THE APPLICABILITY OF SERVPERF IN JUDGING SERVICE QUALITY FOR BIOMEDICAL INFORMATION PROFESSIONALS.

DISSERTATION

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements For the Degree of

DOCTOR OF PHILOSOPHY

By

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Denton, Texas

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The applicability of SERVPERF as a tool for judging the quality of services used by biomedical information professionals was tested using standard statistical procedures. Data was gathered nationally via a combination of electronic and non-electronic forms, from Area Health Education Center (AHEC) information professionals and the results consolidated to provide information for the study. It was determined that SERVPERF was applicable in making judgements about service quality for AHEC information professionals. Their perceptions about service quality tended to have a greater influence than did their level of actual satisfaction on whether or not they planned to use a particular service in the future. There is currently no validated tool available to ascertain the quality of services offered to these valuable members of the rural health care team. This dissertation proposes to provide such a tool, and to serve as a guide or template for other professionals seeking a means to judge service quality in their own disciplines.
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1999
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CHAPTER 1

PROBLEM STATEMENT

The aim of this research is to test the applicability of a modified service quality evaluation tool, SERVPERF, for use as an instrument that can be used to judge the quality of information services offered to biomedical information professionals.

Background

The tool under investigation is one that has been developed and tested widely in the area of market research. The original instrument, called SERVQUAL, was developed and introduced by Parasuraman, Zeithaml & Berry [hereafter referred to as PZB], in 1988. This instrument is based on the gaps model of service quality as described by PZB in a 1985 publication. A series of gaps, or key discrepancies was uncovered during their exploratory investigations. PZB felt that these gaps were instrumental in preventing consumers from perceiving a service as being of high quality.

SERVQUAL provides a score for service quality resulting from the difference in user expectations and user perceptions. After its initial release, SERVQUAL was further developed and modified. In 1991 PZB published a revised version.

The instrument had been continually tested and validated in other industries, such as: hospital services (Babakus, E. & Mangold, W. G., 1992), long distance telephone
company services, credit card services (PZB, 1988), a dental clinic services and dry cleaning services (PZB, 1991). It had also been continually challenged on various theoretical and technical points.

In response to serious questions raised about the relevance of the underlying theory of this service quality tool (Carman, J. M., 1990, Babakus, E. & Boller, G. W., 1992), Cronin and Taylor (1992) developed an alternative to SERVQUAL which they named SERVPERF. SERVPERF measures service quality based solely on the users' perception of performance as opposed to using a measure based on the difference between expectations and perceptions which had been a major criticism of SERVQUAL.

The newly-constructed instrument improved on a number of areas that were criticized from SERVQUAL. The 22 items that made up the original instrument were retained rather than being distilled into new underlying dimensions of service quality and subsequently has been validated in a number of industries. The new instrument, as administered in the original study, included a section on the importance of the 22 questions to a user's judgements of service quality. This section was included as a way to measure the validity of the instrument and as a comparison tool for another objective in Cronin & Taylors' original research. It was not intended to be used routinely with the statements about performance.

Questions on overall service quality, user satisfaction and intention to buy were included in SERVPERF as well to provide reinforcement for the applicability of the new instrument as a measure of service quality. SERVPERF has generally withstood scrutiny
and is considered a good instrument with which to measure service quality in a number of industries (McAlexander, J.H., Kaldenburg, D.O. and Koenig, H., 1994).

Overview

Problem Statement

An examination of the literature reveals no instrument currently available that is capable of measuring service quality for agencies traditionally offering information services to biomedical information professionals. Since many of these services are now being offered through new, non-traditional sources it becomes more imperative that a means of comparing quality across providers be discovered.

Multitudes of tools exist that evaluate services provided by members of the health care team. Marshall (1990) provides a useful compilation of 56 evaluation instruments for use by information providers on the health care team servicing health science libraries. Unfortunately, none of them is adequate or capable of judging the quality of services offered to information professionals themselves. What is needed is to be able to objectively measure the quality of services that are intended for biomedical information professionals themselves so that comparisons can be made between agencies and within an agency.

Purpose of the Study
The aim of this research is to validate an instrument that can be used to judge the quality of services used by biomedical information professionals. This study seeks to demonstrate that SERVPERF is a valid and reliable instrument to employ when attempting to judge the quality of information services used by biomedical information professionals.

Significance of the Study

The principles and concepts evolving from total quality management or continuous quality improvement have become pervasively discussed in the health care industry and have also been sporadically and sometimes incorrectly or inappropriately applied. Consequently the quality of services offered by individual institutions can be expected to be inconsistent across the industry. An independently objective means for judging service quality in the diverse situations of medical institutions needs to be developed.

The contention of this researcher is that service providers traditionally patronized by biomedical information professionals have to remain competitive. To maintain patronage and remain competitive, service providers must continuously improve their users' perceptions about service quality.

If this is indeed the case, then the opposite situation should also be true; decreases in users' perceptions of an institution's service quality will adversely effect satisfaction, which will result in loss of patronage. Loss of patronage for the service
providers currently offering services to biomedical information professionals will, over time, lead to several undesirable outcomes: decreased revenue for these agencies leading them to reduce other services; increases in costs for the services since they are still needed but may only be offered through more profit-oriented venues; and decreased availability of services thereby compounding the already detrimental effects of geographic or economic maldistribution of health care services and providers.

This study contributes in identifying and evaluating SERVPERF, an instrument that measures an individual's perception of the quality of service. This research also explores the relationship between service quality, satisfaction and intention to use the services. If the instrument is valid it will help identify quality information services for health information professionals.

Research Approach

Research Questions

To properly address the research problem, this study's questions will be divided into two parts. The first part will define the validity and reliability of the instrument. The questions that address this are:

1. Does the instrument have content validity?
   a. How important are the scale items to biomedical information professionals' judgements about service quality?
2. Does the instrument demonstrate reliability?
3. Does the instrument demonstrate convergent and discriminant validity?

   a. Is there convergent validity, i.e. a correlation between the items of SERVPERF and other measures of overall service quality?
   
   b. How well do the scale items differentiate the concept under study from other, related concepts (discriminant validity)?

   The second part of the research problem is concerned with other kinds of relationships between service quality and two related concepts: satisfaction and intention to use.

   4. Which judgement occurs first, service quality or satisfaction?
   
   5. Does satisfaction affect the biomedical information professional’s intention to utilize services in the future?
   
   6. Does service quality affect the biomedical information professional’s intention to utilize the organization’s services in the future?

**Hypotheses**

From these questions can be derived the hypotheses that will guide this research. They are:

**Hypothesis one:** The instrument will have content validity:

   a. The scale items will be statistically significant to biomedical information professionals’ perceptions of service quality.
Hypothesis two: The scale's reliability as measured by the coefficient alpha for modified SERVPERF will fall within the range of scale reliabilities as demonstrated in previous research using the instrument.

Hypothesis three: The instrument (with modifications to involve wording specific to medical information services) will demonstrate convergent and discriminant validity through these two statements:

a. Modified SERVPERF's measures of service quality offered to biomedical information professionals will correlate positively with measures of overall quality thus indicating convergent validity.

b. Modified SERVPERF items will correlate more strongly with each other than they will with measures of other variables.

Hypothesis four: Satisfaction as perceived by the biomedical information professional is an antecedent of perceived service quality.

Hypothesis five: The satisfaction of the information professional will have a significant impact on whether she or he intends to use the service in the future.

Hypothesis six: Perceived quality of the service will have a significant impact on whether the biomedical information professional intends to use the service in the future.

Limitations, Delimitations and Assumptions

The major delimiting factor for this research is that this study will use input only from biomedical professionals who are affiliated with an Area Health Education Center.
(AHEC). AHECs are private, non-profit agencies under contract to and in partnership with a medical school or other provider of health care in rural or underserved communities. This group of approximately 100 individuals scattered over 41 states was chosen as representative of the population of biomedical professionals because of their much more critical need for services of all kinds and the very lack of availability of some of the services. The institutions in which these professionals work are those most likely to reduce overhead by reducing support for these supposedly ancillary personnel. Professionals must then rely on a myriad of service providers, the quality of which they have no objective way to judge.

For the modified SERVPERF, respondents may choose to answer survey questions for any of the services they have used. Nitecki’s 1995 dissertation used SERVQUAL, an earlier version of this service quality tool. Her study divided users into separate groups based on which service they had used within a certain period of time. Users were not given an opportunity to respond to questions on more than one service. The assumption was that users of various services would have different quality judgements of the institution in question due to their varying reasons for using the services. It had to also be assumed that prior experience with other services at the institution would not influence the current judgements about service quality. This assumption highlights what is, in this researcher’s opinion, a fundamental flaw (not found with SERVPERF) in the applicability of SERVQUAL. This study assumes that potential respondents have probably utilized other services available from the National Library of Medicine at some point and were thus already familiar with and had some preconceived
expectations of the service quality of the institution prior to the survey. The current study involving SERVPERF has assumed that respondents have some prior familiarity with the agency in question.

This study also does not assume that a performance-based judgement of service quality (SERVPERF) constitutes the totality of the service quality construct. Indeed, there is evidence that suggests service quality has several components, (Richard & Allaway, 1993) though outside the scope of this study they do exist and perhaps could be addressed in future research.
CHAPTER 2

REVIEW OF RELATED LITERATURE

Introduction

The controversy surrounding the concepts of service quality and evaluation has been waged in many academic disciplines, such as business and marketing, psychology, education and other social sciences. In fact there is a continual discussion of evaluating or judging service quality within every discipline and human activity.

A review of the literature that uses service quality as a central construct is immediately faced with the rather daunting task of describing the concept and its major components. Since the focus of this research is one instrument’s applicability in measuring service quality in an as yet untested industry, the tasks of this review will be primarily restricted to examining the literature associated with measuring service quality using this instrument. A literature review was conducted searching for information about the tool to be used in the study, SERVPERF. In this case the tool to be defined by our literature is a derivative of an earlier instrument called SERVQUAL. This means that both SERVPERF and its parent instrument, SERVQUAL, will need to be investigated and adequately defined. One specific question, which had to be explored and answered by this review, was whether or not the tool, SERVPERF had been used to judge service quality in the knowledge industry and under what circumstances.
This review begins with a discussion of that most elusive of terms, Quality. It then proceeds with an introduction to the derivation of the antecedent measurement tool, SERVQUAL. SERVPERF is then introduced along with a comparison and explication of its preference to the earlier instrument. The chapter concludes with discussions of difficulties and common practices involved in measuring service quality in the knowledge industry in general and in library services in particular. This is followed by a final section which gives an overview of how SERVPERF can and has been used in measuring service quality in the knowledge industry and libraries.

The Service Quality Construct

What is Quality?

Historically, defining quality has been an elusive and rarely attempted task. Finding a definition for service quality is still more elusive. Often it was defined in the literature by simply applying adjectives like “goodness or luxury, or shininess, or weight”, (Nitecki, 1995). Many researchers of the same time period avoided definitions altogether and instead relied on single attribute, self-reported measures to capture the concept. PZB had gingerly approached a definition in 1985 by stating that service quality was a form of attitude related to but not equivalent to satisfaction. Satisfaction, they noted in a 1988 publication, was an ephemeral concept that seemed to be transaction specific. Since then, service quality has generally become accepted to be, as Carman put it in 1990, “an enduring global attitude”.
Much of what had been written or known prior to the early 1980s about quality came out of the goods sector. The quality of tangible, manufactured items rather than quality in the services sector was studied. Knowledge about goods quality has largely proven insufficient to an understanding of service quality. Characteristics of services, intangibility, heterogeneity and inseparability have been well documented and must be accounted for in any relevant definition of service quality. (PZB 1985) Most services are intangible, they are performances rather than objects. Services, especially those with a high labor content can be extremely heterogeneous. Each transaction or encounter with a user may be very different from the previous or former encounter just as each employee may interpret the organizations’ goals and aims slightly differently.

The knowledge industry is a good example of such a situation. Consistency of behavior from one knowledge worker or information professional to the next is difficult to insure. This may mean that what the organization intends to deliver in the way of services may be entirely different from what the consumer receives.

Finally, production and consumption of many services are almost inseparable. The service provider may have less control over quality in services where the consumer has high interaction and influence on the process. The work that information professionals perform, both for other information professionals and for the general consumer is a classic example of this situation. For these reasons service quality has been and continues to be a very difficult concept to define and evaluate.

PZB developed a set of procedures to address this problem of evaluation. From their exploratory investigation they noticed a consistent pattern emerging in the results.
This pattern translated into a group of commonalties from which they developed a general model of service quality. PZB defined this as the Gaps model.

The commonalties noticed in preliminary investigation were described as a “set of key discrepancies or gaps... regarding executives perceptions of service quality and the tasks associated with service delivery”. (PZB 1985) PZB defines four gaps in organizations that lead to problems with quality. From these four, they derived a fifth gap which was stated in the original article as Proposition 5: “The quality that a consumer perceives in a service is a function of the magnitude and direction of the gap between expected service and perceived service.”

PZB operationalized service quality as the gap between expectations and performance. They then proceeded to develop an objective instrument to measure it.

This sets the groundwork for the view of service quality as a difference score. In subsequent investigations PZB (1988) refine their definition and measurement instrument into a tool that was named SERVQUAL. Since then SERVQUAL has been validated and tested by other researchers outside of the original four industries used by PZB. Babakus and Mangold (1992) adapted SERVQUAL for use in a hospital environment, as did Whitman-Smithe in his 1995 dissertation.

The original instrument, SERVQUAL, was modified and refined in 1991 by PZB as a response to early criticism and as a result of their own research. The criticisms of the constructs underlying SERVQUAL have grown into a major area of contention in the service quality literature. There are essentially two major camps are: those researchers who feel that service quality can be adequately defined as the difference between user
expectations and actual performance, and those researchers who think that performance alone is a better indicator or service quality. From this latter group, ultimately emerges a derivative instrument called SERVPERF. This study is concerned with that instrument and its applicability in an untested environment.

SERVQUAL

SERVQUAL was developed using four companies presumed to be not only representative of their respective industries but representative of variations in type of organizations offering services; a bank, a credit card company, a repair and maintenance company and a long distance company. In the original instrument, SERVQUAL, there were 97 separate items that respondents used to describe service quality. PZB expressed these items as a set of 22 questions in two sections, an expectations section and a perceptions section. These two sets of 22 questions described 10 dimensions of service quality. The original 10 dimensions were then reduced to five: tangibles, empathy, responsiveness, reliability, and assurance.

A refinement in wording and a repositioning of some items in the instrument took place in 1991 when they published the revised version of SERVQUAL. Negatively worded items were rewritten as positive statements to decrease the variation in consumer response. This was thought to be a result of confusion as much as anything else. Other wording changes focused on an attempt to counteract unrealistic expectations some consumers might associate with the term “should”. This wording was replaced by “would” in the expectations portion of the instrument. They also suggested the addition
of performance weights to the items in the instrument. Two new items, one each under the tangibles and assurance dimension were added. PZB incorporated suggestions from managers to include an item that covered communication materials such as pamphlets, statements or brochures as well as an item that focused on employee knowledge. These latter changes turn out to be quite essential to its subsequent usefulness in judging service quality for information professionals. In the setting under investigation much of the communication takes place in non-face to face encounters. Interaction between the various information professionals relies quite often on printed material

**Using Difference Scores**

During this time SERVQUAL had been tested in a number of other settings and problems had begun to emerge regarding its reliability, the presumed generic nature of its applicability across all industries and to a lesser extent some aspects of it validity. Specifically challenging its theoretical basis were Carman, (1992), Teas (1993), Cronin and Taylor, (1992 & 1994), McAlexander, Kaldenburg & Koenig, (1994) and Van Dyke, Kappelman & Prybutok, (1997).

Carman accepts that the wording of items may be changed somewhat without significantly affecting validity and that the instrument has validity across many types of industries. He does questions the use of differences scores as a consistent measure of service quality and wonders if the expectations question set need always be used in administering the survey. “[To] most service providers the importance of a particular service attribute seems more relevant than its expected level.” In a replication study,
Carman was able to confirm the validity and reliability of the individual items but found that the various factors did not consistently load on the same dimensions as those in the PZB study. They also had difficulty separating expectations, which should logically come before exposure to a service, and perceptions that would come after the user has experienced the service. In no case from the original PZB study were respondents able to rate service quality expectations prior to experiencing it. From a practical standpoint administering a battery of expectation questions to customers prior to service and then administering another set to gather perceptions at the end of the encounter does not appear feasible in most settings. They were able to use before and after test situations only once during their own experiments, at the placement center. They conclude that these ex-post facto reporting of respondents were ultimately of little value.

Teas comes to similar conclusions in his empirical test of a limited subset of SERVQUAL items in 1993. He concludes that it is unclear what the expectations portion of SERQUAL actually represents, the concept was unclear to the respondents. They also note that the expectations portion seems to lack discriminant validity with regard to the concepts of importance and forecasting (referred to in other studies as an intention to buy or use). In either case, serious problems have been delineated regarding the use of difference scores as a measure of service quality. This central issue led to a revision and transformation by Cronin and Taylor of SERVQUAL into what this researcher feels is a more valid tool, SERVPERF.

A more recent work, Van Dyke, Kappelman & Prybutock (1997), continues this critical discussion of SERVQUAL as the generic tool of choice when attempting to
measure service quality. This study looks at the problems associated with applying SERVQUAL for use by Information Systems (IS) services providers. Van Dyke, Kappelman & Prybutok point out the ambiguity of the expectations construct which collectively leads to measurement problems. They conclude that a considerable portion of the variance in SERVQUAL instrument is a result of measurement error induced by respondents’ varying interpretations of the “expectations” construct. They also note that the five dimensions PZB describe are unstable across industries, including the IS domain.

These researchers note that the difference scores of SERVQUAL resulted in three, five or seven factors depending on the industry analyzed. Future researchers are cautioned to independently assess the dimensionality of any specific data set used.

These researchers recommend several alternatives to using SERVQUAL, foremost among them SERVPERF. This perceptions-only model proves to have both a superior predictive value and more significant convergent validity than the original model, which was based on difference scores. They found that the difference scores model (SERVQUAL) demonstrated reduced reliability when compared to SERVPERF, the perceptions-only model when used by IS service providers. Additionally, due to the instability of the original five dimensions, Van Dyke, Kappelman & Prybutok state that “…for scoring purposes, each item should be treated individually and not as part of some a priori dimension.” This independent treatment of individual service quality attributes is precisely what the designers of SERVPERF intended.
Cronin & Taylor (1992) engaged in a study that investigated the conceptualization and measurement of service quality and relationships between service quality and two other constructs, consumer satisfaction and purchase intentions. They compared the original SERVQUAL scale with an alternative, performance only based model. Cronin and Taylor clearly outlined and described the confusion, which still exists in the service quality literature about the constructs of service quality and satisfaction. Service quality, as mentioned previously, is generally accepted to be analogous to an attitude (Bolton and Drew, 1991) that, like other attitudes, develops over time. Cronin and Taylor further suggest that an attitude-based conceptualization (such as the adequacy-importance form) of this new service quality tool would be of more use to administrators and managers. While expectations (used to calculate the difference score in SERVQUAL) are known to influence the users perception of service, it is a weak and transitory influence whose affects are mitigated by other constructs, such as satisfaction.

Through a replication and comparison of SERVQUAL and this alternative, performance only instrument, Cronin and Taylor find that indeed service quality is more reliably and consistently measured by the performance-only model than the original instrument.

Cronin & Taylor conducted a comparison study that in part replicated the original PZB study. A performance weighted SERVQUAL, a performance weighted SERVPERF, the original SERVQUAL and SERVPERF alone were tested in four industries, banks, pest control, dry cleaning and fast food. In all cases the unweighted
SERVPERF scale explains more of the variation in service quality than do any of the other variants used in the study.

SERVPERF, as introduced by Cronin and Taylor, uses a 22-item scale to gather respondent’s perceptions about service quality and about the importance of each item to formulations of those perceptions. They also use other statements to gather information about overall quality and satisfaction. This study has used a validated tool modified slightly from that found in Galleta and Lederer (1989) to gather information on satisfaction. In an experimental environment, they found that this set of summary questions [also used in this research] measuring satisfaction, demonstrated test/retest reliability not found in the other measures of satisfaction they tested. Galleta and Lederer felt that the attitude being measured, satisfaction, might consequently serve as a more reasonable alternative to using other measures of satisfaction.

Service Quality Assessment

How Service Quality is to be Judged.

The marketing literature reveals that the interest in measuring service quality continues to be a widely researched and hotly debated issue in industries as diverse as banking, telecommunications and retail sales. Companies have used higher levels of service quality as a strategy in their efforts to position themselves more effectively in the marketplace. (Brown & Swartz, 1989; PZB, 1988) The supposition of such a strategy is that the quality of service influences satisfaction, which ultimately results in increased
market share in a particular industry, although this supposition is still under investigation. (Cronin & Taylor, 1992) Because of the difficulty of measuring the effect of service quality on market share directly, the desired result has been operationalized in the literature as an intention to purchase or in the case of this research, as an intention to utilize the service.

Attempts to define and describe service quality appear in literature from all industries and at all levels. Some studies limit themselves to merely describing the components that comprise the service quality attitude, such as Davies, Preston and Wilson in their 1992 case study of university student accommodations. Others, such as Boscarino (1992) attempt to provide a model for monitoring quality. They perform their research utilizing a health care institution.

Two studies, both in the health care industry, one measuring physicians attitudes of service quality (Walbridge and Delene, 1993) and the other evaluating quality hospital service (Whitman-Smithe, 1993), call into question the generic validity and reliability of SERVQUAL across all industries. Walbridge and Delene cite earlier works, which appear to prove that SERVQUAL is inappropriate for measuring professional services without modifications. More importantly the validity of the disconfirmation effect on perceptions of service quality does not appear to be proved. Other works, such as Babakus and Boller (1992), Cronin and Taylor (1994) and Teas (1993) all point to the superiority of a performance-based model for service quality.

Quality for Information Professionals
While much has been written over the past two decades about service quality in commercial enterprises, only recently has the concept come under much serious investigation in the public, non-profit industries. With the increasing focus on accountability from government and other funding sources, assessment of service quality has become much more important in the non-profit and public sector. (Davis, Preston and Wilson, 1992)

Examining literature in this area and more specifically about the knowledge industry we find that little has been published that specifically addresses service quality. This may be due to the very intangible nature of service quality as discussed earlier. It must also be remembered that in the knowledge industry the product, i.e. information, is practically inseparable in many instances from the service. Researchers, in the past, have often attempted to assess or evaluate the product strictly on non-attitudinal terms. Since service quality is best defined as an attitude, it has not been well addressed as a separate construct. Nor has evaluation of information services on non-attitudinal terms proven to be very effective or satisfactory, certainly no objective measurement or comparison has been possible. Use of SERVPERF would make such comparisons possible and available to Information service providers and Information service consumers.

With the move toward total quality management and continuous quality improvement finally being seen in the knowledge industry, service quality is of growing importance in many institutions. White and Abels (1995) and Whitehall (1992) both report on measuring service quality in libraries.
White and Abels emphasize the inherent difficulty in measuring service quality for information services. Their paper outlines some consideration users of both SERVQUAL and SERVPERF might have when attempting to use either instrument in an information setting. The perceptual overlap between information as a commodity and information as a process causes enormous difficulty for anyone attempting to measure quality in the information industry. Whitehall, in his 1992 review of quality in library and information services, defines and delineates service quality for many areas of the information system: “inquiry” or reference services; document delivery services; computerized services—i.e., CD-ROMs & OPACs; and for current awareness services.

Whether service quality is to be addressed through examining a subset of the industry, as White and Abels do for special libraries or on a service by service basis like Whitehall is negotiable. Each stress the importance of administration making an effort to insure that service quality evaluation become an ongoing process and grow into a useful adjunct to any real attempt at quality management.

Applicability of SERVPERF

A 1995 dissertation by Nitecki serves as an antecedent for this research. In her work she tests the applicability of SERVQUAL in a setting within the knowledge industry. She selects three services from an academic library. In Niteckis’ dissertation, respondents are selected based on current use of the individual service. They need have no special knowledge of either the institution or the service.
The current research study is concerned with a unique situation and a special group of consumers. Knowledge workers (biomedical information professionals in this study) are being asked to judge the quality of services being offered to them by other knowledge workers. This will provide a uniquely accurate assessment of service quality in this area of the knowledge industry. The consumer must be the ultimate judge of service quality. Arguments that consumers may not be knowledgeable enough to effectively weigh the components of a service are without merit in this instance. The biomedical librarians, the consumers in this study, are intimately involved and have a broad knowledge of the factors that influence knowledge work.

A closer examination of Whitehall’s 1992 review of quality in library and information services reveals that an essential piece of the total quality management picture is missing. The overall emphasis of TQM is on making the product or service match the requirements of the customers. Service quality for the information professional is rarely, if ever assessed, consequently the requirements continue to be unknown. Since they are unknown it is unlikely that they will be met.

Armstrong (1991) describes how obtaining input from the consumer (in this case the biomedical information professional) assists the organization in systematically focusing on those attributes of a product or service that are important to him or her. She notes one method of examining quality is to conduct ad-hoc quality checks of a particular service. SERVPERF would allow managers to do this. It provides a way to compare these “snapshots” of service quality to each other throughout an organization.
Armstrong further describes a study done by Telecom Australia's National Information Resource Center (NIRC) using a planning method called quality function deployment (QFD) in which a modified SERVQUAL was utilized. SERVQUAL continued to demonstrate its consistently unstable dimensionality. Obtaining a useful modification of SERVQUAL required a great deal of manipulation, expansion and contraction of the five dimensions. Use of SERVPERFs 22-item scale would have made some of this manipulation unnecessary. She notes that in the QFD method, the establishment of the importance and performance of each attribute is a key requirement. Accomplishing this goal is a straightforward procedure using SERVPERF.

Provision of information services is a complicated process or system that depends on multiple inputs to be successful. Likewise, quality in this setting is dependent on multiple levels of input. It is reasonable to assume that managing quality in the information system means managing quality in these various inputs. Indeed, the tenets of total quality management insist that consistently delivering a quality product depends on this assumption. If information professionals are expected to deliver high service quality, they should likewise be recipients of high service quality. The services they utilize to improve their professional and practical skills and knowledge base should have standards of quality that meet their expectations. One way to insure that this service quality is adequately managed is by measuring it objectively and repeatedly. It is proposed in this study that SERVPERF is a way to do this consistently and reliably.

Summary
In this review various definitions of service quality as they pertain to this study have been presented and some of the background of the instrument being used to judge service quality have been presented. Also examined were some issues surrounding the controversy between the two main service quality camps. Other works that have used either SERVQUAL or its modification, SERVPERF were described and the unique position of this study is noted. The next chapter will describe the methods to be employed in carrying out this study.
Chapter 3

METHODOLOGY

Design of Research Study

The study described here explores the applicability of the instrument, SERVPERF in settings and under conditions where it previously has not been used. It tests SERVPERF using three services from an organization that offers services to biomedical information professionals, the National Library of Medicine. The population of biomedical information professionals responding to this study were all librarians affiliated with the nations' Area Health Education Centers (AHEC).

Data gathering occurred in two phases. In phase one a survey was distributed to gather information about the types of services that are being used by AHEC information professionals and to verify that the chosen agency was in fact familiar to a majority of the potential respondents. An indication of the relative importance of the original five dimensions of service quality as outlined by PZB (1988); tangibles, empathy, reliability, assurance, and responsiveness, was obtained to serve as a baseline for possible future comparisons. The attributes that comprised each dimension were listed in tandem with its associated dimension. These attributes were taken from the 22 items that make up the statements used in SERVPERF. This survey was distributed to AHEC librarians by e-mail, by regular surface mail and as a form on the World Wide Web. Respondents were
encouraged to complete the form on the Web but were given the opportunity to reply using the other formats.

From the responses obtained in the phase one survey, it was confirmed that potential respondents were, as a group, familiar with the National Library of Medicine and, in fact practically all of them had used at least one of the services listed for that agency. It was not necessary to change the choice of agency or the choice of services. Representative services in the Phase one survey were: MEDLARS Training Service; Extramural Grants Consultation Services and the MEDLARS help desk, all offered through the National Library of Medicine. (see Appendix E) These types of information services are also offered by various non-governmental agencies: local professional chapters and societies; commercial vendors of books, supplies or software; consortiums of knowledge workers - regional, state and local; and by the parent health care institution which employs the AHEC librarian.

While neither the agency nor the services was changed for phase two, the individual attributes were modified in accordance with accepted previous practices. Such modifications, to make its wording more industry/service specific are acceptable practices in using the instrument. The modified SERVPERF contains four sections. Section one asks respondents to rate the performance of the agency particular attributes of service quality. Section two asks the respondents to rate the importance of these attributes in their judgements of service quality. In section three the respondent is asked to give general, global ratings on three related constructs; service quality, satisfaction
with the agency and intention to utilize a service. The fourth section was devoted to questions designed to gather information about the respondents' working environment.

Pilot tests were conducted in 1997 and early 1998 to test the distribution modes, clarity, readability and ease of use of the instrument and will be discussed later in this chapter.

Data analysis used primarily quantitative methods. Correlation studies, factor analysis and path analysis were used to test the reliability and validity of scale items that comprise SERVPERF for this group of AHEC librarians. All correlations were conducted with missing cases excluded pairwise using one-tailed significance tests and reported at both the 0.01 and 0.05 level.

A description and discussion of these study design elements occurs in the following sections: the hypotheses under investigation; the organization and services chosen for examination; the population used in the study, the pilot tests as administered; modifications to SERVPERF; and a discussion of the development of the various phases of the survey instrument and their distribution.

Development of Hypothesis

This section addresses the set of hypothesis that pertains to the usefulness of the instrument for AHEC librarians. Can SERVPERF be used by biomedical information professionals to evaluate the quality of services they use? Does the instrument have content validity? Are the scale items important to BIP judgements about service quality? Is the construct of service quality adequately and completely measured by the statements
that comprise SERVPERF? These are the first set of questions fundamental to this research and upon which the hypotheses are based.

The process of developing and validating measurements of abstract constructs, like service quality, consists of three psychometric aspects according to Nunnally and Bernstein (1994). These aspects are: (a) specifying the domain of observables related to the construct; (b) determining the extent to which the observables tend to measure the same thing, several different things, or many different things from empirical research and statistical analysis and (c) (consists of) ...determining whether a supposed measure of a construct correlates in expected ways with measures of other constructs and/or is affected in expected ways by appropriate experimental manipulations. (Nunnally and Bernstein, 1994, pp. 86-87). Each aspect is introduced followed by the hypothesis that supports and demonstrates it along with the supporting statistical methodology.

**Aspect One**

The first aspect is concerned with face validity as well as content validity. An analysis of results from the phase one survey has shown that the statements included in the modified SERVPERF reflect service quality judgements for biomedical information professionals. Respondents were able to assign a measure of importance to each of the set of dimensions used to judge service quality and did not, for the most part, add any other attributes to the list of attributes they would use to judge service quality. Respondents were also given an opportunity to add to the list of information services that they or other AHEC librarians might have been familiar with. This group of services will be addressed
more fully in the next chapter, but it is sufficient at this point to note that no other services were duplicated by any respondent in sufficient numbers to warrant its addition to the previously chosen set of three NLM services.

Through an exploration of hypothesis one I further assessed the modified SERVPERFs transferability to the current setting and its ability to adequately define the domain of the construct. The task here was to outline or specify the domain of observables as well as possible by demonstrating the content validity of the instrument.

**Hypothesis 1** - The instrument will have content validity. The scale items will be statistically significant to biomedical information professionals' perceptions of service quality.

The modified SERVPERF contains four sections (see Appendix D), the first of which lists 22 statements for which the respondent must rate the importance of each using a seven point Likert scale: “Very Unimportant” (=1) to “Very Important” (=7). If SERVPERF was to have content validity, it was proposed that there would be few additions to the scale items used to judge service quality and that few of the original items will be judged “Very Unimportant”. Please note that each question in the samples included in Appendix D has been numbered. This was done only for the purpose of this publication. The surveys respondents completed were not numbered. The means of items in the SERVPERF Importance section should each measure at least the value of the mean of the Likert scale, i.e. 3.5, to be significant. The choice menu of the web survey respondents is illustrated in Figure 1.
Figure 1. Menu choices for importance ratings in the version of SERVPERF displayed by the respondent's browser.

The second section uses the same 22 statements and asked the respondents to give their perceptions of the organization's performance on an attribute of service quality. The respondent is given a seven point Likert scale that ranges from “Strongly Disagree” (=1) to “Strongly Agree” (=7). The choice menu for web respondents is displayed in Figure 2.

Figure 2. Menu choices for performance ratings in the version of SERVPERF displayed by the respondent's browser.
Since a meaningful number of respondents did not add any other attributes to the listed statements (from phase one) used to judge service quality, it was not necessary to add other statements to modify either of these first two sections of SERVPERF.

Aspect Two

Hypothesis two describes the relationship between the variables comprising the modified SERVPERF. The various parts of the instrument should all measure some facet or attribute of the construct under investigation. The second of Nunnally and Bernsteins' psychometric aspects will be demonstrated with hypotheses two.

Hypothesis 2 - The scale reliability as measured by the coefficient alpha for modified SERVPERF will fall within the range of scale reliabilities as demonstrated in previous research using the instrument.

Using data on the reliability of the scale items for perceptions found in the two versions of the parent instrument ([SERVQUAL] Parasuraman, et al., 1988 & 1991), replication studies (Carman, 1990; Babakus & Boller, 1992; Babakus & Mangold, 1992; Nitecki, 1995) and the original version of SERVPERF (Cronin & Taylor, 1992), as a benchmark, data from this research was used to calculate the Cronbach's Alpha reliability coefficients for the perceptions scores for this version of SERVPERF. Across studies these scores range from .55 to .96. The highest scores were obtained by Cronin & Taylor after which much of this research is modeled and ranged from .88 to .96.
Reliability analysis computations were performed using SPSS to determine the coefficient alphas of each of the services; MEDLARS Training, Grants Consultations and the MEDLARS Helpdesk.

Confirmatory factor analysis of SERVPERFs 22 individual scale items using SPSS functions was done to determine the factor structure for each sampled service. It was determined from these results that the scale items do not demonstrate a five-factor structure as hypothesized by PZB.

In hypotheses three, four, five and six, I determined what the relationships were between these observables (the individual scale items) and other variables, Nunnally and Bernsteins third aspect of measurement. Aspect three will be discussed first, then aspects four, five and six. The latter aspects will be discussed in a separate section as they are inter-related and depend on the same statistical methodology for confirmation.

Aspect Three

The final part of developing and validating this instrument for AHEC librarians revolves around the relationship between service quality (the main construct under investigation) and the related variables of information professional satisfaction and future intention to utilize the services being offered.

Construct validity may be demonstrated primarily through examining convergent and discriminant validity.

Hypothesis 3 - The instrument will demonstrate convergent and discriminant validity.
H3a. Modified SERVPERFS measures of service quality will correlate positively with measures of overall service quality, indicating convergent validity.

H3b. Discriminant validity is shown when measures of service quality (SERVPERF and overall service quality) demonstrate more correlation with each other than they do with measures of satisfaction or intention to use.

Again, an examination of the correlation coefficients was used to determine the relationships among the variables and between the measures of each of the three constructs.

This analysis of the three psychometric aspects of construct validation concludes with an examination of the inter-relatedness of service quality, satisfaction and intention to use

Relationship of Service Quality to Related Variables

In section three of the instrument, respondents are asked to rate their satisfaction with the quality of service offered by the agency using three questions from an instrument developed by Galleta and Lederer (1989). They are also asked to give an overall rating of their perception of the agency's service quality and whether or not they intend to utilize the service in the future.

Hypothesis 4 - Satisfaction as perceived by the biomedical information professional is an antecedent of perceived service quality.

The fourth hypothesis considers the order of influence between the two related constructs, service quality ($P_{SO}$), and satisfaction ($P_{SA}$). Figure 3 has been modified from
a model discussed in Cronin and Taylor (1992) and serves to illustrate the possible paths for these constructs as well as their relationship to the third construct, intention to use (PiU). This third construct is an indication of the predictive value of SERVPERF and is useful to our BIP in the very competitive healthcare market.

Figure 3. Relationship of constructs evaluated using SERVPERF. (Adapted from Cronin & Taylor 1992)

Note. Psa indicates satisfaction, Psq indicates service quality and Piu refers to intention to use

**Hypothesis 5** - The satisfaction of the information professional will have a significant impact on whether she or he intends to use the service in the future.

**Hypothesis 6** - Perceived quality of the service will have a significant impact on whether the biomedical information professional intends to use the service in the future.
Hypothesis five investigates whether, and how much, the information professionals' level of satisfaction with the service provider affects decisions to use that service again. Hypothesis six states that service quality will also affect the BIP future use of a particular service. In each case the structural models hypothesized by Cronin & Taylor (1992) are used to guide and inform the investigation of these three hypotheses. Specifically, the estimated path coefficient that links these variables was used to determine which construct has the greater influence on the respondent's intention to use the service, and also to determine if indeed either actually does influence it.

The final three questions on the survey are used to gather data about the working environment and background of the respondents. Respondents are asked how long they have been affiliated with an AHEC, how long they have had paid employment as a biomedical information professional and what regional NN/LM serves their AHEC. These factors may aid in understanding the variations in data received from this group of respondents.

Organization Investigated

The National Library of Medicine (NLM) was the organization used in this study. NLM serves as the de facto national medical library for the United States and is the largest medical library in the world. (website available at http://www.nlm.nih.gov/) It is, arguably, the most recognized if not most well known organizational entity among biomedical information professionals. It offers a wide range of services to health care professionals at all levels of the healthcare industry. NLM was chosen to test this
instrument because of the pervasiveness of its products and services in the health care community, especially among biomedical information professionals. Three of those services were explored to test the applicability of SERVPERF in this context.

Using one of NLMs premier products, the Medical Literature Analysis and Retrieval System (MEDLARS), the constructs of service quality, satisfaction and intention to use were examined. MEDLARS indexes and abstracts millions of articles from thousands of journals dating back to 1965. This product is subdivided by various medical or health care related categories and is offered electronically to biomedical information professionals through various commercial and private sources. NLM supports research and development projects nationwide to further develop this national resource.

Three of the services that NLM provides for the use of its large community of biomedical information professionals were chosen to test the applicability of SERVPERF. Those services (see Appendix E) are: the Medical Literature Analysis and Retrieval System (MEDLARS) help desk, which provides assistance to users of the various databases available through the system; the MEDLARS training service which trains biomedical information professionals in how to use the system for direct interaction with the computers at NLM; and the extramural grants consultation service which assists potential applicants with completion of grant applications. At the start of this research, all three services were available through a variety of methods. Access to any of the services could be obtained via electronic mail, by telephone, or even in person if the requester happened to be geographically proximate.
Identification of Population

The Area Health Education Center

The information professionals chosen for this study were affiliated with Area Health Education Centers (AHECs) from the late fall of 1997 to the spring of 1998. The AHEC system began as a response to findings of the 1970 Carnegie Commission Report on Higher Education and the Nation’s Health, which documented the need for a broader base of health care provision in the nation's underserved and rural areas. AHECs were given initial authorization and established under Section 804 of Title VII of the U.S. Public Health Service Act. AHECs have been funded through a succession of Acts of Congress covering Health Professions: PL 92-157, PL 94-484, PL 97-35, PL 99-129, PL 100-607 and most recently an amendment, PL 102-408.

The stated mission of the AHEC Program is to (see website at http://www.hrsa.dhhs.gov/bhpr/dm/ahecmiss.htm) "Improve the supply and distribution of health care professionals, with an emphasis on primary care, through community/academic educational partnerships, to increase access to quality health care".

Several of the goals used to accomplish this mission led to the formation of learning resource centers at many of AHECs. These learning resource centers served as distribution points for biomedical information. Since these learning resource centers were created, they have become instrumental in assisting the AHEC in creating systems for learning and networks for information dissemination in support of health care providers in underserved and rural communities. Many of the centers are also
instrumental in providing technical assistance related to education and training. These learning resource centers often utilized biomedical information professionals to secure additional funding and to further the goals of the HEC.

Biomedical Information Professionals

Biomedical librarians affiliated with the national AHEC system were chosen to participate in this study because of the unique settings in which they operate. AHECs, as previously noted are situated in medically underserved regions of the country. The health care providers in these settings are themselves in need of support services that have historically been unavailable to them except through inconvenient and unreliable systems. The needs of AHEC biomedical information professionals are no different than other members of the health care community in rural and underserved regions. The maintenance and enhancement of their professional and personal skills depends on obtaining services through multiple providers who are often located at unmanageable distances and whose services are obtainable only at unacceptable costs.

Due to the impermanent nature of funding at some centers, employees tend to be rather impermanent also. This fact, coupled with the normal, but high population flux associated with these rural and underserved areas, influenced this researcher into making similar assumptions about the transient nature of the AHEC biomedical information population.

The Instrument – SERVPERF
The use of SERVPERF as a tool to judge the quality of services for AHEC information professionals depends, in part on whether or not the attributes of service quality as defined by PZB, are actually of use to them. Additionally, it must be determined what services are actually being used by this population. For these reasons it was decided that a questionnaire able to garner this data should first be administered to this group of biomedical librarians prior to administering the modified SERVPERF.

Pilot Tests

In late 1997 a pilot test of the phase one survey (see Appendix B) was done to finalize the list of proposed services and to ensure proper operation of the web based document. Clarity of wording and ease of navigation were also goals of the pilot test.

Ten potential respondents were chosen from a set of persons known to the researcher to be affiliated with AHECs. Six valid responses were completed and returned. (see summary in Table 1)

Table 1

<table>
<thead>
<tr>
<th>Distribution of pilot tests by mode</th>
<th>E-mail</th>
<th>USPS</th>
<th>Fax</th>
<th>Web-form</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase One</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sent</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Responded</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Phase Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sent</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Responded</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
All but one individual noted that they had indeed used all three of the proposed services under investigation. Changes in the wording of section two, the ratings section, were made for the sake of clarity as well as refinements to both sections one and two. Additional information services listed by two of the respondents were ones provided either by state agencies and regional representatives of the National Library of Medicine, offices of the National Network of Libraries of Medicine (NN/LM).

A pilot test of the phase two survey (modified SERVPERF) was done in early 1998 using the respondents from the phase one pilot survey. There were three versions of the modified SERVPERF prepared one for each service. Respondents were instructed to complete a survey for any service that they had ever used. Three questions were added to SERVPERF. Respondents are asked to state which of the eight NN/LM regions serves the AHEC with which they are affiliated. Next, respondents are asked how long they'd been affiliated with an AHEC and finally, how long they'd had paid employment as a biomedical information professional.

Of the six original respondents only one requested that phase two surveys be sent back to her via the U.S. postal service. All the others requested e-mail notification of the survey web-site. However, only one of the five responded to surveys for all three services. One respondent sent a message to the researcher after completing surveys for two of the three services. She stated that her experiences with the third service, the one she did not complete, was over 10 years old and questioned its usefulness as a service to biomedical information professionals during the entire time NLM offered it. A decision was made to continue to include all three services in the final version of SERVPERF.
Changes in the order of the questions in section four was made also for the final version and a question was added to identify which AHEC the respondent was affiliated with. All responses to the pilot tests were distributed and collected from November 1997 to February of 1998.

**Distribution**

The most recent copy of the AHEC Health Sciences Library Directory was obtained which contained contact information for 77 institutions. Of that number, 38 listed electronic mailing addresses, 33 did not have email addresses listed and six did not have anyone listed as a point of contact for that institution. (see Table 2)

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase one respondents as a proportion of directory listing</td>
</tr>
<tr>
<td>Respondents</td>
</tr>
<tr>
<td>No e-mail address</td>
</tr>
<tr>
<td>E-mail address provided</td>
</tr>
<tr>
<td>No contact person provided</td>
</tr>
<tr>
<td>TOTAL</td>
</tr>
</tbody>
</table>

Nationally, there were 71 persons listed as contact librarians for an AHEC in this 1996 publications. Table 3 shows the numbers of unresolved directory entries whose addresses remained either unknown or unresolved at the end of Phase one distribution. There were 15 e-mail addresses listed that were incorrect for various reasons. Six mailed surveys were returned with the addressee unknown and no forwarding address. There
remained five addresses which consisted merely of the name of an institution, most often a hospital, and the city and state of its location. Individual AHEC state program offices were called to find out if a lack of being listed in the directory indicated the absence of an AHEC affiliated BIP.

Table 3

Respondents with unresolved contact information.

<table>
<thead>
<tr>
<th>Proposed contact mode</th>
<th># Of addresses</th>
<th>% By category</th>
<th>% Of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No e-mail address provided</td>
<td>6</td>
<td>18%</td>
<td>8%</td>
</tr>
<tr>
<td>E-mail address provided</td>
<td>15</td>
<td>39%</td>
<td>19%</td>
</tr>
<tr>
<td>No contact person provided</td>
<td>5</td>
<td>83%</td>
<td>6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>26</td>
<td>34%</td>
<td>34%</td>
</tr>
</tbody>
</table>

Note: Respondents from Phase one portion of the study, as a proportion of total addresses available and by category of proposed mode of contact.

It was subsequently determined that during the time of this study, November 1997 through June of 1998, there were approximately 95 people who could be classified as AHEC biomedical information professionals. All biomedical librarians listed in the directory as well as those solicited by other means, such as electronic mailing lists, were asked to respond to the surveys.

Surveys were distributed by surface mail via the U.S. postal service to all those persons listed that did not give an e-mail address. The initial announcement and request for participation was done at the end of February 1998. (See Appendix A)
who listed e-mail addresses, an e-mail message containing a copy of the same survey was sent to them. (See Appendix B and Appendix F) Additionally, requests for participation were posted to several electronic mailing lists: medlib-1, which caters to medical librarians; outlib-1, for librarians engaged in outreach services; and the electronic mailing list for the South Central Region of the National Network of Libraries of Medicine (NN/LM), the list for the Mid-continental Region of NN/LM, and the Greater Mid-West Region. While participation and assistance in disseminating the questionnaires from the other five NN/LMs was solicited, cooperation was limited. A reminder to potential respondents about participation was both posted to electronic sources and sent via surface mail at the beginning of April, during the second week of May and again at the beginning of June. The final two sections describe Phase One and Phase Two of this study.

**Phase One - Services Questionnaire**

A finalized version of the survey was subsequently prepared to gather the necessary information. Besides finding out if the respondents had used the services being considered, they were asked to provide brief descriptions of other professional information services they’d used, whether they were affiliated with the AHEC when they used the service and who provided the service to them. Also they were asked to rank the original five (PZB) dimensions of service quality by assigning a score of one to one hundred where the total of all rankings was to equal one hundred. Additionally they were asked to provide any attributes, other than those listed on the questionnaire, that they
would use in making judgments about service quality. Phase one elicited a total of 33 respondents.

**Phase Two - Modifications to the Instrument**

The final instrument was to be modified in accordance with the results of the phase one survey and an announcement and invitation to participate was distributed. (See appendix C) As noted previously, no additional services were listed by more than one respondent so the original choice of services offered by NLM was used. The only other modifications were those which enhanced the comprehensibility and pertinence for this audience of biomedical information professionals (BIPs). (See Appendix D and Appendix G) These modifications are sanctioned and encouraged by both the original developers of SERVQUAL (PZB) and the developers of SERVPERF (Cronin & Taylor). These researchers note that the instrument may be modified for the sake of clarity and should be seen as a basis for further development based on a particular industry's need. No other attributes for judging service quality were added by any respondents that were not already on the list of 22 attributes that comprise SERVPERF so none needed to be added to the instrument in its final form.

Responding to the modified SERVPERF via the web-based form was encouraged but the other formats were available to the biomedical information professionals. However, to assist in obtaining an optimal response rate, phase two of the survey was distributed according to whichever method the respondent chose in phase one, either;
surface mail, as an attachment to an e-mail message, or notification of the questionnaires' URL by e-mail. (See Appendix G)

Each service elicited a different number of respondents. The MEDLARS Training Service had 28 responses, the MEDLARS Helpdesk Service brought in 27, and the Grants Consultation Service gathered 26 responses. Input was limited to those person who, through self-selection, described themselves as being affiliated with one of the 44 AHEC offices distributed in 41 states nationwide.

Chapter four presents the responses gathered from this group of biomedical information professionals.
CHAPTER 4

DATA COLLECTION & ANALYSIS

In this chapter selected aspects of the data collected will be presented. The first section reports on the demographic aspects of the AHEC information professionals. Section two contains data about each of the three aspects of importance to the process of developing and validating measurements of abstract constructs. Section three presents an exploration of data from the other two related constructs, satisfaction and intention, defined through the path analysis noted in hypotheses four, five and six.

The Population

There were respondents from 21 out of the 41 states with active AHECs represented in the Phase one portion of this study. In Phase two, respondents from 17 states replied to the three service surveys. The final three questions on each survey reflect the geographical and employment distribution of the respondents.

Question #50 on the paper and pencil, mailed survey (see Appendix D) asks the respondent how long they have been affiliated with an AHEC. Persons answering the web survey (Figure 4) received the same set of choices.
Across all services the highest number of respondents reported that they had worked for an AHEC at least five years: sixteen respondents each from both the Grants Consultation service and the MEDLARS Training service and 18 respondents from the MEDLARS Helpdesk service surveys. This totals approximately 65% of all respondents (see Table 4). There were four respondents who failed to answer this question accounting for 4.9% of the total yielding 100%

Table 4

<table>
<thead>
<tr>
<th>Years of Service affiliated with an AHEC</th>
<th>Helpdesk service</th>
<th>Training service</th>
<th>Grants service</th>
<th>Total frequency of years of service</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;One</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>9.1</td>
</tr>
<tr>
<td>&gt;One &lt;Two</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>5.2</td>
</tr>
<tr>
<td>&gt;Two &lt;Five</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>20.8</td>
</tr>
<tr>
<td>&gt;Five</td>
<td>18</td>
<td>16</td>
<td>16</td>
<td>64.9</td>
</tr>
<tr>
<td>Missing</td>
<td>4.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note. A total of four respondents failed to answer these two questions. One each from the Helpdesk and Grants consultation services survey and two from the Training services survey.

Table 5 shows the distribution of respondents arranged according to the category of years they have been affiliated with an AHEC vs. their regional affiliation within the National Network of Libraries of Medicine (NN/LM). Region VI does not appear on the Table since there were no respondents in any category who were affiliated with an AHEC in that region. Region II, Southeast/Atlantic, with 9.5% has the greatest percentage of respondents with the longest AHEC affiliation (of at least five years), followed by Region III, the Greater Midwest with 11.7%. This is not surprising since these are two of the regions having the longest history of continuously operating AHECs in the country. The infrastructure for health science information outreach is well-established in these regions as are the funding sources. These factors lead to more stable employee populations.

Across all regions the fewest number of years of AHEC affiliation is the second category, over one but less than two years. Four respondents reported from Region II. This indicates that new AHEC biomedical information professionals (BIP) either stay and are able to adapt to being in a rural area, or they leave rather quickly.

Table 5.

Cross-tabulation for Years of AHEC affiliation vs. regional affiliation

<table>
<thead>
<tr>
<th>Years of AHEC affiliation VAR 50</th>
<th>Regional NN/LM VAR</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>≤One Count</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>% of Total</td>
<td>2.6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>&gt;One</td>
<td>0</td>
<td>4.0</td>
</tr>
<tr>
<td>&lt;Two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥Two</td>
<td>0</td>
<td>7.0</td>
</tr>
<tr>
<td>&lt;Five</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥Five</td>
<td>10.0</td>
<td>15.0</td>
</tr>
</tbody>
</table>

% of Total: 0.5 5.2 13.0 19.5 17.7 11.7 3.9 5.2 64.9

Note: There were no respondents reporting from Region VI. BIP = Biomedical information professional. Var51 and Var52 refer to statements on survey in Appendix D.

The second of the demographic questions asked how long each person had been working for pay as a biomedical information professional. Figure 5 illustrates what the web survey respondents would see in contrast to the paper and pencil version in Appendix D.

* In summary, my satisfaction with the entire NLM-GRANTS CONSULTATION Services environment can best be described as 7 = Not Satisfied. Please choose the ONE selection that best represents your answer.

1. How long have you been affiliated with an AHEC? One year or less.
2. How long have you had paid employment as a biomedical information professional? One year or less.

Your AHEC is served by which region of the National Network of Libraries of Medicine?

Figure 5. Web survey menu choices for paid employment.
In Table 5 are listed the data resulting from this question. Almost 56% of respondents had been working at least 10 years in the health sciences information field. No one reported experience in the one to two year range although 6.5% (5) of respondents were in their first year of paid employment in the health information sciences arena. Twenty two percent of the respondents reported working five to ten years which makes that response the next most frequently given. The total of 100% is obtained when the missing four responses are added in accounting for 4.9% of the responses.

Table 6

<table>
<thead>
<tr>
<th>Years as paid</th>
<th>Helpdesk service</th>
<th>Training service</th>
<th>Grants service</th>
<th>%</th>
<th>Total frequency of working years</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIP</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;One</td>
<td>1</td>
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<td>&gt;Two &lt;Five</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>15.6</td>
<td>12</td>
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<tr>
<td>Five &lt; Ten</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>22.1</td>
<td>17</td>
</tr>
<tr>
<td>&gt;Ten</td>
<td>16</td>
<td>14</td>
<td>13</td>
<td>55.8</td>
<td>43</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td>4.9</td>
<td>[100]</td>
</tr>
</tbody>
</table>

Note. A total of four respondents failed to answer these two questions. One each from the Helpdesk and Grants consultation services survey and two from the Training services survey.

Respondents were asked with which region of the NN/LM their AHEC was affiliated. While two persons failed to respond to this question they had previously given the name of their AHEC office, the correct region was then deduced by identifying the state. Table 6 lists the results from this question.
In summary, my satisfaction with the entire NLM-GRANTS CONSULTATION Services environment can best be described as Not Satisfied.

Please choose the ONE selection that best represents your answer.

1. How long have you been affiliated with an AHEC?
   - One year or less.

2. How long have you had paid employment as a biomedical information professional?

Your AHEC is served by which region of the National Network of Libraries of Medicine?

Table 7

Regional affiliation of AHEC

<table>
<thead>
<tr>
<th>Region</th>
<th>NN/LM of AHEC</th>
<th>Helpdesk service</th>
<th>Training service</th>
<th>Grants service</th>
<th>% Total frequency of region</th>
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<tr>
<td>I</td>
<td>Middle Atlantic 5</td>
<td>6</td>
<td>5</td>
<td></td>
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<tr>
<td>II</td>
<td>SE/Atlantic 8</td>
<td>10</td>
<td>8</td>
<td></td>
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<tr>
<td>III</td>
<td>Greater Midwest 7</td>
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<td>6</td>
<td></td>
<td>21</td>
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<tr>
<td>IV</td>
<td>Mid-continental 1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>3.7</td>
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<tr>
<td>V</td>
<td>South Central 3</td>
<td>4</td>
<td>3</td>
<td></td>
<td>12.3</td>
</tr>
<tr>
<td>VI</td>
<td>Pacific Northwest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 6. National Network of Libraries of Medicine as a choice list for AHEC affiliation.

There were no responses reported from the Pacific Northwest region which is not surprising since no AHEC in that region reported having a health science information professional on its payroll. The most frequent responses came from regions one, two and three, with 20%, 32% and 21% respectively. The Mid-continental region, region five, accounted for only three responses which is approximately 4% of the subjects.
Table 8 shows, by category, how many years respondents have had paid employment as a biomedical information professional as a function of their regional affiliation with the NN/LM. While there were five categories for respondents to choose from, only four were actually used. Region II again has the largest number of respondents with the longest paid tenure as BIPs; 20.8% having been employed at least 10 years. According to these data, very few new BIP are affiliated with AHECs in any region. Only 6.5% overall have been BIPs for just a year. Of this number Regions II, V (South Central) and VIII (New England) each have 1.3% and Region I (Middle Atlantic) has 2.6%.

Table 8
Cross-tabulation for Years of paid employment as a BIP vs. regional affiliation

<table>
<thead>
<tr>
<th>Years of paid employment (VAR 51)</th>
<th>Regional Affiliation (VAR 52)</th>
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<td>I</td>
</tr>
<tr>
<td>≤One</td>
<td>Count: 2.0</td>
</tr>
<tr>
<td></td>
<td>% of Total: 2.6%</td>
</tr>
<tr>
<td>≥Two&lt;Five</td>
<td>Count: 2.0</td>
</tr>
<tr>
<td></td>
<td>% of Total: 2.6%</td>
</tr>
<tr>
<td>Five &lt; Ten</td>
<td>Count: 6.0</td>
</tr>
<tr>
<td></td>
<td>% of Total: 6.5%</td>
</tr>
</tbody>
</table>

Note. A dash indicates that no respondents reported from that region.
Aspect One: Specifying the Domain of Observables Related to the Construct

The concern of aspect one was data designed to answer questions about the content validity of the study. The results are found in data gathered in both phase one and phase two of the study. From phase one it is noted that no respondent listed any other attribute that they would use to judge service quality that did not already occur among the 22 service quality statements in SERVPERF. From phase two, data about the importance of each of the statements are gathered. These data are collected and displayed, individually and cumulatively, in Table 9. The means of each service are detailed in the first three columns and the cumulative means and standard deviations are listed in the final two columns.

Table 9 also shows how many valid responses were collected for each service and how many were used in the calculation of table data. The Training service had 28 respondents, of which 26 were used in calculations. The Helpdesk service had 27 with
26 useable respondents and the Grants Consultation service had 26, all of which were used.

Table 9

Means of importance, by individual service and cumulatively.

<table>
<thead>
<tr>
<th></th>
<th>Training</th>
<th>Helpdesk</th>
<th>Grants</th>
<th>Merged</th>
<th>Std. Deviation</th>
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<tbody>
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<td>VAR1</td>
<td>5.21</td>
<td>3.74</td>
<td>3.77</td>
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<td>1.98</td>
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<td>3.96</td>
<td>4.31</td>
<td>4.42</td>
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<td>5.31</td>
<td>5.42</td>
<td>1.54</td>
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<td>6.69</td>
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<td>6.69</td>
<td>6.69</td>
<td>0.52</td>
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<td>6.69</td>
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<td>0.68</td>
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<td>6.59</td>
<td>6.73</td>
<td>6.68</td>
<td>0.57</td>
</tr>
<tr>
<td>VAR9</td>
<td>6.32</td>
<td>6.04</td>
<td>6.46</td>
<td>6.27</td>
<td>0.97</td>
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<td>VAR10</td>
<td>6.32</td>
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<td>6.79</td>
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<td>0.62</td>
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<td>6.42</td>
<td>0.70</td>
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<td>VAR19</td>
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<td>6.25</td>
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<tr>
<td>VAR20</td>
<td>6.39</td>
<td>6.30</td>
<td>6.54</td>
<td>6.41</td>
<td>0.74</td>
</tr>
<tr>
<td>VAR21</td>
<td>6.43</td>
<td>6.41</td>
<td>6.46</td>
<td>6.43</td>
<td>0.79</td>
</tr>
<tr>
<td>VAR22</td>
<td>6.46</td>
<td>6.63</td>
<td>6.62</td>
<td>6.57</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Valid N= 26 of 28 26 of 27 26 of 78 of 81
The variable numbers refer to an individual question in the importance section of the instrument. From the copy of the survey found in Appendix D, VAR1 corresponds to statement one, VAR2 is statement two, VAR22 is statement 22, etc. The ratings use the same seven-point scale as previously illustrated in the menu from Figure 1, with 1=Very Unimportant and 7=Very Important as anchors. Of note are ratings for the first four variables in each service which are much lower than those of any other variables. These four also show the widest range in standard deviations among all 22 statements, from 1.54 to 2.16. Statement 12 has the highest rating, at 6.79 in the Training service group with statement eight next at 6.71. Within the Helpdesk service responses, the highest rating was received by statement six, 6.74, with statements 12 and 17 tied for next highest at 6.70. In the third service, Grants consultations, respondents rated statement eight highest giving it 6.73. Statements six and seven are next, both rating 6.69.

When ratings from all three services are combined, statements 6 and 12 were highest with both scoring 6.69, but only marginally higher than statement eight which scored 6.68. The standard deviations for statements 6, 12 and 8 are also lowest (0.52, 0.54 and 0.57 respectively), demonstrating the narrow range within which answers were given for these three statements.

Aspect Two: Determining what the Observables Measure

The second of Nunnaly and Bernsteins psychometric principles is concerned with describing the relationship between the variables comprising the instrument. Hypothesis two of this study investigates this by using the scale reliabilities for each of the three
services. A scale reliability analysis was done in SPSS and the alpha coefficients were
determined for each service; MEDLARS Helpdesk service - 0.9535, Grants Consultation
service - 0.9468, MEDLARS Training service - 9129. In the next chapter a comparison
of these alpha values to values obtained in other studies using a similar instrument is
presented.

Aspect Three: Relationship of Constructs

The third psychometric principle informed an investigation of the relationship
between service quality and the other constructs present in this study. Hypothesis three
delineates the relationships among service quality, satisfaction and intent to use a service,
by assessing the correlations among them. It states that SERVPERF will demonstrate
convergent (H3A) and discriminant (H3B) validity as a way to measure or assess these
relationships. Correlation tables for the three services and the table of merged services are
included as Tables 10, 11, 12 and 13. These tables show correlations that support
convergent and discriminant validity and serve to help confirm hypothesis three.

H3A addresses convergence. Convergence involves demonstrating that
statistically significant correlation exists among the SERVPERF scale items and between
them and another measures of the same construct. The 22 scale items that are used to
judge service quality are statements 23-44 (V 23-V 44 on all tables) and the independent
measure of service quality, which corresponds to statement 46 (V 46 on all tables). The
greatest correlation is demonstrated in the MEDLARS Helpdesk service (Table 10).
Seventeen out of 22 statements have significant correlation with statement 46, including
14 with values greater than 0.700. The least amount of correlation is seen in the Grants Consultation service (Table 12) where only two scale items demonstrate significant correlations with the overall statement of service quality. When all services are combined (Table 11), 16 statements show correlation with statement 46; 15 of which are at the 0.01 level of significance.

The other part of hypothesis three, H3B addresses discriminant validity. In this instance statistically significant correlation should not exist between the 22 statements about service quality and statements about the two other constructs in this study. No correlation was shown to be significant for statements 47-49, measures of satisfaction, and statements 23-44, the statements about service quality, for the Grants Consultation service (Table 12).

The MEDLARS Training service (Table 11) results exhibited several instances of correlations between service quality and satisfaction however. Statement 25 (employees having a neat-appearance) had correlations with statements 48 (satisfaction with the information product) and 49 (summary of satisfaction with the service environment) that were less than 0.500 but significant at the 0.01 level. A correlation also occurred between statement 26 (materials associated with service being visually appealing) and statements 47 (satisfaction with support and services) and 49. Both of these correlations were less than 0.500 and only significant at the 0.05 level.

More puzzling were results exhibited by the MEDLARS Helpdesk service (Table 10) which shows 9 instances of significant correlation between statements 47 and 48 and
the scale items, 23-44; three at 0.01 and six at the 0.05 level of significance. All these were negative correlations and all except one was with statement 47.

When ratings for the services was merged (Table 13), a small, but statistically significant negative correlation occurred between variables 28 and 47. Examined individually by service, a small negative relationship exists between these two variables. Only upon aggregation of the three does this negative relationship become significant. Variable 28 refers to statement 28 which reads "When you have a problem (Service) staff shows a sincere interest in solving it". The other significant correlation occurs between variables for statements 26 and 49. This correlation was less than 0.500 and significant at p ≤ 0.05.

The note refers to all four correlation tables.

Note. The lower half of the correlation table mirrors the upper half so it is left blank. In the upper portion of the table only those correlations greater than 0.500 and significant at the 0.01 level for one-tailed tests are reported in the table. Correlations less than 0.500 but significant at the 0.01 level are indicated with a double asterisk (**); if the correlation is significant at the 0.05 level, but still less than 0.500 (one-tailed tests) it is denoted by a single asterisk (*). All correlation data have been rounded to the nearest single decimal place.
Table 10.

Intercorrelations between SERVPERF for MEDLARS Helpdesk Service, Satisfaction and Intention to Use

<table>
<thead>
<tr>
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83
Other construct relationships

In this final section data gathered in support of hypotheses four, five and six are reported. Treatment of this data consisted of a path analysis where each portion of the model (Figure 3) is described by one of the hypothesis. Data is reported collectively for the original model, repeated here in a revised form as Figure 7.

![Diagram of path analysis model](image)

Figure 7. LISREL 8 Path-analytic model for influence of satisfaction and service quality on intention to use.

In this path-analytic model, intention to use may be influenced through either of the constructs of satisfaction and service quality, or through some combination of the two. The total effect of satisfaction has both a direct and an indirect effect on intention. Satisfaction is mediated by service quality to produce the indirect effect just as service quality is influenced by satisfaction producing a smaller indirect effect. The double
headed arrow in Figure 7 indicates that whichever specific path model is chosen the regression coefficient remains constant at 0.14.

Equation 1 is from Schumacker, R. E. & Lomax, R. G. (1996), a numerical representation of the total effect of variables of interest in a particular model.

\[ R_{x \text{ path}} = p_{\text{path } x} + (p_{\text{path } x,y} * p_{\text{path } y}) \] (1)

Where \( p_{\text{path } x} \) and \( p_{\text{path } y} \) are alternative path models representing direct effects of the constructs under investigation and \( p_{\text{path } x,y} \) is the indirect effect one variable has on the other.

In equation 2, \( P_{SA} \) (see Figure 3) represents the specific path model where satisfaction precedes service quality in judgments about intention to use

\[ P_{SA} = -0.022 + (0.14 * 0.086) \] (2)

In equation 3, \( P_{SQ} \) (from Figure 3) represents the specific model where service quality precedes satisfaction. The indirect effect is minimal and can effectively be ignored.

\[ P_{SQ} = 0.086 + (0.14 * -0.022) \] (3)
The total effect of service quality on intention is not mediated to any significant degree by satisfaction. It may therefore be represented by the coefficient 0.086 alone. In the first of the alternate paths, P₁, (see Figure 7) satisfaction is the independent variable and service quality is the dependent variable, \( R^2 = 0.2 \) and explains approximately 2% of the model. In the second alternative path, P₂, (Figure 7) satisfaction and service quality are both independent variables and intention to use is the dependant variable. P₂ explains approximately 0.74% of the model (\( R^2 = 0.0074 \)). When combined, these alternatives yield an \( R^2 \) for the model of 0.0273. This model accounts for approximately 3% of the variance, given the data available. In Chapter five these data are explained within the context of the final set of hypotheses.
CHAPTER FIVE

CONCLUSIONS

The primary purpose of this study was to test the applicability of SERVPERF in a particular setting and with a population in which it had never been applied. The quality of three information and support services offered by the National Library of Medicine and available for use by all health science information professionals, in this instance Area Health Education Center librarians, was used to test the tool.

Aspects of proof delineated in three psychometric principles put forth by Nunnally and Bernstein (1994) served to guide this research. This chapter will provide a summary of the data results introduced in the previous chapter. Each hypotheses will be examined and related to one of the three aspects to show why this researcher feels that SERVPERF can be used to successfully judge service quality for AHEC information professionals.

The first section describes the formal steps taken to demonstrate the validity and reliability of the tool. The next section deals with the predictive value of SERVPERF and the two related constructs of satisfaction and intent. The third section will look at some interesting relationships in the demographic data collected for this population. In the last section conclusions for this study are given and avenues are introduced for future research taking into account the limitations of this study.
Delineating Validity and Reliability

Hypothesis One

SERVPERF must be able to specify the domain of observables related to the construct, according to aspect one of Nunnally and Bernsteins (1994) psychometric principles. Aspect one is concerned with face validity as well as content validity. This was demonstrated both in the Phase one part of the study and through validating hypothesis one.

In Phase one, the services questionnaire, (see Appendix B) respondents were asked to list any attributes they used to judge the quality of services offered to them. Since only one respondent listed any other attributes in that section of the survey, this additional attribute was not added to the modified instrument. The statement, "responding in a timely manner", was also judged to be very similar in intent to statements 27 and 30 which have to do with the service staff (and the perception about the facility generally) responding at the time it promises to respond. This researcher felt that the original 22 SERVPERF statements adequately constituted attributes AHEC respondents used in making judgements about service quality.

Hypothesis one states that the scale items comprising SERVPERF will be important to the respondents judgements about service quality. Table 7 in chapter four gives the means of the importance ratings for each of the services as well as a cumulative importance rating for the entire project. Each of the SERVPERF scale items was rated
above 3.5, corresponding to mid-range on the importance scale. With the exception of
the first four statements, which all had to do with some aspect of physical appearance, the
answers were consistently rated similarly in importance across all three services. For the
others, the range of answers went from a low of 6.04 to a high of 6.79 where seven
corresponded to Very Important on the scale. Therefore each item was judged to be
important to the biomedical information professionals judgements about service quality,
validating hypothesis one. The 22 observables referred to in aspect one have been
demonstrated here as able to specify the domain of the construct service quality for the
respondents.

Hypothesis Two

Quoting Nunnaly and Bernsteins (1994) aspect two, "....determining the extent to
which the observables tend to measure the same thing, several different things, or many
different things from empirical research and statistical analysis" gives the scope of the
second hypothesis.

Hypothesis two says that the scale reliabilities for each service will be within the
range of reliabilities found in other studies using the scale items. Table 14 shows the
reliabilities calculated in this study compared with those found in three other studies.

Table 14. Comparison of SERVPERF scale reliabilities with scale reliabilities from other
studies.

<table>
<thead>
<tr>
<th>Service</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDLARS Helpdesk Service</td>
<td>0.954</td>
</tr>
<tr>
<td>MEDLARS Training Service</td>
<td>0.913</td>
</tr>
</tbody>
</table>
Grants Consultation Service\(^1\) 0.947
Hospital Services\(^2\) 0.964
Fast Food\(^3\) 0.884
Dry Cleaning\(^3\) 0.932
Banks\(^3\) 0.925
Academic Library Services\(^4\) 0.796

**Note:**\(^1\) Results for this study.\(^2\) Results from Babakus & Mangold, 1992.\(^3\) Results from Cronin & Taylor, 1992. Firms with largest market share in that geographic area.\(^4\) Mean across services; Interlibrary Loan, Reserve Services, Reference Desk Service.

Reliabilities ranging from 0.55 to 0.964 are reported in the literature. Carman (1990) obtained a mean of 0.75 using these scale items in three industries; a dental clinic, a placement center and a tire store. This study obtained alpha values of 0.95 for the Grants Consultation service, 0.95 for Helpdesk service and 0.91 for Training service which are well within the range of those obtained in similar studies. In Table 14 representative alpha values for these 22 scale items range from a low of 0.80 in an academic library setting to a high of 0.96 for hospital services. Hypothesis two is confirmed.

**Hypothesis Three**

In an effort to logically distribute the data analysis, aspect three was rather artificially divided at this point into considerations of hypothesis three and the hypothesized relationships occurring in hypotheses four, five and six. This section will
only look at hypothesis three and how it relates to aspect three. Please refer to Appendix D for the complete text of statements.

The third psychometric aspect of construct validation consists of "...determining whether a supposed measure of a construct correlates in expected ways with measures of other constructs and/or is affected in expected ways by appropriate experimental manipulations". These correlations - between service quality and the related constructs of satisfaction and intent, are addressed in Hypothesis 3A (H3A) and Hypothesis 3B (H3B). H3A states that the scale, SERVPERF, will demonstrate convergent validity. The scale items will have significant correlation with each other and that another measure of the same construct, here demonstrated by statement 46 which asks about overall service quality, will also have significant correlation with the scale items. Referring to Tables 8-11 it is apparent that in each service the 22 statements have a high level of correlation with each other at the 0.01 level. The MEDLARS helpdesk service (Table 10) has particularly high correlation for statement 46 and the other scale items demonstrating the greatest level of convergence on the construct of service quality. It also demonstrates the highest level of relationship with other constructs as well which will be discussed in H3B. The least amount of construct convergence is seen in the MEDLARS training service (Table 11) where only two scale items demonstrate significant correlations with the overall statement of service quality.

In no case in any of the three services is there an instance where a scale item has significant correlation with less than three other scale items.
When all services are combined (Table 13), it is noted that 16 statements have correlations with each other that are significant at the 0.01 level which are at least 0.500. Statement 46 also shows significant (p<0.01) correlation with 16 SERVPERF statements. This means that approximately 73% of the scale items demonstrate a significant level of convergence. SERVPERF demonstrates convergent validity.

In H3B the scale items must demonstrate discriminant validity. In discriminant validity, the construct items should demonstrate little correlation with measures of other constructs. Tables 10-13 are referred to with special attention for variables 47-49 (satisfaction), and the relationships with variables 23-44 (service quality).

From the data gathered and analyzed in Chapter four clearly SERVPERF is well able to discriminate the construct of service quality from that of satisfaction. Only statements 26 (materials being visually appealing) and 28 (service staff showing a sincere interest in solving your problem) show any consistent significant correlation with statements about satisfaction. In the instance of the Helpdesk there is one negative correlation with statements 47 and 48. Significant and large negative correlation also occurs with statements for variables 47 (satisfaction with support and services) 28, 34 (employees being always willing to help clients) and 38 (employees being consistently courteous). In fact, there were eight instances of significant negative correlation with statement 47 including those just mentioned. This accounts for approximately 37% of all statements in this one service. There seems to be a definite negative relationship between the biomedical information professionals' (BIP) feelings about service quality and their satisfaction with the MEDLARS Helpdesk service. It is an interesting phenomenon
however that may best be addressed by future research and is not necessarily sufficient alone to rule out a finding of discriminant validity for SERVPERF.

Upon merging the services, it is found that significant correlation occurs in only two statements (26 and 29) both positive, considerably less than 0.500 and both at the 0.05 level. This researcher conjectures that with a marginally larger sample the correlation would rapidly diminish to a non-significant level overall. SERVPERF does, in the main, exhibit discriminant validity, confirming hypothesis 3B.

Relationship of Related Constructs

This section deals with hypotheses four, five and six regarding the relationship of the three related constructs; service quality, satisfaction, and intention to use. These final hypotheses are concerned with the predictive value of SERVPERF which speaks to the usefulness it may have for managers who seek to use it. SERVPERF historically only consisted of two sections, the 22 statements about respondents' perceptions of an organization's service quality and another section with three questions about related constructs. There was one question each on future use, satisfaction and overall feelings about service quality. The instruments crafters (Cronin and Taylor) and earlier authors of the original instrument (PZB and SERVQUAL) allowed for flexibility and variation in the number and kinds of additional questions which might be added to the instrument in this latter section and in other sections. These additions would depend largely on the industry involved and what use an organization planned to have for the data gathered with the instrument.
This study is concerned with both instrument validation and with a potential use of the tool as a predictor of a biomedical information professional's intention to use a service in the future. The following set of hypotheses, collectively, addresses this issue of prediction. I will restate the hypothesis and discuss its relationship to the model in Figure 7.

**Hypothesis Four**

Satisfaction, as perceived by the biomedical information professional is an antecedent or precursor of perceived service quality.

This hypothesis assumes that a respondent's perceptions of satisfaction form prior to perceptions about service quality on the path to deciding whether or not she will use the service in the future (P2 in Figure 7). The corollary statement would be to suggest that perceptions of service quality form prior to perceptions about satisfaction when a BIP is deciding if they intend to use the service in the further, illustrated by P1. The larger magnitude of the regression coefficient for P1 indicates that the biomedical information professional forms perceptions about service quality first when deciding whether they intend to use the service again. Satisfaction is not an antecedent of service quality.

**Hypotheses Five and Six**

Hypothesis 5. The satisfaction of the information professional will have a significant impact on whether she or he intends to use the service in the future.
Hypothesis 6. Perceived quality of the service will have a significant impact on whether the biomedical information professional intends to use the service in the future.

Again the reader is referred to Figure 7 and the alternative paths illustrated therein. Figure 7 shows that both service quality and satisfaction has some influence on the biomedical information professionals' intention to use the service. The influence that satisfaction has is mediated by its being affected by service quality to some degree. As stated previously, perceptions about service quality form first. Satisfaction on the other hand, has a negligible effect on service quality. Looking at the path coefficients in the model for both $P_1$ and $P_2$ we see that the larger effect is definitely attributable to service quality. Satisfaction has a very small negative effect.

Combining the amount of variance explained by each path in the model reveals that this model is not a useful predictor. This model explains about 3% of how the Biomedical Information Professional (BIP) decisions about intention to use a service are arrived at, given the data available.

Discussion

As has been shown throughout this study, respondents consistently judge the quality of services offered by NLM to be very high. The very lack of variation in service quality judgements was a major factor in this models lessened predictive ability. However there are many mitigating factors that converge to interfere with any predictive value this instrument might have. Cronin and Taylor (1992) also discovered that service
quality and satisfaction were inconsistent and often insufficient indicators of intent across various industries.

Path analysis is a useful tool given certain limited and controlled assumptions. Schumacker and Lomax (1996, p.39) note that "a specified model might ... establish causal relationships among variables when the following [assumptions] are met:

1. Temporal ordering of variables exists.
2. Covariation or correlation is present among variables.
3. Other causes are controlled for.
4. Variables are measured on at least an interval level.

It was shown in Hypothesis 4 that a temporal order exists among the variables, satisfaction being an antecedent of service quality. There exists a small but significant covariation (see Table 13) between measures of satisfaction (47-49) and the overall measure of service quality (statement 46) and the measure of intent to use (statement 45). All variables were measured using scales that ranged from one to seven in discrete intervals. In the circumstances and with the population available for this study, virtually no control of other causes was available and so a vital assumption and restriction was not able to be met. The respondents themselves are often unable to influence whether or not they are allowed to use a particular service or not. This may be due to the precarious nature of employment situations that exist for this group of health care information professionals. The transient funding sources upon which they must depend as well as the geographic and cultural isolation all have an influence on whether or not the information professional intends to use a service again.
Summary of Findings

This research has served to demonstrate a number of things. First, that this instrument, SERVPERF, has data on validity and reliability that falls well within the parameters of other, similar studies. Therefore SERVPERF appears to be useful in judging service quality in this setting for biomedical information professionals. However, its predictive value appears to be marginal. This was not a totally unexpected finding, given the precarious circumstances in which this group of information professionals live and work. The precarious financial nature of their workplace and the relative isolation of this group leave them particularly vulnerable to any number of uncontrollable market vagaries. These circumstances interfere with their choice of the type and nature of services to use. This ability to control other interfering variables is key to use of path analysis as a predictive measure. Even so, SERVPERF should prove to be a useful adjunct to management's overall quality assessment plans and goals used judiciously and repeatedly. Service quality is an attitude that needs continual monitoring to make truly accurate judgements about customer thinking.

The health care industry is no different from many other industries in that it finds itself in the position of having progressively increasing costs of doing business coupled with decreasing revenues. Medical institutions and hospitals must stay competitive; many have chosen to do this by enhancing their service component while simultaneously keeping expenditures low. Since expenditures for personnel have notoriously been the
largest expenditures in any service business, labor costs have been chosen by many health care organizations as the first place to reduce expenses. This has led to cost-cutting measures that have become ubiquitous throughout the industry, including the reduction of financial support for sending personnel to even the most modesty priced conferences or seminars. Institutions instead have chosen to set up in-house support programs or to develop cooperative services with other local health care providers.

For some health care professionals, this shift in how their needs for training and continuing education are provided has meant that services offered by their professional organizations are no longer going to be available to them. The trend toward lower support will be especially detrimental for those in less affluent and more isolated areas where the costs of supporting professional development are highest historically rural or other medically under-served areas. Health care professionals working in isolated conditions suffer from the same lack of available services and professional support as their patient population.

An interesting sidebar to this research is the participants’ attitudes towards the three services. The respondents consistently judged the quality of these National Library of Medicine (NLM) offerings high, across all services regardless of the mode of delivery of that service. Their satisfaction levels with the services, though, are not as consistently high overall as one might have predicted given the very good reputation enjoyed by NLM. The final section of this project will review some possible avenues for further research and applications of SERVPERF.
Future Research

An obvious extension of this research would be to conduct a similar study with a larger, more diverse group of health information professionals. Different kinds of services offered by professional organizations that serve this population would be ideal for measurement. Various services could then be objectively compared from one region to the next. Larger study populations would yield opportunities for greater interpretations of correlations as well. Sample questions that may be answered in future studies are:

Does length of service as an information professional affect attitudes about service quality, if so, in what way? Is there a relationship between the structure or type of organization where the information professional is employed and their judgements about service quality?

Other groups, such as legal or financial information professionals, may find SERVPERF useful for judging the service quality of their own professional organizations. If this instrument is validated sufficiently among enough users with specialized knowledge and skills then its use could be extended to information professionals with a generalized scope of work. While research on service quality is very much in evidence in the commercial sector, it is much less developed in non-commercial sectors of industry. Using SERVPERF in this population of information professionals may spur investigation of service quality by other not-for-profit organizations. The predictive value of SERVPERF should also be tested more extensively with populations having greater autonomy, stability in and control over their working environment. It may be inferred that the decrease in uncertainty inherent in such a situation leads to a
concomitant decrease in variability. In situations where many variables may be controlled, a path analysis would prove to be a very useful tool for predicting future use in a given population.

Probably the most intriguing adjunctive issue to arise from this research is that occurring as part of the delivery mechanism. Some of the participants responded by traditional mail service but approximately two thirds responded to both Phases electronically. Due to the limited scope of this research it was not possible to gauge whether or not the method of response chosen by specific participants demonstrated any correlation (positive or negative) with their attitudes about service quality.

This has been an exploratory study limited to a very select and homogenous group of biomedical information professionals. As such it is generalizable to other specialized homogenous groups. It may be that it is, by extrapolation, generalizable to the entire population of biomedical or health science information professionals.

The answers uncovered in this research lead logically and inevitably to more questions about the issue of how we, as information professionals view the products of our colleagues who are in the business of serving us. Do we hold them to the same standards of judgment for services we use as those we offer to our own customers, the information consumer? Is it a higher or lower standard? Providers offering services that information professionals consume for professional growth and development should have as their objective continual monitoring and adjustment of that service product so as to maintain a high level of quality. Using SERVPERF as one of their management tools would seem to be an ideal way to do this.
APPENDIX A

Letter to Respondents for Information Service
Dear AHEC Information Professional,

Some of you may recall meeting me during the librarians’ gathering last August at the AHEC conference in San Antonio. Others of you are new to me. As a former AHEC librarian, I maintain an interest in this group. Presently I am working on my dissertation, which will investigate the ability to judge the quality of services offered to biomedical information professionals such as you. To that end I have prepared a two-part survey which allows me to include input from AHEC librarians. Attached is Part One of the survey.

In Part One you are asked to name services that are offered to you and identify the agencies that sponsor them. I have included four services to give you an idea of the types of services I’m interested in; one is offered by the Medical Library Association (MLA), and three are offered by the National Library of Medicine (NLM). You are also asked to look at and score some attributes of quality. Phase Two will be a follow-up to Phase One and will be available for distribution in early 1998. Please be assured that your responses will remain confidential and that you will not be identified in any subsequent publications.

I have included a self-addressed, stamped envelope for your convenience. You may choose to respond to the survey by fax or by going to my website and filling out the form. If you would like notification when results are available, or for further information, please feel free to contact me. You may photocopy and forward this survey to other AHEC information professionals if you like. Your timely attention to this matter will be greatly appreciated. Thank you very much for your participation, both now and in the future. I am eagerly looking forward to your responses.

Sincerely,

Sharon D. Jenkins, M.L.S
Ph.D. Candidate, Toulouse School of Graduate Studies
University of North Texas/SLIS
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Denton, TX 76203-1068
Telephone: (940) 565-2445 Fax: (940) 565-3101
E-mail: sdj0001@jove.acs.unt.edu
Website URL: http://www.courses.unt.edu/sjenkins/survey/hello.htm
APPENDIX B

Phase One: Paper-based Information Services Survey for AHEC Information Professionals
Section One

Below is a partial list of some professional services offered to medical librarians. Please answer the questions for the listed services and add to the list by filling in whatever additional professional services you have used as a biomedical information professional as well as the sponsoring agency.

Professional Services

1.) Grants – NLM Extramural consultation support
   Have you ever used this service?  (Circle one) YES  NO
   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency | NLM

2.) Training – MEDLARS/NLM
   Have you ever used this service?  (Circle one) YES  NO
   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency | NLM

3.) Helpdesk – MEDLARS/NLM
   Have you ever used this service?  (Circle one) YES  NO
   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency | NLM

4.) MLA – Continuing Education
   Have you ever used this service?  (Circle one) YES  NO
   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency | MLA

Please write in additional professional services.

5.)

   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency

6.)

   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency

7.)

   Have you used this service since becoming affiliated with an AHEC? (Circle one) YES  NO
   Sponsoring agency
8.) 

Have you used this service since becoming affiliated with an AHEC? (Circle one) YES NO
Sponsoring agency ______________________

9.) 

Have you used this service since becoming affiliated with an AHEC? (Circle one) YES NO
Sponsoring agency ______________________

10.) 

Have you used this service since becoming affiliated with an AHEC? (Circle one) YES NO
Sponsoring agency ______________________

11.) Do you need to add more services? (Circle one) YES NO Please attach another sheet of paper.

Section Two

For this section you are to consider only the types of services in section one.

- Attributes often used to judge service quality are listed below. If there are additional attributes that you consider important in judging service quality, you may write them in the spaces provided.

- Please assign a score to each attribute – inside the score box - which would indicate how important that attribute is in your judgement of service quality. Zero (0) to one hundred (100) points may be assigned to any specific attribute. However, your total score for all the attributes should equal a total of one hundred (100) points.

Attributes

1.) Responsiveness
   [Willingness to help customers & provide prompt service] 

2.) Reliability
   [Ability to perform the promised service dependably & accurately] 

3.) Assurance
   [Knowledge & courtesy of employees & their ability to inspire trust & confidence] 

4.) Empathy
   [Caring, individualized attention the organization provides its customers] 

5.) Tangibles
   [Appearance of physical facilities, personnel, equipment, communication materials] 

TOTAL 100%
Additional attributes (if necessary)

6.________________________________________________________

7.________________________________________________________

8.________________________________________________________

9.________________________________________________________

10.________________________________________________________

☐ Do you need to add more attributes with scores? (circle one) YES NO Please attach another sheet of paper.

Section Three

Please provide the name and address of the Area Health Education Center with which you are affiliated.

Name of AHEC  
Street address  
Address (cont.)  
City __________________________ State ________ Zip Code ___________ 
Work Phone ____________________

How would you prefer to respond to Part Two when it becomes available? [Please select only one]

A. ☐ World Wide Web Form. E-mail address: ____________________________
   Name of web browser: ____________________________ version #: ____________

   Or

B. ☐ E-mail. E-mail address: ____________________________

   Or

C. ☐ U.S. Postal Service. Your name ____________________________
   Mailing address  

!!Thank you very much for your participation, both now and in the future!!
Mail to:
Sharon D. Jenkins, M.L.S
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Denton, TX 76203-1068
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APPENDIX C

Letter to Respondents for Modified SERVPERF
Dear AHEC Information Professional,

Attached is a set of questionnaires that ask you to give your perceptions of the quality of certain selected services offered by the National Library of Medicine. This is Phase two of a study being done as part of my doctoral dissertation. In this part I am attempting to gather not only your perceptions about each service but I also wish to get information on how important you consider each service attribute to be in formulating those perceptions.

There are three services included in this phase of the study. Each set of different colored pages deals with a different service. You may, of course, complete a questionnaire for each service you have ever used. Please be assured that you will not be identified in any subsequent publications and that all responses will remain confidential.

I have included a self-addressed, stamped envelope for your convenience. You may choose to respond to the questionnaires by fax, by mail, by e-mail or by going to my website and filling out the forms. If you would like to be notified when results are available, or for further information, please feel free to contact me. You may photocopy and forward this questionnaire to other AHEC information professionals if you like. Your timely attention to this matter will be greatly appreciated. Thank you very much for your participation, both now and in the future. I am eagerly looking forward to your responses.

Sincerely,

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Website URL: http://www.courses.unt.edu/senkins/survey/servprf.htm
APPENDIX D

Example of Paper-based Modified SERVPERF for Phase Two Individual NLM Services
Applicability Survey
GRANTS CONSULTATION SERVICE

This survey deals with your opinions of National Library of Medicine (NLM) services.

What is the name of the AHEC with which you are affiliated?

Importance

The following set of statements relates to your feelings about the importance of each feature described in your decision to use the Grants Consultation Service. A seven means you consider the feature very important in deciding whether to use the Grants Consultation services, a one means it is very unimportant. You may place any of the numbers shown on the scale below beside each feature to indicate its importance to you. There are no right or wrong answers—all we are interested in is your perception of how important each feature is to you in making a decision to use the Grants Consultation Service.

1 2 3 4 5 6 7
Very Unimportant Very Important

1. _______ Modern-looking equipment.
2. _______ Physical facilities that are visually appealing.
3. _______ Employees being neat-appearing.
4. _______ Materials associated with the service (such as pamphlets, correspondence or publications) being visually appealing.
5. _______ When something is promised by a certain time, doing it.
6. _______ When there is a problem, showing a sincere interest in solving it.
7. _______ Performing the service right the first time.
8. _______ Providing services by the time promised.
9. _______ Insistence on error-free records.
10. _______ Employees telling clients exactly when services will be performed.
11. _______ Employees giving prompt service.
12. _______ Employees who are always willing to help you.
13. _______ Employees who are never too busy to respond to your requests.
14. Employees whose behavior instills confidence in you.
15. The feeling that you are safe when conducting transactions with the firm's employees.
16. Employees who are consistently courteous with you.
17. Employees who have the knowledge to answer your questions.
18. An organization that gives you individual attention.
19. Convenient operating hours.
20. An organization with employees who give you personal attention.
21. An organization which has your best interests at heart.
22. An organization whose employees understand your specific needs

Performance

The following set of statements relate to your feelings about the Grants Consultation service at NLM. For each statement, please show the extent to which you believe the Grants Consultation Service has the feature described by the statement. Placing a seven on the line means you strongly agree that the Grants Consultation Service has that feature, and a one means you strongly disagree. You may use any of the numbers in the middle as well to show how strong your feelings are. There are no right or wrong answers—all we are interested in is a number that best shows your perceptions about the Grants Consultation Service whether you use the service or not.

1 2 3 4 5 6 7
Strongly Disagree

23. Equipment in use for the NLM-GRANTS CONSULTATION service is modern-looking.
24. Physical facilities used for the NLM-GRANTS CONSULTATION service are visually appealing.
25. Employees operating the NLM-GRANTS CONSULTATION service are neat appearing.
26. Materials associated with the NLM-GRANTS CONSULTATION service (such as correspondence or publications) are visually appealing.
27. When the staff of the NLM-GRANTS CONSULTATION service facility promises to do something by a certain time, they do so.

28. When you have a problem, the NLM-GRANTS CONSULTATION service facility shows a sincere interest in solving it.

29. The NLM-GRANTS CONSULTATION service performs a service right the first time.

30. The NLM-GRANTS CONSULTATION service facility provides its services at the time it promises to do so.

31. The NLM-GRANTS CONSULTATION service facility insists on error-free records.

32. The NLM-GRANTS CONSULTATION service staff tells its clients exactly when services will be performed.

33. You receive prompt service from the NLM-GRANTS CONSULTATION service employees.

34. Employees of the the NLM-GRANTS CONSULTATION service facility are always willing to help clients.

35. Employees of the the NLM-GRANTS CONSULTATION service facility are never too busy to respond to your requests.

36. The behavior of NLM-GRANTS CONSULTATION service employees instills confidence in you.

37. You can feel safe in your transactions with the NLM-GRANTS CONSULTATION service employees.

38. Employees of the NLM-GRANTS CONSULTATION service facility are consistently courteous with you.

39. Employees of the NLM-GRANTS CONSULTATION service facility have the knowledge to answer your questions.

40. The NLM-GRANTS CONSULTATION service facility gives you individual attention.
41. ______ The NLM-GRANTS CONSULTATION service has operating hours convenient to all their clients.

42. ______ Employees of the NLM-GRANTS CONSULTATION service give you personal attention.

43. ______ Employees of the NLM-GRANTS CONSULTATION service facility have your best interests at heart.

44. ______ Employees of the NLM-GRANTS CONSULTATION service understand your specific needs.

Additional Questions

The following set of statements relate to your feelings about the Grants Consultation Service. Please respond by circling the number which best reflects your own perceptions.

45. In the next year, my use of the Grants Consultation Service will be:

1  2  3  4  5  6  7  
None At All     Very Frequent

46. The quality of the Grants Consultation services is:

1  2  3  4  5  6  7  
Very Poor       Excellent

Again, please respond by circling the number that best represents your own perceptions.

47. My satisfaction with the support and services of the Grants Consultation Service unit can best be described as:

1  2  3  4  5  6  7  
Satisfied       Not Satisfied

48. My satisfaction with the information product itself, provided by Grants Consultation Services, can best be described as:

1  2  3  4  5  6  7  
Satisfied       Not Satisfied

49. In summary, my satisfaction with the entire Grants Consultation Services environment can best be described as:

1  2  3  4  5  6  7  
Satisfied       Not Satisfied

Please circle the ONE answer that best represents your situation.
50. How long have you been affiliated with an AHEC?

1. One year or less.
2. From one year to less than two years.
3. From two years to less than five years.
4. Five years or more.

51. How long have you had paid employment as a biomedical information professional?

1. One year or less.
2. From one year to less than two years.
3. From two years to less than five years.
4. Five years to less than ten years.
5. Ten years or more.

52. Your AHEC is served by which region of the National Network of Libraries of Medicine?

1. Middle Atlantic Region
2. Southeastern/Atlantic Region
3. Greater Midwest Region
4. Midcontinental Region
5. South Central Region
6. Pacific Northwest Region
7. Pacific Southwest Region
8. New England Region

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MEDLARS - Helpdesk
This survey deals with your opinions of National Library of Medicine (NLM) services.

What is the name of the AHEC with which you are affiliated?

**Importance**

The following set of statements relates to your feelings about the importance of each feature described in your decision to use the MEDLARS helpdesk services. A seven means you consider the feature very important in deciding whether to use the MEDLARS helpdesk services, a one means it is very unimportant. You may place any of the
numbers shown on the scale below beside each feature to indicate its importance to you. There are no right or wrong answers—all we are interested in is your perception of how important each feature is to you in making a decision to use the MEDLARS helpdesk.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Unimportant</td>
<td>Very Important</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. ______ Modern-looking equipment.
2. ______ Physical facilities that are visually appealing.
3. ______ Employees being neat-appearing.
4. ______ Materials associated with the service (such as pamphlets, correspondence or publications) being visually appealing.
5. ______ When something is promised by a certain time, doing it.
6. ______ When there is a problem, showing a sincere interest in solving it.
7. ______ Performing the service right the first time.
8. ______ Providing services by the time promised.
9. ______ Insistence on error-free records.
10. ______ Employees telling clients exactly when services will be performed.
11. ______ Employees giving prompt service.
12. ______ Employees who are always willing to help you.
13. ______ Employees who are never too busy to respond to your requests.
14. ______ Employees whose behavior instills confidence in you.
15. ______ The feeling that you are safe when conducting transactions with the firms' employees.
16. ______ Employees who are consistently courteous with you.
17. ______ Employees who have the knowledge to answer your questions.
18. ______ An organization that gives you individual attention.
19. ______ Convenient operating hours.
20. ______ An organization with employees who give you personal attention.
21. ______ An organization which has your best interests at heart.
22. ______ An organization whose employees understand your specific needs.
Performance

The following set of statements relates to your feelings about the MEDLARS helpdesk at NLM. For each statement, please show the extent to which you believe the MEDLARS helpdesk has the feature described by the statement. Placing a seven on the line means you strongly agree that the MEDLARS helpdesk has that feature, and a one means you strongly disagree. You may use any of the numbers in the middle as well to show how strong your feelings are. There are no right or wrong answers—all we are interested in is a number that best shows your perceptions about the MEDLARS helpdesk whether you use the service or not.

1 2 3 4 5 6 7
Strongly Disagree Agree

23. _______ Equipment in use for the MEDLARS helpdesk is modern-looking.
24. _______ Physical facilities used for the MEDLARS helpdesk are visually appealing.
25. _______ Employees operating the MEDLARS helpdesk are neat-appearing.
26. _______ Materials associated with the MEDLARS helpdesk (such as pamphlets, correspondence or publications) are visually appealing.
27. _______ When the MEDLARS helpdesk promises to do something by a certain time, it does so.
28. _______ When you have a problem, the MEDLARS helpdesk service unit shows a sincere interest in solving it.
29. _______ The MEDLARS helpdesk performs a service right the first time
30. _______ The MEDLARS helpdesk provides its services at the time it promises to do so.
31. _______ The MEDLARS helpdesk insists on error-free records
32. _______ The MEDLARS helpdesk staff tells its clients exactly when services will be performed.
33. _______ You receive prompt service from the MEDLARS helpdesk employees
34. _______ Employees of the MEDLARS helpdesk are always willing to help you
35. _______ Employees of the MEDLARS helpdesk are never too busy to respond to your requests.
36. The behavior of MEDLARS helpdesk employees instills confidence in you.
37. You can feel safe in your transactions with the MEDLARS helpdesk employees.
38. Employees of the MEDLARS helpdesk are consistently courteous with you.
39. Employees of the MEDLARS helpdesk have the knowledge to answer your questions.
40. The MEDLARS helpdesk gives you individual attention.
41. The MEDLARS helpdesk has operating hours convenient to all its clients.
42. Employees of the MEDLARS helpdesk give you personal attention.
43. The MEDLARS helpdesk has your best interests at heart.
44. Employees of the MEDLARS helpdesk understand your specific needs.

Additional Questions
The following set of statements relate to your feelings about the MEDLARS helpdesk. Please respond by circling the number which best reflects your own perceptions.

45. In the next year, my use of the MEDLARS helpdesk will be:
   1  2  3  4  5  6  7
   None At All   Very Frequent

46. The quality of the MEDLARS helpdesk services is:
   1  2  3  4  5  6  7
   Very Poor   Excellent

   Again, please respond by circling the number that best represents your own perceptions.

47. My satisfaction with the support and services of the MEDLARS helpdesk unit can best be described as:
   1  2  3  4  5  6  7
   Satisfied   Not Satisfied

48. My satisfaction with the information product itself, provided by MEDLARS helpdesk services, can best be described as:
   1  2  3  4  5  6  7
   Satisfied   Not Satisfied
49. In summary, my satisfaction with the entire MEDLARS helpdesk services environment can best be described as:

1  2  3  4  5  6  7
Satisfied Not Satisfied

Please circle the ONE answer that best represents your situation.

50. How long have you been affiliated with an AHEC?
   1. One year or less.
   2. From one year to less than two years.
   3. From two years to less than five years.
   4. Five years or more.

51. How long have you had paid employment as a biomedical information professional?
   1. One year or less.
   2. From one year to less than two years.
   3. From two years to less than five years.
   4. Five years to less than ten years.
   5. Ten years or more.

52. Your AHEC is served by which region of the National Network of Libraries of Medicine?

   1. Middle Atlantic Region          5. South Central Region
   2. Southeastern/Atlantic Region    6. Pacific Northwest Region
   3. Greater Midwest Region          7. Pacific Southwest Region

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MEDLARS -Training
This survey deals with your opinions of National Library of Medicine (NLM) services.
What is the name of the AHEC with which you are affiliated?

Importance
The following set of statements relates to your feelings about the importance of each feature described in your decision to use MEDLARS training services. A seven means you consider the feature very important in deciding whether to use MEDLARS training services, a one means it is very unimportant. You may place any of the numbers shown on the scale below beside each feature to indicate its importance to you. There are no right or wrong answers— all we are interested in is your perception of how important each feature is to you in making a decision to use MEDLARS training.

<table>
<thead>
<tr>
<th>Very Unimportant</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>

1. _______ Modern-looking equipment.
2. _______ Physical facilities that are visually appealing.
3. _______ Employees being neat-appearing.
4. _______ Materials associated with the service (such as pamphlets, correspondence or publications) being visually appealing.
5. _______ When something is promised by a certain time, doing it.
6. _______ When there is a problem, showing a sincere interest in solving it.
7. _______ Performing the service right the first time.
8. _______ Providing services by the time promised.
9. _______ Insistence on error-free records.
10. _______ Employees telling clients exactly when services will be performed.
11. _______ Employees giving prompt service.
12. _______ Employees who are always willing to help you.
13. _______ Employees who are never too busy to respond to your requests.
14. _______ Employees whose behavior instills confidence in you.
15. _______ The feeling that you are safe when conducting transactions with the firms employees.
16. _______ Employees who are consistently courteous with you.
17. Employees who have the knowledge to answer your questions.

18. An organization that gives you individual attention.

19. Convenient operating hours.

20. An organization with employees who give you personal attention.

21. An organization which has your best interests at heart.

22. An organization whose employees understand your specific needs.

Performance
The following set of statements relates to your feelings about MEDLARS training at NLM. For each statement, please show the extent to which you believe MEDLARS training has the feature described by the statement. Placing a seven on the line means you strongly agree that MEDLARS training has that feature, and a one means you strongly disagree. You may use any of the numbers in the middle as well to show how strong your feelings are. There are no right or wrong answers—all we are interested in is a number that best shows your perceptions about MEDLARS training.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

23. Equipment in use for MEDLARS training is modern-looking.

24. Physical facilities used for MEDLARS training are visually appealing.

25. Employees conducting MEDLARS training are neat-appearing.

26. Materials associated with MEDLARS training (such as pamphlets, correspondence or publications) are visually appealing.

27. When the staff of the MEDLARS training facility promises to do something by a certain time, they do so.

28. When you have a problem, MEDLARS training facility staff shows a sincere interest in solving it.

29. The MEDLARS training facility performs a service right the first time.

30. The MEDLARS training facility provides its services at the time it promises to do so.

31. The MEDLARS training facility insists on error-free records.
32. _____ The MEDLARS training staff tells its clients exactly when services will be performed.
33. _____ You receive prompt service from MEDLARS training facility employees.
34. _____ Employees of the MEDLARS training facility are always willing to help clients.
35. _____ Employees of the MEDLARS training facility are never too busy to respond to customer requests.
36. _____ The behavior of MEDLARS training facility employees instills confidence in you.
37. _____ You can feel safe in your transactions with MEDLARS training facility employees.
38. _____ Employees of MEDLARS training facility are consistently courteous with you.
39. _____ Employees of the MEDLARS training facility have the knowledge to answer your questions.
40. _____ The MEDLARS training facility gives you individual attention.
41. _____ The MEDLARS training facility has operating hours convenient to all their clients.
42. _____ Employees of the MEDLARS training facility give you personal attention.
43. _____ The MEDLARS training facility has your best interests at heart.
44. _____ Employees of the MEDLARS training facility understand your specific needs.

**Additional Questions**

The following set of statements relates to your feelings about MEDLARS training. Please respond by circling the number which best reflects your own perceptions.

45. In the next year, my use of MEDLARS training will be:
   1 2 3 4 5 6 7
   None At All Very Frequent

46. The quality of MEDLARS training services is:
   1 2 3 4 5 6 7
Very Poor ➗ Excellent

Again, please respond by circling the number that best represents your own perceptions.

47. My satisfaction with the support and services of the MEDLARS training unit can best be described as:

1 2 3 4 5 6 7
Satisfied ➗ Not Satisfied

48. My satisfaction with the information product itself, provided by MEDLARS training services, can best be described as:

1 2 3 4 5 6 7
Satisfied ➗ Not Satisfied

49. In summary, my satisfaction with the entire MEDLARS training services environment can best be described as:

1 2 3 4 5 6 7
Satisfied ➗ Not Satisfied

Please circle the ONE answer that best represents your situation.

50. How long have you been affiliated with an AHEC?
   1. One year or less.
   2. From one year to less than two years.
   3. From two years to less than five years.
   4. Five years or more.

51. How long have you had paid employment as a biomedical information professional?
   1. One year or less.
   2. From one year to less than two years.
   3. From two years to less than five years.
   4. Five years to less than ten years.
   5. Ten years or more.

52. Your AHEC is served by which region of the National Network of Libraries of Medicine?

1. Middle Atlantic Region ➗ 5. South Central Region
2. Southeastern/Atlantic Region ➗ 6. Pacific Northwest Region
3. Greater Midwest Region ➗ 7. Pacific Southwest Region
4. Midcontinental Region

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8. New England Region

THIS PROJECT HAS BEEN REVIEWED BY THE UNIVERSITY OF NORTH TEXAS COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (565-3940)
APPENDIX E

Description of Individual NLM Services
MEDLARS

NLM’s computer-based Medical Literature Analysis and Retrieval System (MEDLARS) allows rapid access to a vast store of biomedical information. It was a pioneering effort to use computer technology of the early 1960s to produce bibliographic publications and to conduct searches of the literature for health professionals.

MEDLARS is still used for preparing and photo-composing bibliographic publications like Index Medicus®—the monthly subject/author guide to articles in 3,000 journals. Today, through communications networks, MEDLARS search services are available online to individuals and institutions throughout the world. MEDLARS now represents a family of approximately 40 databases of which MEDLINE® is the most well known. Essentially Index Medicus online, MEDLINE enables individuals and organizations to query the NLM computer’s store of journal article references on specific topics. It currently contains eight 1/2 million references going back to 1966. The other databases provide information on cataloging and serials, toxicological and chemical data, AIDS, cancer, and other specialized areas Help Desk

Helpdesk MEDLARS

The MEDLARS help desk is customer assistance with this range of services. Users may call or send electronic messages to the staff about problems that may arise in conjunction with use of the products or services.
Training MEDLARS

Training is provided to information professionals (and others) both directly through NLM and through its national network of medical libraries. Currently, classes are offered on how to search various MEDLARS databases on a rotating but regularly scheduled basis through NLM. Instruction is also given in use of the MEDLARS system itself though this is due to be phased out in the next several months.

Grants Consultation Service - Extramural Programs

The Extramural Programs Division of NLM provides a variety of grants to support research and development activities leading to the better management, dissemination, and use of biomedical knowledge. Grants are available to support research in medical informatics, health information science, and biotechnology information, as well as for research training in these areas. Network planning and development grants support computer and communication systems in medical centers and health institutions, and the study of new opportunities with high-speed computer networks in the health sciences. Health science library resource grants assist in improving information access and services for health professionals. Research and publications in the history of medicine and the life sciences are also supported. Interested applicants may call or write or visit NLM to gain assistance in applying for one of these grants.
APPENDIX F

Phase One: Web-based Information Services Survey for AHEC Information Professionals
Hello AHEC Information professional, thanks for coming!

If you've gotten this far, you probably know why you're here. But just in case you got here accidentally, You are about to go to a site that contains a questionnaire. The questionnaire is part of a research project that will investigate the quality of services offered to biomedical information professionals.

If you are not a biomedical information professional, health sciences librarian, or a medical librarian currently affiliated with an Area Health Education Center (AHEC), please do not fill out the questionnaire.

On to the questions!

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Last revised: March 12, 1998

The introductory screen for the Services Questionnaire.
Services Questionnaire for AHEC Information Professionals

Section One

Below is a partial list of some professional services offered to medical librarians. Please answer the questions for the listed services and add to the list by filling in whatever additional professional services you have used as a biomedical information professional as well as the agency sponsoring the service.

Professional Service

1.) Grants - NLM Extramural Programs

Have you ever used this service? O Yes O NO
Have you used this service since becoming affiliated with an AHEC? O Yes O No
Sponsoring agency: NLM

2.) Training - MEDLARS/NLM

Have you ever used this service? O Yes O NO
Have you used this service since becoming affiliated with an AHEC? O Yes O No
Sponsoring agency: NLM

3.) Help desk - MEDLARS/NLM

Have you ever used this service? O Yes O NO
Have you used this service since becoming affiliated with an AHEC? O Yes O No
Sponsoring agency: NLM

4.) MLA - Continuing Education
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Have you used this service since becoming affiliated with an AHEC?</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td></td>
<td>Sponsoring agency: MLA</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Have you used this service since becoming affiliated with an AHEC?</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td></td>
<td>Sponsoring agency: MLA</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Have you used this service since becoming affiliated with an AHEC?</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td></td>
<td>Sponsoring agency: MLA</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Have you used this service since becoming affiliated with an AHEC?</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td></td>
<td>Sponsoring agency: MLA</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Have you used this service since becoming affiliated with an AHEC?</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td></td>
<td>Sponsoring agency: MLA</td>
<td></td>
</tr>
</tbody>
</table>
Section Two

For this section you are to consider only the types of services in Section One.

• Attributes often used to judge service quality are listed below. If there are additional attributes that you consider important in judging service quality, you may type them in the spaces provided.

• Please assign a score to each attribute - [inside the score box] - which would indicate how important that attribute is in your judgment of service quality. Zero (0) to one hundred (100) points may be assigned to any specific attribute. However, your total score for all the attributes should equal a total of one hundred (100) points.

Attributes

1. Responsiveness: Score □
   [willingness to help customers & provide prompt service]

2. Reliability: Score □
   [ability to perform the promised service dependably & accurately]

3. Assurance: Score □
   [knowledge & courtesy of employees & their ability to inspire trust & confidence]

4. Empathy Score □
   [caring, individualized attention the organization provides its customers]
4. Empathy Score [caring, individualized attention the organization provides its customers]

5. Tangibles: Score [appearance of physical facilities, personnel, equipment, communication materials]

Total = 100 pts.

- You may list additional attributes below that you think are important to your judgements about service quality.

6.)

7.)

8.)

9.)

10.)

Do you need to add more attributes and scores? O YES O NO- you may e-mail them to me.

Section Three
**Section Three**

Please provide the name and address of the Area Health Education Center (AHEC) with which you are affiliated.

<table>
<thead>
<tr>
<th>AHEC Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Street address</td>
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</tr>
<tr>
<td>Address (cont.)</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td></td>
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<tr>
<td>State</td>
<td></td>
</tr>
<tr>
<td>Zip code</td>
<td></td>
</tr>
<tr>
<td>Work Phone</td>
<td></td>
</tr>
</tbody>
</table>

How would you prefer to respond to Part Two when it becomes available?

- [ ] Web Form

Please provide the following information so that you may be notified:

<table>
<thead>
<tr>
<th>Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
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<tr>
<td>Street address</td>
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<tr>
<td>Address (cont.)</td>
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<tr>
<td>City</td>
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<td>Zip code</td>
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<tr>
<td>E-mail address</td>
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<td>Operating system</td>
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<tr>
<td><strong>E-mail address</strong></td>
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</tr>
<tr>
<td><strong>Operating system</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Work phone number</strong></td>
<td></td>
</tr>
</tbody>
</table>

This project has been reviewed by the University of North Texas Committee for the Protection of Human Subjects (5653940).

Copyright Sharon D. Jenkins.
Last revised: March 12, 1998.
APPENDIX G

Example of Web-based Modified SERVPERF for Phase Two: Individual NLM Services Applicability Survey
Hello AHEC Information Professional, thanks for visiting this site!

If you've not seen this form, you probably know why you're here. But just in case you not here.

You may complete a questionnaire for any (all) service(s) whether you have ever used it or not. This project is concerned only with your perceptions of the service.

Go to Grants Consultation service questionnaire.

Go to MEDLARS Training service questionnaire.

Go to Helpdesk services questionnaire.

Copyright Sharon D. Jenkins.
Last revised: March 12, 1998

Note. This is the introductory screen for the SERVPERF applicability surveys. The following pages contain images of one complete survey taken as a series of screen captures. Each survey is identical to all the others except that the name of the service is different.
This survey deals with your opinions of a specific National Library of Medicine (NLM) service.

Please enter the name of the AHEC with which you are affiliated.

Importance

The following set of statements relates to your feelings about the importance of each feature described in your decision to use the NLM-GRANTS CONSULTATION service. A seven means you consider the feature very important in deciding whether to use the NLM-GRANTS CONSULTATION services, a one means it is very unimportant. You may place any of the numbers shown on the scale below beside each feature to indicate its importance to you. There are no right or wrong answers- all we are interested in is your perception of how important each feature is to you in making a decision to use the NLM-GRANTS CONSULTATION service.

7 = Very Important Modern-looking equipment.
7 = Very Important Physical facilities that are visually appealing.
7 = Very Important Employees being neat-appearing.
7 = Very Important Materials associated with the service (such as pamphlets, correspondence or publications) being visually appealing.
7 = Very Important When something is promised by a certain time, doing it.
7 = Very Important When there is a problem, showing a sincere interest in solving it.
7 = Very Important Performing the service right the first time.
7 = Very Important Providing services by the time promised.
Very Important

- Accommodation for the time promised.
- Insistence on error-free records.
- Employees telling clients exactly when services will be performed.
- Employees giving prompt service.
- Employees who are always willing to help you.
- Employees who are never too busy to respond to your requests.
- Employees whose behavior instills confidence in you.
- The feeling that you are safe when conducting transactions with the firm's employees.
- Employees who are consistently courteous with you.
- Employees who are consistently courteous with you.

Very Important

- Employees who are consistently courteous with you.
- Employees who have the knowledge to answer your questions.
- An organization that gives you individual attention.
- Convenient operating hours.
- An organization with employees who give you personal attention.
- An organization which has your best interests at heart.
- An organization whose employees understand your specific needs.

Performance

The following set of statements relate to your feelings about NLM GRANTS CONSULTATION services.
The following set of statements relate to your feelings about NLM-GRANTS CONSULTATION services at NLM. For each statement, please show the extent to which you believe the NLM-GRANTS CONSULTATION service has the feature described by the statement. Choosing a seven (7) means you strongly agree that the NLM-GRANTS CONSULTATION service has that feature, and choosing a one (1) means you strongly disagree. You may use any of the numbers in the middle as well to show how strong your feelings are. There are no right or wrong answers—all we are interested in is a number that best shows your perceptions about the NLM-GRANTS CONSULTATION service whether you use this service or not.

7 = STRONGLY AGREE  Equipment in use for the NLM-GRANTS CONSULTATION service is modern-looking.

7 = STRONGLY AGREE  Physical facilities used for the NLM-GRANTS CONSULTATION service are visually appealing.

7 = STRONGLY AGREE  Employees operating the NLM-GRANTS CONSULTATION service are neat-appearing.

7 = STRONGLY AGREE  Materials associated with the NLM-GRANTS CONSULTATION service (such as correspondence or publications) are visually appealing.

7 = STRONGLY AGREE  When the staff of the NLM-GRANTS CONSULTATION service facility promises to do something by a certain time, they do so.

7 = STRONGLY AGREE  When you have a problem, the NLM-GRANTS CONSULTATION service facility shows a sincere interest in solving it.

7 = STRONGLY AGREE  The NLM-GRANTS CONSULTATION service performs a service right the first time.

7 = STRONGLY AGREE  The NLM-GRANTS CONSULTATION service facility provides its services at the time it promises to do so.

7 = STRONGLY AGREE  The NLM-GRANTS CONSULTATION service facility insists on error-free records.

7 = STRONGLY AGREE  The NLM-GRANTS CONSULTATION service staff tells its clients exactly when services will be performed.

7 = STRONGLY AGREE  You receive prompt service from the NLM-GRANTS CONSULTATION service.
7 = STRONGLY AGREE You receive prompt service from the NLM-GRANTS CONSULTATION service employees.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service facility are always willing to help clients.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service facility are never too busy to respond to your requests.

7 = STRONGLY AGREE The behavior of NLM-GRANTS CONSULTATION service employees instills confidence in you.

7 = STRONGLY AGREE You can feel safe in your transactions with the NLM-GRANTS CONSULTATION service employees.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service facility are consistently courteous with you.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service facility have the knowledge to answer your questions.

7 = STRONGLY AGREE The NLM-GRANTS CONSULTATION service facility gives you individual attention.

7 = STRONGLY AGREE The NLM-GRANTS CONSULTATION service has operating hours convenient to all their clients.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service give you personal attention.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service facility have your best interests at heart.

7 = STRONGLY AGREE Employees of the NLM-GRANTS CONSULTATION service understand your specific needs.

Additional Questions
Additional Questions

The following set of statements relate to your feelings about the NLM-GRANTS CONSULTATION service. Please respond by choosing the number which best reflects your own perceptions.

- In the next year, my use of the NLM-GRANTS CONSULTATION service will be \( \geq 7 = \text{Very Frequent} \).
- The quality of the NLM-GRANTS CONSULTATION service is \( \geq 7 = \text{Excellent} \).
- My satisfaction with the support and services of the NLM-GRANTS CONSULTATION Service unit can best be described as \( \geq 7 = \text{Not Satisfied} \).
- My satisfaction with the information product itself, provided by NLM-GRANTS CONSULTATION Services, can best be described as \( \geq 7 = \text{Not Satisfied} \).
- In summary, my satisfaction with the entire NLM-GRANTS CONSULTATION Services environment can best be described as \( \geq 7 = \text{Not Satisfied} \).

Please choose the ONE selection that best represents your answer.

1. How long have you been affiliated with an AHEC? \( \text{One year or less.} \)
2. How long have you had paid employment as a biomedical information professional? \( \text{One year or less.} \)

Your AHEC is served by which region of the National Network of Libraries of Medicine? \( \text{Middle Atlantic Region} \)

This project has been reviewed by the University of North Texas Committee for the Protection of Human Subjects (S65-3940)

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Last revised: April 02, 1998
Your responses have been successfully submitted!

Thank you very much for your assistance with this research.

If you would like to complete a questionnaire for another of the professional information services listed below, just click the selection and your browser will take you to it. Thanks again for your participation.

Go to Grants Consultation service questionnaire.

Go to MEDLARS Training service questionnaire.

Go to Helpdesk Services questionnaire.

GOODBYE!

If you have questions or need clarification, please e-mail me and I will be happy to answer you!

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Last revised: March 12, 1998

This screen would take the respondent to the site of each of the other surveys so that they could complete either of the others as well.
REFERENCES

Area health Education Center website

http://www.hrsa.dhhs.gov/bhpr/dm/ahecmiss.htm


