

## Automated Reference Assistance: Reference for a New Generation



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CNI Meeting – April 2002

### What is the ARA?

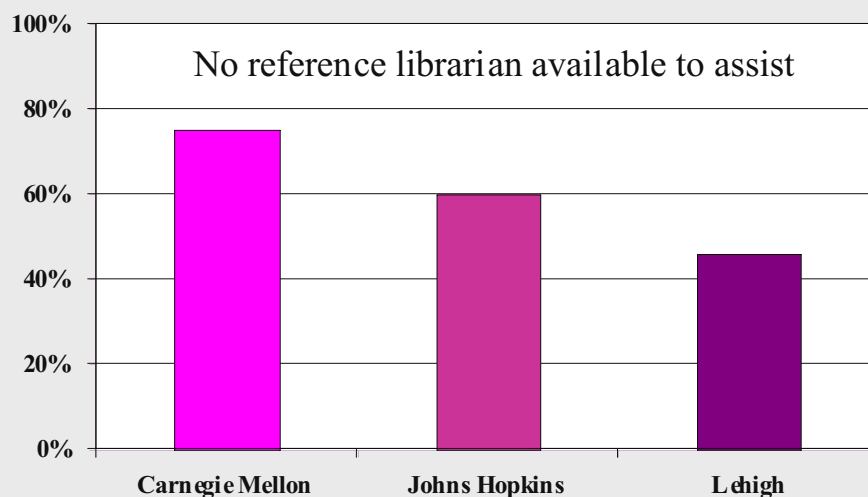
- Software designed to
  - Enhance, not replace traditional reference service
  - Elicit information about users & what they need
  - Suggest appropriate resources
  - Operate 24 x 7

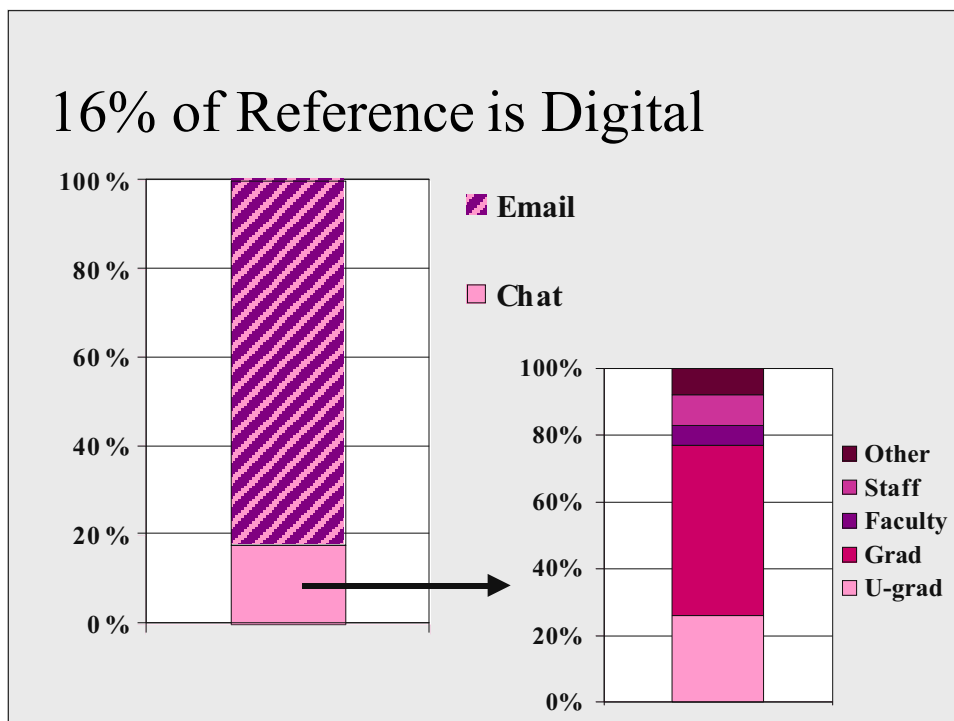
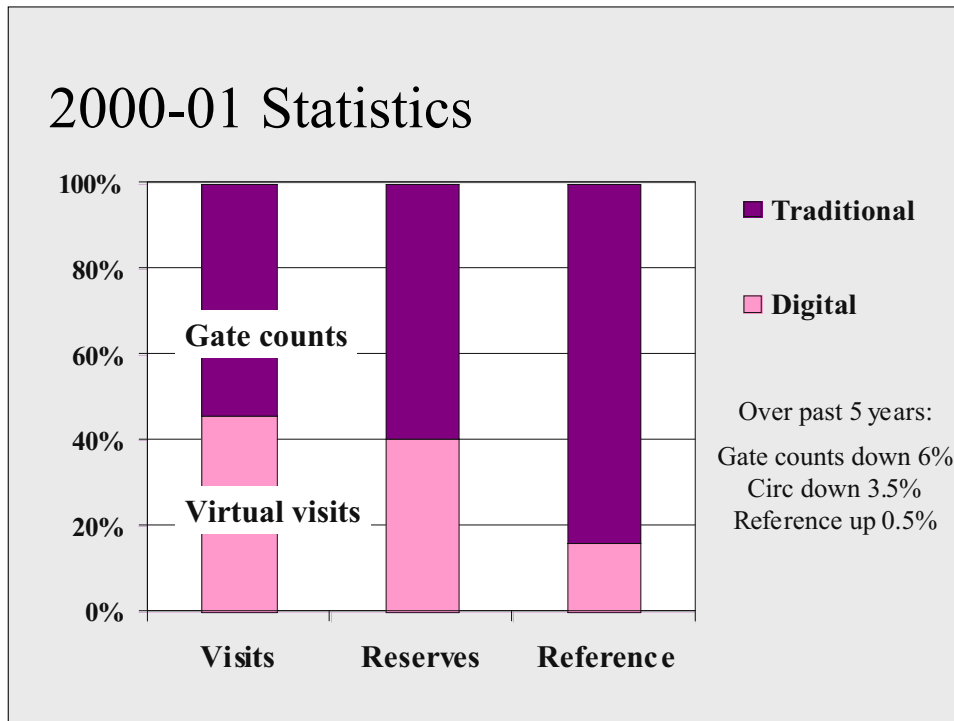
## Why is the ARA?

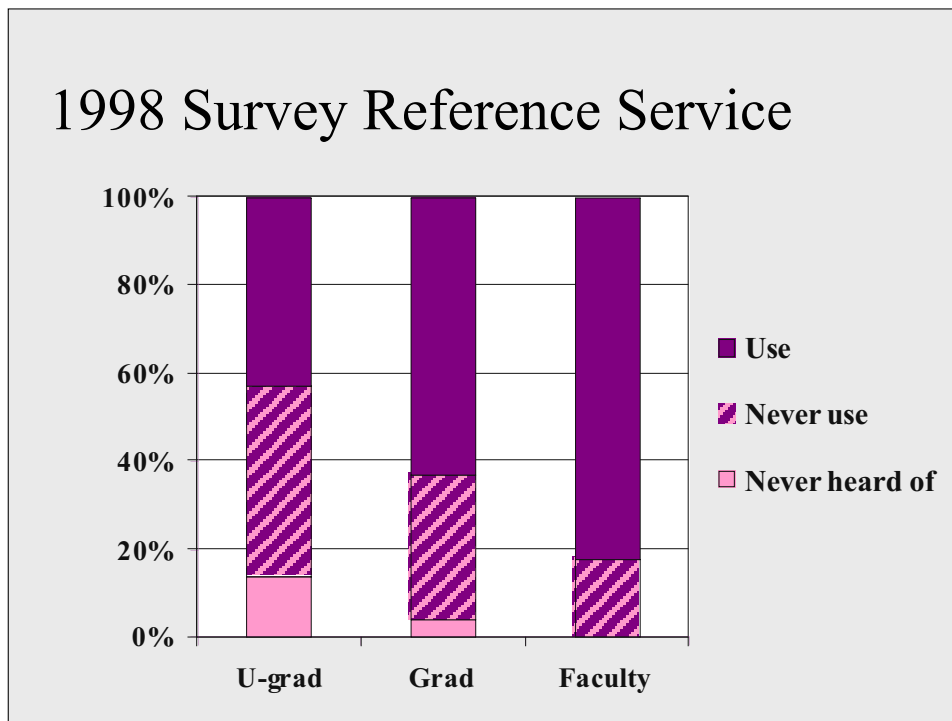
- Users value convenience, speed, ease-of-use
  - Prefer remote access, e-resources, & independence
  - U-grad students use inappropriate e-resources
    - Less than 6% of surface Web is scholarly content
    - No single Web search engine indexes more than 16%
    - Web magnifies problems with poor search strategies
- The number, names, & content of e-resources overwhelm & confuse both users & librarians

**Carnegie Mellon**  
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## 1999 Remote Use of E-Resources







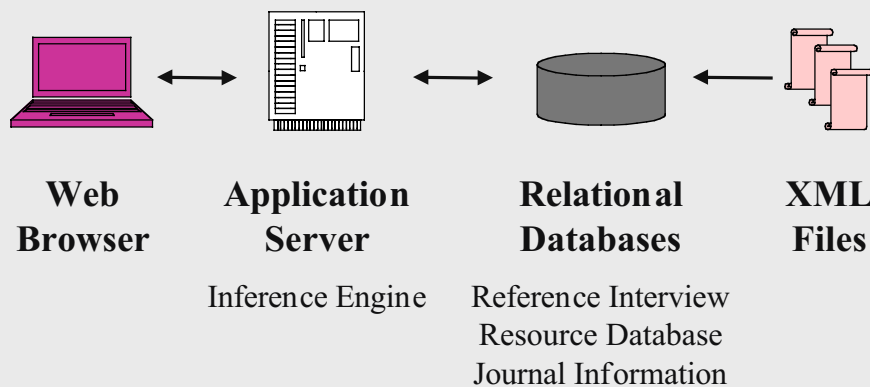
## Goals of the ARA

- Intervene & guide
- Facilitate learning & independence
- Match preferences & lifestyles
- Begin to close the gap  
between perceived ease  
of using the Web  
& perceived cumbersomeness  
of using the library

## What the ARA Does

- Interviews users
- Limits the number of resources to choose from
- Dynamically groups the resources available
- Provides information about the resources
- Provides links to resources
- Submits queries to resources

## ARA Architecture



## ARA Web User Interface

The screenshot displays the ARA web user interface. At the top left is the 'ARA' logo. To the right are navigation links: 'CMU Libraries / ARA Home / Search History / Help'. Below the logo is a welcome message: 'Welcome to the ARA, CMU's Automated Reference Assistant. I can help you find books, journals, articles and other resources. Currently, I know of 63 sources of information that might be useful for you.' The main section is titled 'Tell me what you're looking for :'. It contains three search categories, each with a pink background and a 'Submit' button:

- You're looking for a **book****:
  - about:  Submit
  - called:  Submit
  - written by:  Submit
- You're looking for an **article****:
  - in the journal named:  Submit
  - in the subject area: Arts (dropdown menu) Submit
- You're looking for **information**** about:  Submit
- in the subject area: Art and Architecture (dropdown menu) Submit

## ARA Inference Engine

- Interviews user to focus the information need
- Converts user's information need into a query of the Resource database & Reference Interview database
- Transforms the results of the query into useful reference advice, a list of suggested resources, & follow-up questions

## ARA Reference Interview Database

- Set of questions a librarian might ask a user
- Information about when it's appropriate to ask each question
- Actions associated with each answer
  - To update the facts the ARA “knows” about what the user is looking for

## ARA Resource Database

- Contains facts about every resource the ARA “knows”
  - Resource name
  - Resource level
  - Dates of coverage
  - Item types
  - Subject areas
  - Dewey Decimal ranges
  - Full text availability
  - Internet address
  - Full descriptions
  - Brief descriptions
  - Other facts
    - ✓Atlas = maps & geography
    - ✓Encyclopedia = general information
    - ✓Poems = can be located through concordances & indexes of first lines

## ARA Journal Information Database

- Identify databases that index a journal
- Identify databases with full-text
- Disambiguate journal titles
- Incorporated from JAKE

## ARA Action

User answers questions & submits a request



Advice, a ranked list  
of resources &  
follow-up questions

Inference Engine

Converts user information need into a query



Reference Interview database  
Algorithm determines  
which follow-up questions  
are valid for which user-provided facts



Resource database  
Algorithm determines  
which resources are  
appropriate to user need

## Resource Database Example

ARA ARTICLE Search [CMU Libraries / ARA Home / Search History / Help](#)

CAMEO (the library catalog) has a complete list of all journals which the library possesses.  
[Search CAMEO for the journal 'nature'](#)

If you are looking for a particular article from 'nature', it may be available online.  
I know of the contents of many databases. Would you like to [see which databases contain the journal 'nature'](#) ?  
I know of **8 basic resources** for **article in 'nature'**:

- **ArticleFirst**  
*OCLC index of articles from the contents pages of journals* [\(more...\)](#)
- **CAMEO**  
*CMU's online library catalog* [\(more...\)](#)
- **CMU journal list**  
*Searchable database of all CMU-owned journals* [\(more...\)](#)
- **CMU's Full-text Journals List**  
*CMU Libraries alphabetical list of full-text journals* [\(more...\)](#)
- **CQ Library**  
*In-depth analysis reporting on the most current and controversial issues of the day.* [\(more...\)](#)
- **Expanded Academic ASAP**  
*Scholarly journals, news magazines, and newspapers - many with full text and images.* [\(more...\)](#)
- **Lexis-Nexis Academic Universe**  
*A wide range of news, business, legal, medical, and reference information* [\(more...\)](#)
- **PITTCAT**  
*University of Pittsburgh's Library Catalog* [\(more...\)](#)

Tell me more about what you're looking for

Searching for:  
query='nature' [\(more...\)](#)  
querytype='title' [\(more...\)](#)

**Reference assistance**

**List of most relevant resources**

## Reference Interview Example

ARA INFO Search [CMU Libraries / ARA Home / Search History / Help](#)

You can look up 'particle physics' in [the dictionary](#) or in [the encyclopedia](#).

The library catalog, CAMEO, may also have books, journals, videos, or other information about 'particle physics'. You can search the library catalog for [subject='particle physics'](#) or [items with 'particle physics' in the title](#).  
I can also help you locate [articles](#), [dissertations](#), [statistics](#), or [standards](#) about 'particle physics'.  
I know of **5 basic resources** for **info about 'particle physics'**:

- **Britannica Online** [\(lookup 'particle physics'\)](#)  
*The complete encyclopaedia, with related Internet sites and more* [\(more...\)](#)
- **Lexis-Nexis Academic Universe**  
*A wide range of news, business, legal, medical, and reference information* [\(more...\)](#)
- **Merriam-Webster Collegiate OnLine Dictionary** [\(lookup 'particle physics'\)](#)  
*Merriam-Webster Collegiate OnLine Dictionary* [\(more...\)](#)
- **Wilson Biographies**  
*The full text of the biographies from more than 100 print volumes of biographical reference books* [\(more...\)](#)
- **World Almanac**  
*The World Almanac - fundamental reference resources* [\(more...\)](#)

Tell me more about what you're looking for

Limit to subject area:

Look for:

Change search type:  articles  books  dissertations and theses  information  journals  standards  statistics

Searching for:  
que

**Reference Interview follow-up questions**

## ARA Technology

- Inference & resource information stored in XML
- Oracle 8i relational database technology
- Information retrieved by Java Beans
- Interface constructed using Java Server Pages
- Easy to add, remove, or modify resources
- Easy to customize

## ARA Schedule

- Spring 2002
  - Index all e-resources in the Resource Database
  - Conduct user study & revise interface
  - Submit grant proposal
- Summer 2002 – release prototype
- Fall 2002
  - Market the ARA on campus
  - Monitor & study usage

## ARA 2002-2004

- Improve the Inference Engine & Interview model
- Improve interface design & functionality
- Index print resources in the Resource Database
- Integrate chat software
  - No evidence that simply using appropriate resources will improve student work

## ARA Dreams

- Enable spoken dialog between users & librarians
- Enable users to select a reference personality
  - Implement multiple virtual reality agents
    - ✓ African American      ✓ Male
    - ✓ Asian                      ✓ Female
    - ✓ Hispanic                  ✓ Young
    - ✓ Punk                        ✓ Old
- Commercialize & offer ARA versions adapted for different kinds of libraries

## Thank you!

- Denise Troll Covey

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