



دانشگاه علوم پزشکی و خدمات بهداشتی و درمانی گیلان

دانشکده داروسازی

واحد کتابخانه

## Virtual Reference Desk in Academic Universities

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2025

A **Virtual Reference Desk (VRD)** is an online service that provides users with access to information and reference assistance, typically offered by libraries, universities, or other educational institutions. It allows users to ask questions, seek research help, and access resources remotely, often through chat, email, or web forms. VRDs are designed to replicate the experience of visiting a physical reference desk in a library but are accessible from anywhere with an internet connection.

Librarians can leverage **Artificial Intelligence (AI)** to enhance the functionality, efficiency, and user experience of **Virtual Reference Desks (VRDs)**. AI can automate routine tasks, provide personalized assistance, and improve access to information.



Here are some ways librarians can use AI in VRDs, along with examples:

### 1. Chatbots for Instant Assistance

- **How it works:** AI-powered chatbots can handle routine inquiries, such as answering FAQs, guiding users to resources, or providing basic research help.
- **Example:** A chatbot on a university library's VRD can answer questions like, "How do I access JSTOR?" or "What are the library's opening hours?"
- **Benefits:**
  - Provides 24/7 support.
  - Frees up librarians for more complex queries.
  - Reduces response time for common questions.

### 2. Natural Language Processing (NLP) for Better Search

- **How it works:** AI can analyze and understand user queries in natural language, improving the accuracy of search results.
- **Example:** A student asks, "Find articles about climate change impacts on

agriculture." The AI interprets the query and retrieves relevant articles, books, and datasets.

#### • **Benefits:**

- Enhances search precision.
- Understands context and intent.
- Improves user satisfaction.

### 3. Personalized Recommendations

- **How it works:** AI can analyze user behavior, preferences, and past interactions to recommend relevant resources.
- **Example:** If a student frequently searches for materials on artificial intelligence, the VRD can suggest new AI-related books, articles, or conferences.
- **Benefits:**
  - Tailors resources to individual needs.
  - Encourages exploration of new materials.
  - Improves engagement with library resources.

### 4. Automated Citation Assistance

- **How it works:** AI tools can help users generate citations in various formats (e.g., APA, MLA, Chicago) and check for errors.
- **Example:** A student uploads a paper, and the AI tool automatically generates citations and flags missing references.
- **Benefits:**
  - Saves time for users and librarians.
  - Ensures accuracy in citations.

- Reduces plagiarism risks.

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### 5. Sentiment Analysis for Improved Service

- **How it works:** AI can analyze user feedback or chat interactions to gauge satisfaction levels and identify areas for improvement.
- **Example:** If users frequently express frustration about finding specific resources, the library can improve its search interface or provide additional training.
- **Benefits:**
  - Enhances user experience.
  - Identifies pain points in real-time.
  - Helps librarians prioritize improvements.

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### 6. AI-Powered Research Assistance

- **How it works:** AI can assist users in conducting research by summarizing articles, extracting key points, or suggesting related topics.
- **Example:** A researcher asks, "What are the latest trends in renewable energy?" The AI summarizes recent articles and suggests related research areas.
- **Benefits:**
  - Speeds up the research process.
  - Provides concise, actionable insights.
  - Helps users discover new areas of interest.

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### 7. Multilingual Support

- **How it works:** AI-powered translation tools can help librarians serve users in multiple languages.
- **Example:** An international student asks a question in Spanish, and the AI translates it into English for the librarian. The response is then translated back into Spanish.
- **Benefits:**
  - Expands access to library services.
  - Supports diverse user populations.
  - Breaks language barriers.

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### 8. Predictive Analytics for Resource Management

- **How it works:** AI can analyze usage patterns to predict future demand for resources, helping librarians make informed decisions about acquisitions and subscriptions.
- **Example:** The AI predicts a surge in demand for materials on quantum computing and recommends purchasing additional resources.
- **Benefits:**
  - Optimizes resource allocation.
  - Ensures availability of high-demand materials.
  - Reduces costs by avoiding unnecessary purchases.

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### 9. Virtual Research Assistants

- **How it works:** AI can act as a virtual research assistant, helping users organize their research, set reminders, and track progress.
- **Example:** A PhD student uses an AI tool to organize references, set

deadlines for literature reviews, and receive reminders about upcoming conferences.

- **Benefits:**
  - Streamlines the research process.
  - Improves productivity.
  - Provides personalized support.

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### 10. Data Visualization and Analysis

- **How it works:** AI can help users analyze and visualize data, making complex information more accessible.
- **Example:** A researcher uploads a dataset, and the AI generates charts, graphs, and summaries to highlight key trends.
- **Benefits:**
  - Simplifies data interpretation.
  - Enhances research outputs.
  - Supports data-driven decision-making.

### Challenges and Considerations:

1. **Privacy and Security:** Ensure user data is protected and used ethically.
2. **Accuracy:** AI tools must be trained to provide reliable and accurate information.
3. **Human Oversight:** Librarians should monitor AI interactions to address complex or sensitive queries.
4. **User Training:** Educate users on how to effectively use AI-powered tools.

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### Real-World Examples:

- **Chatbots:** University of Nebraska-Lincoln uses an AI chatbot to answer library-related questions.
- **Personalized Recommendations:** North Carolina State University's VRD

uses AI to recommend resources based on user behavior.

- **Multilingual Support:** The European Library uses AI to provide multilingual access to its collections.

Here are some examples of Virtual Reference Desks from top universities:

### Harvard University - Ask a Librarian

- **Service:** Harvard offers a comprehensive virtual reference service where users can chat with a librarian, send an email, or schedule a one-on-one consultation.
- **Features:**
  - Live chat during business hours.
  - Email support for detailed inquiries.
  - Specialized librarians for different disciplines (e.g., law, medicine, humanities).
- **Example:** A student researching historical documents can chat with a librarian specializing in archives to locate primary sources.

### 2. Stanford University - Ask Us

- **Service:** Stanford's VRD provides 24/7 chat support, email assistance, and appointment scheduling with subject experts.
- **Features:**
  - In-depth research consultations by appointment.
  - Guides and tutorials for self-help.

- **Example:** A graduate student working on a machine learning project can schedule a consultation with a data science librarian for help with datasets and tools.

### 3. MIT Libraries - Ask Us

- **Service:** MIT offers a virtual reference desk with live chat, email, and phone support.
- **Features:**
  - Live chat with MIT librarians.
  - Email support for complex questions.
  - Access to specialized research guides.
- **Example:** An engineering student can use the chat service to get help finding technical standards or patents.

### 4. University of Oxford - Bodleian Libraries Help

- **Service:** Oxford's VRD includes live chat, email support, and an extensive FAQ section.
- **Features:**
  - Live chat with librarians during specified hours.
  - Email support for detailed research queries.
  - Access to subject-specific research guides.
- **Example:** A history student can email the VRD for assistance in locating rare manuscripts or digital archives.

### 5. University of Cambridge - Library Support

- **Service:** Cambridge provides a virtual reference desk with live chat, email, and a knowledge base.

- **Features:**

- Live chat with library staff.
- Email support for in-depth research questions.
- Access to online tutorials and guides.

- **Example:** A philosophy student can use the live chat to get help accessing digital copies of rare texts.

### 6. University of California, Berkeley - Ask a Librarian

- **Service:** UC Berkeley's VRD offers chat, email, and in-person consultations.
- **Features:**
  - Live chat with librarians during business hours.
  - Email support for detailed inquiries.
  - Research consultations by appointment.
- **Example:** A biology student can use the chat service to find articles on a specific topic or get help with citation management tools.

### 7. University of Toronto - Ask a Librarian

- **Service:** U of T's VRD provides chat, email, and appointment-based consultations.
- **Features:**
  - Live chat with librarians.
  - Email support for complex questions.
  - Access to subject-specific research guides.
- **Example:** A business student can email the VRD for help locating market research reports.