assistance would continue.[17] More recently, Steven Bell recounted his well-publicized Columbia University debate with Sarah Watstein on the future of the reference desk. Bell advocates that academic reference desks should be eliminated by 2012 and offers some standard rationales for his position: mobile technology negates the need for a physical desk; students or paraprofessionals can staff a desk because reference questions are largely printer- and computer-related; and a "just-in-time" model of reference service (as opposed to "just-in-case" desk sitting) puts professional skills to better use elsewhere, including classrooms, residence halls, or academic departments. His opponent argued that the reference desk remains a powerful symbol of the culture of academic libraries; the value of personal service should not be underestimated; reference desks are busy despite decreased transactions; users of complex information tools need an intermediary; a teachable moment in person is not equal to a teachable moment online; and modern physical reference desks are designed to complement the versatile learning environments that are found in academic libraries.[18]

Neal responded to Bell's call for the elimination of the reference desk with a rather pragmatic middle-of the road stand and calls for just the type of examination this study hopes to accomplish:

> Especially with relatively few staff, a library with a busy reference desk can't just get rid of it because of some 'visionary' proclamation. Similarly, a library with a slow reference desk can't hold on to one for the sake of tradition, especially if time and money can allow librarians to engage in more visionary work. Ultimately, it's up to individual libraries to decide whether 'traditional' reference desk duties seem more useful for their communities, or (time and money permitting) if librarians should do more than clearing various mechanical jams and pointing patrons to the bathroom.… Some institutional honesty and a willingness to critically examine the nature of reference desk transactions seems a good place to start.[19]

Whitson advocates a "differentiated service" model that discards the idea of reference service as a single "desk" activity and categorizes different levels of service (directions, technical assistance, information look-up, research consultation, and library instruction) which must each be structured, staffed, supported, and evaluated on its own terms.[20] In a survey of literature on perceptions of reference services from the perspectives of managers, librarians, and users, Rieh concludes that "alternative reference service models can best be redesigned by looking more closely at how users are dealing with their information problems and how they get help from reference librarians in technological environments."[21] This study attempts to address the latter, based on the questions users posed at a reference desk; it looks at the actual cost-effectiveness of staffing a reference desk based on librarian salaries and the nature of the questions asked.

METHODOLOGY

Stetson University is a private university (approximately 2500 FTE) with a main library that holds about 336,000 volumes and bound periodicals, as well as 376,000 federal documents. The library subscribes to more than 100 subscription databases and holds more than 20,000 print and electronic journal titles. The reference desk is staffed for 68 out of 92 open hours per week, including nights and weekends, by four full-time and two part-time librarians, all of whom hold the MLS degree. During the study periods, the library housed between 27 and 40 public workstations that had Internet access and the Microsoft Office

suite of software loaded; each computer also had an individual printer attached. The library building offers both wired and wireless Internet access for laptops as well.

For a two-month period beginning in October 2002, Stetson University reference librarians recorded all reference question asked at the reference desk along with the source(s) used to try to answer them. All questions were recorded that came to the reference desk in person, by phone, or by email. Although most questions came in person, no distinction was made in the data collection as to the manner in which the question came to the desk. The two-month study was repeated in spring 2003, spring 2006, and fall 2006 to account for changes in class assignments and changes over time.

The original study design focused not on the questions asked, but on the sources used to answer the questions. Librarians wanted to test their hypothesis that online sources were used far more than print reference books to answer questions. The 2002–2003 data were used in a previously published study that showed, as librarians had suspected, that online sources were used much more than print reference sources to answer questions.[22] That study suggested as an area of further research "an analysis of what students want to know – in other words, what questions are students asking and can library reference services better address the students' information needs."[23] The current study, therefore, addresses that suggestion and focuses on the questions asked over the total eight-month study period.

To collect the data, reference librarians recorded each question along with the source or sources used to answer the question. The first 2 months, librarians manually recorded the questions and sources used to answer them and then the data were transcribed into an Excel spreadsheet. During the subsequent study periods, librarians typed the questions and sources directly into an Excel spreadsheet at the reference desk. Questions were necessarily paraphrased, but librarians tried to write or enter a question as soon as possible after the question had been asked to ensure the question was accurately represented and included all the answer sources. A data monitor reviewed the spreadsheet daily to clean up typographical errors, to maintain data consistency, and to assign categories to the sources used to answer the questions.

Because the original study focused on the answer sources and not the questions, it was decided in the study design to exclude two transaction categories as they would not yield any meaningful answer source data; therefore 2528 directional and "machine" transactions, though counted in the aggregate, were not logged as questions. Directional questions that did not refer to the collection (the location of the restroom, a campus building, or an office) were excluded, along with "machine" transactions (paper jams, cartridge changes, and copier problems) that did not directly relate to an information need. Directional queries that related to the collection (the location of a call number, the location of a dictionary, or the location of a specific format or collection), however, were included in the question spreadsheet. Similarly, if a hardware or software question related to an information need (for example, downloading a document, addressing error messages, printing documents, or performing standard functions in the Microsoft Office suite programs), it was included in the question spreadsheet.

Data Analysis

To facilitate data analysis in the current study, the four spreadsheets from the four study periods were combined into