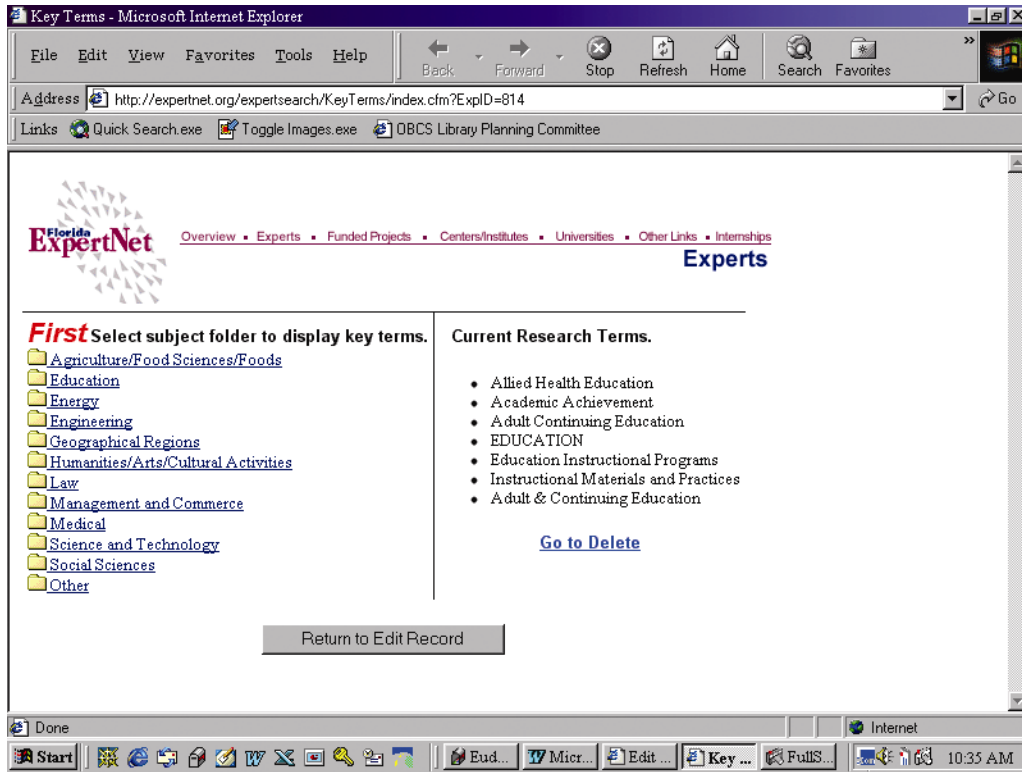
1. Development is just the beginning. When they come, you'll have a lot of work to do.
2. Create a knowledgeable and cohesive development team of individuals that love teamwork and a challenge.
3. Employ usability standards. Test across platform/browsers. Do user testing.

4. Data management/quality control is very expensive and time consuming and requires a tenacious personality.
5. Identify, review, evaluate, and adopt/adapt whenever possible. Not only is it cost effective but it's practical.
6. Have a management system for capturing data about user activity and responses in place before you contact 6,500 experts.
7. **DO NOT CONTACT 6,500 EXPERTS AT THE SAME TIME!** Technical assistance is very time consuming, so contact experts in manageable numbers.
8. People don't read instructions but instead focus on user queues to take them to the next step.
9. Don't assume that everyone has a Web-enabled E-mail client. The first E-mail sent had an embedded link to records and didn't provide the URL. If their E-mail client wasn't Web-enabled, then they couldn't link to their record. Be sure to include the URL!
10. Remember, herding cats is possible, just use the right system!

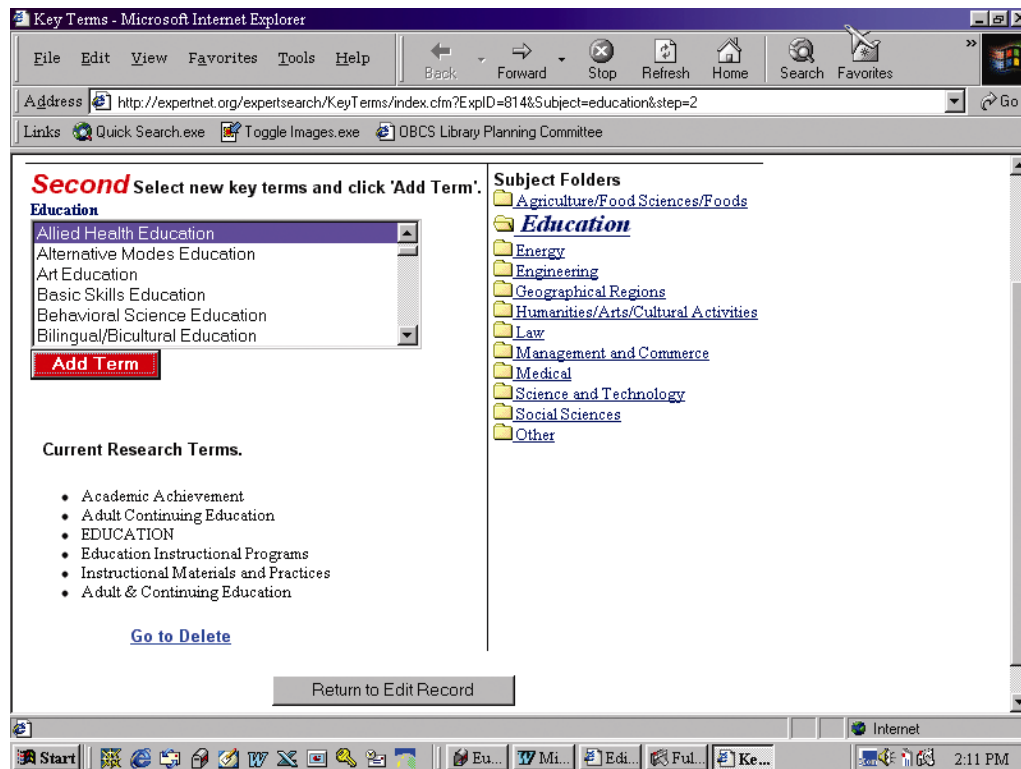
**Figure 1. ExpertNet Data Structure.**



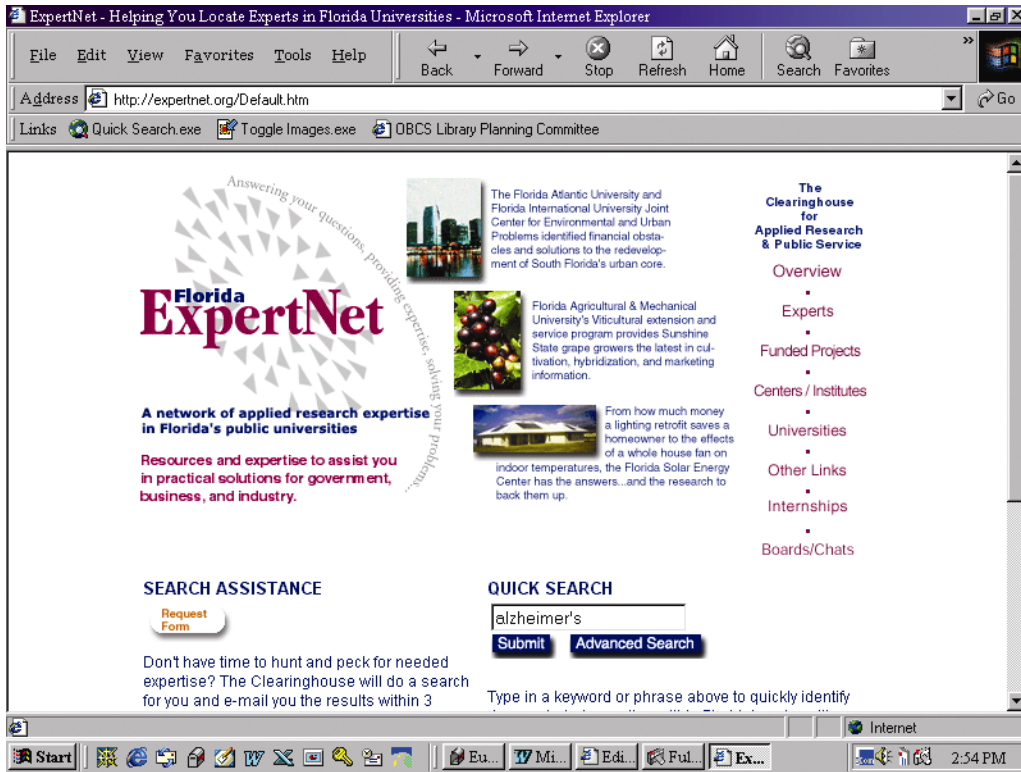
**Figure 2. ExpertNet Taxonomy Term Selection Screen.** The first step is selecting a subject folder.




**Figure 3. Selecting Subject Terms.** The second step is to browse and select terms (by highlighting), then select the *Add Term* button. Current Search Terms are the terms previously selected. Allied Health Education is the term being added in this screen capture.



**Figure 4. Quick Search Feature.** The term "alzheimer's" is entered in the Quick Search window.



**Figure 5. Quick Search Results.** Quick Search results provides centers/institutes, experts, and funded projects.



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**Quick Search**

Search results for *alzheimer's*

| <b>Institutes/Centers</b>   |  |
|-----------------------------|--|
| University                  | Institute/Center   |
| University of Florida       | Center for Neurobiology of Aging (HSC)   |
| University of South Florida | Robert and Diane Roskamp Institute for Research in Alzheimer's Disease and Other Neuropsychiatric. . |
|                             | Suncoast Gerontology Center on Health and Longevity (Health Science Center)                          |

| <b>Experts</b>              |   |
|-----------------------------|---|
| University                  | Expert                                      |
| Florida A&M University      | Magdi Soliman,                              |
| University of Florida       | Michael King, Neuroscience                  |
|                             | W Millard, Pharmacodynamics                 |
| University of South Florida | William Haley, College of Arts and Sciences |
|                             | Huntington Potter, College of Medicine      |
|                             | Brent Small, Gerontology                    |

| <b>Funded Projects</b>           |   |
|----------------------------------|---|
| University                       | Proposal  |
| Florida A&M University           | ASTDR-Administration (10/1/96 to 9/8/97)  |
|                                  | Effects of Lead On Glucocorticoid Regulated Enzyme (9/9/95 to 9/8/96)   |
|                                  | Effects of Lead On Glucocorticoid Regulated Enzyme (9/9/94 to 9/8/95)   |
|                                  | The Effects of Manganese Exposure on Reactive Oxygen Species in Rats (10/1/98 to 9/29/99)                             |
|                                  | The Genotoxicity of Di-N-Butyl Phthalate (10/1/98 to 9/29/99)   |
|                                  | MBRS - Project #18 (3/1/96 to 2/28/97)  |
|                                  | MBRS - Project #18 (3/1/95 to 2/28/96)  |
|                                  | Mechanism of Lead and Cadmium Toxicity (9/9/95 to 9/8/96)   |
|                                  | Mechanism of Lead and Cadmium Toxicity - Project (9/9/94 to 9/8/95)   |
|                                  | Mechanisms of Manganese-Induced Toxicity At Molecular Level (10/1/98 to 9/29/99)                                      |
|                                  | Substance-Specific Applied Research Program (9/9/94 to 9/8/95)  |
|                                  | Substance Specific Applied Research Program S018 (9/9/95 to 9/8/96)   |
|                                  | Substance-Specific MHPF/Florida Aand M University Administration (10/1/96 to 9/8/97)                                  |
|                                  | Substance-Specific Research Program--Administratio (9/9/94 to 9/8/95)   |
|                                  | Substance Specific Research Program MHPF/Florida Aand M University Administration (10/1/97 to 9/29/98)                |
|                                  | Substance Specific Research Program S006 (9/9/95 to 9/8/96)   |
| Florida Atlantic University      | Exercise and Depression in Alzheimer's Disease FFT (1/13/99   |
|                                  | Therapeutic Conversation With Individuals in the Later Stages of Alzheimer's Disease: Mental Health Outcomes (3/10/99 |
| Florida International University | Azulenyl Nitrones as Potential Alzheimer's Disease Therapeutics (7/15/98 to 7/14/99)                                  |
| Florida State University         | Evaluation of Alzheimer's Special Care Unit at Florida State Hospital (5/25/94 to 6/30/94)                            |
|                                  | Statewide Alzheimer's Conference (10/31/88 to 2/28/89)  |
| University of Central Florida    | Alzheimer's Disease Initiative: Screening for (5/1/99 to 6/30/99)   |
| University of Florida            | Availabi of Novel Drugs for Alzheimer's Disease Project (9/30/91 to 7/31/96)  |
|                                  | Caore A: Discovery of Novel Drugs for Alzheimer's Disease (8/1/96 to 7/31/99)   |
|                                  | Chronic Ethanol Effects On Brain Glial Cells (5/1/94 to 4/30/97)  |
|                                  | Core A: Discovery of Novel Drugs for Alzheimer's Disease (9/30/91 to 7/31/96)   |

Figure 6. Expert (PI) Record Display.



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## Experts

|                        |   |
|------------------------|---|
| <b>Name</b>            | William E Haley   |
| <b>University</b>      | University of South Florida   |
| <b>Home Department</b> | College of Arts and Sciences  |
| <b>Work Department</b> | Gerontology   |
| <b>Address</b>         | Department of Gerontology, SOC 107 University of South Florida<br>Tampa, FL 33620                               |
| <b>Expert Homepage</b> | <a href="http://www.cas.usf.edu/gerontology/Haley_Wm.html">http://www.cas.usf.edu/gerontology/Haley_Wm.html</a> |
| <b>Email</b>           | <a href="mailto:whaley@chumal.cas.usf.edu">whaley@chumal.cas.usf.edu</a>  |
| <b>Phone</b>           | 813-974-2414  |
| <b>Fax</b>             | 813-974-9754  |

### Research Areas

- Psychology of Aging
- Death and Dying, Behavioral/Social
- Cross-Cultural Studies
- Clinical Psychology
- Blacks
- BEHAVIORAL/SOCIAL SCIENCES

### Degrees

- Ph.D., Clinical Psychology, University of Massachusetts/Amherst, 1982

### Selected Publications

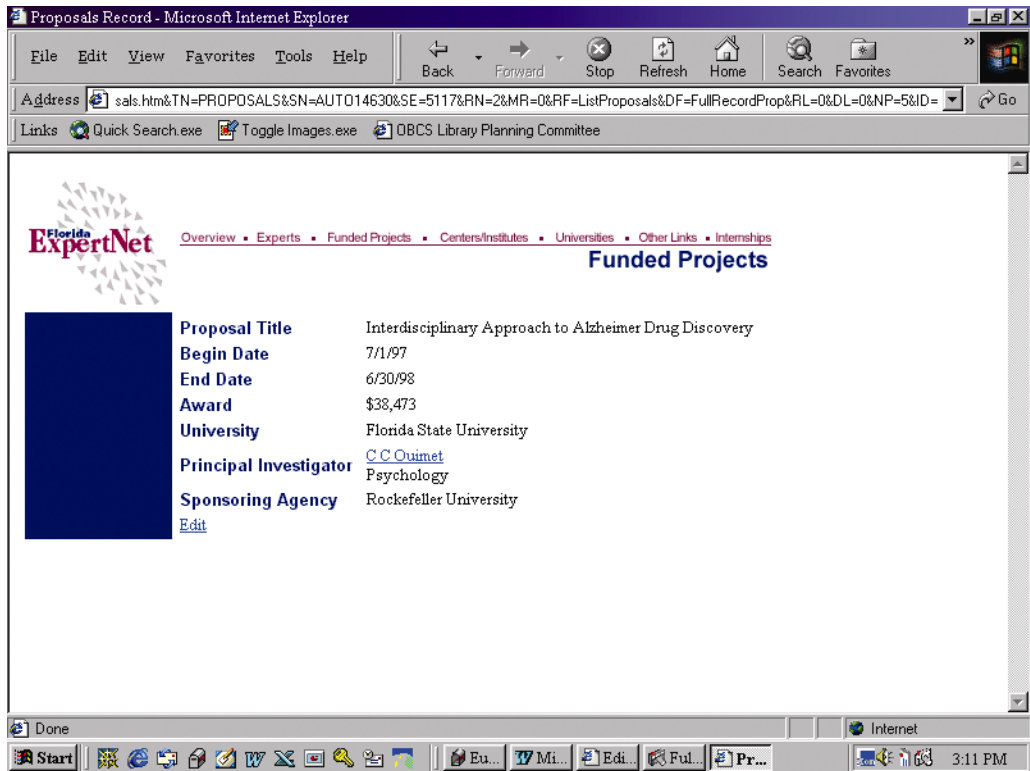
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### Proposals

- [Alzheimer's Disease: A Multidisciplinary Approach](#)
- [Skill Training for African American and White Caregivers](#)
- [Skill Training in African American and White Caregivers](#)

[Edit Record](#)

**Figure 7. Funded Projects Search Results Display.**



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