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ABSTRACT

This document reports on the e-mail-based question and answer services (digital reference) that the Department of Education offers to customers. The report is presented in five sections. Section 1, "Introduction," outlines the research goals which were to: analyze current processes, procedures and problems; suggest solutions for optimization of information delivery to customers; provide recommendations for policy; outline software requirements for possible future automation of processes; and suggest training goals for managers and specialists. Section 2, "Methods," describes the three-part approach to the research method: document analysis; in-depth interviews at six digital reference sites; and a poll of digital reference administrators representing ED.gov and related Centers. Section 3, "Results," describes findings from each of the above three data sources, and Section 4, "Issues," consolidates the findings and groups them. Section 5, "Recommendations," contains the research team's recommendations for re-designing and improving ED.gov digital reference Centers. Several appendices provide copies of the instruments and a glossary. (AEF)

# Digital Reference Services and Centers at the United States Department of Education: Analysis and Recommendations

By. Joanne Silverstein & R. David Lankes

Digital Reference Services and Centers at the United States Department of Education:
Analysis and Recommendations

# Executive Summary

Information service Centers at the Department of Education use email-based question and answer services (digital reference) to offer information to customers.

The number of customers is growing quickly (ED.gov Centers receive 21,276 digital reference questions every week). Customer demand is straining Departmental resources, and posing difficult decisions to the Specialists who answer questions. Policies for answering questions were originally crafted by separate offices and while they serve very well for individual constituencies, they may not be easily accessible to newly interested populations of users. Specific challenges are standardization of processes and formats across offices, and support for optimal tracking, archiving, and creation of Frequently-Asked Question (FAQ) files across Centers.

The Department of Education is not alone in facing the challenges of digital reference. In a recent conference presentation[1] for example, Kresh and Arrett reported that the Library of Congress must deal with growing numbers of users and proliferating online resources. Further, they noted that the tools required to connect users and resources (human intermediaries, catalogs, indexes, and bibliographies) are distributed and diverse.

CENDI[2], a group of governmental agencies encountered similar problems and has met in yearly workshops since 1997. That group suggested[3] that (a) a

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[1] "Collaborative Digital Reference Service: Providing Library-Quality Reference Service Using Digital Technologies" by Diane Kresh and Linda Arret, Library of Congress, for the Virtual Reference Desk Conference Reference in the New Millennium: The Evolving Role of the Information Professional, October 14, 1999 Cambridge, Massachusetts. An article based on the presentation is currently at press for RUSA.

[2] The CENDI agencies include Defense Technical Information Center (DTIC), Department of Energy/Office of Scientific and Technical Information (DOE/OSTI), National Aeronautics Space Administration (NASA), National Air Intelligence Center (NAIC), National Library of Medicine (NLM) and National Technical Information Service.

[3] CENDI: Impact of the Internet on Customer Service and Product Development Among the CENDI Agencies. Submitted by CENDI Users Education Working Group, by Gail Hodge, CENDI Secretariat Information International Associates, Inc., Oak Ridge, Tennessee, August 1997.

study be conducted to find optimal practices in digital reference, and (b) those practices be shared across offices.

For several years the Department of Education has offered digital reference services that are well established and committed to customer service. Now the Department has advanced beyond other agencies by conducting a major research initiative to optimize those services. The research featured methodical data gathering, and accomplished:

- presentation of findings
- analysis of current processes, procedures and problems
- suggestions for optimization of information delivery to customers
- provision of recommendations for policy
- outlines of software requirements for possible future automation of processes
- suggestion of training goals for managers and Specialists.

The findings may be applicable to digital reference services in many Government agencies, and are therefore outlined below.

## KEY FINDINGS

Specialists reported that they encounter problems in almost every aspect of answering and tracking customers' question. For example, they find it increasingly difficult to:

- check quality and content of referred answers
- formalize and share reference lists (of other Specialists and their areas of expertise)
- share and use FAQs and archives
- keep FAQs accurate, up-to-date and consistent across related resources
- differentiate among types of questions and answers
- understand standards and procedures for tracking, archiving and referring questions
- educate customers of varying expertise levels
- identify customer populations, and priorities for their levels of service.

Philosophical differences create divergent policies and practices and are particularly troublesome in the Centers' quickly-changing environments: A fundamental problem is that Specialists disagree with each other, and with managers about the identity of the primary customers, and how to best answer their questions.

That problem is compounded because the influx comes not only from the Centers' traditional customers, but from new populations, as well. New users have varying levels of skill and may need more contexts in their answers.

New customers are asking new kinds of questions, and require more definition of on-topic questions vs. out-of-scope questions. Out-of-scope questions appear in at least sixteen forms and questions may be answered in any of nine configuration types.

In addition, the growing number of online information resources is overwhelming Specialists with more information, new interfaces and greater expectations for service. These forces combine to create both internal and external challenges to the Centers' answer management.

## MANAGING ANSWERS (INTERNAL PROBLEMS)

Tracking allows Specialists to monitor the progress of questions sent to other information providers and is important to customer services. Tracking at the Centers, however, lacks consistency across referents, time, tools and media types. Commitment to overcoming these problems varies across Centers and by the abilities of Specialists who must work with the systems.

Archiving is the storage of answers for possible reuse, and presents some of the same problems as tracking. Like tracking, archiving is a fragmented process that differs from Center to Center, and is constrained by lack of standards and inadequate support.

FAQs are educational tools that are developed from archived answers to Frequently Asked Questions. They are currently difficult to find, and are therefore underused. The result is wasted resources and continually re-created answers.

Procedures for tracking, archiving and creating FAQs were developed in separated offices each of which selected its own database platform, processes, operating system and applications. These "islands" of development create disconnects when Centers attempt to share information internally.

## MANAGING ANSWERS (EXTERNAL PROBLEMS)

The Centers face two primary external influences that dramatically affect their customer service performance.

First, current events trigger increased demand for information. Because of their dynamic nature, however, current events allow little time in which to coordinate Department-wide answers that are timely, consistent and accurate.

Second, journalism influences the Centers both formally and informally. Formally, professional journalists may write about a Program office and disseminate the Center email address without contacting the Center. This causes confusion and makes it difficult for Specialists to find the source. Informally, non-journalists (parents, students, teachers and researchers) cut, paste and electronically dissemination previously published articles. The growing interest that is generated by informal dissemination of Department information must be served rather than constrained. To do that, Specialists and managers must acquire new skills.

The results, originally a disparate group of observations, were grouped into broad issues and are outlined below.

## ISSUES

Findings were grouped into underlying issues (see Section 4) and they are outlined here:

1. Currently there is no one champion to coordinate standards, documents or procedures across Centers.
2. Policies are inconsistent from Center to Center.
3. Minimal standardization across Centers impairs effectiveness.
4. Software was developed separately for each working group and imposes disconnects between groups when they attempt to exchange information.
5. Training is informal for Center Specialists and minimal for managers.
6. Resource sharing is difficult because of inconsistent polices, standards and software.

## SUMMARY OF THE RECOMMENDATIONS

Policy decisions, standards and procedures should be documented and, depending upon the degree of detail, included in updated versions of documentation at www.ed.gov/internal.

More specific recommendations are included in Section 5 Recommendations, and they advise that the Centers and their managers:

1. choose a champion in the CIO's office to procure resources and determine the optimal level of centralization (Section 5.1)
2. select Level 2 centralization to coordinate policy and standards (5.2)
3. incorporate AskA software into a Department-wide Intranet (5.5)
4. employ QuIP protocols to enable resource sharing across Centers (5.5)
5. use checklists to translate policy into actionable items (5.4)
6. formalize the Frontline Forum and use it to coordinate software specification and standardize operations across Centers (5.5.1.2.1)
7. coordinate a "Fast-response" team to provide fast and accurate answers to questions about current events, thus preventing traffic spikes in the Centers
8. research commercially available software packages to determine if they support Center processes and procedures (5.6)
9. create training goals and plans, and decide on implementation mode(s) (5.7)
10. evaluate daily operations using checklist (5.8)
11. continuously gather and use feedback to upgrade systems and services (5.9).

These recommendations are designed to better interrelate and redesign the ED.gov digital reference Centers in accordance with Educational Excellence for All Children Act (1999):

to...promote the sharing of examples of promising practices developed under this authority in order to bring effective models to scale (page 76) (and) leveraged resources and promoted high quality (page 65).

As prescribed in the U.S. Department of Education Strategic Plan, 1998-2002, the report provides guidance regarding:

- training for front-line employees and planning workforce development
- supporting strategic partners
- providing seamless service based on optimal technological approaches
- capturing and incorporating customer feedback, and
- establishing standards for internal and external operations.

The recommendations may also serve to inform and support digital reference practice at CENDI agencies, the Library of Congress, and other government offices that are facing increasing expectations for digital reference service.

## OVERVIEW OF THE REPORT

The report is presented in five sections and includes the Introduction (Section 1) in which the research goals are outlined, and a description of Methods (Section 2). Results (Section 3) describes findings from each of the three data sources (government documents, personal interviews, and a poll). Issues (Section 4) consolidates the findings and groups them. Recommendations (Section 5) contains the recommendations of the research team. Section 5 may be used as a planning guide for re-designing the Center's processes and procedures. Several appendices provide copies of the instruments, and a glossary.

# Digital Reference Services and Centers at the United States Department of Education: Analysis and Recommendations

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## Digital Reference Services and Centers at the United States Department of Education: Analysis and Recommendations

# 1 INTRODUCTION

The Department of Education has actively adopted new media to offer information to customers. One medium in particular - email on the World Wide Web - offers customers unprecedented interactivity, and poses a number of challenges for the Department.

Currently, the Department has established Web-based information Centers to describe public programs, grants and initiatives. At these Websites, and in various print publications, the Department provides email addresses of government employees who can be contacted for more information, thus providing direct communication channels between the public and the Department. For topics that generate the most interest (e.g. Office for Civil Rights or OCR), the Department created larger, Web-based, digital reference Centers[4] that receive hundreds of email messages per month.

As the number of customers increases, these email channels and Centers are transmitting unprecedented numbers of questions. Increased demand for customer service is straining processes, policies, and resource allocation at the Department's digital reference customer Centers.

Provision of the best services possible is mandated in the Departments strategic plan (U.S. Department of Education Strategic Plan, 1998-2002 - September 1997). In its continuing effort to provide these services, the Department contracted with the Virtual Reference Desk research team (at the Information Institute of Syracuse) to evaluate the state of email message management at six digital reference sites during the calendar year of 1999. The goals of the study were to:

- analyze current processes, procedures and problems
- suggest solutions for optimization of information delivery to customers
- provide recommendations for policy
- outline software requirements for possible future automation of processes
- suggest training goals for managers and Specialists.

The research team's evaluation included:

- document analysis
- in-depth interviews with six Department message Centers
- a poll of all ED.gov sites and other, related information service providers.

[4] Underlined words are defined in Appendix A Glossary.

This report is intended to describe plans, tools and applications that support the Department's charter "to use technology and electronic networks to create a nationwide system that supports interactive information sharing and dissemination to improve educational practice" (Educational Excellence for All Children Act of 1999, page 65).

The report is presented in five sections; Introduction, Methods, Results, Issues, and Recommendations.

# 2 METHODS

The research method comprised a three-part approach including

- document analysis
- in-depth interviews at six digital reference sites, and
- a poll of digital reference administrators representing ED.gov and related Centers.

## 2.1 DOCUMENT ANALYSIS

Document analysis was conducted to identify the goals and culture of the existing ED.gov digital reference Centers. Included were the Educational Excellence for All Children Act (1999), the U.S. Department of Education Strategic Plan, 1998-2002 (1997), the Overview and Functions, Office of the Executive Secretariat (1992); Department of Education's' Customer Corner, July 26, 1999, Vol. 1, (20)), and other documents available at ED.gov Websites.

## 2.2 IN-DEPTH INTERVIEWS

In-depth interviews were conducted in Washington, D.C. on July 24th and 25th, 1999 with representatives of the following digital reference Centers:

1) National Library of Education (NLE) (CustomerService@inet.ed.gov Library@inet.ed.gov, http://www.ed.gov/NLE/)
2) Information Resources Center (IRC) (USA LEARN@ed.gov, http://www.ed.gov/offices/OIIA/IRC/)
3) Allied Technology Group, Inc (Webmaster@inet.ed.gov)
4) EDInfo (http://www.ed.gov/MailingLists/)
5) OS Executive Secretary
6) OESE Program.

Thirteen individuals were interviewed in six interview sessions. Most interviews were conducted in groups of two or three interviewees, and the discussions were taped. Interview tapes were transcribed and stored in Microsoft Word files. Qualog software was used to assign codes categories and retrieve coded text.

Data analysis of the interviews generated a list of issues that were investigated on a broader scale in the subsequent poll of digital reference Centers

## 2.3 POLL OF ED.GOV DIGITAL REFERENCE CENTERS

The third method of gathering data was a poll of all digital reference Centers in, or linked to the Department. Notification of the poll was sent by email to a list of digital reference Centers (see Appendix B Notification of Poll). Poll respondents accesses the designated Website and answered demographic questions, questions about work processes, and open-ended questions. A copy of the polling instrument may be found in Appendix C Polling Instrument[5].

[5] Poll participants were identified in the following way: The research team scanned www.ed.gov for "mail to" links, (html fields in a Web site) and found about 17,000. After duplicates and Webmaster addresses were removed, the remaining list contained over 4,000 email addresses, many of which were entry points to the Department of Education's online resources (others email addresses represented grantees, task force and advisory group members, conference attendees, paper authors, and state agencies.).

# 3 RESULTS

Results are reported for the three methods of data gathering, and include discussions of:

- document analysis
- in-depth interviews, and
- a poll of digital reference Center administrators.

## 3.1 DOCUMENT ANALYSIS RESULTS

> *Customer service isn't just a slogan, it is a necessary focus of our organization. We believe that customers should have seamless access to information and services and are striving to meet the standards we have set for customer service (U.S. Department of Education Strategic Plan, 1998-2002 - September 1997).*

Document analysis showed that high-quality customer service is a crucial strategic competency for the Department. The U.S. Department of Education Strategic Plan, 1998-2002, for example requires that guidance be provided for:

- training front-line employees and planning workforce development
- supporting strategic partners
- providing seamless service based on optimal technological approaches
- capturing and incorporating customer feedback, and
- establishment of standards for internal and external operations.

The Strategic Plan lists objectives designed to correct problems of unqualified technical staff, short term fixes, lack of customer service standards and centralization of responses to customer inquiries. In response to these shortcomings, the Department created goals, including that:

> by 2001 at least 90% of customers, internal and external, will agree that ED products, services, and information, including those on the Department's Website, are of high quality, timely, and accessible.

This research study directly contributes to Objectives 4.1, 4.5, and 4.7 of the U.S. Department of Education Strategic Plan, 1998-2002.

Another document, the US Dept of ED-WWW Policy and Procedures ED World Wide Web Policy and Procedures (1998) establishes procedures specific to the communication modes of the World Wide Web. That document directs the

U.S. Department of Education (ED) to establish standards and guidelines to help customers find, retrieve, and use the information they need.

The Policy and Procedures document, like the Strategic Plan, falls short of describing policy for e-mail-based digital reference. The use of email addressed in low level documents such as the WWW Server and Site Problems Customer Support Process document, but only for use in technology administration. For example:

> If you or someone in your principal office notices that the ED-WWW Server is down, send an urgent e-mail to webmaster@inet.ed.gov. Put the word URGENT (all caps) at the beginning of subject line.

and:

> If OERI or the ED contractor notices that the ED-WWW Server is down, a notice will be sent immediately to an e-mail list to include Internet Working Group representatives and interested managers

Finally, the Educational Excellence for All Children Act of 1999 recommends that the use of:

> electronic networks to create a nationwide system that supports interactive information sharing and dissemination... (Educational Excellence for All Children Act of 1999, page 65).

Like the other documents reviewed for this study, however, the Educational Excellence Act does not prescribe policies, standards or procedures.

## 3.2 POLL RESULTS

A poll was conducted of all ED.gov sites and sites to which they are linked. The poll prompted respondents for demographic data, referents, and trends developing in their Centers.

Table 1 Polled Populations shows that some notifications were lost, some were auto-responses, and some were answered by digital reference workers.

| | ED.gov address | non-ED.gov address | Total |
|---|---|---|---|
| No response | 442 | 1,872 | 2,314 |
| Auto-response | 174 | 824 | 998 |
| ***Human response*** | ***193*** | ***689*** | ***882**** |
| Total notifications sent | 809 | 3,385 | 4,194 |

Sub-totals in ***bold italic*** represent the responses that contributed to this report.

Table 1 Polled Populations

Poll notifications were emailed to 4,194 potential participants; 809 to digital reference Centers operated by the Department of Education, and the 3,385 to non-ED.gov digital reference to which various ED.gov Centers link.

Two thousand, three hundred and fourteen (2,314) addressees never responded (of which 442 non-responses were ED.gov email addresses, and 1,872 were from non-ED.gov email addresses).

A total of 1,880 responses was received by the research team 998 of which were auto-responses (advising that the poll notification was undeliverable because of unknown address, recipient was out of town, on vacation, had moved to a new job, or had retired) and 882 human-generated responses.

Of the workers who responded, their responses fell into two group: Table 2 Poll Responses shows the nature, and number of poll responses received..

| Nature of Responses | ED.gov Centers | Non-ED.gov Centers | Totals |
|---|---|---|---|
| Declined to participate | 3 | 59 | 62 |
| Participated | ***190*** | ***630*** | ***820**** |
| TOTAL RESPONSES | 193 | 689 | 882 |

* Sub-totals in ***bold italic*** represent the responses that contributed to this report.

Table 2 Poll Responses

The 820 human-generated responses were delivered via two communication channels: 802 responded directly to the Web form, and 18 used ASCII-based email. Of the 820 responses, 190 were from ED.gov digital reference Centers and 630 were from Centers to which various Department sites link. (Although this research began by separately analyzing the two sets of responses, the results were remarkably similar. Therefore, results are reported here for the entire group, rather than by ED.gov vs. non-ED.gov respondents.)

The poll served two purposes: to verify whether ED.gov email Centers are functioning (thus identifying "dead links"), and to gather data from all Centers currently in service. Dead links to ED.gov sites were reported to the Office of the Director, Resource Sharing and Cooperation.

Poll data were stored in a Microsoft Access database. The database record employed both numerical and textual fields, and required two methods of analysis (database fields may be found Appendix D Database Record Structure for Poll): First, numerical fields were compared across respondents to look for trends and patterns. Second, each open-ended answer was analyzed using content analysis

### 3.2.1 DATABASE QUERIES (BASED ON NUMERICAL FIELDS)

Microsoft Access queries and reports were constructed to compare numerical fields in the database. One query, for example, retrieved information about how many questions each Center referred out to other Centers. An example of this method is Query 1.

The purpose of Query 1 was to find out how much question referral occurs among the polled digital reference Centers. Query 1 retrieved the following fields; email address, number of emails answered, number of emails referred, and the record's unique identifier. The resulting report showed that approximately 95% of respondents refer questions to other Centers. One quarter of that group refer over 10% of their question to other Centers. Query 2 showed that over 80% of digital reference Centers discard some questions every week.

Similar queries showed that

- ED.gov Centers receive in an average week, a total of 21,276 digital reference questions every week.
- each ED.gov Center receives on average 123 questions per week, and
- the range spans from 0-500 questions at individual sites.

Almost half of poll respondents did not know the name of the email packages they were using. The remaining half use the following packages almost equally; Outlook, Eudora, Netscape email, Exchange and Pine.

### 3.2.2. CONTENT ANALYSIS (BASED ON OPEN-ENDED QUESTIONS)

Open-ended questions (e.g., "characterize what trends (if any) you see forming in your service") allowed poll respondents to describe observations not anticipated in the polling instrument.

Content analysis was used to analyze answers to open-ended questions and consolidate them into the following list of observations (in order of decreasing frequency):

Email is replacing phones
Email is replacing faxes
Email is reducing need for meetings
There is increased access to programs
There is increased expectation for speed of response
There is increased unsolicited mail
There are increased numbers of customers
Pressure is increasing to expand Web-based services
Pressure is increasing linkages with other sites
There is increased use of the Web to solve problems
The Web is increasingly used to establish communities
There is increased use of the Web to convey information
There is increased use of the Web for retrieving information
Increasing demand is unsupported by static resource budgets
There is increasing use of forms over email to ask questions
There is increasing need for documentation to improve quality

There is more need for dedicated email addresses
Email is leading to development of listservs and collaborative environments
Increasing need exists for policy and procedures to handle request centralization and referrals
Sites need more prepackaged information
Email is co-occurring with fewer phone interruptions
Email is co-occurring with less paper
The number of customers in any given population is increasing
The number of populations is increasing (students, parents, teachers)
There is increased geographical scope of questioners
Power is shifting to the customers as it is incumbent on Specialists to answer
Customers do less preliminary research
Questions may be obscure, poorly articulated, and require advice rather than objective information
Specialists must gain increased expertise in expanding domains
Published articles create spikes in customer demand.

Out of the 362 poll respondents that answered the question "What trends do you see developing?", 148 commented that the most important trend was the increasing volume of email.

Of those 148, 23 respondents reported dramatic increases in out-of-scope questions. Nine respondents commented that email messages were quickly replacing phone calls, and 14 commented that the nature of the questions was becoming more specific, sophisticated or contextual.

A synopsis of the responses is that:
(a) increasing numbers of customers must be served
(b) customers have diverse levels or types of expertise
(c) each customer type needs different training, format and level of content.

Clearly, the demands on digital reference Centers and Specialists are growing not just in number, but in nature. This is a typical outcome of rapid technological diffusion among customers and is illustrated in the Human Intermediation Curve (Lankes, 1997).

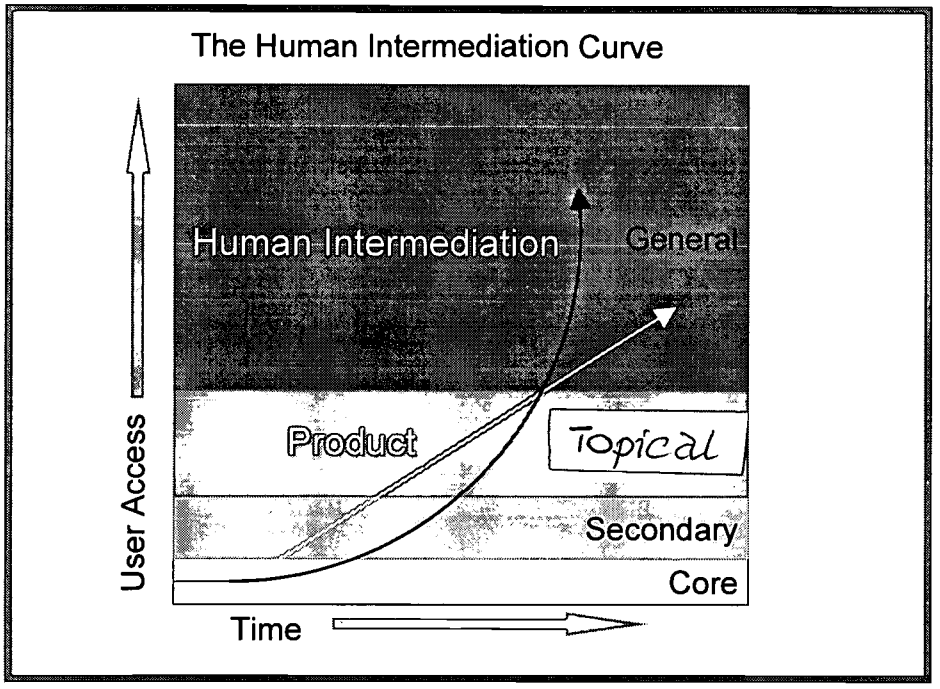


Figure 1 Human Intermediation Curve

Figure 1 illustrates the human intermediation curve, and explains that, in some systems, the use of human intermediaries increases faster than the use of the technology they administer.

As diffusion of a technology (the vertical axis) occurs over time (the horizontal axis) the number of customers grows. But the new customers do not come from the same population as the initial customers. In fact, they represent four distinct user groups.

The Core population is the first and most expert set of users. Core customers tend be familiar with all aspects of a specific information product. Core users would be familiar with the Department, its purposes, products and its methods. A core user might ask, "How can I obtain a copy of the U.S. Department of Education Strategic Plan, 1998-2002 (1997)?"

Secondary customers have some knowledge of the Department, but less about the topic they are investigating, for example, "Is there any document that tells what the Department's goals will be for the next several years?"

Topical customers are familiar with general agency topic, but need increased definition, direction and synthesis, e.g., "I'm writing a report on education - are there any special resources that can help me?"

General public customers posses minimal understanding of the Department and its products, and need increased synthesis. Such a customer might ask, "What does the Department of Education do?"

As the diversity of customer types grows, along with technical expertise, Specialists must customize the level of content, the sophistication of language

and technical instruction for each answer they supply. This customization requires additional time and diminishes the number of questions each Specialist can answer. Ultimately, these demands will compel consideration of increased resource allocation to accomplish scalability in digital reference Centers. That is, the Centers must be able to replicate their core competency (human expertise) and increase productivity.

Regarding the ability to customize answers, one respondent expressed the concern that:

> ...we (humans) function at a much higher level than the technology can. But when you bump up the volume (of emailed questions)....

The limits of human capacity cannot keep pace when we "bump up the volume" of digital reference questions. We must therefore create tools that support scalability. Tools such as databases, standards and communications will be discussed in Section 5 Recommendations.

## 3.3 INTERVIEW RESULTS

In-depth interviews provided three kinds of information. Demographic data help describe the interviewees and their Centers. Process data provide a description of how they perform digital reference. The third kind of data were generated when interviewees were invited to suggest topics about unanticipated issues and trends. They are known here as Interviewee-initiated Topics. All three kinds of data were gathered using an open-ended, semi-structured interview that was useful in capturing unanticipated issues and trends.

### 3.3.1 DEMOGRAPHICS DATA

Demographic data comprise names, titles, email addresses, U.S. postal addresses and locations. Those data were used primarily for contacting and responding to interviewees, and are available from the authors.

### 3.3.2 PROCESS DATA

Process data were collected to investigate how Specialists collect, track, refer, answer and archive digital reference questions and answers. An aggregation of those processes is depicted in Figure 2 Digital Reference Processes at the Department of Education.

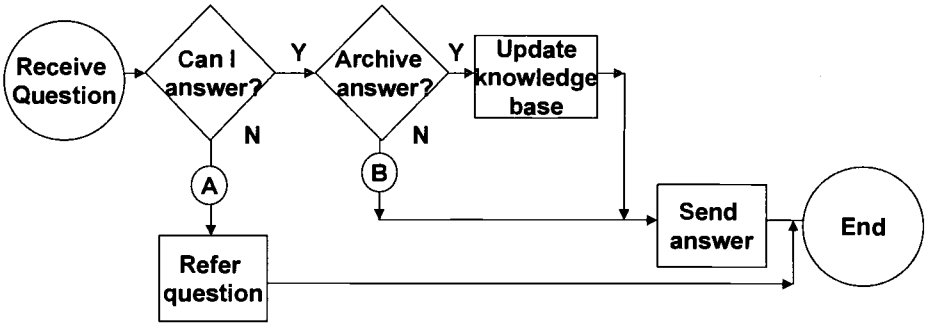


Figure 2 Digital Reference Processes at the Department of Education

Across most digital reference Centers, fundamental processes are the same: The Specialist receives a question from a customer and determines whether the question can be answered within the Specialist's Center. If the Specialist decides to answer the question, he or she may look for existing answers in the FAQs, archives, or Website. The Specialist then sends the answer to the customer.

Under some circumstances, the Specialist refers the question out to another Specialist (the referent). Although many Specialists refer questions out, their tracking processes differ from Center to Center. The most important differences in the tracking processes occur at points A and B in Figure 2, above. At point A the Specialist decides to refer out the question to another Specialist. The destination for that question is decided by the Specialist. There are no official handbooks or guidelines about who could answer particular kinds of questions. Almost every interviewee had a personal list of referents; some called it a "cheat sheet", some a "filofax", some - just "the list". All expressed frustration about keeping their personal references up-to-date, and most suggested that the personal reference lists be shared among groups:

> it's just a reference sheet. The Office of Legislation and Congressional Affairs generated this. There's another updated version as I mentioned, but how updated it is, I don't know. It's just a subject index. There was a

'97 one, I believe, and there may have been a '98. I've added people I've met just in the last 6 months and I'd like to someday transcribe this (Interviewee 2).

and:

A lot of times you just have to pick up the phone and say, "Hey, I'm sending something to you, are you the best person to send this to?" You have to resort to the telephone at times. There's an incredible amount of knowledge in those people. A lot of grant knowledge and things like that...a lot of these offices don't have a presence on the Web and they're still just working with paper. Talking to them is very beneficial.

Another issue emerges at point A. Currently, there are no suggested practices for tracking questions. Some Specialists keep tracking information in Microsoft Excel databases, some in spreadsheets, some on manual lists, and some not at all.

A lot of the questions are the types of things that get forwarded on to another office and once it's forwarded, it's out of our hands (Interviewee 7).

Tracking was frequently mentioned in the interview data: When interviewees were asked to talk to about their concerns (in the third part of the interview) many mentioned tracking. Therefore, tracking will be discussed in more detail in Section 3.4.2.1 Tracking Questions.

Point B in the figure above identifies archiving as another part of the referral process that is problematic for Specialists. Almost all Specialists remarked that it was important to store answers to commonly asked questions. But no two offices perform this function in the same way. Some use Microsoft Outlook and scan subject lines to retrieve answers. Some use more sophisticated databases. Some do not archive at all. This subject is discussed in more detail in Section 3.4.2.2 Archiving, below.

## 3.4 INTERVIEWEE-INITIATED TOPICS

Digital reference Centers employ impressive technological forces. They use routers, cables, fiber, satellites and telephony to span national borders, academic disciplines and languages.

These technologies, however, are merely tools of the people who plan, implement and support the services. Specialists make decisions about resource allocations, strategic goals and acceptable outcomes - according to their own perspectives, or philosophies.

Therefore, the remainder of the Results section is devoted to topics that were initiated by the interviewees. They may reiterate some issues discussed in Poll Results and Demographic Interview Results, but were of sufficient interest that they are presented here in detail.

### 3.4.1 PHILOSOPHY

*I'd like to see a message come down from the Secretary's office stating clearly what the Department's policy is regarding responding to email (Interviewee 1).*

Organizations use both formal and informal mechanisms to carry out their goals. **Formal** mechanisms (written policies, mission statements and other kinds of documentation) may be mandated and monitored across offices, departments and programs. **Informal** mechanisms (such as culture, norms, or **philosophy)** are not represented by tangible artifacts and may vary substantially across and within departments. While it may be invisible, organizational philosophy is a crucial component in how - and how well - Department goals are accomplished.

Philosophy can vary by organizational function, managerial level, and other variables. Few organizations are able to instill the same philosophy in every Specialist, and this may not even be a desirable goal. It is important, however, that the differences in philosophy be identified and understood. To that end, the following observations describe philosophical conflicts that may affect the Department's ability to meet strategic goals.

#### 3.4.1.1 WHAT IS THE GOAL?

Some philosophical conflicts are a function of an individual's position in the hierarchical structure. Highly placed executives often have dramatically different concepts of digital reference - its purposes, features and goals - from the perspectives of Specialists who perform the digital reference services. One executive described the contrast:

> We charge forward with some idea, which, in our minds, should work very well, but when you are down in the trenches and your ownership or views haven't been reflected, it makes...it much harder to overcome resistance... And they do have a little different perspective than I do...(Interviewee 9).

Due to differing perspectives, then, various Specialists may understand differently the goals of digital reference.

#### 3.4.1.2 WHO IS THE CUSTOMER?

There is some conflict within individual digital reference Centers regarding the identity of the customer. Program officers, for example, may be concerned

primarily with serving the Secretary or the White House, rather than the general public:

> We have a system, at least from the Secretary's perspective, that works pretty well. If you are a Program officer, and you are running a grant competition, the pressure for you is to...make sure the money gets out in time, to worthwhile projects. That's where the emphasis is for these people [Program officers]. Controlling correspondence, e-mails, those kinds of things, tend to take on lesser importance. It's just not one of the priorities for many Program officers (Interviewee 9).

Digital reference Specialists who deal directly with the public have a different perspective about the identity of the customer:

> What's really, really, important...is that we are able to...have the time to spend with people to talk about how you get involved with improving education in your community, and the special projects and Programs that the public is really trying to push (Interviewee 6).

#### 3.4.1.2.1 MORE CUSTOMERS

> *We've been getting a lot more people e-mailing us for research. Now you have a lot more free e-mail accounts. So people are e-mailing us more. When I first started doing this, I took about 600 to 700 a month, and now it's about 1000 (Interviewee 8).*

Interviewees confirmed the views of poll respondents (see Section 3.2.2 above), regarding the increase in email traffic and growing sophistication of digital reference questions. They report that email is supplanting phone service, fax and postal service and that the number of digital reference questions is rising weekly. As shown above in Figure 1 Human Intermediation Curve, the growth is a result of new customers who have new needs and various levels of technical and subject expertise.

It may be useful at this point to investigate the sources of new customers, the types of questions they ask, and the kinds of challenges they will pose to digital reference Centers.

#### 3.4.1.2.2 NEW SOURCES OF CUSTOMERS

Until a few years ago, many Department offices emphasized internal support and regarded questions from the public as "loose questions, from outsiders (Interviewee 12)". Recently, however, the advent of affordable

technology has generated millions of questions from many kinds of new customers. New sources of customers were identified by Departmental Specialists as follows (listed alphabetically):

citizens
congress
external direct request
foreign citizens
general public
internal direct request
internal referrals
lawyers
parents
students
teachers
vendors
the Secretary.

This list may be only partially representative of all customer populations, but illustrates that digital reference Specialists and Centers must answer the needs of a newly diverse group.

#### 3.4.1.2.3 TYPES OF QUESTIONS ASKED

Second only to the conflict about the customer identity, is the issue of what questions should be answered. This issue is illustrated in the "Pizza Hut" story:

| | |
|---|---|
| Interviewee 8: | Somebody wanted to know about Pizza Huts in the area, I gave them the Pizza Hut e-mail address, found the location site, sent him on to them. |
| Interviewer: | Did you consider the location of the Pizza Hut question to be out of scope? |
| Interviewee 8: | Yes. |
| Interviewer: | And, you answered it anyway. |
| Interviewee 8: | Yes I did. |
| Interviewer: | How come? |
| Interviewee 8: | Because we are customer service. |

The Pizza Hut story shows that Department Specialists possess a strong commitment to answering the public, and sometimes answer questions that are out of scope. Contributing to the problem is the fact that few Departmental Centers define the parameters of what is off-topic, and advise how to treat out-of-scope questions. Each Specialist, therefore, is left to make that decision on his or her own. Often, making such a policy decision is more difficult than just

answering the question, thus many Specialists opt to answer the out-of-scope questions.

The results of many Specialists making independent policy decisions about out-of-scope questions may be confusing to the public, result in inconsistent service, and make inefficient use of resources.

#### 3.4.1.2.3.1 NEW KINDS OF QUESTION CONTENT

Each interviewee mentioned the existence of several question types and implied that some require special attention. The following list is an example of, but not the inclusive set of question types, and they are listed in the order that they occurred in interviews:

on-topic-specific (can be answered with some effort using various resources)
on-topic-general (can be answered easily using Center resources)
out-of-scope (email intended for another Specialist, Center or office[6])
position clarification (requires subjective response directly representative of the Center's policy. This answer type is used, for example, when a customer asks about the advantages of private schools.)
policy interpretation (requires high degree of synthesis and subjective response, "Can I sue the parents of children bullying my child?")
technical email (intended for Webmaster
request to update site/upload files (from Program offices and potential link partners)
error messages (autoresponses such as "server down")
maintenance (email from customer reporting server difficulties)
listservs (customers encountering difficulty signing up for/posting to listservs).

Each type of question presents unique challenges to the Specialist and the Center, and should be addressed in training. Out-of-scope questions present an especially large potential risk; that of wasting resources, and is discussed in greater detail below.

#### 3.4.1.2.3.3 OUT-OF-SCOPE QUESTIONS

No matter what the intended scope for a digital reference Center, Specialists often receive questions that are unrelated to their Programs and Centers. These are out-of-scope questions, and interviewees had several definitions, listed here:

---

[6] "The new Internet service at vote.com asked visitor to click on Yes/No radio buttons on its home page to vote on school vouchers. Each Yes/No vote triggered a form email to customer service @inet.ed.gov. Poor (Specialist's name) received a thousand such emails in a week. ...It's not out-of-scope but it's certainly unwanted" (an example of out-of scope email from Keith Stubbs, December 18, 1999).

unnecessary and repetitive follow-up dialogues ("Customer isn't listening")
mistakenly sent messages (sent by customers)
inappropriate referrals (sent to wrong Specialist by other Specialists)
pornographic messages (from unknown individuals)
advertisements (from unknown individuals)
unsolicited overtures (from vendors already serving the office)
grassroots persuasion messages (requests for support political)
crank mail ("Close NASA now")
hate mail (from unidentified individuals)
death threats (from unidentified individuals)
security threats (from unidentified individuals)
viruses (from unsuspecting customers)
requests for links to other sites (from other organizations)
dead-link information (about links for which ED.gov is not responsible)
upgraded pages (should be updated on customer's server, not ED.gov's)
error messages (redirected email from customers re: jammed servers).

While interviewees have a clear and collective knowledge of out-of-scope questions, many are unclear about what to do about them. Similar in its negative outcome is the conflict over what comprises a good answer.

#### 3.4.1.2.4 WHAT IS AN APPROPRIATE ANSWER?

One interviewee pointed out that there is little agreement about how to answer a question. Answers depend on how committed each individual manager is, and some perceive that their managers are not as committed to customer service as the Specialists are:

> I think our boss looks at it as a pain-in-the-butt job that we have to do. He told me to answer things as briefly as possible and just keep it short and sweet and don't be really overly friendly to people. He just wants us to forward it (refer it out to another Specialist). He just wants us to jettison it out of there (Interviewee 1).

Keeping it "short and sweet" may actually be beneficial to both the Department and to customers, who may not want to wade through several pages of information. And coordinating questions with external Specialists may, in fact, provide better answers to customers. But as long as these decisions are perceived as mere expediencies, Specialists may not agree - with each other or with managers - regarding how to answer questions.

##### 3.4.1.2.4.1 TYPES OF ANSWERS

Each Center administrator prescribes - either formally or informally - the format and nature of an acceptable answer. Thus, the contents of answers vary

by Center - and often by the kind of customer requesting information. Acceptable answers may contain one or more of the following kinds of responses (listed in order of increasing complexity):

citation (name of a resource material)
pointer (name of resource material and instructions for accessing it)
full text (text from a resource material)
statistic (data with minimal context, usually numeric, brief answers)
referral (notice that the question has been sent to another Specialist)
research (list of citations from ready reference materials)
customized research (citations/pointers resulting from detailed search)
synthesis (any of the above with explanatory verbiage)
compound (any combination of the above responses).

These differentiations among answering techniques are only implicitly understood in the Centers. If identified and strategically deployed, the techniques could be used to streamline and standardize processes.

#### 3.4.1.2.4.2 SOURCES OF ANSWERS

*Too many sources! We normally keep 5-6 things open on our desktops - sometimes Netscape and Internet explorer, and all my different bookmarks, clearinghouses, and the databases - all the different things open. If there was a way to have all the information accurate and use one depository where we wouldn't have to keep 8 or 9 things open - would be good (Interviewee 3).*

As the number of online organizations and Centers grows, sources, references, and links to other sites, grow exponentially. This situation slows down the Specialists' response times in two ways. First, each source must be evaluated for legitimacy and currency of information. Second, each source has a different interface and different navigational standards.

The growing number of resources is overwhelming Specialists with information, new interfaces and greater expectations for service.

### 3.4.1.3 SUMMARY

Philosophic differences result in conflict and wasted resources across the Department's digital reference Centers. These differences are sometimes linked to an individual's position, and often create confusion that can be expressed as the following questions:

What is the goal of this digital reference Center?
Who is the primary customer?

What questions should be answered?
What are the parameters for determining out-of-scope?
How should we treat out-of-scope questions?
What are the characteristics of a "good" answer?

Knowledge management and human resources are affected by these philosophic differences. Those issues are explicated in the following sections.

### 3.4.3 KNOWLEDGE MANAGEMENT: TRACKING, ARCHIVING AND FAQS ACROSS PLATFORMS AND MEDIA

*We have created a system of information that is going out to the public, (but) we didn't take it a step further, which is, - now what do we do with it, once it comes back to us? (Interviewee 9).*

Before they respond to a digital reference question, most Specialists record data about the question. This information helps Specialists monitor the progress and status of each question, and is called Tracking.

When a question is answered, the response is often stored and indexed so the answer may be re-used. This is known as Archiving, and successfully implemented, can reduce costs and increase efficiency of digital reference Centers. Tracking and archiving at the Department's Centers are briefly described below. Following that is the presentation of a number of challenges to effective tracking at the Department's Centers.

#### 3.4.2.1 TRACKING QUESTIONS

*It would be really nice, if there was some way to track these questions ...if we got a receipt, and knew that (referents)...actually opened the mail and are answering it (Interviewee 8).*

Tracking has two fundamental uses: it allows Specialists to track the status of a question and report that back to the customer, if needed. Equally important, tracking data can be analyzed to find strengths and weaknesses in customer service. Tracking statistics allow evaluation of turn-around time and resource allocation. These functions are components of knowledge management and their successful implementation is crucial to effective digital reference Centers. Currently, however, tracking at the Centers is hampered by lack of consistency, as described below.

#### 3.4.2.1.1 TRACKING LACKS CONSISTENCY ACROSS REFERENTS

Although standards do not dictate what must be recorded across Centers, the following fields are most commonly recorded:

date (of receipt of the question)

name (of customer)
email address
mode of contact (Web page, email, other)
kind of customer (student, teacher, parent)
due date (according to policy)
topic
name of Specialist
referent (was the question forwarded on to another Specialist?)

The last field (Referent) is key to tracking activities: The second Specialist (the referent) may have personal expertise with which to answer the question, or an appropriate FAQ. When Specialists send questions on to referents they often track the progress and status of the question.

Regardless of which Specialist finds the answer, the customer's perception is that the first Specialist, rather than the "invisible" referent, is answering the question. Many Specialists, therefore, expect referents to return the answers to them (so they may send answers back to customers, along with descriptions of how they obtained the answers). These Specialists often want to track the progress or status of the question (e.g., "received by the referent", "being researched", or "being returned with answer"). Some of these Specialists also want to rate the answers for quality and speed and be able to report these data back to their own managers and the referents' managers.

Other Specialists, however, offload to referents not only the questions, but the responsibility to send the answers to the customers. These Specialists either want a brief electronic receipt of the question, or do not require tracking of further actions.

> Those are the types of things that get forwarded on to another office and once it's forwarded, it's out of our hands (Interviewee 5).

Because tracking procedures are not standardized, each office - and often each employee - uses different tracking systems:

> Each office and department has got their own internal system for how they route and control (Interviewee 9).

and

> We put a lot of stuff (tracking data) into Lotus notes. Let me rephrase that - I put a lot of stuff into Lotus notes (Interviewee 8).

Some digital reference Centers are operated by one individual so idiosyncratic methods of storing and tracking data are not a problem:

> as it's forwarded on, it's actually just saved in a folder and the folder is simply called "Chris" (Interviewee 4).

Most Centers, however, are operated by several Specialists, so individually stored tracking systems and inconsistent file-naming conventions present barriers to easy tracking.

#### 3.4.2.1.2 TRACKING LACKS CONSISTENCY OVER TIME

There is little continuity in tracking requirements over time:

> When I assumed this responsibility our project manager told me not to worry about tracking things after I forward them... I was a little uncomfortable with that and I asked him why. He said, "You don't need to be spending too much time on this." But (my predecessor) took such good care of it and she'd always say (to customers), " If you don't hear from so and so contact me in 2 weeks" (Interviewee 1).

#### 3.4.2.1.3 TRACKING: CONSISTENCY ACROSS TOOLS

In some offices, there is little effort to match tracking tools to whatever tracking requirements do exist:

> We were supposed to be reporting back...on a monthly basis. It's hard to try to keep track of that stuff...It's a nightmare. It's extremely tough and time consuming to try to jam things into (electronic) mail boxes, saying "here's this subject"...(Interviewee 1).

Some Centers use manual tracking systems. Others use Microsoft Access, Outlook or LotusNotes. Still others use 'home-grown" systems based on customized software programs.

Many Specialists report that they are researching new software, but there is no organized effort: working in isolation, many are looking at the same software packages, and have no mechanism for comparing findings, and making decisions about software selection or creation.

#### 3.4.2.1.4 TRACKING: CONSISTENCY ACROSS MEDIA

Further fragmentation exists in the way that multi-media messages are tracked. No Center participating in this study has accomplished the tracking of phone, fax, paper and email digital reference questions. Thus, answers are re-created many times across kinds of media (see section 3.4.2.4 Platform and Media, below).

#### 3.4.2.1.8 TRACKING: CONSISTENCY ACROSS VARIOUS LEVELS OF COMMITMENT

Also fragmenting the Centers' efficiency are the various philosophies about the importance of tracking. Some managers view tracking as an administrative task only, and consider it to be unrelated to, or not useful for improving customer service:

> To the degree that you are putting resources into tracking and monitoring, you are getting away from what the purpose of the job is...(respondent 9).

Tracking was viewed most negatively by the respondents holding the highest positions in the Department hierarchy, each of whom has many responsibilities aside from digital reference:

> For many program people - responding to letters is not one of their favorite things to do. It's just not one of their priorities for many program officers. I want to know what the purpose of what we're attempting to achieve and what are the trade-offs in achieving that (Interviewee 9)?

Specialists who were devoted entirely to digital reference responsibilities were the most enthusiastic about automating, standardizing and otherwise improving tracking procedures.

#### 3.4.2.1.6 TRACKING: CONSISTENCY ACROSS COGNITIVE STYLES OF INDIVIDUALS

Because the Centers have grown up quickly, and somewhat separately from each other, the daily routine of tracking questions has evolved from the habits and cognitive styles of the Specialists, not planners or administrators. For example, the frequency with which Specialists check their email depends upon personal decisions, not policy. Some Specialists check their emailboxes five times daily. Others read email once a week.

Similarly, prioritizing is an undocumented process, and differs from Specialist to Specialist. Some Specialists prioritize by subject line, some by sender, some by the order in which the messages were received. One interviewee scans each message to see whether the word "urgent" is in the text.

#### 3.4.2.1.7 TRACKING: CONSISTENCY ACROSS MARKETING STRATEGIES

While Specialists are generally very committed to answering, their enthusiasm for serving the customer may exceed their resources:

> Generally, I contact (the customer), and give them the program name, my number and my personal phone number, if they have question, to give me a call (Interviewee 10).

This constraint becomes a major impediment as new Centers emerge: For example, Interviewee 10 reported that her digital reference Center is new and very popular. Her office has delayed publicizing the Center until processes are optimized. What will happen when the site is publicized? When students, parents, teachers, researchers and journalists are cutting, pasting and informally disseminating information about the Center on listservs, Web sites and in school newspapers? It is unlikely that this Specialist will be able to provide the level of personal service she describes above. Currently, there are no policies that recommend minimum levels of service, nor are there recommended processes for managing spikes in volume or for offloading questions to other Centers.

This is an important point for the Department because use of the Centers is one way that the public forms opinions about government entities.

> When someone sends an email message to the Website of a government agency, that is often the first and only contact they will have with that agency. (Interviewee 4).

In summary, tracking allows digital reference Specialists to monitor question status and provide information about the quality of customer service. Tracking is especially important to Specialists who refer questions to other Centers. Most Specialists track the same kinds of information, but use different tools to perform tracking. The result is inconsistency in tracking across:

referents (other Specialists)
time
tools
media
commitment levels
idiosyncrasies of individual cognitive styles, and
marketing plans that are not aligned to the Centers' resources and goals.

Fragmented systems and inadequate policy hinder the ability to share tracking information and solutions across Centers and media.

#### 3.4.2.2 ARCHIVING

> *Everyone has their own way of doing things. Everyone has their own mail archives (Interviewee 1).*

Archiving is the methodical storage of answers to digital reference questions. Archived questions and answers can be stored in electronic files and retrieved and re-used to answer repetitive questions. They may also be used to construct online information resources called Frequently Asked

Question Centers (see the Section 3.4.2.3 FAQs). It may be helpful to review the relationships among tracking, archiving and FAQs.

Tracking is the monitoring of a question's progress and status until the answer is sent to the customer.

Archiving is the storage of the questions' answers either in databases, online sites, text files or in hard copy

FAQs are teaching tools presented in the format of questions and answers. Their content is derived from archived answers, and is accessible to customers through a Web site interface. A FAQ may be a definitive collection of clarifying questions and answers on a topic, (e.g.http://www.shu.edu/about/WWWFaq), as a general collection of anticipated questions and answers (e.g., http://www.ed.gov/faqs.html), or as a generic collection of questions and answers.

Like tracking, archiving is a fragmented process that differs from Center to Center.

> Documents on my laptop and PC, are mostly canned responses, or sources of information that I have to constantly update. If somebody wants the State Department of Education- for some reason these guys like to change their URL's' a lot, so I have to constantly get through that. But I keep a list. It just makes it a lot easier, but the problem is I do have to constantly go through, because the states will change their site. It's (filed) under My Document. I know what the names mean, just from sheer recognition (Interviewee 8).

Currently, archiving processes are diverse and informally managed. Because no formal policies guide archiving, any impediment can halt the process. Inadequate software, for example, can limit the ability of Specialists to archive data:

> Pine (a popular email software application) slows down if you keep too much archived in it. So these records (answers to frequently-asked questions) are kept only two months. They got rid of earlier ones. Also with Pine, only one person at a time can work with the records (Interviewee 1).

and:

> I did it (archiving) for about six months or so, until the night that Outlook (a software application) mail blew up. It just blew up (Interviewee 1).

Archived answers are used to share knowledge across departments and to supply consistent and convenient responses to frequently asked questions (FAQs).

An additional concern - one often overlooked by busy managers - is preserving the accurate history of information about Department programs, grants and documents. Unlike paper resources, online sources are constantly changing, and the Department cannot depend on libraries to safeguard historical material. Legal and medical librarians, for example, are trained to preserve accurate histories of case law, and medical procedures. This information is useful in litigation, education and describing historical context. As of this report, the Department has not made clear its policy regarding the preservation of digital reference answers.

### 3.4.2.3. FAQS

> *It's harder to find them (FAQ's) than it is to just make up answers (Interviewee 13).*

Most digital reference Centers use Frequently Asked Question (FAQ) files to store answers to commonly-asked questions. As mentioned above, FAQs are educational tools that are developed from archived answers to previously asked questions. Entire FAQ files may be devoted to popular topics, and they contain complete, thorough and accurate information that has been captured and stored in the archives. These files are located on the computers of digital reference specialists, and can be scanned and retrieved for use in answering frequently-asked questions.

Some Specialists create their own FAQ collections and use them consistently:

> ...you can capture the information so that it can be re-used, so that you can make the next response faster (Interviewee 9).

For other Specialists, however, finding those answers can be sufficiently difficult, that many avoid searching the FAQs and generate answers from their own experience:

> I find it interesting that it's not, "Oh, let me go look up the answers that somebody put together" (Interviewee 4).

Finally, some Specialists are concerned about the information quality of FAQ resources:

> A lot of people get this stuff off the Web, and it's so out of date that it's scary. It horrifies me because people think - I mean this is the classic thing - even people in my office think, well this is on the Web, so that's it!

And, I say, "Shouldn't we call these people, to make sure the information is right? Don't just depend on one source of information." We probably give different answers than what the National Library gives, or what ERIC gives, or the Webmaster is giving, or whoever. I don't know if there is any coordination (Interviewee 3).

In summary, there are many reasons that digital reference Specialists may avoid using FAQ files, including:

There is no consistency to naming and storing FAQ files and they are difficult to find.
The files were created by someone else with a different way of organizing and storing the files.
There are so many FAQs that searching them takes longer than generating an answer from scratch.
Some FAQ information may be obsolete.
Some FAQ information may be inaccurate.
FAQ information may be inconsistent with other official resources.

FAQs represent a powerful tool with which to answer rapidly increasing emailed questions. But navigation, the capacities of human beings to remember what is stored where, the currency of FAQ information, and the flagging ability of searching mechanisms, are all impeding FAQ use.

#### 3.4.2.4 PLATFORMS AND MEDIA

*These different pockets have developed (in various offices). They have developed...their own everything, so there is a lack of coherence...So, I think we have to look at what's grown up, and see what makes sense in a distributed organization (Interviewee 9).*

Department of Education digital reference Centers support the needs of all customers, regardless of their communication modes or technological platforms. Digital reference answers are generally sent using the medium in which the question was received, whether by mail, phone, fax and email. Each medium has generated the creation of separate tracking systems for each digital reference Center. As a result, phoned questions and their answers are tracked differently from mailed and emailed questions. In some Centers mail, phone and email questions are tracked by different personnel, in different offices using different tools. Therefore, answers are not shared across communication modes, and must be continually recreated. Respondents to the poll and the interviews predict that the percentage of telephone and mail questions will taper off as email traffic grows. The shift to email messages alleviates two problems: Phone logs show a

high abandonment rate: that is, phone many customers hang up before their calls are answered.

The second problem, the inability to capture answers, is inherent to telephone communication:

> One of the things that you can't do on the phone, but that you can do on email, is that you can capture it (the answer). So, in a phone call, if someone comes up with the greatest, most brilliant, most wonderful response, (and then) they walk out the next day and get hit by a bus - there goes that knowledge. With e-mail you can capture that information so that it can be re-used, so that you can make the next input faster in response. ...

Despite the convenience of digital reference, some customers do not have access to email. That circumstance prevents (at least for now) a mandate to move all reference activities to email. Even if such a mandate existed, it would not solve the problem of "technology islands" that prevent sharing of knowledge bases across Centers and programs:

> Presently because of the lack of interconnection with systems, there is a recreating of that message every time an email goes out, and in whose head it is? And how do we make sure that we can get to that person (Interviewee 9)?

Each Center currently selects its own database platform, processes, operating system and applications. Software choices across Centers include, but are not limited to; manual systems, Pine, Microsoft Outlook and Access, Lotus Notes, Unix-based (such as iNet, Pine), custom applications (e.g., Correspondence Control Manager or CCM), and Teloquent for phone tracking. Firewalls create barriers between many Specialists. Web browsers are rapidly evolving and new upgrades often prevent customers from filling out Web-based forms, and using the email connections on Department Websites. Systems personnel are facing the increasingly difficult task of allowing their systems to communicate with each other.

In summary, tracking, archiving and FAQs - important functions of knowledge management in digital reference Centers - are impaired by diverse platforms, media and procedures.

### 3.4.3 EXTERNAL INFLUENCES

> *The biggest problem we have is that some journalist or somebody up there will write this (a new Program service) up and not tell us (Interviewee 8).*

Outside of ED.gov, many digital reference Centers can anticipate and plan for external influences. They possess mechanisms for tracking developments

and they update their knowledge bases as new developments occur. Few of them, however, face the kind of external influences that challenge the Department's Centers.

For example, while a medical digital reference service may routinely monitor for new developments in telemedicine, research and clinical practice, new developments are rarely of a magnitude to create confusion, delay service or create new policy. In the Department of Education's digital Centers, however, sudden, externally-initiated developments may lead to surging email traffic, overwhelmed staff, and confusion about how and what to answer. These developments are generated by two kinds of external influence: current events and journalistic activity.

#### 3.4.3.1 CURRENT EVENTS

Current events, for the purpose of this discussion, are the sudden, random, emergence of government-related events that stimulate great interest from the public. They include but are not confined to new legislation, international and domestic incidents and disasters. Interviewees pointed out that whereas expertise or domain of a Center affects the number of topics about which customer ask questions, the actual volume of questions is influenced by the magnitude of current events:

> Traffic tends to peak and valley depending upon what issues or controversies might be relevant to that particular time (Interviewee 9).

Current events present a particularly difficult challenge because there is a chronological gap between the event itself, and the government's official response. During that brief time, digital reference Specialists - many of whom are committed to 24 hour turn-around service - are unprepared to answer topic-related questions. Compounding the confusion is the sudden increase in incoming email questions:

> Email jumped up tremendously especially when we had the school shootings, and I have to admit the last time with Columbine, I don't know what happened (Interviewee 8).

Interviewees reported that the Columbine incident affected all of the Centers. Some interviewees reported that press releases that went out to the public, did not go to the Centers. Others expressed concern that incorrect information (about safe schools) was disseminated, and still others spoke of the diminished quality of service resulting from message overload and longer waiting times for answers. The Columbine incident was addressed on an ad-hoc basis that seemed to work well and could provide insights into planning for future current event traffic spikes:

> They got a Website up within a couple of days...they did a really good job of it, of getting a Website up and a specific e-mail address. We had a Website to send them to, and an e-mail address to send their comments, and that took just a couple of days, and it was great. It made it a lot easier (Interviewee 8).

and

> After Columbine, I had loads of emails. We waited a day or two (to respond). And then we sent out an EdInfo, reminding people that a guide was designed to help. We put it on our home page. And then, the President told people in a town meeting. He even published our email address (Interviewee 13).

The anecdotes above suggest that while individual current events cannot be anticipated, some steps should be taken to avoid:

(a) dissemination of incorrect or inconsistent answers
(b) confusion in the Centers and
(c) diminished service due to longer turnaround times.

### 3.4.3.2 JOURNALISTIC ACTIVITY

When significant current events occur, journalists write about them, and their publications often affect the operations of the Department's digital reference Centers. For the purposes of this discussion, journalistic activity is defined in two ways. The first definition of journalistic activity - publications by professional journalists - is easily understood. Professional journalists often publish material that refers to the Department's digital reference Centers. But they do not alert the Department to anticipate the inevitable increases in demand.

Sometimes confusion results because customers refer to the newspaper they read, instead of the Departmental Program or information that was the subject of the newspaper article:

> When a newspaper writes up the (Department) publication, it would be darn nice if they would put the name of the (Department) publication in there. Let's say they come up with a new reading report, and it's in the Post and in USA Today, but they don't always tell you what the name of the report is (Interviewee 8).

and

> That's one of the bigger problems - people will see this (a Departmental article) referred to in their local newspaper, and they'll email us. We have a publication called Helping Your Child Learn Science. One issue featured an experiment with celery entitled "The Celery Stalked at Midnight". We keep getting these requests for "The Celery Stalked at Midnight". It's like, what the heck are they

talking about? We had no clue and it adds to digging (Interviewee 8).

When customers send reference questions to the Department's Centers, they often refer only to an article's title as mentioned in a journal or newspaper. They don't include the name of the Departmental program or service in which they are interested. This increases the workload for digital reference Specialists who must then obtain a copy of the publication to look up the reference.

A second definition of journalistic activity is the cutting, pasting and electronic dissemination of previously published articles by journal readers. This secondary journalistic activity - until recently almost invisible - has emerged as a powerful influence on digital reference Centers in the Department. The fact is that any teacher, parent or student can cut and paste press releases and online articles to education-based-listservs and individuals all over the world. And they are free to do so without asking permission, registering the activity or otherwise giving notice to the Department. This phenomenon is an example of the Web's powerful capacity for education. It should not (and logistically cannot) be curtailed. It does, however, create unexpected demand for services and must be addressed to relieve duplication of effort.

> Sometimes it (email volume) just goes up, for no apparent reason. I received 20 e-mails in the course of 3 days, saying, "Please send me 50 copies of the Parents Guide to the Internet And I have no idea where it came from.
>
> EdInfo stuff gets cut and pasted and put all over everywhere. You can find it in surprising places, tucked away here and there, on the Net, as well as in state newsletters, and various education newsletters (Interviewee 13).

Center managers may be tempted to discourage informal dissemination of information that will stimulate heavy use of the Department's digital reference Centers. But the success of a digital reference Center is often measured by the frequency of its use. Thus, the burgeoning interest that is generated by informal dissemination of Department information must be accommodated rather than curtailed.

In summary, the Department's Centers face two kinds of external influence, current events and journalistic activity. Current events occasionally cause traffic spikes, dissemination of inconsistent answers, and diminished service due to longer turnaround times.

Journalistic activity - both professional reporting, and informal dissemination of articles - is becoming a challenge to Center policies, processes and goals.

### 3.4.6. HUMAN RESOURCE ISSUES

Digital reference Centers are dependent upon the abilities of human beings to answer customers' questions. As more people have access to networked resources, customer populations grow and change, placing increasing pressure on Specialists who are unable to change their cognitive limitations. Specifically, Specialist must find ways to manage:

more customers
new sources of customers
new types of questions, including out-of-scope questions, and
new types of answers (various formats and levels of sophistication).

The digital reference Center function is not always understood or appreciated by organizational managers and administrators. Some use the function as a temporary job for employees they cannot otherwise employ. In such cases, digital reference is served by under-skilled workers who may not know or care about the Center's mission:

> A lot of these jobs go to people who need something to do. Don't just shove it onto someone because we need to give them something to keep their grade, or get them out of my hair, or to stop them from twiddling their thumbs all day (Interviewee 8).

Organizational pressures such as employee placement and lack of resources may leave some Specialists ill-equipped to acquire new skills. This is profoundly detrimental to the Department and its strategic plans for digital reference, and is explored in the following section.

## 3.4.5 NEW SKILLS

Preceding sections have reported some developments that affect interviewee's skill sets. This section is intended to list all such new skills as mentioned by interviewees:

### 4.4.5.1 DIFFERENTIATE SERVICES

Specialists must be able to recognize and work with customers who have varying technical skills and levels of sophistication about topics and resources.

### 4.4.5.2 UNDERSTAND POLICY AND STANDARDS

"Trying to explain why we have this but not that (Interviewee 2)" can be difficult for Specialists in large and complex organizations. They must understand their organizations' policies, and the standards for delivering information.

#### 4.4.5.3 EDUCATE CUSTOMERS

> *...with people trying to use these resources in their offices or homes, we're having to do (customer) education by phone or e-mail (Interviewee 7).*

Specialists often have to decide whether to instruct customers in how to find material - or just provide it themselves ("...we tried to explain, 'No, you can't download to your television set'," Interviewee 1).

Customers often don't know, "... how much more they need to KNOW before they can even begin to use these new resources well (Interviewee 3)". Specialists must be able to (a) make the decision when to instruct and (b) have the resources and skills to provide appropriate training.

#### 4.4.5.4 LEARN NEW SOFTWARE

Effective management and operation of digital reference Centers is dependent upon the ability of Specialists to use their tools. For digital reference Specialists, the tools include multiple databases, communications applications, presentation and email applications. Additional tools include reporting, telephony, contact management and record management applications.

#### 4.4.5.5 EXERCISE MANAGEMENT SKILLS

As Specialists exchange resource lists and augment their reference resources, they will need to practice contact management. Good communication and record management skills will contribute to the accurate and timely management of their contacts.

#### 4.4.5.6 MONITOR AND UPDATE KNOWLEDGE MANAGEMENT AND RECORD KEEPING SYSTEMS

Specialists reported that they are unaware of processes for updating archives, FAQs and other knowledge management systems.

#### 4.4.5.7 PREPARE FOR FLEXIBLE, SHIFTING RESPONSIBILITIES

Because Specialists are shouldering more tasks, each one must be able and prepared to do many kinds of tasks.

#### 4.4.5.8 LEARN AND MAINTAIN GOOD WRITING SKILLS

> *We want to develop shared standards of quality in writing, and what a good response is (Interviewee 13)*

and

> Some people have terrible netiquette. I sent one over to (another Specialist) in non-public schools office, and he actually corrected the grammar of the (initial Specialist) that sent the e-mail.

Because many digital reference Centers re-use answers in Websites, archives and FAQs, Specialists must view their writing and communication skills as permanent and strategic additions to the Department's core capabilities.

The skills listed above were mentioned by interviewees as issues that they face in operating digital reference Centers. The stories that the interviewees told suggest that another list could be constructed - a list of required skills for Center administrators and managers. Since they are implications of the data, and not explicit excerpts, those suggestions will be explored in the Section 4.5 Training Managers.

In summary, specialists must contend with new challenges, including, more customers, new sources of customers, out-of-scope and new kinds of questions, and new types of answers. Resource and organizational limitations are not supporting Specialists in acquiring newly necessary skills such as:

- differentiating services
- understanding policy and standards
- educating customers
- learning new software
- exercising managerial skills
- monitoring and update knowledge management systems
- preparing for flexible, shifting responsibilities
- learning and maintain good writing skills.

# 4 ISSUES

After data collection, the research team reexamined the poll respondents' and interviewees' observations (presented in Section 3 Results, above), and grouped them in issues. The issues are listed in the chronological order that is most common in strategic planning, and includes:

**Sponsorship** of digital reference
**Policy** refinement
**Standardization** of processes to establish policy in processes
**Software** selection and or design
**Training** to maintain policy in operations
**Resource** sharing.

## 4.1 SPONSORSHIP

Section 3.1 shows that the Department supports excellence in digital reference and section 3.4.1 suggests that the Department's philosophy understood by all Specialists. But the high-level philosophies have not been converted into actionable plans and there are few documented standards or prescribed procedures for the use of email-based digital reference.

Coordination of processes is occurring on an ad-hoc basis, but is left to individual managers in each Center. This ensures that the needs of Specialists will be identified, but does not ensure that the necessary resources - usually supplied by a high-level champion - will be provided. A highly placed individual, committed to and knowledgeable about digital reference should be identified. This individual must be recruited to sponsor, coordinate, procure funds for, and coach the process of re-inventing digital reference Centers at the Department.

## 4.2 POLICY REFINEMENT

Policy supports an organization's goals by articulating explicitly how to interpret them into standards. Standards are implemented in training, daily operations, and evaluation activities. Current policy insufficiently addresses the Centers' standards for clarification of, and centralization of processes for:

response time
question overload and to whom questions should be referred
how to deal with out-of-scope questions
scope of Centers' knowledge domains
how they should be tracked, and
how to design and share FAQs and archives.

In the interests of space, we do not list every issue here, as each is discussed in greater detail in the following section, Standardization.

## 4.3 STANDARDIZATION

Standardization is the process of making procedures consistent across populations, and is often viewed with trepidation by those it affects. Some view standardization as the eradicator of individual creativity. Properly implemented, however, standardization can reduce friction (repetitive, non-productive or frustrating efforts that detract from productivity). More importantly, it can free Specialists to use their time and resources to act as topical experts, rather than record-keepers.

Virtually every complaint voiced by participants in this research is related to the fact that processes are fragmented, confusing, and undocumented - in a word, unstandardized. It is well to remember, however, the speed with which the World Wide Web has been adopted by the Department, and to understand that processes evolved as Specialists "put out fires". The collective expertise and ingenuity in putting out fires has resulted in many informal standards. Rather than impose them across Centers, these informal standards should be used as a springboard for creation of centralized standards that will coordinate the Departments' Centers. That task should be undertaken by the champion or sponsor of digital reference Centers.

Properly developed standards can incorporate the benefits of centralization (streamlining, processes, preserving resources, ensuring constant quality) with the benefits of decentralization (better fit of processes to organization, customization of services for customers). To meld both perspectives, standardization must consist of two parts; determining the general degree of centralization, and determining which individual tasks and processes should be standardized. See Section 5.2 Centralization for a more detailed discussion of this process.

For recommendations regarding standardization and centralization of processes, see Section 5.2 Determining the Level of Centralization.

## 4.4 SOFTWARE

Currently, ED.gov Centers use various software packages to track questions and answers, and individual Centers have begun research into software packages and systems that could:

use shorter URLs (some are too long to paste into Web forms)
resolve of case sensitivity issues[7]
capture URLs on email messages sent from customers using Web forms
automate tracking and archiving
automate checking for dead links[8]
provide a capability for local private entries as well as shared, ED-wide entries and global public ones (at least 3 tiers of private/public) to provide enough incentive for distributed update responsibility.

Section 3.4.2.4. showed that Centers do not share database platforms, processes, operating system or applications, and that because they use different packages, their results cannot be compared across digital reference Centers. A decentralized approach for selecting software will result in more diverse systems, and increase the existing difficulty in sharing data and communicating across Centers.

These two trends - the growing diversity of software systems, and an increase in customer demand, require that the Centers and Specialists accomplish scalability - the ability to replicate human expertise through use of technology (Section 3.2.2). Scalability is crucial to the Centers for this reason: The success of information services is often evaluated by their use; the more questions the more successful the Center. Yet answering digital reference questions is labor intensive, and for that reason, many Centers are not eager to publicize their services. This cycle keeps many services small, and prevents the marketing that will procure continued funding.

> ...we've just been seeing what would happen if we set it up and how would we handle this, before we publicize to the world that these kind of services are available online (Interviewee 3).

Another issue for Specialists is tracking multi-media messages. Answers are generally sent to customers using the medium in which the question was received whether by mail, phone, fax or email. In some

[7] "Case sensitivity is a non-optional characteristic of UNIX web servers and cannot be eradicated without moving the ED web sites to Windows NT, which would have massive implications for capacity and support" as per email from Keith Stubbs. The research team recommends rather than eradicating case sensitivity, finding a software-based workaround, perhaps based on a look-up table for lower and upper case letters.

[8] Note: Regarding software requirements for this item, automated dead link checking for email systems requires more sophisticated software than pinging Web sites. Diagnostic messages also take more time to be delivered for email than for Web-site messages. The Department is currently investigating ways to validate Exchange email addresses and should have a quarterly validation routine in place by February, 2000 (email from Keith Stubbs, December 18, 1999).

Centers mail, phone and email questions are tracked by different personnel, using different tools. Answers are not shared across communication modes and must be continually recreated.

Some software packages feature the ability to track multiple modes of communication (phone and email, for example) and:

> The end game will surely go to leading providers of customer relationship management solutions that handle a combination of voice, email, fax, and internet transactions as easily as voice calls are handled today. ("When the Internet meets Call Center", Inter@ctive Week, page c-2, May 10, 1999, Frank Bowers).

Recommendations for accomplishing scalability through software are presented in Section 5.5.

## 4.5 TRAINING SPECIALISTS AND MANAGERS

Training in the Departments' digital reference services is minimal and inconsistent. Only those at the "front lines" (Specialists) receive any kind of training and that training may or may not address such issues as:

- differentiating among types of questions, customers and answers
- understanding policy, standards and procedures, including tracking, archiving and referring questions
- educating customers of varying expertise
- learning new software
- exercising managerial skills
- monitoring and update knowledge management systems
- preparing for flexible, shifting responsibilities
- learning and maintain good writing skills
- responding to security threats

Poll respondents and interviewees also raised the issue of training managers, and suggested the following skill be taught to them:

- creating new staffing models to select and train staff who can rotate responsibilities
- planning backups (cultivate Specialists domain expertise and share expertise across services)
- fighting for resources, especially telephony support and training
- dealing with international support issues
- directing records management and ensuring consistency across Centers
- ensuring redundancy (preserve government digital documents that may otherwise disappear)
- marketing and publicity.

## 4.6 RESOURCE SHARING

Section 3.4.2.1 states that fragmented approaches in tool design and tracking systems make it difficult to share tracking information and solutions across Centers. Specialists commented on the lack of ability to:

obtain receipts confirming referrals
check quality and content of referred answers
formalize their "cheat sheets"
share references
dynamically update reference guides
obtain lists of their counterparts in other Centers
ensure better access to FAQs and reference lists across Centers.

Interestingly, most interviewees suggested that Specialists from various Centers meet in internal groups on a regular basis, because, currently, "Referents are in another office. They might as well be in a different world."

These issues, and those above, will be linked to specific planning suggestion in Section 5 Recommendations.

# 5. RECOMMENDATIONS

Recommendations are provided here for re-designing and improving ED.gov digital reference Centers. This section may be used as a planning document for re-designing the ED.gov digital reference Centers.

Section 5.1 suggests how to choose a champion to implement the plan.

Section 5.2 recommends selecting a specific level of centralization.

Section 5.3 identifies important policy points to be decided by the centralized office.

Section 5.4 presents a checklist for use in each Center to translate centralized policies into actionable processes and procedures.

Section 5.5 lists software requirements that will inform the creation or selection of appropriate software.

Section 5.6 advises the immediate and on-going analysis of existing software systems to inform a make/buy decision.

Section 5.7 suggests an outline of training goals for managers and Specialists.

Section 5.8 presents approaches for evaluating Center outcomes.

Section 5.9 recommends that internal communication and customer feedback be organized to inform and update all of the above activities over time.

Figure 3 Recommended Processes, illustrates these recommendations as steps in a chronological process:

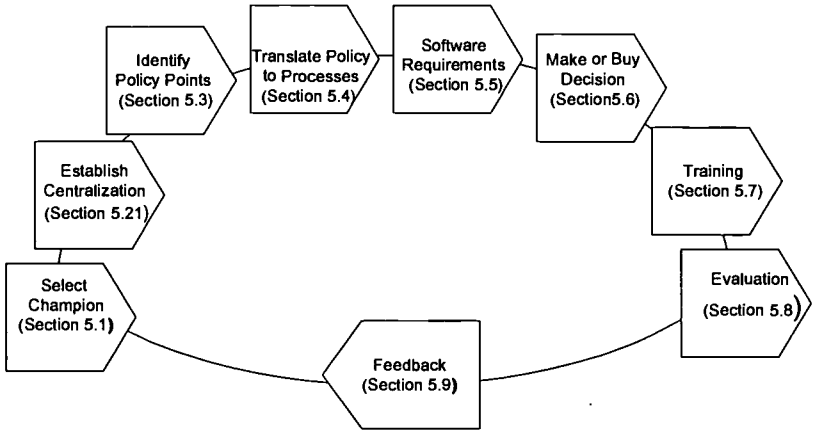


Figure 3 Recommended Processes

Each arrow in the Figure represents a step and is labeled with the Section number that describes it in the sections below.

## 5.1 SELECT CHAMPION OR SPONSOR

ED.gov's digital reference Centers comprise a rich network of human expertise. That network began as an informal effort when there was little traffic, but has grown along with the Web that supports it. Now the Centers are facing increased demand and must coordinate fast-growing information resources.

Like all growing organizations the Centers need to re-examine their goals, determine which processes to formalize and how to expend assets. Each of these activities consumes resources and requires considerable coordination of disparate groups, thus requiring that a high-level executive serve as champion. The champion of such an effort would have authority over budgeting, personnel, and technology.

The research team advises that the CIO of ED.gov champion the continuing development of digital reference Centers at the Department of Education. The team also advises that the CIO use the following recommendations to optimize the Centers' productivity and resource use.

## 5.2 DETERMINE THE LEVEL OF CENTRALIZATION

The champion's first task is to determine the optimal level of centralization from among four levels (illustrated in Figure 4 Levels of Centralization).

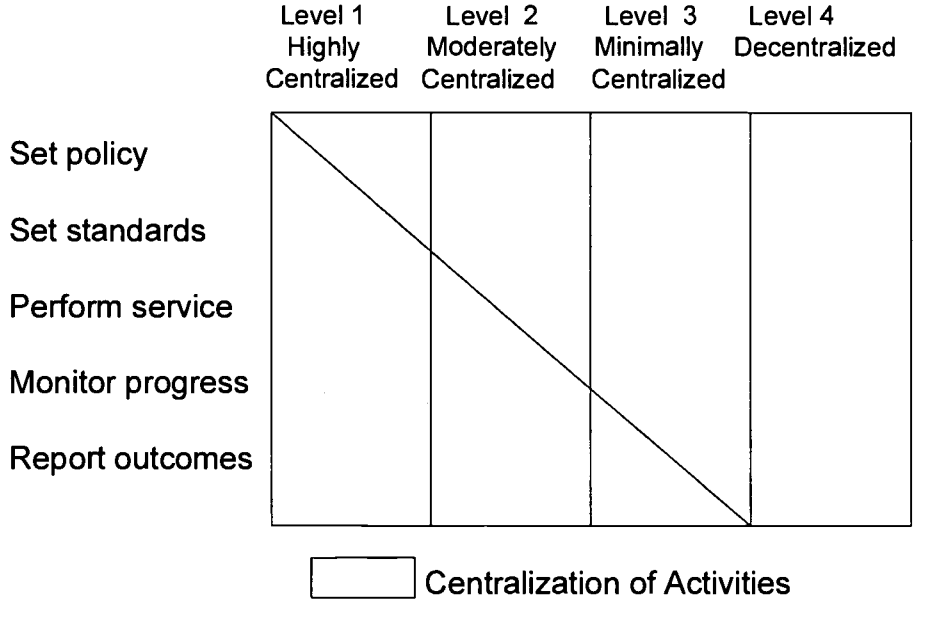


Figure 4 Levels of Centralization

The optimal degree of centralization can be informed by considering four levels presented as scenarios below. Deciding upon the level of centralization will help determine how closely each Center must adhere to standardized procedures.

Level 1: Highly Centralized

One centralized Customer Service Department sets policy and standards, performs and monitors all ED.gov digital reference activities. Characteristics of highly centralized organizations are high levels of consistency in processes, an efficient flow of information from executive management to operations, impaired flow of information from operations on up, and inability to harvest expertise of individuals to improve the organization and its products or services. Because Level 1 centralization discourages the upward of flow of information, and Specialists' expertise is an important part of this plan, this level of centralization is not appropriate.

Level 2: Moderately Centralized

One centralized Customer Service Office sets policy and standards. Individual Centers perform services, monitor for compliance and report performance.

This model makes good use of centralization to standardize shared tasks and general processes, yet allows Centers to capitalize on their most important assets - the expertise of their Specialists. Level 2, therefore, seems best-suited to the ED.gov digital reference Centers.

Level 3: Minimally Centralized

One centralized Customer Service Coordinator sets policy. Individual Centers interpret that policy to their own needs, set their own standards, and perform operations however they choose. One difference between Level 2 and 3 is the locus of standards creation. Unlike Level 2, Level 3 centralization makes does not require monitoring for compliance or reporting outcomes to a centralized entity. This level imposes specific conditions (policies, standards and procedures) without the benefit of evaluating outcomes. Level 3 centralization, therefore is not an optimal choice.

Level 4: Decentralized

Level 4 describes the present organization of the Centers. Individual centers now decide whether to operate according to any policy, and can set their own policy and standards. They are not required to monitor for compliance or to report outcomes. While this model has allowed the evolution of rich and useful networks, networks operations are increasingly constrained by disconnects in software, priority, and resources sharing.

In summary, Level 1 would prevent the knowledge of Specialists from contributing to the Centers' best practices and is therefore rejected.

Level 3 requires that Centers adhere to policies set outside their domain, but does not evaluate if the Centers benefit from them. Level 3 is also rejected.

Level 4 is the current status of the digital reference Centers, and is not sufficiently supporting their tasks. Level 4 is rejected.

The growing size, complexity, and importance of the digital reference Centers will be best served by Level 2 Moderate Centralization. The research team recommends that the champion or sponsor of digital reference at ED.gov adopt Level 2 and implement it using the following recommendations. All recommendations are made based upon the selection of Level 2 as the level of centralization and will support shared standards of quality across the Department.

## 5.3 IDENTIFY POLICY POINTS

The next step is to determine policy points that should be established by a centralized Customer Service Office (as per Level 2) and standardized from Center to Center. Policies should be established to dictate criteria for determining:

(a) how to create templates for reacting to unanticipated current events
(b) how to notify Centers in advance of public announcements
(c) how to create communication devices for journalists to warn of traffic[9]
(d) whether to increase frequency of EdInfo announcements regarding new developments(from a weekly to a daily basis)
(e) if encryption or watermarks in answers could determine what publication has cut and pasted ED.gov information products
(f) how to diminish, report and handle security threats
(g) the identification of customer populations and their priorities of service
(h) if Centers must use the same software applications
(i) if Centers must use the same hardware platforms
(j) a common protocol for sharing information across platforms
(k) whether to use archives for historical preservation
(l) devise procedures for answering various types of questions
(m)suggest when to use various types of answers
(n) specify required qualifications for Specialist positions
(o) create career paths through advanced levels of expertise
(p) the parameters of in-scope questions and strategies for managing them
(q) minimum quality of information in answers, including response time (See Kasowitz and Bennett, 1999)
(r) how to design, share and use FAQs and archives including how to:
    - create naming conventions for FAQs
    - keep FAQs accurate and up-to-date
    - keep FAQ content consistent across related resources
    - share FAQs across diverse platforms and media

[9] The research team recommends the creation of a Current Events Response team. The Team should comprise Specialists, Program office public information functions and Web-designers. Together they can create tools and procedures to respond quickly to current events.

determine whether to use archives for historical preservation.

The AskA Starter Kit: How to Build and Maintain Digital Reference Services (R. David Lankes and Abby S. Kasowitz) provides a helpful guide for considering these issues. Specific recommendations are made in Module 2, Planning. A copy is included with the original of this report.

Policy points should be documented and, depending upon the degree of detail, included in updated versions of documentation at www.ed.gov/internal, including US Dept of ED-WWW Policy and Procedures, and www.ed.gov/internal/inet5.html.

A useful tool for translating standardized policies into operation is the checklist, and its use is illustrated in the next section.

## 5.4 CHECKLISTS

This section presents two sample checklists to translate standardized functions into actionable processes and procedures. Each Center may decide upon slightly different ways to enact the policies listed above. The checklists below are therefore prototypes of devices that would allow each Center to ensure that centralized policy is guiding daily operations. Checklists 1 and 2 are meant as examples, only. Final checklists can be created after policy is set and feedback obtained.

Checklist 1 ANSWERING QUESTIONS

ABOUT THE CUSTOMER

Who is the customer and how should their answers be prioritized?

*Primary customer (e.g., the Secretary[10])*
*Secondary customer (e.g., the Program office)*
*Other customers (e.g., the public)*

ABOUT THE QUESTION

Is the question within scope? *(definition of scope inserted here)*
If out-of-scope send it to *(referrals here)*
If overload question send it to *(referrals here)*
If security threat send it to *(referral here)*

ABOUT THE ANSWER

Does the answer:

meet standard response time? *(specify turnaround time here)*
meet the minimum standard of quality? *(list criteria here)*
use the most appropriate format? *(choose one of the following)*

citation
pointer
full text
statistic
referral
research
customized research
synthesis
compound.

Should the answer be incorporated into a FAQ? *(See FAQ checklist)*

[10] Italicized text represents possible answers for a specific Center and are examples, only.

Checklist 2 CREATING AND MANAGING FAQS

To contribute an answer to a FAQ, answer the following questions:

- Is this information already contained in or referred to in existing archives?
- Is this information already contained in an existing FAQ?
- Is the answer information indexed according to standards for easy retrieval?
- Is the answer contained in a file that uses standard naming conventions?
- Is the information accurate and up-to-date?
- Is the information in this FAQ consistent with other Centers' FAQs?
- Does the answer use language that is easily understood across Program offices?
- Is the FAQ accessible to various platforms and software programs?

The two checklists above are examples of how to methodically transfer high-level policies of the Department into daily operations. Checklists should also be created to help translate all policy points into daily operations.

## 5.5 SOFTWARE REQUIREMENTS

Section 3.2.2 introduces the notion of scalability and the ability of software to support scalability. If the number of digital reference questions were to remain at current level, they could be answered by human intermediaries - Specialists. If, however, one accepts the assumptions that (a) digital reference Centers want to encourage customer-initiated communication, and (b) that most customers will have access to the Web, it becomes clear that some kind of automated intermediation will be required to facilitate communication.

### 5.5.1 INTERMEDIATION

Intermediation by humans is most effective at the level of "meta-intermediation", i.e., decision-making about the information to be provided, and the design of the software and systems that will provide it.

Intermediation by software provides assistance at a lower level, conducting repetitive actions, transactions with individual customers.

Thus, software-based and automated processes could leverage human expertise by freeing Specialists from repetitive tasks, to perform the uniquely human task of synthesizing knowledge in customer-oriented contexts.

The domain of electronic commerce offers many kinds of software solutions that aid in scaling human expertise. They are described as software for digital reference Centers, e-mail management, message management, customer service, call Centers, response Centers, Customer Relationship Management (CRM) and "Ask-A[11]" Centers. These software systems support customer e-mail, internal email routing, tracking, databases, and response management.

Section 4.4 established that Centers must leverage human expertise through the use of software and mentions that such software is often referred to as Ask-A software.

AskA software has been successfully used to coordinate information service organizations, but is recommended here for internal coordination, specifically for use as an intranet for ED.gov digital reference Centers. AskA software resolves centralization issues because it allows "front-line" Specialists to enrich archives and FAQs, and to contribute to the creation of standardized fields and operating systems. The remainder of this section describes:

basic AskA functionality
challenges to basic AskA software, and
future functions for software within ED.gov.

[11] Ask-a Centers connect customers with questions to experts, as in "Ask-an-expert".

### 5.5.1.1 BASIC AskA FUNCTIONS

The following description is derived from AskA software functionality as reported in Section 1; Introduction, Virtual Reference Desk AskA Software, Decision Points and Scenarios, September 29, 1998, www.vrd.org/Tech/AskAsw-rpt.html. That section outlines functionality and specifications for AskA Software and provides a customizable workflow system for individual digital reference services.

The system is based on a set of five Web-based modules that can be customized by each Center to best meet its individual requirements with maximum flexibility and ease of use. The five components of the meta-description question/answer process are defined in Table 3 Components of the Meta-Description Question/Answer Process. The following descriptions are based on assumptions made for Version 1 of the AskA software and do not reflect possibilities of all AskA services.

| Component | Description |
|---|---|
| 1. Question Acquisition | A Web form allows a user to submit a question and other identifying information. During this process users may be prompted to identify a topic for their questions. Some automated pre-processing may occur to put the question in HTML or assign some sort of tracking identification. |
| 2. Triage | A message is queued and prepared for expert response. In services with multiple experts, some automatic or human-mediated triage process occurs. (For example, Ask A Volcanologist uses a PERL script to simply send questions to on-call experts based on the days of the week, while MAD Scientist Network uses human moderators to select experts based upon their expertise. ) Human mediators may have permission to perform certain actions on questions before assigning them to experts (e.g., split messages containing multiple questions, delete inappropriate questions, etc.). |
| 3. Expert Answer Generation | An expert generates an answer using personal knowledge and available resources. This component also includes any actions that experts may be allowed to perform on questions that have been assigned to them (e.g., make modifications to a question, send a question to a different expert, etc.) as well as "review" actions that other service staff can perform on completed responses as a form of quality control and/or expert training. |
| 4. Answer Sent | Once an answer is generated, it is posted to a Web page. The answer may also be sent via e-mail if possible. Users may be able to follow up on responses directly from the answer page. |
| 5. Tracking | Trends, subjects and other question/answer data from service transactions are tracked and used. In some cases the trends are used in Web development. Tracking can consist of Web-based archives, private archives, or simply informal information. |

Table 3: Components of the Meta-Description Question/Answer Process

The meta-description constitutes the core of the AskA system. This core manages the information flow within an AskA service and provides fundamental system services (i.e., assigning tracking data to questions, managing a database of possible expert respondents, sending out responses to customers). It is, in essence, a database that supports the core workflow process and related functions in digital reference Centers. The core, however, is insufficient to capture all the complexity of a Center's processes. The complexity of those challenges is described in the following section.

### 5.5.1.2 CHALLENGES TO BASIC AskA SOFTWARE

This section presents a list of issues not addressed by the core AskA software requirements. These issues should be considered as requirements that will inform the creation or selection of software appropriate to ED.gov. The three most important challenges facing the selection of software are:

convergence of information sources
convergence of media types
standardizing protocols across platforms.

#### 5.5.1.2.1 CONVERGENCE OF INFORMATION SOURCES

Specialists at ED.gov are aware that many Centers are trying to resolve the same problems. In response they have formed the Frontline Forum - a group of Center administrators who meet to address issues. Most of the Department's Program offices participate in the Frontline Forum. They hope to promote communication, coordination, and sharing of information and techniques among ED's telephone, email, and U.S. Postal mail call Centers.

Similarly, USGS is trying eliminate duplication of effort, diminish customer confusion, reduce the number if repetitive dialogues, and prevent errors or discrepancies in answers across its many distributed customer service contact points. A sub-group (comprising EROD, VRD and IRC) is developing a referral database.

It appears then, that the Centers are ready to develop and use processes and procedures to support broad interactivity and resource sharing. The danger here is that processes and procedures will spring up, as did the services they'll support, without including input from appropriate and interested Centers.

Feedback from human beings - both customers and Specialists - is crucial to the success of ED.gov. But the feedback must be gathered in a methodical and inclusive way.

The research team, therefore, recommends the formalization and sponsorship of the Frontline Forum. The Forum should receive funding to meet regularly with representatives from all Centers. Together they will resolve the issues raised in this report, and inform processes that resolve those issues. The Forum should report to the CIO on action items, new developments and ongoing efforts.

Specifically, the Forum should contribute to

(a) investigating software
(b) implementing AskA and QuIP protocols, and
(c) creating, monitoring and evaluating resource-sharing activities and products.

These same issues should be addressed at annual Help Desk conferences, and presented at digital reference conferences and presentations for ED.gov staff and management.

In addition to identifying best practices and determining useful metrics, participation in the Frontline Forum and Helpdesk conferences would enable Specialists to inform the creation of helpful activities and products, some of which are described here:

##### 5.5.1.2.1.1 DYNAMIC YELLOW AND WHITE PAGES

A centralized database should be available to Center Specialists and administrators. It should list phone numbers and emails indexed by individual, by program, by project, and most important, by area of expertise. This database will serve across departments as an accurate and intuitive "who-knows-what" referral system, or internal locator, and should include personnel from all ED.gov Centers.

This reference would require that personnel list their areas of expertise with Human Resources. The database can be updated dynamically as personnel files are updated with new job titles, and as people move from office to office.

#### 5.5.1.2.1.2 FAQs AND "SUGGESTION" SOFTWARE

Finding answers to Frequently Asked Questions can be difficult, and many Specialists simply generate answers, create naming conventions and storage formats, and select storage locations for files, all from their own experience and according to their individual preferences. The standardization and coding of answers will help to organize them in an orderly method. But as individual Specialists attempt to cover growing domains of knowledge, they need intuitive ways to retrieve answer already created. "Suggestion" software is the name given to a set of applications that test a question for reserved words or phrases, and automatically offer topics that the Specialist can review, and from which he or she can select an answer. "Suggestion" software is featured in several commercial applications and in at least one not-for-profit AskA service, and is used to ensure consistency of answers across working groups.

Many small databases exist across ED.gov Centers and contain answers to frequently asked questions (FAQs). All such databases should be culled for useful information which can be included in one large FAQ database for all Centers to share. Suggestion software should be run against all Center databases when offering answer solutions to Specialists.

#### 5.5.1.2.1.3 REFERRAL SOFTWARE

Specialists are committed to delivering high-quality answers, and would like to ensure similar quality in questions they refer to other Specialists. To that end, referral systems should generate and send receipts of referred questions to the original Specialists. In addition, answers provided to customers by referred Specialists should also be sent to the original Specialist for quality inspection and inclusion in FAQs.

#### 5.5.1.2.1.4 AUTOMATED INDEXES AND ARCHIVING FOR FAQS

The Frontline Forum should catalogue all answer topics and assign to each a unique code. The appropriate code could be used as an internal "Dewy decimal" system, and should be included in every answer for easy and consistent FAQ development. This task must consider trade-offs between coding consistency and distributed effort, as well as optimal levels of granularity and depth.

#### 5.5.1.2.2 CONVERGENCE OF INFORMATION SOURCES

Within the Department of Education there are currently 190 active digital reference Centers. Multiple Specialists address questions for each Program, project, office and grant. The resulting repetition of answer-creation and diminished consistency of answers suggests that information sources be coordinated. Planners and managers should consult Specialists and:

- decide upon multiple and redundant entry points into ED Info
- reduce unnecessary or highly volatile entry points
- offer one centralized access point for customers who need more prompting
- return personal ownership of processes to Specialists.

These points begin to address the convergence issues from both the customers' and the Specialists' perspectives, both of which are described below.

##### 5.5.1.2.2.1 INFORMATION CONVERGENCE FROM THE CUSTOMER PERSPECTIVE

The research team recommends that ED.gov allow customers to access any of its information resources through a centralized Web presence. This presence could be linked to, or represented by an icon on the Department's home Web page. The icon or linked page should allow customers to obtain ED.gov information from what looks like a seamless, one-stop access point. In actuality, the "back end" of the system will use QuIP and AskA software, and the unique coding scheme (mentioned in 5.5.1.2.1.4 and 5.5.1.2.2.2) to distribute, track, gather, answer and archive answers for all the Centers.

The key concept here is providing quick access to diverse resources through a simple interface. An example, albeit somewhat simplistic, is presented in Figure 5 Unified Information Access Point for ED.gov.

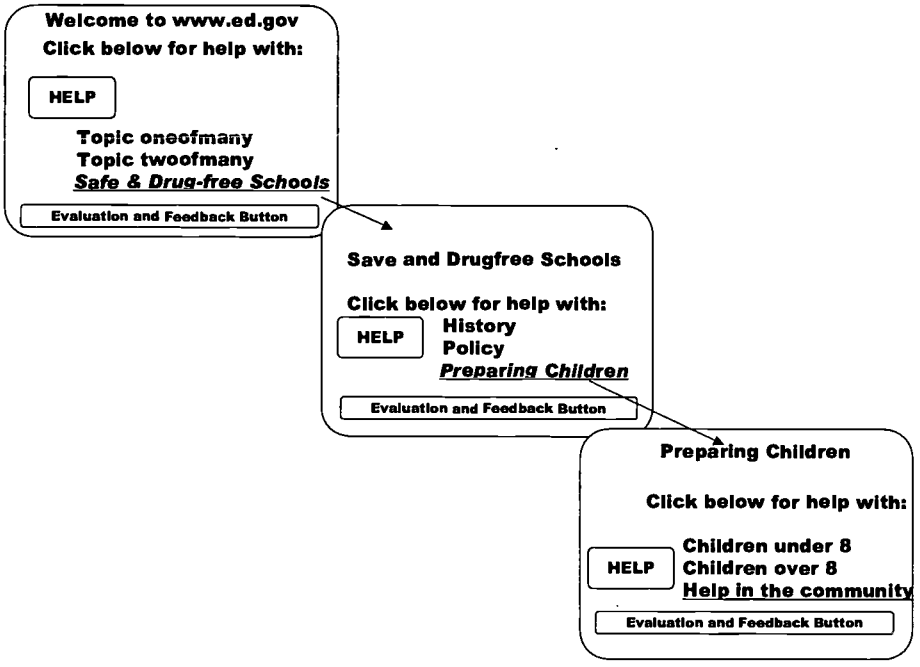


Figure 5 Unified Information Access Point for ED.gov

Every effort should be made to accomplish the following goals for ease of customer navigation:

1. Information sources should be available within 3 "mouse-clicks". That is, customers should not have to dig for deeply buried links to resources.
2. Every screen should allow customers to access a general help tool, thus preventing customer frustration.
3. Every screen should accommodate customer feedback, suggestions and complaints.

#### 5.5.1.2.2.2 INFORMATION CONVERGENCE FROM THE ADMINISTRATORS' PERSPECTIVE

While customers will see a unified access point to all ED.gov information resources, each resource represents a separate Center. Centers are not located together, nor will they always use the same processes. Together, however, they must present a unified appearance to customers. The best way to accomplish that goal is to coordinate back-end processes that refer and track questions, and to share FAQs and archives. Back-end coordination will be aided by adoption of common policies and strategies. For example, archive and FAQ databases could provide tiered information sources. That is, databases could allow Specialists to enter data for local use, shared use with designated Centers, and global access.

In summary, convergence of information sources should include

- collection of feedback and coordination of standards through Frontline Forum
- dynamically updated, shared reference guides
- use of suggestion software with FAQ databases
- automated reference tools
- coded topics used for filing and retrieving FAQs
- interfaces designed for ease of customer use, and
- tiered administrative functions in databases and software.

Coordination would be further aided by use of AskA software (see Section 5.5.1), and QuIP standards (see Section 5.5.2.3, below) and by addressing issues such as the convergence of media, and other technical issues.

#### 5.5.1.3 CONVERGENCE OF MEDIA

ED.gov digital reference Centers receive questions and provide answers via several communication media, including U.S. postal mail, telephone, fax, email and Web forms. Questions are generally tracked by the kind of media used, and their answers are rarely shared across communication modes. Because they cannot currently be tracked, these answers are continually re-created and waste resources.

Some software features the ability to track multiple modes of communication and should be incorporated as needed across ED.gov Centers. While the number of phone requests is declining, for instance, it must be assumed that there will always be some phone-based dialogue. Further investigation will determine what percentage of resources should be devoted to non-email-based questions and answers in ED.gov Centers.

Software problems have been identified by customers and by the research team. Potential solutions lie in AskA software packages, but which packages, and what features? The research team recommends that ED.gov research commercially available packages to determine if one or more could support its needs. This activity is described in the next section.

##### 5.5.1.3.1 STANDARDIZING PROTOCOLS ACROSS PLATFORMS: QuIP

Section 3.4.2.1 states that fragmented approaches in tool design and tracking systems make it difficult to share tracking information and solutions across Centers. Section 4.6 reported that Specialists need shared tracking and answering systems. Such shared functions require a standard protocol for exchanging information across platforms.

The research group recommends the application of QuIP (Question Interchange Profile). The QuIP protocol was developed at the Virtual Reference Desk (Information Institute of Syracuse[12]). The following explanatory material

[12] The Virtual Reference Desk is a project headed by the ERIC Clearinghouse on Information & Technology. It is funded by the U.S. Department of Education's

was excerpted from Question Interchange Profile, White paper, Version 1.01D, 1999. R. David Lankes, Director, ERIC Clearinghouse on Information & Technology. The White Paper demonstrates the viability of implementing a large-scale information system that directly utilizes human expertise. The White Paper is available in its entirety at http://www.vrd.org/Tech/QuIP/1.01/1.01d.htm.

#### 5.5.1.3.1.1 QuIP BACKGROUND

The Question Interchange Profile (QuIP) was a concept first proposed in the Virtual Reference Desk's White Paper (Lankes, 1998a) and research report on K-12 digital reference services (Lankes, 1998b). It was subsequently discussed in Virtual Reference Desk meetings and AskA consortium meetings.

QuIP was proposed as a means to distribute questions and answers among K-12 digital reference services (AskA services), and has subsequently been extended as a generalized means of expressing discussion-like interchanges between one or more people or organizations.

At the heart of QuIP development is the belief that reference interchanges can be both computational (that is, able to be processed by software without human intervention) and extensible (into various domains for example) while retaining the value of human to human communication.

This following description presents QuIP in the abstract. It is envisioned that QuIP will be transmitted via HTTP, SMTP, NNTP, Z39.50 and other protocols appropriate to specific contexts. QuIP is a profile that sets definitions beyond a simple set of elements. Some elements are mandatory and repeatable, others are pre-defined values and may not work in all circumstances. Variations of these choices using the same base of elements represent different profiles. Development was conducted in such a way as to minimize the need for multiple profiles, but it is not ruled out at this point.

#### 5.5.1.3.1.2 QuIP FOUNDATIONS

The heart of QuIP is a **thread** - an exchange of question(s) and answer(s). Exchanges may span many interactions, with changing subjects and personnel. Thus, a thread can be a shifting, on-going dialog. A simple thread can simply be a question, followed by an answer:

**Customer**: How many senators are there in the congress?
**Specialist**: 100, two from each state.

On the other hand, in the face of ambiguity, a thread may consist of several interactions:

**Customer**: How many senators are there?

---

National Library of Education and receives support from the White House's Office of Science and Technology Policy.

**Specialist**: In state government or in the federal government?
**Customer**: The federal government.
**Specialist**: 100, two from each state.

As illustrated in the second example, questions can come from both customers and Specialists. The difference, however, is that a customer is asking a content related question, while the Specialist is asking a clarifying question. These clarifying questions can be open-ended, or closed in nature.

Perhaps the best definition of a thread is as a series of **interchanges**. These interchanges have several attributes. For example the interchange has **content** - the question, or answer, or some other informative data. It also has a **date** such as when it was sent, received, or acted upon. Each of these attributes also can have sub-elements, or attributes themselves. For example, the content of an interchange has the **text** of an answer, or question, but it also has a **format** that that text is expressed in, and a **language** that expresses it. For example, the content of the interchange may be an HTML file written in English such as:

```
<html>
<head><title>The Answer</title></head>
<h1>The answer is....</h1>
<p>100, two from each side.</p>
</body>
</html>
```

Since most of the processing and use of QuIP will be automated, this level of detail and metadata is necessary. (QuIP must be as specific and succinct as possible to allow for computational manipulation.)

Other elements, attributes, sub-elements and sub-attributes are fully explored in the Question Interchange Profile White Paper. The purpose of this section is only to present the fundamental concepts of the profile.

QuIP is hierarchical in that, for example, a **thread** may have one or more **interchanges**, and interchanges can have one or more **dates**. Another important concept is that some elements of QuIP are mandatory, repeatable, and some attributes of these elements are pre-defined and extensible. These concepts are explained below:

- Elements in QuIP are either mandatory, conditional or optional: QuIP must have (in fact is) a Thread. A Thread must have one or more interchanges. An interchange may or may not have restrictions. While a Person element is optional. If used, however, the person element must have an associated Surname.
- Elements in QuIP are either repeatable or not: You can only have one thread, however a thread can have multiple interchanges (in fact the simplest example of a thread would have two interchanges: an originating question and an answer).
- Elements in QuIP can have pre-defined values. In some cases there is no limit to the number of values an element can contain. In some cases,

however, there is an established range of values an element can take. These ranges can be relatively small and controlled like the **state** of an interchange (it can have one of five values: new, assigned, answered, sent, closed). Ranges can also be expansive, but controlled like the **language** of an interchange.

- Elements and attributes can be extensible: In order to make QuIP accommodate existing practices and software, key elements of QuIP are extensible: QuIP has a place holder where other metadata standards and definitions can be used. For example, it is anticipated that digital reference services will use a variety of **subject** schemes and thesauri. Rather than selecting one, QuIP allows a service (or a Center) to specify a **vocabulary** to use, and the language of that vocabulary, and a place to look up that vocabulary. This means that a service (or Center) can use any subjects, so long as they indicate which ones they are using, and how a computer can make sense of them.

#### 5.5.1.3.1.3 QuIP IS PROCESS ORIENTED

A foundation of QuIP is that it is process oriented. QuIP is designed to transmit data from one Center to another. It is the exchange that drives QuIP, not the actual content of the exchange. This means that QuIP-formatted threads fully formed document like objects. While QuIP could be used as an internal file structure of digital reference services, it is assumed that most of the time services will parse QuIP data and transform it into another format internal to a service (such as a relational database). This assumption influences the predictive nature of QuIP and is the reason for QuIP's structured definitions. If the format of the data is known in advance, then programs can be written to manipulate the data without human intervention. (This concept is fundamental to metadata, but space precludes a general discussion on that topic, here.)

#### 5.5.1.3.1.4 QuIP INSTIGATORS

A key concept in QuIP is that interchanges are initiated by a process or person and that entity is called an **instigator**. Threads have interchanges that come from an instigator. Instigators can be a **people** or an **organizations**. The instigator has a **profile** that describes the entity originating an interchange, and a **role** that defines what that entity is doing. Note that an interchange assumes there is both the instigator of a message and a receiver of that message. In the QuIP element set, the receiver is implicit, and no elements define the receiver. An interchange is one way, with interactivity (a discussion) coming from iteration to form a thread. A more complex thread is made up of multiple instigators and multiple interchanges. For example, the receiver in one case, can become the instigator in another.

#### 5.5.1.3.1.5 QuIP RESTRICTIONS

Several other fundamental concepts will support a full understanding of QuIP. The first is that interchanges have a **sequence**, a **subject** and a set of **restrictions**. Restrictions are mechanisms for building complex types of transactions with interchanges. For example, one type of restriction is a **certification**.

With this mechanism services can build tools to force Specialists to have some level of knowledge (such as an MLS in a library world, or CNE in a help desk environment). These certifications can then be matched to **qualifications** (part of the instigator information). **Other Restrictions** can also be expressed to enforce Center policies and standards ( e.g., this question must be answered in two days).

### 5.5.1.3.1.6 QuIP IDENTIFICATION AND REPOSITORIES

Two final concepts are key. One is the concept of identification. The other is the implicit dependency on repositories. In order to manipulate QuIP data computationally, unique identification of data is mandatory.

Identification is based on QuIP Unique Identifiers (**QUID**). A QUID is composed of two elements. The first is a **QuIP_Registy_ID**. This ID is unique to a given digital reference service. Thus, a service like AskERIC might be given a registry ID of 'ASKE'. The **Local_ID** is a number that is assigned by, and unique within a digital reference service like 0000001. A QUID, in this case might be ASKE-0000001. This number will follow a thread no matter how many services may handle or hand-off a thread. With a QUID, one can uniquely identify an interchange within a thread by a combination of a QUID and the sequence information associated with a given interchange.

There are several pieces of information that cannot be contained within the QuIP specification, but are required by QuIP data. For example, QuIP_Registry_ID's must be unique, and the number of entries will grow as new digital reference services come into existence. Profiles and vocabularies are other examples, and are discussed further in the White Paper.

### 5.5.1.3.1.7 QuIP ELEMENTS

Table 4 Simplified QuIP Elements, is a simplified version of first table in the White Paper, and contains elements and definitions, only.

| Element Name | Definition |
|---|---|
| Affiliation | A non-person organization (company, professional association, etc.) to which a person belongs as an employee, volunteer or member. EXAMPLE: Library of Congress |
| Certification | An abstract representation of a skill or level of mastery. These may include degree designations or professional demonstrations. EXAMPLES: MLS, CNE |
| Content | The data being interchanged |
| Date | A specific point in time expressed in Months, Days and Years. EXAMPLE: |

| | 01012000 |
|---|---|
| Dates | Information in an interchange relating to when an interaction occurred, or was in some way manipulated (such as a change in a state). |
| DateType | A label identifying a specific type of manipulation of an interchange. So that a service can record when a message was received, answered or sent. EXAMPLE: Sent |
| Description | An abstract of the content of an interchange. Such a short description can be used in retrieval or browsing. Analogous to the subject line of an e-mail message. EXAMPLE: How Many Senators are there? |
| E-Mail | An electronic mail address of a person or organization. EXAMPLE: bob@example.com |
| FirstName | A person's first name. EXAMPLE: Richard |
| Format | The file type of a document or text. This information is necessary to de-code and manipulate information being exchanged. EXAMPLES: HTML, ASCII, GIF, MP3 |
| ID_String | An identifier that can be used as a label or an input to a profile repository. EXAMPLE: rdlankes |
| Instigator | The person or organization that originated a given interchange. So when a user asks a question, he or she is the instigator. However, when a service or Specialist responds to that original inquiry, the Specialist or service is the instigator. |
| Interchange | The basic repeating element of a thread. It contains the information that varies as a thread changes hands (from service to service, or user to service). |
| Language | The language used to encode information. EXAMPLE: English |
| LevelSpecialty | Designation from a given vocabulary of non-topical oriented specialty that indicates position in a hierarchical, or continuous system. This element is used to indicate either a nominal level such as grade in a school context, or ordinal such as trainee. EXAMPLES: 6, Primary, Manager |
| Local_ID | An ASCII string that represents a unique identifier within a given service. Combined with the QuIP_Registry_ID it uniquely identifies a thread regardless of the service. EXAMPLE: 00000000001 |
| Locator | The means of identifying the location of a person or organization on the Internet or in real space. |
| MiddleName | A person's middle name or initial. EXAMPLE: David |
| Organization | An aggregation of individuals or an abstraction that represents a non-person such as a company, corporation, or professional organization. EXAMPLE: National Library of Education |
| Org. Name | Name of an organization. EXAMPLE: National Library of Medicine. |
| OtherRestriction | Information used to control the use of an interchange. Restriction data can relate to service level agreements on time to answer, commerce data, or any other data that impacts how and why a question changes service ownership. EXAMPLE: 2 day turn around. |
| Person | A human being that initiates an interchange. The person can be a user with an information need that initiates a thread; a Specialists who has the knowledge to meet an information need, or an intermediary that brokers an exchange between a user and a Specialist (see role). |
| Postal | A postal address. EXAMPLE: 4-192 Center for Science & Technology, Syracuse, New York, 13244 |
| Prefix | Title or designation used in a name. EXAMPLE: Dr. |
| Profile | An abstract container for information relating to a person or organization that initiates an interchange. |

| | |
|---|---|
| Profile_ID | In order to be extensible the Profile_ID represents a mechanism to refer to external profile information. These external profiles can be domain specific or simply enriched beyond the QuIP person and organization scheme. Profile_IDs can also be used to create a local ID that are only referenced within a thread, and minimize repetition of profile information through multiple interchanges. |
| Profile_Location | A means of locating profile information. Locations may include a URL to an online profile repository, an XML file, or some other means of computationally extracting person or organization data. |
| Qualifications | An indication of a person or organization's ability to perform in a given role. For example, a Specialist's ability to answer a question. |
| QUID | A unique identifier for a thread. |
| QuIP_Registry_ID | A string that represents a digital reference service uniquely. |
| QuIPThread | The primary element of QuIP, it is defined as a series of interchanges with a single identifier (QUID). This is the root element of QuIP. |
| Restriction | A means to control the use of an interchange. This element is intended to be extensible to a given domain such as e-commerce. |
| Role | An abstract representation of an instigator's position or stake in an interchange. This role determines the information about an instigator needed beyond basic identification. |
| Scheme | A information organization system that can be used computationally to disambiguate information, or map one system to another. EXAMPLES: GEM, IMS, MARC |
| Sequence | An ascending real number that represents the order of interchanges. EXAMPLE: 1. |
| State | An indication of the current action being conducted on an interchange or the present condition of an interchange. |
| Subject | The topic of a question. EXAMPLE: Science. |
| SubjectSpecialty | A topic in which a Specialist has extensive knowledge and understanding. EXAMPLE: Science. |
| Surname | A person's last name. |
| Telephone | A phone number used to contact a person or organization. |
| Text | The body of a message. Text here is used in a broad sense as in analysis of the text of a book. This is the original creation of an instigator that is in the format of the content of an interchange. EXAMPLE: How many senators are there? |
| Type | The role being played by the instigator of the message. The role can be as a USER, that is a person or organization with an information need; a SPECIALIST, that is a person or organization with extensive knowledge and/or experience to alleviate on information need; or an INTERMEDIARY, that is a broker that matches a user with a Specialist. |
| URL | A Uniform Resource Locator used to identify the Internet location or an electronic resource. EXAMPLE: http://www.vrd.org/ |
| Vocabulary | A cohesive collection of terms that identify key concepts in a given domain. EXAMPLES: the ERIC Thesaurus, GEM Subjects. |
| VocabularyEntry | A term in a vocabulary. |
| VocabularyName | A label used to refer to a vocabulary. |

**Table 4 Simplified QuIP Elements**

#### 5.5.1.3.1.8 EXAMPLE

The following is a simple example of data represented by QuIP for a single interaction:

QUID: ASKE-000001
SEQUENCE: 1
STATE: NEW
DATE_TYPE: ORIGIN
DATE: 01012000
FORMAT: ASCII
LANGUAGE: English
TEXT: How Many Senators are there?
SUBJECT: Senators
TYPE: User
PROFILE_ID: Dave
Minimal QuIP Information (simple exchange)
QUID: ASKE-000001
SEQUENCE: 1
STATE: NEW
DATE_TYPE: ORIGIN
DATE: 01012000
FORMAT: ASCII
LANGUAGE: English
TEXT: How Many Senators are there?
SUBJECT: Senators
TYPE: USER
PROFILE_ID: Dave
SEQUENCE: 2
STATE: ANSWERED
DATE_TYPE: SENT
DATE: 01022000
FORMAT: ASCII
LANGUAGE: English
TEXT: 100, 2 from each state.
SUBJECT: Senators
TYPE: SPECIALIST
PROFILE_ID: AskERIC

In summary, recommendations for software requirements address both human processes and software functionality, and include that the Centers:

- use meta-triage approach and AskA software
- create a convergence of information sources and media types
- provide tools such as dynamic references and automated FAQs indexes
- use suggestion software to recommend FAQs to Specialists, and
- incorporate QuIP to standardize protocols across platforms

## 5.6 MAKE OR BUY DECISION

Based on their software requirements, the Centers must choose between existing software and creating custom software. This section advises the immediate and on-going analysis of new software systems to inform a make/buy decision. ED.gov can choose from two categories of software.

One category of software is small applications that run "on top" of existing Center software. That is the model currently in use and it is useful to the degree that it accommodates legacy systems. A major shortcoming is that such systems limit information sharing. Research into such software is not advised.

A second category to consider is new systems. They also present challenges, such as large investments of time and money, and steep learning and implementation curves. Cognizant of these issues, the research team advises investigating new systems because they allow the sharing of expertise across Programs, office and departments that is crucial to ED.gov.

Appendix E: Software Digest is a snapshot of packages that are available at this writing. The list is lengthy, and does not include details e.g., licensing options, prices, and which packages are customizable) - an indication of the large scope of commercial software available.

Should existing software packages prove inadequate, software should be created to support the activities listed above, and to support future needs of the Centers, as mentioned in the following section.

### 5.6.1 SUGGESTED FUTURE FEATURES FOR ED.GOV SOFTWARE

Software will help Centers answer queries and collect extensive data about customers(customer relationship management software)

In addition, future uses of software should include database mining, analyzing customer service feedback, and determining best new uses for the Centers' services. Difficult choices will have to be made, however, in deciding which functionalities to automate.

As the use of ED.gov Centers grows, they will face the issues of language translation. It would be advisable, therefore, for ED.gov planners to begin (a) considering future policy about interpreting languages, and (b) determining if software is available for that feature.

### 5.6.2 SUMMARY

The specification, design, selection, implementation and evaluation of software are critical to the scalability and success of ED.gov Centers. Resources need to be allocated to these tasks, and careful consideration given to their outcomes.

In addition to automating existing procedures, software can be used to perform database mining, to analyze customer service feedback, and determine best new uses for the Centers' services. These features should be incorporated into future uses of the Centers' software systems.

## 5.7 TRAINING

The redesign of ED.gov digital reference centers and their processes will result in:

new decisions affecting managers and administrators
new software, processes and procedures that affect Specialists
new interfaces that affect customers.

The remaining three parts of this section suggest training for all three groups. The AskA Starter Kit: How to Build and Maintain Digital Reference Services (R. David Lankes and Abby S. Kasowitz) provides a thorough guide for planning training activities (see Module 3 Training). The Information Institute of Syracuse can make suggestions for more specific training, including training classes, on-site sessions and other formats.

## 5.7.1 TRAINING MANAGERS

Center managers need training that will prepare them for the following tasks:

(a) learn how to translate policy points into Center procedures
(b) be familiar with referral, out-of-scope questions, answering, FAQ and archiving issues
(c) assign sharing levels to FAQs (personal, shared, or global)
(d) determine whether to use archives for historical preservation
(e) monitor the status of referred questions
(f) notify Centers in advance of public announcements
(g) react to unanticipated current events
(h) use procedures to diminish, report and handle security threats.
(i) create checklists to determine procedures for the following issues
(j) coordinate communication between journalists and Specialists
(k) participate in Frontline Forum activities
(l) monitor coding of answers that indexes them for FAQs
(m) be able to instruct Specialists in use of QuIP
(n) create new staffing models to select and train staff to rotate responsibilities
(o) plan backups (cultivate Specialist's domain expertise to share)
(p) budget for resources, especially telephony support and training specialists
(q) deal with international support issues
(r) direct records management
(s) ensure consistency across Centers
(t) incorporate redundancy (preserve government digital documents that may otherwise disappear).

## 5.7.2 TRAINING SPECIALISTS

Specialists will benefit greatly from the re-designed policies,

centralized resources and automated processes mentioned in previous sections. Each of these, however, will require that Specialists acquire new skills, including how to identify and deflect out-of-scope questions, such as:

(a) technical email (intended for Webmasters)
(b) requests to update sites/upload files (from Program offices and potential link partners)
(c) error messages (autoresponses such as "server down")
(d) maintenance (email from customer reporting server difficulties)
(e) listserv email.

Specialists must also learn to differentiate and choose from various answer types, including:

(a) citations (name of a resource material)
(b) pointers (name of resource material and instructions for accessing it)
(c) full text (text from a resource material)
(d) statistics (data with minimal context, usually numeric, brief answers)
(e) referrals (notice that the question has been sent to another Specialist)
(f) research (list of citations from ready reference materials)
(g) customized research (citations/pointers resulting from detailed search)
(h) synthesis (any of the above with explanatory verbiage)
(i) compound (any combination of the above responses).

Specialists must cultivate managerial skills so they may:

(a) understand policy, standards and procedures, including tracking, archiving and referring questions
(b) educate customers of varying expertise
(c) decide when to teach customers how to use tools.
(d) learn new software and tools including databases and automated processes
(e) monitor and update knowledge management systems
(f) prepare for flexible, shifting responsibilities
(g) learn and maintain good writing skills
(h) understand and employ proper "netiquette"
(i) respond to security threats
(j) aspire to qualifications for higher-level positions.

Training should include incentives (to be determined after skill sets are identified), provide skills for advanced career paths and allow Specialists to contribute their expertise to the upgrading of ED.gov systems. Further work is needed in the planning and development of training, and should be carried out in concert with the creation of policy, standards, and software.

### 5.7.3 TRAINING CUSTOMERS

Customers have already learned how to access and navigate Websites, use email, and phrase queries. ED.gov should provide online training for customers

who want to want to perform more sophisticated searches. Such training would include information about how to:

(a) use strategies specific to ED.gov for more sophisticated searches
(b) respond to Specialists' messages (customers are instructed to send messages to another party, but often re-send to original Specialist).
(c) evaluate legitimacy of online sources (if not ED.gov)
(d) suggest improvements to the Centers.

In summary, redesign of the Centers' goals, processes, and software will require that both managers and Specialists be trained. New functions will add unfamiliar tasks and material to Specialists' responsibilities. Customized training, strategically administered will require additional resources, but will result in

(a) shorter learning curves
(b) reduced error and
(c) increased productivity.

In short, the resources allocated to training will directly increase the Centers' scalability.

## 5.8 EVALUATION

Ongoing monitoring can evaluate adherence to policies, standards for customer satisfaction, improvement in internal processes and human resource issues. The AskA Starter Kit: How to Build and Maintain Digital Reference Services contains specific suggestions for evaluating activities.

Checklists, similar to those presented in Section 5.4, should be used to monitor and evaluate the following topics:

**Adherence to policies and checklists:**
Have we provided appropriate answers?
Have we identified our primary customer?
Have we answered the right questions?
Have we determined and adhered to the parameters for determining out-of-scope questions?

**Customer service:**
Have we provided faster response time?
Have we provided consistent information?
Have we provided accurate information?
Have we provided current information?
Have we used the appropriate answer format(s)?

**Internal processes:**

Have we reduced question overload?
Are file naming conventions consistent?
Is tracking coordinated across media?
Have we reduced technical email (intended for Webmaster)?
Have we reduced requests to update site/upload files?
Have we reduced the number of error messages?
Have we reduced maintenance email (re: server difficulties)?
Have we reduced out-of-scope questions of all kinds?
Are FAQ files easily be retrieved and re-used?
Are FAQ files are re-used and shared across Centers?
Is FAQ information is complete?
Is FAQ information is accurate?
Is FAQ information is consistent with other official resources?
Do FAQ naming conventions conform across Centers?
Are plans in place to manage traffic-spikes that result from current events?
Can cut-and-paste journalism be easily tracked to sources?
Have we coordinated press releases and media events with Specialists?

**Human resources:**
Have incentives and career paths been created for advanced levels?
Have qualifications been specified for Specialist positions?
Have we identified and implemented ways to accomplish scalability?

ED.gov Centers must reach satisfactory performance standards by 2001. That means that at least 90% of customers, internal and external, must agree that ED products, services, and information, including those on the Department's Website, are timely, accessible and of high quality. The evaluation topics listed above provide a guide to measuring Center outcomes.

## 5.9 FEEDBACK

Feedback is the richest source of focused input about practical improvements to a system. Every major topic mentioned in the Recommendation section depends, to some degree, on feedback from Specialists and customers. (The recommended Web interface (Section 5.5.2.1.1), for example, advises that each screen solicit customer feedback.)

Feedback is represented in Figure 3 Recommended Processes, as the last step in re-designing ED.gov Centers, but feedback occurs all throughout the entire process, and should be continuously gathered.

Conversations, office meetings and email are all sources of feedback. More formal feedback can be gathered at Frontline Forum meetings, and through polls and surveys.

Similarly, it would be advantageous to formalize some monitoring. For example, individuals could be asked to monitor and report back to the Centers about such matters as:

new legislation,
the availability of multi-language software
the progress and potential use of Internet II.

Use of formalized feedback can be designed and implemented, however, only after policy points have identified specific and useful topics.

# 6 SUMMARY

This report is a reflection of findings from the research into ED.gov digital reference Centers (Sections 1 through 4). It is also a planning document that allows for accountability and supervision, and enables Specialists to enrich the Centers with their expertise (Section 5).

The planning document provides suggestions to provide consistent and fast operation across Centers and provides general recommendations for determining policy and software issues including that the ED.gov digital reference Centers and their managers:

- choose a champion in the CIO's office to procure resources and determine the level of centralization (Section 5.1)
- select Level 2 centralization to coordinate policy and standards (5.2)
- incorporate AskA software into a Department-wide Intranet (5.5)
- employ QuIP protocols to enable resource sharing and tracking, archiving and FAQs across Centers (5.5)
- use checklists to translate policy into actionable items (5.4)
- formalize the Frontline Forum and use it to coordinate software specification and standardize operations across Centers (5.5.1.2.1)
- coordinate a "Fast-response" team to provide fast and accurate answers to questions about current events, thus preventing traffic spikes in the Centers
- research commercially available software packages to determine if they support Center processes and procedures (5.6)
- create training goals and plans, and decide on implementation mode(s) (5.7)
- evaluate daily operations using checklist (5.8)
- continuously gather and use feedback to upgrade systems and services (5.9).

These recommendations are designed to better interrelate and redesign the ED.gov digital reference Centers.

This research project has, in accordance with Educational Excellence for All Children Act (1999) created:

> models or applications that use technology to...promote the sharing of examples of promising practices developed under this authority in order to bring effective models to scale (page 76) (and) leveraged resources and promoted high quality (page 65).

As prescribed in the U.S. Department of Education Strategic Plan, 1998-2002, the report provides guidance regarding:

- training for front-line employees and planning workforce development
- supporting strategic partners
- providing seamless service based on optimal technological approaches
- capturing and incorporating customer feedback, and
- establishing standards for internal and external operations.

Appendix A Glossary of Terms

Archiving. The storage of the questions' answers either in databases, online sites, text files or in hard copy. Archived information may be used to create better online information resources, including Frequently Asked Questions files (see FAQs).

AskA Services. Internet-based question and answer services that connect users with individuals who possess specialized subject or skill expertise. Also known as digital reference services, they provide human expertise through question/answer services on the Internet. So called for services such as Ask-A-Scientist, these services take questions through e-mail and the World Wide Web. (Version 1 of the AskA software considers questions submitted through the Web only.)

Center. Digital reference services that are under the aegis or the U.S. Department of Education, or of related organizations (see Digital Reference Services).

Customer. Individual from any of the Centers' many populations who submits a question to a Center. Customer populations include, but are not limited to: students, parents, researchers, journalists, attorneys, and school administrators.

Digital Reference Services. Internet-based question/answer and referral services that reach a wide audience on a wide range of topics. Can include AskA services, library electronic reference services, help desks, and others.

FAQs are teaching tools presented in the format of questions and answers. Their content is derived from archived answers, and is accessible to customers through a Web site interface.

Offload. An expert's capacity for receiving questions (e.g., 3 questions per week, 1 question per day, etc.) is sometimes exceeded. The excess, unanswered questions must be assigned to other, available specialists. That process is known as offloading.

Question. A single information problem that can be solved by a Specialist.

Specialists. Individuals who answer user questions submitted to U.S. Department of Education digital reference Centers. They possess special skills and knowledge derived from training, education, and experience. Responsibilities and functions vary from Center to Center (see Center).

Thread. A set of related questions and answers that are stored in a knowledge base. Questions and answers can be linked in a thread by ID#, subject or other data.

Tracking. The monitoring of a question's progress and status until the answer is sent to the customer.

Appendix B - Notification of Poll

IMPORTANT DEPARTMENT SURVEY - PLEASE RESPOND

The Department of Education is conducting a study of e-mail customer service and coordination. As part of this study, several thousand e-mail links and publicly available e-mail addresses have been identified on the Department's web site. This short survey is intended to catalog these services and guarantee the continued availability of their e-mail addresses.

Please respond to the survey by completing the web form at the URL listed below. You will be asked to:

- identify individual(s) who monitor the email address (name, office, individual email, phone)
- describe average weekly volume of email received
- tell approximately what percentages of questions are
- answered discarded referred to others (and list the top three referents)
- specify the intended scope/nature/topic of questions designed to
- be answered by your service
- describe the actual nature/topic of questions received - characterize what trends (if any) you see forming in your service.

Please respond to the survey within 10 working days (by September 21, 1999). Non-responses will be assumed "dead-links." That is, if you don't respond to the survey, we will assume that the address is not being monitored for customer mail and we will initiate removal of links to that address from the Ed. web site. To respond to this survey, please access:

http://aska.syr.edu.

Thank you,
Keith Stubbs
Director, Resource Sharing and Cooperation
National Library of Education

Appendix C: Polling Instrument

DEPARTMENT EMAIL SURVEY FOR ED.GOV

If you have received a message entitled "Important Department Survey", please respond to this survey within 10 working days (by September 21, 1999). All non-responses will be assumed "dead-links." That is, if you don't respond to the survey, we will assume that the address is not being monitored for customer
mail, and we will initiate removal of links to that address from the ED web
site.

This survey is being conducted by The Department of Education to study e-mail customer service and coordination. Several thousand e-mail links and publicly available e-mail addresses have been identified on the Department's web site.

This short survey is intended to catalog these services and guarantee the continued availability of their e-mail addresses. Please contact vrdsurvey@vrd.org if you have any problems using this form.

If you have multiple active email addresses, please fill out the survey form once for each.

Complete the following fields and submit your response.

Thank you
Keith Stubbs
Director, Resource Sharing and Cooperation
National Library of Education

Last Name *
First Name*
Title
Address
City
State
Zip
Email Address*
Phone Number - -
Email Software
Don't Know
Pine
Elm
Microsoft Outlook
Microsoft Internet Mail
Microsoft Exchange
Netscape Mail
Eudora
Other

Total Number of E-mails Received Weekly*
Percentage Answered%
Percentage Discarded%
Percentage Referred%

What department or individual is at the top of your list for referring questions? (example: Jane Doe at the National Library of Education, jane_doe@ed.gov)
What department or individual is second on your referral list?
What department or individual is third on your referral list?
What is the INTENDED scope of this service?
How does the ACTUAL scope of email received, differ from the intended scope o of the service?
What trends (if any) do you see forming in your service?
Thank you for your time.
Required fields are noted with an *

Appendix D Database Record Structure for Poll

| Field # | Field Name | Description | Characteristics |
|---|---|---|---|
| 1. | LAST NAME | | 20 characters alpha |
| 2. | FIRST NAME | | 10 characters alpha |

| | | | |
|---|---|---|---|
| 3. | TITLE | | 40 characters alpha |
| 4. | OFFICE ADDRESS | | 80 alpha/num |
| 5. | EMAIL ADDRESS | | 50 alpha/num |
| 6. | PHONE NUMBER | | 10 char. numeric |
| 7. | WEEKLY | Estimated number of weekly e-mail questions received | 6 characters numeric |
| 8. | ANSWERED | Estimated percent of question the respondent answers | 2 characters numeric |
| 9. | REFERRED | Estimated percent of questions referred out | 2 characters numeric |
| 10. | NAME1 | Name of person/office to whom question are referred | 60 characters alpha |
| 11. | NAME2 | Name of person/office to whom question are referred | 60 characters alpha |
| 12. | NAME3 | Name of person/office to whom questions are referred | Unlimited alpha |
| 13. | TOPIC | Nature/topic of questions | Unlimited alpha |
| 14. | TRENDS | Trends in nature of questions | Unlimited alph/num |

Appendix E: Software Digest
From Philip Verghis' Help Desk FAW: The definitive globala resource for helpdesks, custom relationship management and technical support, Section III Version 5.10, November 1999 © Verghis 1994-1999

**Table 1 - Commercial Products**

| Vendor | Product | Platform | Contact information |
|---|---|---|---|
| 2020 Solutions | CalTraker | PCs | http://www.2020solutions.org/ |
| Advantage kbs | IQ Support Pro | Various | http://www.akbs.com |
| Alexander Frances Systems Consultants | MasterSoft OSM System-4 | Various | http://www.afsc.co.za/ *(link not working - July 1, 1999)* |
| Allen Systems Group | ASG-Impact | PCs | http://www.allensysgroup.com |
| Applied Innovation Management | HelpDesk Expert | Various | http://www.aim-helpdesk.com/ |
| Applix | Applix Enterprise | Various | http://www.applix.com |
| Apsylog | Apsylog help Desk | Various | http://www.apsylog.fr *(link not working - July 1, 1999)* |

| | | | |
|---|---|---|---|
| Ascend Consultancy | CATS | PCs | (England) 0784 431 756 |
| Astea International | Heat | PCs | http://www.astea.com |
| Atlanta On-Line Systems | Help Desk Application Suite | IBM Mainframes | http://www.atlonline.com/aos/index.htm |
| Automation Centre | Support Tracker | Lotus Notes | http://www.acentre.com |
| Baron Software Services | Manage-it! Help Desk | PCs | http://www.bssinc.com/ |
| Bendata Management Systems | HEAT | PCs | http://www.bendata.com |
| Blue Ocean Software | Track-it! | PCs | http://www.blueocean.com |
| Bridgehead Software | Bridgehead Service Desk | Various | http://www.bridgeheadsoftware.com/ |
| Bullseye Systems | HelpDesk I | PCs | http://www.bullseyesystems.com/ |
| BusinessLine Corp. | BusinessLine | Various | http://www.bl-corp.com |
| Caliburn Technology | Caliburn Call Center | Lotus Notes | http://www.caliburntech.com |
| Clarify Inc. | ClearSupport | Various | http://www.clarify.com |
| Coastal Technologies | Help!Desk | PCs | http://www.coastaltech.com |
| Commonsense | Dispatch | Lotus Notes | http://www.groupapps.com/ |
| Computer Associates | CA-Netman | Various | http://www.cai.com |
| ComputerWorks | InterTrac Help Desk | Lotus Notes | http://www.computerworks.com |
| ConSol* Software | CallManager | Java based | http://www.consol.de/Produkte/ |
| Coral Sea Software | Sysman | PCs | http://www.coralsea.com.au |
| Core Technology | Persist | PCs | http://www.ctc-core.com/products/persist.html |
| CustomerSoft | Li@son | Various | http://www.customersoft.com/ |
| CyberSource | FAULT | PCs | http://www.cyber.com.au/cyber/product htm |
| Datawatch Corp. | Q-Support | PCs | http://www.datawatch.com |
| Decisif Software Solutions | Call Tracking Software (LSA) | PCs | http://www.decisif.com *(link not working - July 1, 1999)* |
| DKSystems Inc. | DKHelp Desk | PCs | http://www.dksystems.com |
| DP Solutions | In-Vision | Various | http://www.dpsol.com |
| DVSD International | Napoleon | Various | http://www.dvsd.net/Products/Napoleon leon.htm |
| Envisage Systems | Envisage Support Centre | PCs | http://www.envisage.co.nz |
| Epicor Software | Clientele | PCs | http://www.epicor.com |

| | | | |
|---|---|---|---|
| Firstwave Technologies | TakeControl | PCs | http://www.firstwave.net |
| FG&A | Probe | PCs | http://www.fga-software.com |
| Foresight Software | Service Management System | Various | http://www.foresight-esp.com/ |
| GroupApps | Dispatch | Lotus Notes | http://www.groupapps.com |
| GroupSoft Systems | GroupSoft Help Desk | Lotus Notes | http://www.gsft.com |
| GSx Groupware Solutions | GSX Help Desk | Lotus Notes | http://www.gsx.net |
| GWI Software | GWI Collaborative Front Office | Lotus Notes | http://www.gwisoft.com/ |
| Help Desk Technology | HelpSTAR for Windows | PCs | http://www.helpstar.com |
| Hewlett Packard | HP OpenView - ITSM Operation | Various | www.openview.hp.com/itsm |
| Infinite Access | CITRIS | Various | http://www.bullseyesystems.com/ |
| Infra Corporation (Formerly Help Desk Systems) | Infra-Help | Various | http://www.infra.com.au |
| Integral Solutions Corporation | Support Wizard | Various | http://www.supportwizard.com/fspage.h |
| Ixchange, Inc. | Customer IXCHANGE | PCs | http://www.ixchange.co.za/ |
| Kemma Software | Bridge | Various | http://www.kemma.com |
| KnowledgeSoft | KnowledgeDesk | Lotus Notes | http://www.knowledgesoft.com |
| Metrix | OpenUPTIME | Various | http://www.metrix-inc.com/ |
| MGV America | HelpDesk | PCs | http://www.mgv.com |
| Molloy Group | Top of Mind | PCs | http://www.molloy.com |
| Monarch Bay Software | HelpTrac | PCs | http://www.helptrac.com |
| Motive Communications | Motive Duet | Various | http://www.motive.com |
| Multima Corporation | NetKeeper HelpDesk | PCs | http://www.netkeeper.com |
| Network Associates | ServiceDesk (bought out Magic Solutions)) | Various | http://www.nai.com/products/helpdesk/esk.asp |
| Nocom AB | S.O.S. Help Desk | Various | http://www.nocom.se |
| Octane Software | Octane99 | Various | http://www.octanesoftware.com |

| | | | |
|---|---|---|---|
| Opis Corp. | Support Express | PCs | http://www.opis.com *(link not working - July 1, 1999)* |
| PHD (Professional Help Desk) | PHD | Various | http://www.prohelpdesk.com |
| Peregrine | Service Center | Various | http://www.peregrine.com |
| Platinum Technology (Bought out by Computer Associates) | AutoAnswer (formerly Apriori) | Various | http://www.platinum.com/products/sys.htm#h |
| PosAm Bratislava | Help Desk | Lotus Notes | http://www.posam.sk/ |
| PRD Software Pty Ltd | HelpMasterPro | PCs | http://www.prd-software.com.au |
| Primus | Solution Builder Solution Publisher | Various | http://www.primus.com |
| ProAmerica Systems | Service Call Management | Various | http://www.proam.com/ |
| Quintus Corp. | HelpQ, CustomerQ | UNIX | http://www.quintus.com |
| Remedy Corp. | Action Request System | Various | http://www.remedy.com |
| Repository Technologies | Customer First Software | Various | http://www.custfirst.com |
| royalblue technologies | FrontOffice and HelpDesk | Various | http://www.royalblue.com |
| SIAL Software | Fireman | PCs | http://www.sial.com.br |
| Scopus Technology | Scopus | UNIX | http://www.siebel.com |
| ServiceSoft | WebAdvisor | Various | http://www.servicesoft.com |
| Service Data Management | ServicEdge and TAC | Various | http://www.sdm1.com/ |
| Silknet Software | Silknet | Various | http://www.silknet.com |
| SIO Technologies | MultiHelp | OpenVMS | http://www.sio.com/ |
| Softopia Development | iTrack and iTrack Enterprise | PCs | http://www.softopia.com/ |
| Software Artistry (now IBM/Tivoli) | Expert Advisor | PCs | http://www.softart.com |
| Sunrise Software | Sunrise | PCs | http://www.sunrisesw.com |
| Synchrony Communications | Synchrony eRM | Various | http://www.synchronyinc.com |
| Syntactica | Log-Trak | PCs | http://www.syntactica.co.za *(link not working - July 1, 1999)* |
| Techflow | Enhanced Help Desk | Lotus Notes | http://www.techflow.com |

| | | | |
|---|---|---|---|
| TEK-TOOLS | jTicket (for Remedy) | Various | http://www.tek-tools.com/jticket |
| TJ Tieto Group | TJ Help Desk | Lotus Notes | http://www.tjgroup.com |
| United System Solutions | SystemCare | Lotus Notes | http://www.ussinc.com |
| Tele-Support Software | Tele-Support HelpDesk | PCs | http://www.resource-dynamics.com |
| Tower Concepts | Razor | UNIX | http://www.tower.com |
| Tree Tools | HelpDesk-3 | Various | http://www.treetools.com.br |
| Troika Software | RESOLVE IT! | Various | http://www.troikasoft.com/ |
| UniPress Software | Footprints | Various | http://www.unipress.com/footprints/ |
| Utopia Technology Partners (bought out by RoyalBlue) | Utopia/HelpDesk | PCs | http://www.utosoft.com *(link not working - July 1, 1999)* |
| Vantive Corp. | Vantive | UNIX | http://www.vantive.com |
| Vision4 | Gemini | PCs | www.vision4.co.uk |
| WebWonderland | WonderDesk | Web | http://www.wonderdesk.com |

*Aberdeen Group* publishes a detailed review of customer service software each year.

*Forrester Group* analyzes and predicts the impact of technology change on large companies, consumers, and society.

*Gartner Group* has some reports on prominent vendors and compares them. Their reports gives you an idea about the market and puts the larger vendors in an 'Ability to Execute vs. Completeness of Vision' grid.

*Giga Group* their research focus is on helping companies integrate their businesses with the Internet.

*IDC* is a comprehensive resource on worldwide IT markets, trends, products, vendors, and geographies.

*Jupiter Communications* focuses exclusively on how the Internet and other technologies are changing traditional consumer industries.

*Knowledge Networks* has reports titled:

- "Automating Your Support Center - A Practical Guide to Assessing Service
- Automation Tools" 4th edition.
- "A Field-Tested RFP Template - For Selecting a Customer Response Center Automation System" (includes an Excel spreadsheet form)
- "Implementation Lessons from Leading-Edge Users"
- "Creating A Support Web Site - The Process, Potential and Pitfalls."

*Meta Group* has done research on Help Desks and Call Centers.

| | |
|---|---|
| The *Muns Group* -- contact Lon Hendrickson at webmaster@bendata.com. | (prior to forming Renaissance Partners) published a booklet titled: "*Selecting Customer Support Technology, 23 Important Considerations*". |
| *National Software Testing Labs* | reviewed some help desk products. |
| *Ovum* | is an independent research and consulting company offering advice on IT and telecommunications markets. They have a regularly updated report titled "*Ovum Evaluates: Help Desk and Customer Support Systems.*" |
| SPEX (Software Product Expertise) | is an IT research firm that provides comprehensive software package evaluations to assist global companies in the selection of critical applications. The reports can be downloaded from their site. Site visitors can obtain more than 20 free sample reports from the kits. |
| Unified Business Solutions | has a web-based software selection tool. |
| *Yankee Group* | focuses on strategic planning assistance, technology forecasting and IT industry analysis. |

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Review by a reader of the help desk list (suitable for smaller organizatio

## Related Tools

## Email handling tools

| | |
|---|---|
| *@Once* http://www.onceinc.com/ | is an email management services company that helps Fortune 1000 companies manage inbound customer email and outbound email marketing. |
| *Acuity* http://www.acuity.com | offers the WebCenter product line, which offers web-based customer interaction solutions. |
| *Adante* http://www.adante.com | offers an enterprise-class customer e-mail management solution that allows companies to efficiently manage and respond to hundreds or thousands of customer e-mails daily. |
| *Aditi Corporation* http://www.talisma.com | offers Talisma -- an easy-to-use, out-of-the-box customer e-mail and Web-form manager that helps sales and service teams respond quickly and effectively to electronic communications flooding busy aliases, such as info@company.com |
| *Brightware* http://www.brightware.com | provides customer assistance software on the Internet. |

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| *eGain*<br>http://www.egain.com | offers the eGain Email Management System |
| *Island Data*<br>http://www.islanddata.com | automates the process of reading and responding to electronic support requests. |
| *Kana Communications*<br>http://www.kana.com | offers the Customer Messaging System that provides robust enterprise-class tools to manage customer e-mail communication. |
| *mailQueue*<br>http://www.mailqueue.com | offers a web-based e-mail management solution allowing companies and their customers access to high performance tools when managing their corporate e-mail. |
| *Calypso Message Center*<br>http://www.mcsdallas.com | is designed to efficiently process, route, track and manage inbound departmentalized e-mail. |
| *Mustang Software, Inc.*<br>http://www.mustang.com | offers the Internet Message Center designed to handle inbound e-mail, from web sites where the e-mail is being directed to a department, rather than an individual. |

**Integrated suites (sales, marketing etc. – often called "Customer Relationship" tools)**

- *Aurum Software*, at http://www.aurum.com offers a complete set of integrated sales, configuration, and call center components.
- *Baystone Software*, at http://www.baystone.com offers software that enhances communication between the sales, marketing, support, and quality functions in your organization. (Note: Baystone has acquired by Remedy Corporation.)
- *Corepoint*, an IBM company, at http://www.corepoint.com offers customer relationship management software.
- *Chordiant Software*, at http://www.chordiant.com/ delivers a complete application environment for consumer transactions through call centers, the internet, point-of-sale locations.
- *Siebel*, at http://www.siebel.com/ provides a comprehensive and scalable customer information system

**Knowledge bases and self-help tools:**

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| *Acuity*<br>http://www.acuity.com/ | offers online self-help capabilities and real-time multimedia communication functionality. |
| *Acme Software*<br>http://www.acmesoft.com | offers FAQtory, a dynamic, interactive Q&A hosted internet application |
| *Advantage kbs, Inc.*<br>http://www.akbs.com | offers a suite of products to automate problem resolution at the support center or at the end-user's desk. |

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| *Courion Corporation*<br>http://www.courion.com | offers Internet-based self-service applets which automate common support tasks -- integrated with help desk systems to track support activity. |
| The *Haley Group*<br>http://www.haley.com/help!cpr.html | allows you import or create custom case-bases using the CPR C++ class library. |
| *Inference*<br>http://www.inference.com | offerst the k-commerce suite of products |
| *Knowledge Broker, Inc*<br>http://www.kbi.com/ | offers "Experience Bases" you can purchase to pre populate your knowledge base. |
| *Knowlix*<br>http://www.knowlix.com | has a series of knowledge management products that integrates seamlessly with various support management tools. |
| *MetaQuest Software*<br>*http://www.metaquest.com/* | offers *Triage* - a diagnostic software environment and *Census* - a defect tracking system. |
| *The Molloy Group*<br>http://www.knowledgebridge.com | offers Knowledgebridge - a tool that ties into existing call tracking systems. |
| *NetHelp International*<br>http://www.nethelpnow.com | offers a heuristic ("self-learning") knowledge base, call logging and reporting software. |
| *Platinum Technology* (now part of Computer Associates)<br>http://www.platinum.com/products/dataw/applsres.htm | has Apriori Plus that can tie into various call tracking tools. |
| *Primus*<br>http://www.primus.com | offers a series of knowledge management tools |
| *Right Now*<br>http://www.rightnowtech.com | Right Now Web |
| *ServiceSoft*<br>http://www.servicesoft.com | offers a complete Internet Customer Support solution |
| *ServiceWare*<br>http://www.serviceware.com<br>Also see their knowledge-based support site at:<br>http://www.rightanswers.com | offers multimedia "Knowledge-Paks" you can purchase to pre populate your knowledge base. |

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| *South Wind Design* http://www.swdi.com | has a web based data collection system that improves the productivity of your technical support staff, help desk or call tracking system by using a browser and Active X. |
| *Verity* http://www.verity.com | offers the Knowledge Retrieval Product Suite |
| *Sterling Software* http://www.solve.sterling.com/dip/ | has SOLVE:Diplomat which takes disparate software systems and makes the data logical and easy to use across the entire network enterprise. |
| *Telamon* http://www.telamon.com | has a paging solution called "TelAlert" that runs on UNIX and Windows NT and integrates with popular help desk products. |

## ACDs and VRUs

- *ACDs* -- can route incoming calls to the next available Help Desk staff member, route incoming calls, and can collect data on the calling patterns. These typically reside in the phone system switch. Highly recommended if you have a medium to large staff and call volume. This will allow you to measure how many calls are 'abandoned' (i.e. customer hangs up before speaking to an agent), 'average time to answer' (i.e. how long it take you to pick up the phone) etc.
- *VRUs* -- Can filter and route calls based on information about the caller or problem. With CTI (Computer Telephony Integration), you can pre populate your 'trouble ticket' with your client's information. VRUs can be used for password resets etc.
- If you are interested in learning more about this and related areas, check out
  Call Center magazine.

## Sample companies mentioned in the above two categories...

### ACDs

- Aspect CallCenter System at www.aspect.com has staffing software (TeleCenter System) available from the TCS Management Group which automates many of the tasks associated with managing a call center workforce.
- AT&T at http://www.att.com/ has Definity Communications Systems has the Definity and Conversant product lines.
- Northern Telecom at http://www.nortenetworksl.com has the ACD Max line.
- Teledata Solutions at http://www.tdata.com/ has Call Link.
- Teloquent Communications at http://www.teloquent.com has the Distributed Call Center.

### VRUs

- Many of the same vendors above have VRUs.
- Talx Corporation at http://www.talx.com

References

The AskA Starter Kit: How to Build and Maintain Digital Reference Services (R. David Lankes and Abby S. Kasowitz) ERIC Clearinghouse on Information & Technology, Syracuse University, Syracuse, New York, IR-107. (November 1998)

Department of Education's' Customer Corner, July 26, 1999, Vol. 1, (20)

Educational Excellence for All children Act of 1999: The Clinton Administration's Proposal to Reauthorize the Elementary and Secondary Education Act of 1965 U.S. Department of Education. (1999)

Overview and Functions, Office of the Executive Secretariat, Department of Education.(1992)

Quality Standards for Digital Reference Consortia Kasowitz, Abby; Bennett, Blythe; Lankes, R. David (at press)

Question Interchange Profile, White paper, Version 1.01D, 1999. R. David Lankes (available at http://www.vrd.org/Tech/QuIP/1.01/1.01d.htm)

U.S. Department of Education World Wide Web Policy and Procedures http://www.ed.gov/internal/www tds.html. Change Log. I. Background. II. URL: www.ed.gov/internal/wwwstds.html . (26-May-1999)

U.S. Department of Education Strategic Plan, 1998-2002 - September 1997. Relationship of Strategic Plan Goals and Objectives to Program Goals. URL: www.ed.gov/pubs/StratPln/relation.html. (7-Nov-1997)

U.S. Department of Education Strategic Plan, 1998-2002. Appendix B: Descriptions of Program Evaluations and Other Studies. URL: 165.224.220.67/pubs/StratPln/app-b-5.html. (September 1997)

Virtual Reference Desk AskA Software, Decision Points and Scenarios, September 29, 1998, (available at www.vrd.org/Tech/AskAsw-rpt.htm

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