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VISITOR EVALUATION: AN EXPLORATORY STUDY FOR THE USAF MUSEUM

THESIS

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THESIS

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Abstract

The USAF Museum determined that little is known about its visitor base after conducting an initial survey of USAF Museum Foundation Members in 1996. It became apparent that Foundation members represented a small and unique category of USAF Museum visitors and prompted the need to evaluate visitors from the general population. This thesis explores the process of museum visitor evaluation and applies evaluation concepts in the development of a questionnaire designed to measure five constructs: motivation for visiting the USAF Museum, evaluation of the USAF Museum experience, transportation issues, general awareness of USAF Museum services, and demographic composition of the visitor base.

The questionnaire was pilot tested for reliability and consistency in measurement, and was subsequently administered to 288 visitors in June 1997. Analysis of the data suggested that enthusiasm for aviation and aviation history was the most significant motivating factor for visiting the USAF Museum. In addition, advertising appeared to have an insignificant impact on motivating visitors to visit the USAF Museum. Also, a significant number of respondents found the USAF Museum easy to locate, despite traveling over 150 miles to visit the museum. Although significant statistical analysis of the data yielded valuable information for museum management decision-making, the thrust of this study was to develop a systematic *process* for determining which constructs to measure and to develop a potential measurement instrument. This process can then be used in future visitor evaluation efforts.

VISITOR EVALUATION: AN EXPLORATORY STUDY FOR THE USAF MUSEUM

I. Introduction

Background

The United States Air Force (USAF) Museum, located at Wright-Patterson Air Force Base, Ohio, is the focal point for historic military aviation items ranging from aircraft to uniforms. Appropriations from congress are used to fund daily operation of the museum including aircraft restoration, facilities maintenance, and payroll salaries (Moore, 1996). However, it became evident that government funding would not be enough to sustain the ever-growing inventory of historical military relics. As a result, the non-profit organization Air Force Museum Foundation was formed in 1960 with an ultimate goal of providing funding for long term capital improvement efforts. The Foundation currently provides four primary services which generate revenue: the IMAX theater, the gift shop, the cafeteria, and membership services. Revenue, however, is a function of the volume of visitors attending the Air Force Museum. The success of these functions depends heavily on a steady flow of museum visitors.

General Issue

During the past four years, the USAF Museum has experienced declining attendance. Since the installation of an infrared attendance counting system in 1992,

attendance has steadily declined from a record 1,040,000 visitors in 1992 to 860,000 visitors in 1995 (Johnson, 1996).

As a result, the USAF Museum and the USAF Museum Foundation took the initiative to conduct a visitor evaluation process and began gathering information about museum members. In early 1996, the Foundation distributed a survey in the quarterly membership journal to obtain some demographic information about its members. The results of this questionnaire yielded information about the members' distinguishing characteristics such as age, marital status, military service history, and education level. However, the approximately 15,000 Foundation members constitute a small portion of the entire visitor base, and arguably represent a unique sample of the population. The survey results indicated that nearly 70% of the members were over the age of 60 and that nearly 88% of them had served (or were currently serving) in the armed forces. Consequently, it became evident that the non-member population, often referred to as occasional visitors, represents a large portion of the USAF Museum visitor base. Additionally, little is known about the demographic makeup, desires, and attitudes of this unique group of USAF Museum visitors.

Specific Problem Statement

The USAF Museum Foundation previously developed a questionnaire to be completed by casual museum visitors; however, it was designed to measure attitudes towards museum *services* such as the gift shop, cafeteria, and general facility appearance. A more systematic method for determining the attitudes and desires of casual visitors

towards the museum *itself* was necessary. The lack of a visitor evaluation tool is not at all surprising, as the practice of active visitor evaluation in museums is little more than 20 years old and as a result, large museums have not systematically developed this practice (Schiele, 1992: 28).

Research Objective

The ultimate goal of this study is to determine how the desires and interests of casual museum visitors can be better determined. To achieve this objective, several concepts need to be explored to form a basis of comparison.

Investigative Questions

The answer to the research question can be derived from answering several related questions:

(1) Why are museum visitor evaluations important to museum managers?

(2) What kind of people visit museums, and for what reasons do they attend? Why do those who do not attend stay away?

(3) What models or methods do other museums and non-profit organizations, particularly other aviation museums, use for evaluating their customers' desires?

(4) How can the USAF Museum gain from these principles in the evaluation of visitors?

(5) What kind of customer assessment method could be developed for use in the USAF Museum?

Discussion of Investigative Questions

The first issue to be addressed involves the value in assessing customer desires in a museum setting. According to Ross J. Loomis, museum managers should be concerned not only with the product (the displays) but with those who use the product (the visitors) because, without the visitor, the museum simply becomes a depository of relics:

> Most people responsible for the operation of a museum today are keenly aware that increasing emphasis on museums as viable social institutions makes new areas of growth and change imperative: museums today must add to their traditional purpose of preserving and exhibiting objects new programs and services attractive to increasing numbers of visitors who may be depended upon to add badly needed funds to the museum's shrinking budget. (Loomis, 1987: xi)

The next key construct involves understanding the museum visitor from a personal perspective. Determining the kinds of individuals who attend museums and the reasons they attend is of utmost importance in evaluating the visitor's desires and interests. Often, museums are viewed as "the place for the work of scholars--special people with the knowledge needed to find meaning in the objects of the world" (Loomis, 1987: 3). However, scholars are not the only museum visitors, as this study illustrates.

The answer to a potentially more important question, "why do those who do not attend museums stay away," could provide insight to museum management. This study attempts to answer these questions prior to the development of a visitor needs/satisfaction measurement instrument for the USAF Museum through a review of prior literature written on museum visitor alienation.

Additionally, this study determines what other museums do to assess visitor interests. From this information, we can gather alternative methods of determining visitor attitudes towards certain facets of the museum experience.

Finally, this study develops a questionnaire based on five constructs determined through the research and through focus group input. The areas measured were motivation for visiting, evaluation of the visit, evaluation of transportation to the USAF Museum, and collection of general and demographic information.

Summary

This thesis utilizes prior research of visitor evaluation as well as market survey information regarding common practices at museums today to formulate an application to the USAF Museum. The survey instrument developed in this thesis was sufficiently tested so that the USAF Museum could begin administration and data analysis on information provided by its visitors. In addition, the process used to develop this instrument can be replicated if different constructs are desired by museum management.

Thesis Overview

This thesis is divided into five chapters. The first chapter discusses the background and problem facing the USAF Museum. Specific investigative questions are addressed and formulate the path which is followed in the subsequent chapters. Chapter two comprises a review of literature written on

visitor evaluation. More specifically, the literature review attempts to answer several of the investigative questions set forth in chapter one. Chapter three describes the method used in developing the survey instrument. Constructs discovered in the literature review are applied for USAF Museum use and are incorporated into the survey instrument. Chapter three also discusses the results of the pretest and describes the modifications made to the instrument prior to full-scale administration. Chapter four contains an analysis of the data gathered from the test sample administration of the questionnaire at the USAF Museum during June, 1997. Finally, Chapter five discusses the results and makes recommendations for future visitor evaluation at the USAF Museum.

II. Literature Review

Overview

A review of literature of museum visitor evaluation is critical in answering the five investigative questions set forth in the research objectives section of this study. The following literature review is organized in such a fashion as to answer each of the first three questions with the ultimate goal of developing a visitor needs/satisfaction measurement instrument that is useful to the USAF Museum management.

Importance of Museum Visitor Evaluation

The first investigative question addresses the need for and value of visitor evaluation. Any organization that depends upon the public for its success, whether it be a manufacturing or service-oriented firm, should be concerned with the attitudes and preferences of its patrons. In a manufacturing organization, the volume of production and associated workforce to support production is driven by the demand for the finished good. This demand is often forecast based on current backlogs and historical sales information (Krajewski and Ritzman, 1996: 600). Demand is dependent on customer desires and preferences, among other factors. However, the demand for the output of a manufacturing-based organization is tangible and relatively easy to measure. Service-oriented organizations such as museums face a much more complex problem in determining management decisions and strategic direction due to the fact that their output is often intangible. The *good* produced by the museum is the *visit*. Visits are not hard commodities such as cars in a showroom or products on a shelf. The quality of the *visit* is

extremely subjective. It is for this reason that museum visitor evaluation be conducted efficiently. The need for evaluation research, and more specifically museum visitor evaluation research, can be summarized as follows:

> The goal of evaluation research is to provide for busy managers and professionals, information that will help them judge the worth of the commodity they are dealing with and guide their decision making. Good evaluation can strengthen museum management by providing timely information about audiences, programs, and other items that are part of a manager's responsibilities. (Loomis, 1987: 5)

However, it is paramount that the evaluation process be embarked upon in a methodical, established method, as all good research is based on data and its associated method of collection. There is a difference between brainstorming in a staff meeting about what visitors are like and the attitudes they hold and administering an empirically-based assessment tool that determines the same (Loomis, 1987: 5).

The time and effort required to effectively assess museum visitors is not a task to be taken lightly. It requires time, effort, and money to perform adequate evaluation research and derive useful information from it. However, the benefit of understanding visitors, their preferences and motivations outweighs the increased investment. First, evaluation of museum visitors provides general information about their identities, expectations, interests, and motivations. Next, evaluation research can also help the museum clarify its goals and strategies, as it will be forced to make the goals of a specific project explicit and measurable to satisfy the evaluation process (Loomis, 1987: 6). In other words, evaluation by its very nature heightens awareness and demands clear and specific objectives. Finally, evaluation research can have specific impact on museum

management. C. G. Screven outlined four benefits of using evaluations in conjunction with specific museum tasks:

1) Results from formative evaluation can increase the chances that a particular exhibit elicits a desired effect or interpretation.
2) Specific design decisions will be based on actual information rather than assumptions about museum visitors.
3) Evaluation can identify displays and features of the museum that do not seem to be generating interest, are impractical, or are too costly.
4) Evaluation will reduce the number of post-installation changes of displays, exhibits, or capital improvement efforts which can be costly and embarrassing. (Screven, 1986: 122)

The benefits of conducting museum visitor evaluation in a general sense, as well as in evaluation of specific objectives, are numerous. However, the results of such research are useless unless museum management embraces the process and becomes involved in the survey development and administration process.

Potential Problems With the Evaluation Process. Several potential problems with visitor evaluation must be addressed. First, the evaluation research process alone can interfere with acceptance of its findings. Gary B. Cox suggests that the research process can be seen as trivial and too time consuming for the action-oriented manager. While the researcher is gathering and evaluating his data, the manager has already made a decision regarding the subject of interest. By simply keeping the manager involved in the development and administration of the research method, this pitfall can be partially

avoided. Additionally, evaluation research can often answer questions that nobody is asking. This is often the case when the researcher is working independently of the manager. It is critical that management be involved to avoid the potential for researcher-manager independence. Finally, effective communication between researcher and manager is most important, as research reports can be difficult to read for non-researchers. If the recommendations cannot be interpreted and implemented, then the research is of use only to the researcher (Cox, 1976, 1-18).

Profile of the Museum Visitor

The second investigative question focuses on the museum visitor and non-visitor, as well as their respective reasons for attending museums. The "typical" museum visitor is difficult to describe. Edward E. Robinson is concerned with the human tendency to generalize, and he makes the following statement to describe the "typical visitor." "While guessing, mixed with a small portion of common sense, would tell us that there is more than one kind of museum visitor, the same type of guessing might not fare so well in attempting to discover how many types of visitors there are" (Robinson, 1931: 418). Robinson would have museum managers and researchers see visitors as representing a broad range of people who bring different interests and experiences to the museum. However, some basic information regarding museum visitors does exist. In 1978, Paul DiMaggio, Michael Unseem, and Paula Brown compiled results from 49 surveys given at all types of museums (art, history, science) nationwide revealing mean values and ranges for visitor demographic information. The results are summarized in Table 1.

Table 1: Demographic Summary

	Median	Range
Age	31	19 to 51 yrs
Income Level	$17,158	$13,394 to $30,618
Demographic	**Median %**	**Range %**
Male visitors	46	30 to 71
Female visitors	54	10 to 29
Education Level		
Less than High School	9	4 to 57
Some or all of High School	27.6	8 to 69
Some College	72.3	30 to 93
College Graduate	41.1	10 to 66
Some Post-graduate	17.5	6 to 35
Occupational Category		
Professional	42.2	12 to 73
Managerial	9.6	4 to 27
Teachers	23.1	15 to 33
Clerical and Sales	14.3	5 to 28
Blue-collar	8.5	0 to 45
Homemakers	14.5	6 to 26
Students	22	0 to 57
Retired and Unemployed	5	1 to 21

Some generalizations from the results exist, while others remain a function of lack of standardization of museum surveys. In some instances, as few as 6 of the 49 surveys contained questions regarding these standard demographics. For example, age is often a non-standard interest item in many surveys. Many researchers do not include visitors under age 16 in their surveys, but when they have been included, they made up the largest group of visitors (Hooper-Greenhill, 1994: 61). In general, people who attend cultural

institutions are better educated, and have greater incomes than those of the population as a whole. Sex composition appears to vary from situation to situation, as tentative conclusions from the DiMaggio study indicate that men outnumber women in science museums while the opposite is true of art museums (Loomis, 1987:67-69). However, the range of median values in the 49 surveys would tend to reinforce Robinson's claims that the "typical visitor" is difficult to define.

Screven also noted several generalizations about museum visitors; however, his analysis separated the general visitor population from the relatively small scholarly population in terms of the behavior they display while touring museums. Scholars have specific interests and goals, moving directly to specific areas where they spend considerable time. This behavior differs from other groups whose patterns vary from covering as much ground as possible to viewing only pre-selected exhibits due to media attention, personal interests, or age of accompanying visitors (Screven, 1986: 110). Screven acknowledges the difference between scholarly and casual visitors and reinforces the generalizations about the casual visitor made in the DiMaggio study. In addition, Screven identified several other generalizations:

1) Social/family orientation: Most visitors come in small groups of two or three.
2) Visual orientation: Primary interest is towards high-priority visual elements that move or invite sensory involvement (touching, manipulation) as opposed to low-priority visuals which include passive, two-dimensional wall panels and traditional text.

3) Novelty seeking: Visitors attend to elements that are unusual. Familiar objects attract when they appear out of context, have media importance, or have priority features, such as movement. (Screven, 1986: 110)

Museum managers need to be concerned with the type of people who visit museums, as well as the reasons for which they visit or stay away. This tendency, referred to as "visitor alienation," is addressed further in the next section.

Visitor Motivation. Screven's generalizations about non-scholarly visitors begin to identify the motivation that drives the casual visitor. His delineation between scholars and non-scholars is key for this study as the delineation between Air Force Museum Foundation Members and the occasional visitor to the Air Force Museum displays the same relationship. Although scholars are likely to attend the USAF Museum, it is assumed that their numbers are insignificant when compared to occasional visitors. In addition to describing what kind of people visit and the size of group with which they attend, Screven addressed visual preferences that visitors often display. These generalizations describe the non-scholar as less tolerant of complex, time-consuming displays. As early as 1901, the Smithsonian recognized the need to cater to a unique, but nonetheless, casual group of visitors. A small room for children was created with objects designed and arranged so that the children would be attracted and made to wonder. The labels on the objects were worded in a simple manner and in large type, as not to confuse or tire the children (Hood, 1993: 16).

The delineation between scholars and casual visitors can be made further in the basic types of leisure activities preferred by each group. Scholars tend to emphasize three

factors in their leisure life: opportunities to learn, the challenge of new experiences, and doing something worthwhile for themselves. Casual visitors, on the other hand, are drawn more to leisure activities that offer social interaction, active participation, and comfort in their surroundings (Hood, 1993: 17). The key concept in Hood's claim is that the casual visitor is drawn to activities which involve active participation. Many visitors enjoy discovering the effects of pushing buttons, panels, and dials: controlling what happens and discovering hidden things. It is often acknowledged that fun must be a part of the overall experience. Learning must be enjoyable or the museum will simply be ignored (Screven, 1986: 113).

Museum Visitor Alienation. Potential visitors are deterred from visiting museums for a myriad of reasons. Just as there is a wide variation in visitor demographics, there is an equal variation in reasons for not visiting. However, there appears to be agreement on a few specific areas as many studies in this arena focus on comfort and social interaction factors.

"Museum fatigue" is often addressed as a primary reason why casual visitors stay away from museums. Research describing the causes and effects of museum fatigue typically cites slippery floors, standing, slow walking, dim light, reflections on glass, and no seating as main causes. However, there is evidence that museum fatigue is more a factor of psychological rather than physical discomfort. Robinson carried out extensive and systematic museum audience research in the late 1920s and concluded that the mental saturation often wears people out (Hood, 1993: 18). The combination of small text,

detailed information, and placard location contributes to the overload and mental saturation.

For the non-scholar, the museum is often too intimidating in terms of communication and comprehension (Hood, 1993: 16-17). Exhibit planners and curators are often too close to the subject matter to gain an accurate picture of how casual visitors will react to certain displays. As a result of over- or underestimating the knowledge, attitudes, interests, and expectations of casual visitors, the curator often falls victim to unintended responses to overloaded visitors. Typical reactions include fatigue, physical stress, and tendencies to avoid museums in the future. The first step in avoiding unintended negative effects is better knowledge of audiences (Screven, 1986: 111).

Models/Methods Used by Other Museums

The focus of the third investigative question centers on established methods of visitor evaluation used by other museums. An initial search for information was conducted via the World Wide Web. Requests for information regarding the nature of visitor evaluation, including the constructs measured, were sent to all aviation, transportation, and military history museums which listed a Uniform Resource Locator in several Internet search engines.

Additional attempts to gain information met with little or no success. The only complete respondent was the U.S. Army Transportation Museum at Fort Eustis, Virginia. The museum director mailed a copy of the survey which is used at the U.S. Army Transportation Museum, and described the process used in the development of their

survey. The one in use at Fort Eustis was originally developed by the Casemate Museum in Hampton, Virginia, and was modified for use at the U.S. Army Transportation Museum. The constructs measured in this survey are not arranged in any particular order. However, study of the individual questions reveals that demographics, motivation for visiting, evaluation of the visit, and evaluation of services offered by the museum appear to be the major constructs. The survey consists of 23 closed-end questions and 3 open-ended questions. The closed-end questions vary in their scales. Some items use a multiple choice format, while others use a three-point Likert scale to measure degrees of satisfaction. The individual questions appear to have been generated with little regard to answerability. The survey also requires respondents to answer directly on the question sheets, making data analysis more time consuming and labor intensive than optical scanning of responses.

The Owl's Head Transportation Museum (OHTM) also responded to the request for assistance, but indicated that it had not formally developed any means of evaluating visitors. The Assistant Director suggested the American Association of Museums handbook which provides a guide to questionnaire development and indicated that the OHTM intended to use it as well once its evaluation process gathered momentum (Michalek, 1997). This recommendation was implemented in this study.

The lack of response from many of the major museums, combined with the shortfalls illustrated by the single respondent, suggests that there is no "industry standard" with regard to museum visitor evaluation. The lack of response could be interpreted as an admission that no systematic method of evaluating visitors exists in

those museums. Worse, if an instrument does exist, it may not have been systematically developed to ensure reliability and validity. However, the possibility exists that no assistance was rendered due to time or financial constraints.

III. Methodology

Introduction

The first three investigative questions set forth in this study were addressed in Chapter 2 through a review of literature written on museum visitor evaluation. Investigative question 4 addresses the applicability of the research done in the literature review for use at the USAF Museum. Furthermore, investigative question 5 addresses the feasibility of a visitor evaluation instrument. This chapter applies the concepts which arose during the quest to answer the first three investigative questions, and describes the actual design of the instrument, item development, pretest, and the procedure of administering the instrument to a large scale audience at the USAF Museum.

Instrument Design

As the literature review suggested, several primary constructs need to be included in a visitor evaluation instrument. The factors which motivate visitors to come to museums, and similarly the factors which keep them away, need to be addressed in any instrument. If it is known why they visit, the museum's focus can be tailored accordingly. In addition, an evaluation of the visit is critical for continuous improvement and maintaining a healthy flow of visitors. Demographic information can also yield important information about the visitor base. As the USAF Museum discovered in its previous survey of the Foundation Members, age and prior military experience were

significant descriptors. The museum, knowing visitor demographics, can adjust the advertising, displays, and services to accommodate the appropriate groups of visitors.

Questionnaire Constructs

The instrument developed in this study used five general constructs which were of interest: motivation for visiting, evaluation of the visit, transportation to the USAF Museum, general information, and demographic information. These five constructs were developed by the researcher in conjunction with a focus group of USAF Museum staff members. Three of the constructs; motivation, evaluation, and demographics, are included as is consistent with prior research. The other two, transportation and general awareness of USAF Museum services, were of great concern to the museum staff, and thus were included. A description of the reasons for including them follows.

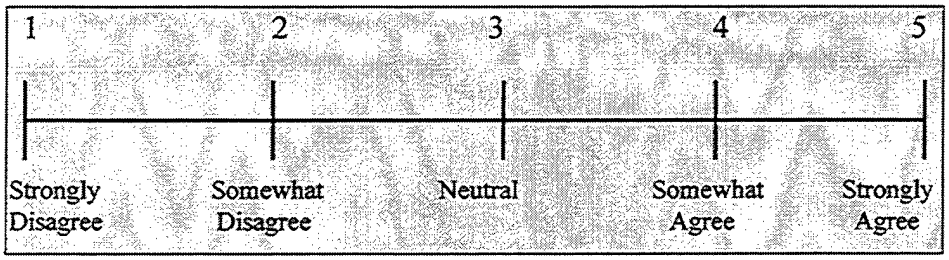
Transportation. Several reasons for including transportation issues exist. First, the staff was considering spending a significant amount of money revamping the highway signs leading to the USAF Museum, as there is a general impression that the existing ones are inadequate. Also, the physical location of the museum with respect to the rest of Wright-Patterson Air Force Base makes it potentially difficult to locate. The segregation of three areas of the base (areas A, B, and C) and their separation of up to five miles, could lead a visitor astray. Finally, advertising is believed to be inadequate to guide the visitor who is unfamiliar with the Dayton, Ohio, area to the USAF Museum.

General Awareness. This construct was included as a data-gathering vehicle regarding services and other attractive features of the USAF Museum that may not be

common knowledge to the public. As a result, this section attempts to gather information about *awareness* of these programs. Further versions of this instrument could then determine whether a *willingness* exists to use these programs.

Item Development

The questionnaire consists of 44 items broken into the five constructs addressed earlier. The first three constructs (motivation, evaluation, and transportation) utilized a five-point Likert scale as shown below:



Respondents were asked to respond to items according to the degree to which they agreed or disagreed with accompanying statements. The decision to use "neutral" as the midpoint was somewhat challenging as some midpoints did not apply to the items being asked. "Borderline" and "neither agree nor disagree" were considered initially, but were discarded because they seemed logically inferior considering the syntax of the items being asked. "Neutral" is less desirable than "borderline" or "neither agree nor disagree"; however, it is an acceptable midpoint (Babbitt and Nystrom, 1989: 125).

The last two constructs, general and demographic information, did not utilize the Likert scale due to difficulty in applying the scale to the items. The information gathered in these two constructs was categorical in nature. For example, it would not have made

sense to ask a visitor whether they agreed with a statement regarding their age or income level. Consequently, the items in these sections utilized multiple choice and bipolar (yes/no) response options.

Motivation. Items 1-11 measure motivation for visiting the USAF Museum. The focus group determined that a number of options could motivate a casual visitor to come to the USAF Museum, including enthusiasm for aviation, military history, the IMAX theater, and family connections to the Air Force. In addition, advertising efforts were measured to determine if any particular mode of advertising was more effective at motivating people to visit the USAF Museum. Finally, several items were included to measure whether visitors had attended previously but did not finish viewing the exhibits, and whether visitors had family connections in the Dayton area which could have contributed to bringing them to the USAF Museum.

Evaluation. Items 12-20 measure visitor evaluation of the museum experience. The focus group determined that the emphasis should be placed on the museum experience rather than the services offered by the museum. Items measured attitudes about the location of displays, logical flow from gallery to gallery, and information saturation resulting from reading display placards. These items were included as a result of the information discussed in the Chapter 2. "Museum fatigue" is a critical hurdle to overcome when attempting to make a museum more appealing to the general public, and the first step was to determine whether visitors experienced this at the USAF Museum.

Transportation. The USAF Museum staff was concerned whether the museum was difficult to locate for the casual visitor. Two major categories of items were asked in

items 21-29: difficulty in locating the museum due to insufficient signs, and confusion resulting from Wright-Patterson AFB layout. Responses to these items could provide insight to museum management on how better to advertise directions and place signs to aid visitors in finding the USAF Museum.

Pilot Test

An initial version of the questionnaire was given to 39 participants. Participants came from three major groups: Air Force Institute of Technology students (9), Air Force Museum Staff (12), and occasional visitors to the USAF Museum (18). In all cases, the participants had visited the museum and were qualified to respond to all 44 questions. Each participant was asked to evaluate the questionnaire given the following guidelines:

Instructions:

Please evaluate this questionnaire with regards to its content as a whole or in parts, its method of administration, and the physical design and layout of the questions. Ask yourself five questions about the quality and intent of the questionnaire:

- Is each of the questions measuring what it is intending to measure?
- Are all the words understood? (jargon or abbreviations not familiar?)
- Does each closed-ended question have an answer that applies to all potential respondents?
- Does the questionnaire create a positive impression, one that motivates people to answer it?
- Does any aspect of the questionnaire suggest bias on the part of the researcher?

You will be timed in order to determine the approximate amount of time to complete the questionnaire. Take notes directly on the questionnaire if you wish so that your comments can be recorded and implemented in the final version.

Initial concerns from both the researcher and the museum staff centered on time required to complete the questionnaire. The pilot test confirmed that respondent took, on average, 12 minutes to complete all 44 items. However, 15 of 39 pilot test participants

felt the questionnaire was too lengthy. It was determined that an additional incentive would be required to entice visitors to complete the questionnaire. This will be discussed further in the section regarding administration of the questionnaire to the test sample.

Comments from pilot study participants led to the discovery and correction of numerous faults which could have induced error of measurement. The following problems with the instrument were corrected prior to test sample administration:

1) The initial questionnaire was printed on both sides of the paper. This resulted in missed items and the "last page syndrome" where respondents totally ignored two questions on the last page of the question booklet. The final version was printed on one side only.
2) Instructions were placed throughout the question booklet reminding respondents to only mark one answer on the answer sheet. Multiple answers would cause problems with the optical scanning of answer sheets and would potentially hinder the analysis of data.
3) Item 20 was reworded to include "time set aside for my visit." The pilot test version implied that someone other than the visitor was the source of feeling "rushed" during the visit.
4) Terminology was softened significantly to invite respondents to participate, and font size was enlarged to facilitate ease of reading.
5) Minor corrections were made to the mechanics of completing the questionnaire including clarifying directions and re-numbering items to be sequential from start to finish.

Corrections to the final version of the questionnaire contributed to, but did not necessarily eliminate all of, the ambiguity and potential sources of error. The most likely source of error was found in the answer sheet itself.

Answer Sheet. Several different ideas for answer format were entertained, and an optical scanning (OPSCAN) sheet was chosen to facilitate data analysis. The AFIT form 11C was chosen primarily because it allowed for more than 5 responses per item (a maximum of 10), and it was less complex than others available at the time. However, several pilot test participants pointed out that having 10 possible answer locations could present complications since most items only required 5 answer locations. Time did not permit the development of a unique answer sheet, but will be a cornerstone of recommendations for further research at the end of this study.

Thorough instructions and verbal coaching by the researcher during test sample administration were given in an attempt to minimize the amount of error due to improper coding of answers by respondents. In addition, a quality check was performed by the researcher before the respondents left the survey area in an attempt to catch any mistaken responses.

Statistical Analysis

This section discusses the statistical techniques used to determine the reliability and the validity of the items used in the pilot test questionnaire. SAS software, Version 6.08, was used to accomplish all of the statistical calculations in this section.

Reliability. The reliability of the items in the three scaled sections of the questionnaire (motivation, evaluation, and transportation) was estimated in two ways to determine if the items warranted further use in the test sample administration of the questionnaire. First, Cronbach's alpha was calculated for items in each of the three scaled sections. Reliability for items in the last two sections of the questionnaire, general awareness items and demographics, was not calculated due to the presence of bipolar and categorical responses (yes/no and multiple choice). No prior reliability testing had been performed on any of the 29 scaled items as they were developed exclusively for this study.

Additionally, reliability for the same three scaled sections was calculated using the split-half reliability method. Even numbered items were grouped and were tested for correlation with odd numbered items grouped in a similar manner. The reliability figures were then adjusted using the Spearman-Brown Prophecy Formula (Thorndike, 1949: 84) to determine the reliability of the entire subscale. These results were compared to Cronbach's alpha determined previously. Cronbach's alpha and the split-half calculations for the pilot test will be discussed in this section, and will be re-addressed for the test sample administration later in this chapter. In both cases, reliability estimate goals of .60 or greater were set. According to Nunnally, "in the early stages of research on predictor tests or hypothesized measures of a construct, one saves time and energy by working with instruments that have only modest reliability, for which purpose reliabilities of .60 or .50 will suffice" (Nunnally, 1967: 226).

Motivation. The reliability estimates for the first 11 items of the questionnaire are shown below in table 2.

Table 2: Motivation Subscale Reliability for Pilot Test

Variable	Cronbach's alpha	Split-Half Reliability*
MOTIVATION	.734603	.807117

*Adjusted using Spearman-Brown Prophecy Formula

Overall, the motivation items had sufficient reliability to warrant use in the test sample administration of the questionnaire. In addition, reliability analysis revealed that only 9 of the 11 items contributed significantly to the reliability of the motivation subscale. Items 9 and 10 were determined to have an insignificant effect on the overall reliability and were excluded from this portion of the questionnaire. The final version actually included items 9 and 10 due to printing time constraints, but will be excluded from the analysis. Coding of the SAS program included a statement to drop these items from the calculation of the reliability calculations. Tables that detail this analysis further can be found in Appendix 2.

Evaluation. The reliability estimates for items 12 through 21 measuring evaluation of the USAF Museum experience are shown below in table 3. All items in this subscale contributed significantly to the overall reliability of this section of the questionnaire and the overall reliability warranted further use in administration to the test sample.

Table 3: Evaluation Subscale Reliability for Pilot Test

Variable	Cronbach's Alpha	Split-Half Reliability*
EVALUATION	.743568	.854794

* Adjusted using Spearman-Brown Prophecy Formula

Items 14 and 15 were negatively worded and scoring was adjusted in the SAS program to account for this. Since all 10 items in this section contributed significantly to the overall reliability, no items were excluded prior to administration to the test sample. Tables that further detail these results can be found in Appendix 2.

Transportation. The reliability estimates for items 22 through 29 are shown below in Table 4. All items in this subscale contributed significantly to the overall reliability of this section of the questionnaire and the overall reliability warranted further use in administration to the test sample.

Table 4: Transportation Subscale Reliability for Pilot Test

Variable	Cronbach's Alpha	Split-Half Reliability*
TRANSPORTATION	.829076	.865763

* Adjusted using Spearman-Brown Prophecy Formula

Items 22 and 23 were negatively worded and scoring was adjusted in the SAS program to account for this. Since all 8 items in this section contributed significantly to

the overall reliability, no items were excluded prior to test sample administration. Tables that further detail these results can be found in Appendix 2.

Validity. "Content validity" implies that the items in the questionnaire reflect the construct that is being measured. Content validity is not determined using statistical techniques. Instead, it is determined through a review of the literature and through detailed analysis with experts in the field being studied. Content validity also concerns item sampling adequacy—that is, the extent to which a specific set of items reflects a content domain (DeVellis, 1991: 43). Content validity is easiest to evaluate when the domain is well defined. However, it becomes more difficult to determine when measuring attributes such as beliefs and attitudes, as is the case in this study. For example, if a physician wanted to measure expected outcomes and desired outcomes of patient involvement in decision making, it might be desirable to establish that all relevant outcomes were reflected in the items. To do this, the researcher might have colleagues familiar with the study review an initial list of items and suggest content areas which have been omitted but should be included (DeVellis, 1991: 44).

Content validity for this study was established in exactly this manner. The focus group consisting of the researcher, academic advisors, and museum staff members contributed to the content areas measured in the study (motivation, evaluation, etc.) and subsequently reviewed a list of possible items prior to pilot testing the questionnaire.

Review of applicable literature also contributes to the content validity of the instrument. In chapter 2 of this study, the literature suggested several areas which should be included when embarking on a museum visitor evaluation journey. Demographics,

motivation for visiting, and evaluation of the overall museum experience were identified as important factors for museum management to consider. All of these constructs were included in this questionnaire, as previously mentioned.

Unfortunately, neither literature reviews nor focus groups could determine all possible measurement areas required for perfect museum visitor evaluation. Attitudes regarding motivation for visiting, for example, are so numerous that inclusion of all possible alternatives is nearly impossible. Additionally, determining which items to include regarding evaluation of the museum experience is an inexact science. Most items included in this questionnaire focused on "museum fatigue" factors such as information overload and comfort during the visit. However, the items included in this questionnaire appear to be consistent with many areas of measurement suggested by prior research and expert opinion. Therefore, these items appear to be valid in evaluating museum visitors.

Test Sample

The final version of the questionnaire was administered in a group setting at the USAF Museum in accordance with guidelines established by Babbitt and Nystrom (1988: 175-192). Additional reliability calculations were conducted as a comparison to the pilot test calculations. Because the pilot test sample included AFIT students, museum staff members, and faculty, reliability figures may be different from the test sample which included mostly casual visitors.

Sample. A volunteer sample of 288 museum visitors completed the questionnaire. Participants included both "casual visitors" and USAF Museum

Foundation Members. Item 42 identified Foundation Members, allowing analysis of purely "casual visitors." Of the 288 participants, only 31 were Foundation Members which indicates that the sample was primarily casual visitors. Further breakout of the sample can be found in Appendix 3.

Random sampling in this study would have been extremely difficult. Random sampling implies that all members of the population have an equal probability of being selected to complete the questionnaire. In order for this to occur, those members of the population who chose *not to attend* the museum would also have had to been selected in addition to those who did attend the museum. This type of sampling was outside the scope of this study and would have arguably required a totally different questionnaire measuring different constructs from the one used in this study. Furthermore, a random sample of visitors who attended during questionnaire administration would have required a systematic selection process which did not lend itself to the time constraints of this study.

However, the sample collected during this study was large enough to guarantee 90 percent confidence given an estimated annual population of 900,000 visitors (based on attendance figures in recent years). The calculation for sample size used in this study is shown below:

$$n = \frac{NZ^2 \times .25}{(d^2 \times (N-1)) + (Z^2 \times .25)}$$

WHERE:

n = sample size required

N = total population size (estimated)

d = precision or confidence level desired (.90 in this study)

Z = different factor for each confidence level

Using the formula shown above with a population size (N) of 900,000, a confidence level of .10, and a corresponding Z value of 1.645, the required sample size for this study would have been 68 participants. Obviously, the 288 participants far exceeds this requirement. At the .05 level of significance using the same formula, the required sample size would have been 384 participants. As the calculations illustrate, this study is much closer to the .05 level of significance.

During the first three days of questionnaire administration, a tally of refusals to complete the questionnaire was kept in order to determine if the population of refusals differed from those that participated. This was an important issue because a high refusal rate may result in a biased survey sample (Korn and Sowd, 1990: 66). However, after 144 questionnaires had been completed, only 5 refusals had been tallied. Each of the five refusals cited lack of time as the reason for not completing a questionnaire. As a result, the refusal rate was so low that it was determined to be unlikely to bias the outcome.

As previously mentioned, time to complete the questionnaire was a concern to the researcher and the museum staff. As a result, an incentive program was implemented to entice visitors to complete the questionnaire. Generally, it is accepted that incentives usually help increase response rate (Babbitt and Nystrom, 1988: 184). Coupons for free

drinks at the USAF Museum cafe were offered to all visitors who completed a questionnaire.

Test Sample Reliability of Questionnaire. The reliability of the items in the three scaled sections of the questionnaire (motivation, evaluation, and transportation) was estimated using Cronbach's alpha and the split-half techniques discussed earlier. Similarly, reliability for items in the last two sections of the questionnaire, general awareness items and demographics, was not calculated due to the presence of bipolar and categorical responses (yes/no and multiple choice).

Motivation. The reliability estimates for the first 11 items of the questionnaire are shown below in Table 5.

Table 5: Motivation Subscale Reliability for Test Sample

Variable	Cronbach's alpha	Split-Half Reliability*
MOTIVATION	.645332	.675996

*Adjusted using Spearman-Brown Prophecy Formula

Overall, the motivation items had sufficient reliability, albeit less than the pilot test, to warrant continued use in USAF Museum visitor evaluation efforts. Items 9 and 10 were dropped from the reliability calculations as in the pilot test and should be removed if further use of this particular questionnaire is planned. Tables that detail this analysis further can be found in Appendix 3.

Evaluation. The reliability estimates for items 12 through 21 measuring evaluation of the USAF Museum experience are shown below in Table 6:

Table 6: Evaluation Subscale Reliability for Test Sample

Variable	Cronbach's Alpha	Split-Half Reliability*
EVALUATION	.730835	.81532

* Adjusted using Spearman-Brown Prophecy Formula

Reliability analysis revealed that only 9 of the 10 items contributed significantly to the reliability of the evaluation subscale. Item 14 was determined to have an insignificant effect on the overall reliability, but appeared to be measuring some other construct. As such, item 14 was not included in the reliability calculations but was evaluated separately. Coding of the SAS program included a statement to drop this item from the calculation of the reliability calculations. Tables that further detail these results can be found in Appendix 3.

Transportation. The reliability estimates for items 22 through 29 are shown below in Table 7.

Table 7: Transportation Subscale Reliability for Test Sample

Variable	Cronbach's Alpha	Split-Half Reliability*
TRANSPORTATION	.704027	.698603

* Adjusted using Spearman-Brown Prophecy Formula

Overall, the transportation items had sufficient reliability, albeit less than the pilot test, to warrant continued use in USAF Museum visitor evaluation efforts. Tables that further detail these results can be found in Appendix 3.

Statistical Analysis. This section details the statistical techniques used to determine motivations for visiting the USAF Museum, visitor evaluation of the USAF Museum experience, ease in locating the USAF Museum, general awareness of USAF Museum services, and demographic composition of the visitors. Summary statistics describing the aforementioned areas of measurement were performed, and cross-tabulations between demographic categories and scaled item responses are presented at length in Chapter 4. In addition, comparisons between weekday and weekend visitors are also made.

Summary

This chapter outlined the methodology used to develop, test, and administer the questionnaire. Furthermore, sufficient reliability testing was performed to allow further use of the items included in the instrument. Validity of the constructs and the items measuring the constructs was illustrated through a review of applicable literature and expert opinion. The results of the questionnaire test sample are discussed at length in the next chapter.

IV. Analysis

Overview

The purpose of the analysis section is to discuss results from the test sample administration of the questionnaire. The data was used to determine motivations for visiting the USAF Museum, visitor evaluation of the USAF Museum experience, ease in locating the USAF Museum, general awareness of museum services, and demographic composition of the visitor base. In addition, this section addresses significant relationships through cross-tabulation of items which are of interest to museum management. Each construct is addressed individually, followed by the relationships between items. Specific data regarding the frequency of responses to individual items can be found in Appendix 3.

Motivation

Of the numerous alternative motivations for visiting the USAF Museum, the results of the questionnaire suggest that enthusiasm for aviation and aviation history is the most significant. Of 288 respondents, 228 (79.4 percent) responded that they either strongly agreed or somewhat agreed that aviation was a factor in motivating them to visit the USAF Museum. Comparatively, 73.3 percent responded in the same manner for enthusiasm for military history and only 23.1 percent responded that the IMAX movie theater was a factor in motivating them to visit the USAF Museum. Interestingly, 43.4 percent of the respondents visited the USAF Museum because a friend or family member had served in the Air Force, and 46.4 percent responded that they had visited before and

did not finish viewing all of the exhibits. Out of town guests of local residents wishing to visit the USAF Museum did not appear to be a significant motivating factor (24.4 percent).

Other interesting conclusions can be drawn with regards to the three modes of advertising measured in the study. Approximately 70 percent of all respondents strongly disagreed that any type of advertising played a factor in motivating them to visit the USAF Museum. Items 5, 6, and 7 were carefully worded in such a way that respondents did not imply that advertising was a "primary" factor in motivating them to visit the museum. Instead, the wording "played a factor" allowed for the possibility that they had heard about the museum through advertising but decided to visit for some other reason. As a result, it is difficult to determine whether the respondents never saw or heard any advertising, or whether they opted to visit based on another reason. Nonetheless, the fact that advertising played such an insignificant factor in motivating potential visitors to come to the museum invites further investigation.

Items 9 and 10 regarding special events and word-of-mouth as motivating factors were excluded from this analysis for reliability problems addressed in pilot testing. Therefore, conclusions cannot be effectively drawn from the frequency of responses to either item.

Evaluation

Evaluation of the USAF Museum experience appears to be positive based on the sample in this study. Items 12 and 13 allowed respondents to compare the USAF

Museum with other museums previously visited. Nearly 90 percent of the respondents either strongly agreed or somewhat agreed that the USAF Museum was one of the best museums of all types (art, history, etc) they had visited. Additionally, 84 percent responded in the same manner when comparing the USAF Museum to other *aviation* museums. This indicates that the USAF Museum is providing a quality experience that visitors enjoy overall, as is evidenced by item 21 where 94.8 percent of respondents either strongly agreed or somewhat agreed that they had an enjoyable experience at the USAF Museum.

However, some items in the evaluation section bear further investigation. Nearly 60 percent of the respondents felt overwhelmed by the amount of information presented on or around the displays (Item 14). This item was excluded from reliability analysis in Chapter 3, but warrants inclusion in the analysis. It clearly measured a construct, but not the same construct as the other items in the evaluation section as was evidenced by its low correlation with the total reliability. Numerous factors could account for being overwhelmed including the size of the displays and the historical accuracy of the placards. To maintain historical accuracy, a large amount of information must be displayed. Responses to Item 16 suggest that visitors feel the displays were easy to view (85.1 percent either strongly agreed or somewhat agreed), but possibly included too much information. This subject requires further investigation into alternative methods of maintaining accuracy, but improving presentation of the information.

The data from Item 18 also suggests that visitors found sufficient places to rest and relax during their visit (72.4 percent), which helps combat "museum fatigue." The

combination of physical and mental exhaustion is a primary deterrent to many museums as previously mentioned. The fact that visitors felt overwhelmed by virtue of their responses to item 14 is only a partial contributing factor. It is reassuring that physical exhaustion does not appear to be a major factor in the USAF Museum experience.

Transportation Issues

The combination of responses to items 22 and 26 (similar questions which were oppositely worded) indicate that visitors found the USAF Museum fairly easy to locate. Nearly 60 percent of respondents either strongly agreed that the museum was easy to locate, and similarly nearly 60 percent strongly disagreed that the USAF Museum was difficult to locate. The different areas at Wright-Patterson AFB did not appear to confuse a significant number of visitors (Item 24); however, nearly 50 percent either responded neutral, somewhat agree, or strongly agree that the different areas made locating the museum confusing.

The highway signs in and around the Dayton, OH, local area were also of concern in this study. The data from Item 23 suggest that the highway signs were helpful in locating the USAF Museum (72.6 percent either somewhat agreed or strongly agreed that the signs helped); however, there were mixed reviews on whether better signs are needed (Item 25). There appears to be a fairly even distribution across all possible responses on this item. Only 40.9 percent of the respondents felt that no additional or more effective signs are needed. Also, 24 percent responded neutral to this item. Many possible explanations for this exist, and one likely reason could be that many visitors came with a

group or family and did not actually drive. If this were the case, then they would likely respond neutral since a "does not apply" response option was not available. However, there appears to be some disparity on this item and it warrants further investigation.

A large number of visitors (62.2 percent) either somewhat disagreed or strongly disagreed that they were familiar with the Dayton area in Item 27. This is plausible because 59.1 percent reside outside a 150 mile radius (Item 36). In addition, a large percentage (89.5 percent) of visitors indicated that they would not visit more frequently if the USAF Museum were easier to locate. This conclusion could also be linked with the fact that many visitors came from outside a 150 mile radius and would not visit more frequently for *any* reason.

General Awareness of USAF Museum Services

Responses to items 30 through 34 were bipolar responses (yes/no) and, as such, can be reported simply as categorical data. Some interesting conclusions can be drawn from the responses to several of these items. First, nearly 31 percent of the respondents indicated that they did not know that admission was free to the USAF Museum. An interesting question for further research would be to determine if, knowing that admission was free, visitors would be more willing to visit the museum.

Also, 42.3 percent of respondents were not aware of the Presidential/Research and Development Gallery located in the museum annex in Area B of Wright-Patterson AFB. Frequent recordings over the museum public address system during the day are made advertising this significant and interesting gallery, yet few visitors responded that they

were aware of its existence. Additionally, 63.4 percent of respondents were not aware that the USAF Museum sponsors tours of the aircraft restoration facility, also located in Area B. The high percentage of aviation enthusiasts, as suggested by responses to Item 1, would likely take advantage of both of these services if they were more aware of their existence. If the USAF Museum management feels that these are important facets to the museum experience, then additional efforts to make visitors more aware may be required.

The Audio Tour service offered at the USAF Museum which allows a self-paced guided tour appears to be significantly under utilized. Over 85 percent of the respondents in this study did not use the Audio Tour service. Depending on the cost of operating this service, the benefit gained by offering it to the public may not outweigh its cost. Further analysis in this area is required before any significant recommendations can be made.

Finally, the data suggests that over 70 percent of visitors are aware that the USAF Museum is partially funded by contributions from individuals and businesses. This may or may not be of concern to museum management; however, it is of some benefit to know that visitors are aware of the opportunity to contribute to the financial well being of the museum.

Demographics

The sample in this study appears to be significantly different from the sample obtained in the prior questionnaire mailed to USAF Museum Foundation Members. Although the goal of this study was not to compare members and non-members with regard to demographic composition, some interesting conclusions can be made from the

data. As previously addressed, nearly 60 percent of the respondents came from outside 150 miles to visit the USAF Museum. Also, the age composition of the sample appears to be fairly evenly distributed across all age groups. Compared to the Foundation Members, the "casual visitor" appears to be much younger in age (47.1 percent were 40 years old or younger). Concerns over a declining visitor base due to age appear to be less of a concern than determined by the Foundation Member data. Consider however, that the time of the questionnaire administration in this study coincided with summer vacation for many children and their families. This could have influenced the larger percentage of young visitors. Administration of the questionnaire over longer periods of time, including the school year, could affect the data significantly. Another interesting conclusion is that 64.8 percent of the respondents never served in the Armed Forces. Again, the Foundation Members represent a much larger prior military population than do those sampled in this study. More detail regarding the demographic composition of the visitors can be found in Appendix 3.

Cross-Tabulation

Further insight into the results of the questionnaire can be made by comparing responses to different items. SAS Software was used to compare responses to several items. Due to the thousands of possible combinations of items, only a few were chosen to analyze in this study. Further comparisons can be made in the same manner if interest warrants the analysis. Detailed figures concerning these comparisons may be found in Appendix 4.

Distance Traveled Versus Ease of Locating USAF Museum. A comparison was made between items 22 and 36 to determine whether visitors who live near Dayton found the USAF Museum easy to locate, and to determine if those who live far away from Dayton found the USAF Museum difficult to locate. The results of the cross-tabulation between these two items (TRANS 1 and DEM 2) can be found in Appendix 4. The responses on these items suggest that those visitors who traveled from outside a 150 mile radius to visit the USAF Museum found it relatively easy to locate. Over 34 percent of the 288 respondents live outside 150 miles and strongly agreed that the USAF Museum was easy to locate. An additional 8.74 percent from the same distance away found the USAF Museum somewhat easy to locate.

Those visitors who live inside a 50 mile radius appear to also find the USAF Museum easy to locate. Of the 57 respondents who live inside a 50 mile radius, 52.6 percent of them strongly agreed that the USAF Museum was easy to locate. An additional 3.85 percent found the museum somewhat easy to locate. The results of this cross-tabulation suggest that ease in locating the USAF Museum is not a major problem area when addressing transportation issues.

Highway Signs Versus Distance Traveled. A comparison was made between items 23 and 36 to determine whether visitors who live in certain regions with respect to the USAF Museum found the signs to the museum helpful. The results of the cross-tabulation between these two items (TRANS 2 and DEM 2) can be found in Appendix 4. The responses on these items suggest that those visitors who traveled from outside a 150

mile radius to visit the USAF Museum found the signs relatively helpful in locating the USAF Museum. Over 31 percent of the 288 respondents live outside 150 miles and strongly agreed that the signs were helpful in locating the USAF Museum. An additional 11.19 percent from the same distance away somewhat agreed that the signs were helpful.

Those visitors who live inside a 50 mile radius appear to find the signs to the USAF Museum less helpful. Of the 57 respondents who live inside a 50 mile radius, only 47.3 percent of them strongly agreed that the signs were helpful. An additional 21 percent found the signs somewhat helpful. The remaining 32 percent of "local" visitors found the signs to be less helpful in locating the USAF Museum. The results of this cross-tabulation suggest that the signs used by "out-of-town" visitors are more helpful than are the ones used by "local" visitors. One can assume that visitors who live outside a 150 mile radius primarily use interstate highways to travel to the USAF Museum, whereas local visitors may use city streets and country roads. This information may be somewhat helpful in any decision regarding increased efforts in improving signage.

Age Versus Ease in Reading Display Information. A comparison was made between items 35 and 17 to determine if the information surrounding the displays was easy or difficult to read for individuals in six age categories. The results of the cross-tabulation between these two items (EVAL 6 and DEM 1) can be found in Appendix 4. The responses on these items suggest that display information is relatively easy for individuals of all ages to read. Due to the amount of historical information presented on placards next to displays, it was suspected that individuals in either the under 20 or over 60 age groups would strongly disagree that the information was "easy to see and read."

However, the responses to item 17 with respect to age suggest the contrary. Only 1.39 percent of those sampled responded that they strongly disagreed with item 17. Of these respondents, none of the under 20 or over 60 individuals felt that the information was difficult to see and read. In fact, 17.07 percent of those age 20 or younger and 24.3 percent of those age 60 or older strongly agreed that the information was, in fact, easy to see and read. Further information regarding this cross-tabulation can be found in Appendix 4.

Summary

The analysis of the data collected in this study illustrates a myriad of conclusions regarding the USAF Museum visitor base. The frequency of responses to individual items help to draw conclusions about motivation for visiting the USAF Museum, visitor evaluation of the USAF Museum experience, transportation issues, general awareness of museum services, and demographic composition of the visitor base. Furthermore, more detailed insight into responses was achieved through cross-tabulation of several items in the questionnaire. Due to the multitude of combinations of items that could have been made, only three cross-tabulations were made in this study. The three comparisons which were reported in this section were of great concern to the USAF Museum management, and thus were the only results of this type chosen for inclusion in this document.

V. Recommendations and Conclusions

Overview

The goal of this research project was to explore museum visitor evaluation practices and to apply the concepts for use at the USAF Museum. Several investigative questions discussed in Chapter 1 guided this study and are re-stated below:

(1) Why are museum visitor evaluations important to museum managers?

(2) What kind of people visit museums, and for what reasons do they attend? Why do those who do not attend stay away?

(3) What models or methods do other museums and non-profit organizations, particularly other aviation museums, use for evaluating their customers' desires?

(4) How can the USAF Museum gain from these principles in the evaluation of visitors?

(5) What kind of customer assessment method could be developed for use in the USAF Museum?

The following section discusses the conclusions drawn from research conducted to answer these questions and makes recommendations for future research in this area.

Importance of Visitor Evaluation

A review of literature in Chapter 2 discussed the importance of visitor evaluation to museum management. Visitor evaluation information is critical to museums due to the fact that the product offered to visitors is intangible. The *visit* is quite different from

products in a store for which desires and measurement of success can be determined by sales volume. Information collected during visitor evaluation can be used to make effective decisions regarding day to day operation of the museum. Any organization that is dependent on the public for it success, museums or otherwise, must determine the desires of its customers. With this in mind, it is of great importance that decisions are made based on sound research of visitor attitudes rather than management's interpretation of the same. As a result, visitor evaluation can be of great use in determining overall impressions of the product being offered by the museum: the visit.

The Museum Visitor and Motivation for Visiting Museums

As detailed in the literature review, visitors travel to museums for a myriad of reasons. Just as there are numerous types of individuals who visit museums, there are an equal number of motivations for visiting. Robinson emphasized that there is no *single* type of museum visitor. Furthermore, he suggested that museum management not to try to categorize all museum visitors as the same. However, some generalizations exist with respect to motivations for visiting museums as well as staying away from them. Those who visit museums tend to be more highly educated and come from higher income levels than do the general public. In addition, a delineation was made between scholars and the "casual visitor" in terms of interests and motivations for visiting museums. While scholars tend to seek information for intellectual purposes, the casual visitor tends to seek a more social atmosphere. All museums will arguably have both types of visitors in their visitor base, and as a result, need to develop a plan to cater to all types of visitors. Alienation of visitors also needs to be considered by museum management. "Museum

fatigue" was determined to be a common factor in alienating people from visiting museums. Information overload and physical exhaustion combine to make the experience at a museum less enjoyable. In addition, visitors may often find the information presented at museums difficult to comprehend. Curators and museum directors need to be aware that their desires for the museum may not be in harmony with the desires of the visitor base.

Models Used by Other Museums

The answer to this investigative question was less than conclusive. The research conducted in this study suggests that there is no "industry standard" for visitor evaluation. The evaluation practices conducted at museums surveyed in this study illustrates that there is a lack of consistency and understanding of evaluation practices. Of those museums which have performed visitor evaluation or are considering beginning the process, there has been very little systematic design and development of the instrument used. In addition, the results of previous visitor evaluation studies arguably lack accuracy and could contain significant amounts of measurement error due to the absence of a systematic development process.

Application of Principles to USAF Museum

The main principles applied from research of museum visitor evaluation to the USAF Museum evaluation journey fall into three main categories: motivation, evaluation, and demographics. A majority of the literature on visitor evaluation focused on these three constructs and their importance to museum managers for decision making purposes.

Motivation factors, by their very nature, are a function of the particular museum. Depending on the type of museum (art, history, etc.) the motivations for visiting can be very different. As such, it was determined that the specific motivation for visiting the USAF Museum needed to be measured in order to determine why visitors choose to visit this specific museum.

Several factors regarding evaluation of the museum experience were applied to the evaluation process at the USAF Museum as a result of the research in this study. "Museum fatigue" factors such as information overload and physical exhaustion are significant sources of alienation in any museum and were selected for inclusion in the USAF Museum evaluation process accordingly.

Finally, demographic information was selected for inclusion in this study. Factors such as age, prior military service, and distance traveled to the USAF Museum could provide further insight into the visitor base.

Two additional constructs were included in the development of a visitor evaluation instrument for the USAF Museum: transportation issues and general awareness of USAF Museum services. Although the research of museum visitor evaluation did not address these constructs, the specific needs of USAF Museum managers dictated measurement of these specific areas of concern.

Development of a USAF Museum Visitor Evaluation Instrument

Chapter 3 details the process of developing, pilot testing, and administering the instrument for the USAF Museum. Although a significant portion of this research project focused on this particular instrument and analysis of the data in Chapter 4, this is not the

only method of evaluating USAF Museum customers. Rather than focusing on the instrument, the items, or the analysis of the result, it is more imperative to learn from the process used in developing *any* museum visitor evaluation instrument. Although the questionnaire developed in this study satisfies the current need for a visitor evaluation instrument at the USAF Museum, it does not measure all constructs which possibly affect decisions made by museum management. In fact, improvements need to consistently be made to the instrument to gather timely and accurate information about museum visitors. Recommendations for further improvements in this particular instrument as well as future potential areas of study are addressed in the next section.

Recommendations

Questionnaire Development. The constructs included in this study were a function of research of literature combined with ideas generated by a focus group of museum staff and the researcher. Other potential areas of concern which surfaced after the administration and analysis of the questionnaire are as follows:

1) Advertising: The results of this study suggested that advertising was not a factor in motivating people to visit the museum. If this is a function of visibility (for example, advertising in the wrong periodicals, radio stations, or television channels), which media would be best for the limited advertising budget?
2) Other motivation factors: This study addressed only a limited number of possible motivating factors in bringing visitors to the museum. Do other motivations exist? Does a better method of determining motivation exist?

3) Evaluation: This study focused on the overall USAF Museum experience. The potential for research into a more specific area is enormous. For example, museum services such as the Audio Tour cost a significant amount of money to operate. Given that 89 percent of those surveyed in this study did not use the Audio Tour, do the 11 percent who did use it find it useful in their visit? Is it cost effective to continue to offer the Audio Tour?

Questionnaire Administration. As previously addressed, the administration of this questionnaire lacked a totally random sample. A longer administration period would allow the researcher to select respondents using probability sampling techniques. Although the sample size in this study was sufficiently large enough to minimize sampling error, a random sampling technique such as described in the American Association of Museums Survey Manual would help guarantee that the sample population was representative of the whole population (Korn and Sowd, 1990: 39-42).

Questionnaire Mechanics. The specific items selected for inclusion in the questionnaire used in this study could be further improved to reduce error in comprehension by respondents. Several items (for example item 28) used in this study resulted in a high percentage of "neutral" responses which may suggest that the respondents did not totally understand the question or their particular response did not apply. Altering the five-point Likert scale to include a "does not apply" option may alleviate this anomaly. In addition, a better answer sheet needs to be developed. The AFIT form 11C used in this study provided more response options (10) per item than the item required (no more than 6). The use of an optical scan answer sheet is still

recommended as it eases the data analysis process. However, a questionnaire which includes the items and response options on the same sheet is more desirable. This would allow the researcher to control the number of response alternatives and would eliminate responses outside the acceptable range. Finally, if use of the specific questionnaire developed in this study is desired, it is recommended that items 9 and 10 be removed from the printed copy as they add no value as addressed in Chapter 3.

Summary

This study explored the museum visitor evaluation process and applied concepts discovered through research in the development of a potential visitor evaluation instrument for the USAF Museum. The emphasis on the *importance* of effective museum evaluation is paramount in continuously improving the intangible product and service provided by a museum. However, the process used in developing the questionnaire is the key thrust of this study. Other evaluation tools and techniques are available, but should follow a similar process of development, pilot testing, and administration to guarantee accurate and usable data regarding the museum visitor base. Furthermore, the constructs measured in this study represent a small sample of the myriad of measurable areas which constitute the museum experience.

APPENDIX 1: VISITOR EVALUATION QUESTIONNAIRE

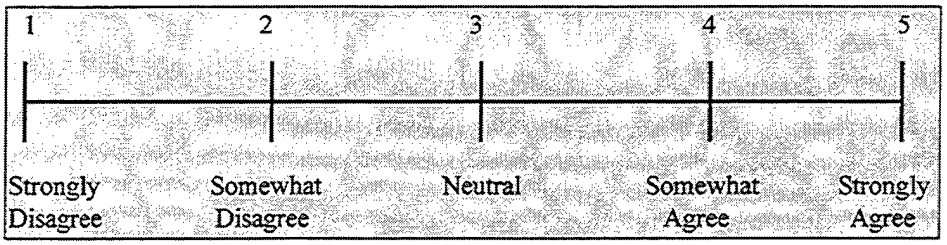
UNITED STATES AIR FORCE MUSEUM
WRIGHT-PATTERSON AFB, OH

VISITOR EVALUATION QUESTIONNAIRE

INSTRUCTIONS

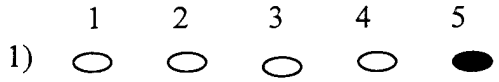
Each question should be answered by filling in the circle on your answer sheet which best describes your feelings and responses. Please use the pencil which we have provided. See the sample question below:

SAMPLE QUESTION:



1) **My enthusiasm for aviation and aviation history was an important reason for visiting the USAF Museum today.**

If you *strongly agreed* that aviation history was important to your visit, then you would fill in the circle with the <u>number 5</u> next to <u>question 1</u> on your answer sheet as shown below:



Please make sure that you fill in the circles completely so that the scanning machine accurately detects your responses. Incomplete or stray pencil marks will result in an improperly detected response and must be discarded from the study.

If you have any questions, please ask the questionnaire administrator for assistance. You are free to take as much time as necessary to complete the questionnaire. **REMEMBER:** We are in need of your honest assessment of the USAF Museum so that we can determine if we are meeting the desires of our visitors! The questionnaire should take approximately 15 minutes to complete.

Please choose only **one** response which most accurately describes your opinion.

Please indicate how much you agree or disagree with the following statements

1	2	3	4	5
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

1) My enthusiasm for aviation and aviation history was an important reason for visiting the USAF Museum today.

2) My enthusiasm for military history was an important reason for visiting the USAF Museum today.

3) An important reason for visiting the USAF Museum today was to view an IMAX motion picture.

4) I visited the USAF Museum today because a family member or a friend served in the Air Force.

5) Television advertising played a factor in motivating me to visit the USAF Museum.

6) Radio advertising played a factor in motivating me to visit the USAF Museum.

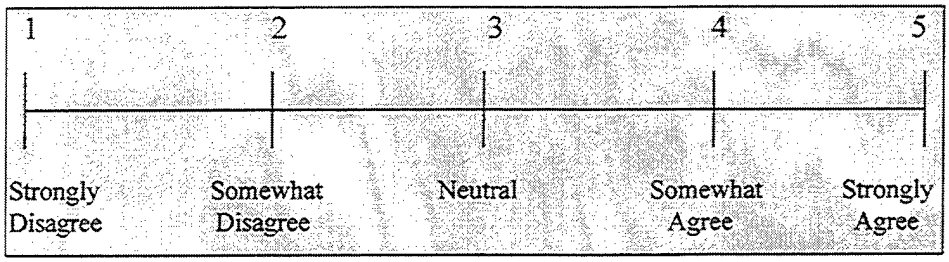
7) Newspaper and/or magazine advertisements motivated me to visit the USAF Museum.

8) I visited the USAF Museum today because I had been here before and did not completely finish viewing all of the exhibits.

9) A friend or family member told me about the USAF Museum, which motivated me to visit the USAF Museum today.

10) A special event (for example: reunion) was a factor in my visit today.

11) I visited today because my out of town guests wanted to see the USAF Museum.



12) Compared to other museums I have visited, the USAF Museum is one of the best.

13) Compared to other *aviation* museums that I have visited, the USAF Museum is one of the best.

14) I felt overwhelmed by the amount of information presented on or around the displays in the USAF Museum.

15) I felt rushed to view all of the displays in the time I had allotted at the USAF Museum.

16) The aircraft and displays I wanted to see were placed so that they were easy to view.

17) The information about the displays was easy to see and read.

18) During my visit, I felt that there were sufficient places to rest and relax in the exhibit areas.

19) The organizational flow of displays from one gallery to the next (for example: from Early Years to the Air Power Gallery) was clear and effective.

20) I had enough time to view all of the aircraft and displays in the time I set aside for my visit today.

21) Overall, I had an enjoyable experience during my visit to the USAF Museum.

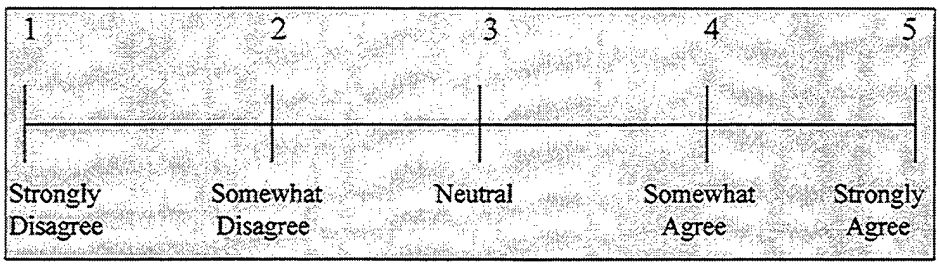
22) During my travel today, I found the USAF Museum easy to locate.

23) I found the highway signs helpful in locating the USAF Museum.

24) The different areas (A, B, and C) on Wright-Patterson Air Force Base made it confusing for me to locate the USAF Museum.

25) Better highway signs directing visitors to the USAF Museum are needed.

26) The USAF Museum was difficult to locate.



27) I am familiar with the Dayton, OH local area.

28) If the USAF Museum were easier to locate, I would visit more frequently.

29) I was reluctant to visit the USAF Museum because it is located on a military base.

Please turn to the next page and continue with question 30

The next 15 questions are multiple choice

Please Choose Only One Response!

30) I was aware that admission was free for the USAF Museum prior to visiting today.

1) yes
2) no

31) I am aware that there is another building, other than this one, which has presidential aircraft displays.

1) yes
2) no

32) I am aware that the USAF Museum sponsors special tours of the aircraft restoration facility.

1) yes
2) no

33) I used the Audio Tour during my visit today.

1) yes
2) no

34) I am aware that donations to the "Friends of the USAF Museum" from visitors such as myself help to raise money for new buildings to house more aircraft and displays.

1) yes
2) no

35) My age is _____.

1) under 20 years old
2) 21-30
3) 31-40
4) 41-50
5) 51-60
6) over 60

36) I live _____.

1) within 50 miles from the USAF Museum
2) between 50 and 100 miles from the USAF Museum
3) between 100 and 150 miles from the USAF Museum
4) more than 150 miles from the USAF Museum

37) My combined household income is _____.

1) under $20,000 per year
2) between $20,000 and $40,000 per year
3) between $40,000 and $60,000 per year
4) over $60,000 per year

38) My prior military experience is _____.

1) never served
2) Army
3) Air Force
4) Marines
5) Navy
6) Other

39) I visited the USAF Museum today _____.

1) by myself
2) with (a) friend(s)
3) with my family
4) with an organized group

40) The highest level of education I have attained is _____.

1) high school
2) some college
3) college degree
4) some graduate work
5) graduate degree

41) How much time did you plan to spend at the USAF Museum today?

1) less than 1 hour
2) between 1 and 2 hours
3) between 2 and 3 hours
4) more than 3 hours
5) no time limit

42) I am a Member of the USAF Museum Foundation, "Friends of the USAF Museum."

1) yes
2) no

43) My occupation is _____.

1) active duty military
2) student (any grade including graduate student)
3) teacher
4) professional/technical
5) retired
6) other

44) How many times have you visited the USAF Museum in the past year? (Not including today)

1) never
2) 1 time
3) 2 - 4
4) 5 - 9
5) more than 10

Thank you for taking time from your visit to complete this questionnaire.

Your responses will help make the U.S. Air Force Museum better!

APPENDIX 2: PILOT TEST

FREQUENCY COUNT AND RELIABILITY DATA

Pilot Test Frequency Count

MOT1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	2	5.4	2	5.4
3	3	8.1	5	13.5
4	10	27.0	15	40.5
5	22	59.5	37	100.0

Frequency Missing = 2

MOT2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1	2.6	1	2.6
2	2	5.3	3	7.9
3	4	10.5	7	18.4
4	16	42.1	23	60.5
5	15	39.5	38	100.0

Frequency Missing = 1

MOT3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	7	18.4	7	18.4
2	6	15.8	13	34.2
3	10	26.3	23	60.5
4	9	23.7	32	84.2
5	6	15.8	38	100.0

Frequency Missing = 1

MOT4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	15	38.5	15	38.5
2	3	7.7	18	46.2
3	7	17.9	25	64.1
4	7	17.9	32	82.1
5	7	17.9	39	100.0

MOT5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	22	56.4	22	56.4
2	4	10.3	26	66.7
3	7	17.9	33	84.6
4	6	15.4	39	100.0

MOT6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	24	61.5	24	61.5
2	4	10.3	28	71.8
3	7	17.9	35	89.7
4	3	7.7	38	97.4
5	1	2.6	39	100.0

MOT7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	20	51.3	20	51.3
2	5	12.8	25	64.1
3	9	23.1	34	87.2
4	3	7.7	37	94.9
5	2	5.1	39	100.0

MOT8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	12	31.6	12	31.6
3	8	21.1	20	52.6
4	9	23.7	29	76.3
5	9	23.7	38	100.0

Frequency Missing = 1

MOT9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	8	21.1	8	21.1
2	3	7.9	11	28.9
3	15	39.5	26	68.4
4	3	7.9	29	76.3
5	9	23.7	38	100.0

Frequency Missing = 1

MOT10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	19	48.7	19	48.7
2	2	5.1	21	53.8
3	9	23.1	30	76.9
4	3	7.7	33	84.6
5	6	15.4	39	100.0

MOT11	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	13	35.1	13	35.1
2	1	2.7	14	37.8
3	6	16.2	20	54.1
4	6	16.2	26	70.3
5	11	29.7	37	100.0

Frequency Missing = 2

EVAL1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	1	2.6	1	2.6
3	2	5.3	3	7.9
4	13	34.2	16	42.1
5	22	57.9	38	100.0

Frequency Missing = 1

EVAL2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
3	2	5.3	2	5.3
4	3	7.9	5	13.2
5	33	86.8	38	100.0

Frequency Missing = 1

EVAL3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	10.3	4	10.3
2	1	2.6	5	12.8
3	6	15.4	11	28.2
4	14	35.9	25	64.1
5	14	35.9	39	100.0

EVAL4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	3	7.9	3	7.9
2	3	7.9	6	15.8
3	5	13.2	11	28.9
4	18	47.4	29	76.3
5	9	23.7	38	100.0

Frequency Missing = 1

EVAL5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1	2.6	1	2.6
2	2	5.1	3	7.7
3	6	15.4	9	23.1
4	18	46.2	27	69.2
5	12	30.8	39	100.0

EVAL6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1	2.6	1	2.6
2	7	18.4	8	21.1
3	6	15.8	14	36.8
4	13	34.2	27	71.1
5	11	28.9	38	100.0

Frequency Missing = 1

EVAL7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	3	7.9	3	7.9
2	11	28.9	14	36.8
3	7	18.4	21	55.3
4	7	18.4	28	73.7
5	10	26.3	38	100.0

Frequency Missing = 1

EVAL8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	8	21.1	8	21.1
3	6	15.8	14	36.8
4	14	36.8	28	73.7
5	10	26.3	38	100.0

Frequency Missing = 1

EVAL9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	9	23.1	9	23.1
2	12	30.8	21	53.8
3	7	17.9	28	71.8
4	5	12.8	33	84.6
5	6	15.4	39	100.0

EVAL10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
4	11	28.9	11	28.9
5	27	71.1	38	100.0

Frequency Missing = 1

TRANS1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	1	2.6	1	2.6
2	10	26.3	11	28.9
3	6	15.8	17	44.7
4	8	21.1	25	65.8
5	13	34.2	38	100.0

Frequency Missing = 1

TRANS2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	10.5	4	10.5
2	7	18.4	11	28.9
3	6	15.8	17	44.7
4	9	23.7	26	68.4
5	12	31.6	38	100.0

Frequency Missing = 1

TRANS3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	7	17.9	7	17.9
2	7	17.9	14	35.9
3	9	23.1	23	59.0
4	9	23.1	32	82.1
5	7	17.9	39	100.0

TRANS4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5	12.8	5	12.8
2	4	10.3	9	23.1
3	9	23.1	18	46.2
4	11	28.2	29	74.4
5	10	25.6	39	100.0

TRANS5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	13	33.3	13	33.3
2	7	17.9	20	51.3
3	5	12.8	25	64.1
4	11	28.2	36	92.3
5	3	7.7	39	100.0

TRANS6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	7	17.9	7	17.9
2	3	7.7	10	25.6
3	3	7.7	13	33.3
4	11	28.2	24	61.5
5	15	38.5	39	100.0

TRANS7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	14	35.9	14	35.9
2	4	10.3	18	46.2
3	15	38.5	33	84.6
4	2	5.1	35	89.7
5	4	10.3	39	100.0

TRANS8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	27	69.2	27	69.2
2	1	2.6	28	71.8
3	5	12.8	33	84.6
4	1	2.6	34	87.2
5	5	12.8	39	100.0

GEN1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	24	61.5	24	61.5
2	15	38.5	39	100.0

GEN2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	20	51.3	20	51.3
2	19	48.7	39	100.0

GEN3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	7	17.9	7	17.9
2	32	82.1	39	100.0

GEN4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	6	15.4	6	15.4
2	33	84.6	39	100.0

GEN5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	20	52.6	20	52.6
2	18	47.4	38	100.0

Frequency Missing = 1

DEM1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	10.5	4	10.5
2	5	13.2	9	23.7
3	11	28.9	20	52.6
4	4	10.5	24	63.2
5	8	21.1	32	84.2
6	6	15.8	38	100.0

Frequency Missing = 1

DEM2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	23	60.5	23	60.5
2	4	10.5	27	71.1
3	1	2.6	28	73.7
4	10	26.3	38	100.0

Frequency Missing = 1

DEM3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	10.3	4	10.3
2	10	25.6	14	35.9
3	13	33.3	27	69.2
4	12	30.8	39	100.0

DEM4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	21	53.8	21	53.8
2	2	5.1	23	59.0
3	15	38.5	38	97.4
5	1	2.6	39	100.0

DEM5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5	12.8	5	12.8
2	8	20.5	13	33.3
3	23	59.0	36	92.3
4	3	7.7	39	100.0

DEM6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	3	7.7	3	7.7
2	9	23.1	12	30.8
3	6	15.4	18	46.2
4	9	23.1	27	69.2
5	12	30.8	39	100.0

DEM7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	2	5.1	2	5.1
2	8	20.5	10	25.6
3	9	23.1	19	48.7
4	14	35.9	33	84.6
5	6	15.4	39	100.0

DEM8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	11	28.9	11	28.9
2	27	71.1	38	100.0

Frequency Missing = 1

DEM9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	9	23.1	9	23.1
2	6	15.4	15	38.5
3	1	2.6	16	41.0
4	10	25.6	26	66.7
5	7	17.9	33	84.6
6	6	15.4	39	100.0

DEM10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	14	35.9	14	35.9
2	11	28.2	25	64.1
3	9	23.1	34	87.2
4	1	2.6	35	89.7
5	4	10.3	39	100.0

Cronbach's Alpha Reliability Data

Correlation Analysis

9 'VAR' Variables: MOT1 MOT2 MOT3 MOT4 MOT5 MOT6 MOT7 MOT8 MOT11

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
MOT1	36	4.33333	1.04198	156.00000	1.00000	5.00000
MOT2	36	4.08333	0.99642	147.00000	1.00000	5.00000
MOT3	36	2.91667	1.29560	105.00000	1.00000	5.00000
MOT4	36	2.72222	1.54200	98.00000	1.00000	5.00000
MOT5	36	1.86111	1.15022	67.00000	1.00000	4.00000
MOT6	36	1.80556	1.19090	65.00000	1.00000	5.00000
MOT7	36	2.00000	1.24212	72.00000	1.00000	5.00000
MOT8	36	3.13889	1.58840	113.00000	1.00000	5.00000
MOT11	36	3.08333	1.67971	111.00000	1.00000	5.00000

Correlation Analysis

Cronbach Coefficient Alpha

for RAW variables : 0.734603
for STANDARDIZED variables: 0.732432

	Raw Variables		Std. Variables	
Deleted Variable	Correlation with Total	Alpha	Correlation with Total	Alpha
MOT1	-0.009594	0.765671	0.041560	0.767863
MOT2	0.129005	0.748001	0.155948	0.750235
MOT3	0.338759	0.722717	0.308708	0.725418
MOT4	0.531734	0.686871	0.505224	0.691252
MOT5	0.641084	0.675811	0.643704	0.665596
MOT6	0.668426	0.669536	0.687642	0.657174
MOT7	0.677975	0.665610	0.671487	0.660286
MOT8	0.523554	0.688498	0.517994	0.688942
MOT11	0.257312	0.746562	0.224272	0.739318

Split-Half Reliability Data

2 'VAR' Variables: ME MO

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
ME	36	11.75000	3.63613	423.00000	4.00000	18.00000
MO	36	14.19444	3.72497	511.00000	8.00000	21.00000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 36

	ME	MO
ME	1.00000 0.0	0.67661 0.0001
MO	0.67661 0.0001	1.00000 0.0

Correlation Analysis

2 'VAR' Variables: EE EO

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
EE	38	19.18421	3.00320	729.00000	13.00000	25.00000
EO	38	16.52632	3.21093	628.00000	11.00000	22.00000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 38

	EE	EO
EE	1.00000	0.74641
	0.0	0.0001
EO	0.74641	1.00000
	0.0001	0.0

Correlation Analysis

2 'VAR' Variables: TE TO

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
TE	38	11.47368	3.68882	436.00000	4.00000	20.00000
TO	38	10.42105	4.22753	396.00000	4.00000	18.00000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 38

	TE	TO
TE	1.00000 0.0	0.76330 0.0001
TO	0.76330 0.0001	1.00000 0.0

APPENDIX 3: TEST SAMPLE

FREQUENCY COUNT AND RELIABILITY DATA

TEST SAMPLE FREQUENCY COUNT

MOT1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	6	2.1	6	2.1
2	11	3.8	17	5.9
3	42	14.6	59	20.6
4	65	22.6	124	43.2
5	163	56.8	287	100.0

Frequency Missing = 1

MOT2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	6	2.1	6	2.1
2	20	6.9	26	9.0
3	51	17.7	77	26.7
4	86	29.9	163	56.6
5	125	43.4	288	100.0

MOT3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	69	24.0	69	24.0
2	45	15.7	114	39.7
3	78	27.2	192	66.9
4	45	15.7	237	82.6
5	50	17.4	287	100.0

Frequency Missing = 1

MOT4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	95	33.0	95	33.0
2	17	5.9	112	38.9
3	51	17.7	163	56.6
4	32	11.1	195	67.7
5	93	32.3	288	100.0

MOT5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	201	69.8	201	69.8
2	24	8.3	225	78.1
3	47	16.3	272	94.4
4	10	3.5	282	97.9
5	6	2.1	288	100.0

MOT6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	207	71.9	207	71.9
2	21	7.3	228	79.2
3	45	15.6	273	94.8
4	11	3.8	284	98.6
5	4	1.4	288	100.0

MOT7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	187	65.2	187	65.2
2	20	7.0	207	72.1
3	50	17.4	257	89.5
4	20	7.0	277	96.5
5	10	3.5	287	100.0

Frequency Missing = 1

MOT8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	94	32.8	94	32.8
2	18	6.3	112	39.0
3	42	14.6	154	53.7
4	49	17.1	203	70.7
5	84	29.3	287	100.0

Frequency Missing = 1

MOT9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	78	27.1	78	27.1
2	16	5.6	94	32.6
3	44	15.3	138	47.9
4	45	15.6	183	63.5
5	105	36.5	288	100.0

MOT10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	151	52.4	151	52.4
2	10	3.5	161	55.9
3	38	13.2	199	69.1
4	34	11.8	233	80.9
5	55	19.1	288	100.0

MOT11	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	170	59.4	170	59.4
2	9	3.1	179	62.6
3	37	12.9	216	75.5
4	17	5.9	233	81.5
5	53	18.5	286	100.0

Frequency Missing = 2

EVAL1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5	1.7	5	1.7
2	5	1.7	10	3.5
3	21	7.3	31	10.8
4	78	27.1	109	37.8
5	179	62.2	288	100.0

EVAL2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5	1.7	5	1.7
2	3	1.0	8	2.8
3	38	13.2	46	16.0
4	43	15.0	89	31.0
5	198	69.0	287	100.0

Frequency Missing = 1

EVAL3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	42	14.7	42	14.7
2	29	10.2	71	24.9
3	45	15.8	116	40.7
4	73	25.6	189	66.3
5	96	33.7	285	100.0

Frequency Missing = 3

EVAL4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	59	20.5	59	20.5
2	44	15.3	103	35.8
3	58	20.1	161	55.9
4	74	25.7	235	81.6
5	53	18.4	288	100.0

EVAL5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	6	2.1	6	2.1
2	10	3.5	16	5.6
3	27	9.4	43	14.9
4	82	28.5	125	43.4
5	163	56.6	288	100.0

EVAL6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	4	1.4	4	1.4
2	17	5.9	21	7.3
3	15	5.2	36	12.5
4	83	28.8	119	41.3
5	169	58.7	288	100.0

EVAL7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	14	4.9	14	4.9
2	37	12.9	51	17.8
3	28	9.8	79	27.5
4	77	26.8	156	54.4
5	131	45.6	287	100.0

Frequency Missing = 1

EVAL8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	2	0.7	2	0.7
2	17	5.9	19	6.6
3	30	10.5	49	17.1
4	82	28.7	131	45.8
5	155	54.2	286	100.0

Frequency Missing = 2

EVAL9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	33	11.5	33	11.5
2	53	18.5	86	30.1
3	43	15.0	129	45.1
4	69	24.1	198	69.2
5	88	30.8	286	100.0

Frequency Missing = 2

EVAL10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	5	1.7	5	1.7
2	1	0.3	6	2.1
3	9	3.1	15	5.2
4	43	15.0	58	20.2
5	229	79.8	287	100.0

Frequency Missing = 1

TRANS1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	8	2.8	8	2.8
2	24	8.3	32	11.1
3	41	14.2	73	25.3
4	46	16.0	119	41.3
5	169	58.7	288	100.0

TRANS2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	13	4.5	13	4.5
2	23	8.0	36	12.5
3	43	14.9	79	27.4
4	51	17.7	130	45.1
5	158	54.9	288	100.0

TRANS3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	87	30.2	87	30.2
2	48	16.7	135	46.9
3	78	27.1	213	74.0
4	50	17.4	263	91.3
5	25	8.7	288	100.0

TRANS4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	62	21.5	62	21.5
2	56	19.4	118	41.0
3	69	24.0	187	64.9
4	55	19.1	242	84.0
5	46	16.0	288	100.0

TRANS5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	168	58.3	168	58.3
2	47	16.3	215	74.7
3	36	12.5	251	87.2
4	27	9.4	278	96.5
5	10	3.5	288	100.0

TRANS6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	145	50.7	145	50.7
2	33	11.5	178	62.2
3	33	11.5	211	73.8
4	27	9.4	238	83.2
5	48	16.8	286	100.0

Frequency Missing = 2

TRANS7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	145	50.3	145	50.3
2	37	12.8	182	63.2
3	76	26.4	258	89.6
4	16	5.6	274	95.1
5	14	4.9	288	100.0

TRANS8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	234	81.5	234	81.5
2	12	4.2	246	85.7
3	26	9.1	272	94.8
4	6	2.1	278	96.9
5	9	3.1	287	100.0

Frequency Missing = 1

GEN1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	196	69.5	196	69.5
2	86	30.5	282	100.0

Frequency Missing = 6

GEN2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	165	57.7	165	57.7
2	121	42.3	286	100.0

Frequency Missing = 2

GEN3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	105	36.6	105	36.6
2	182	63.4	287	100.0

Frequency Missing = 1

GEN4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	42	14.7	42	14.7
2	244	85.3	286	100.0

Frequency Missing = 2

GEN5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	199	70.6	199	70.6
2	83	29.4	282	100.0

Frequency Missing = 6

DEM1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	57	19.9	57	19.9
2	29	10.1	86	30.0
3	49	17.1	135	47.0
4	56	19.5	191	66.6
5	43	15.0	234	81.5
6	53	18.5	287	100.0

Frequency Missing = 1

DEM2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	57	19.9	57	19.9
2	44	15.4	101	35.3
3	16	5.6	117	40.9
4	169	59.1	286	100.0

Frequency Missing = 2

DEM3	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	36	12.7	36	12.7
2	63	22.2	99	34.9
3	88	31.0	187	65.8
4	97	34.2	284	100.0

Frequency Missing = 4

DEM4	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	186	64.8	186	64.8
2	25	8.7	211	73.5
3	56	19.5	267	93.0
4	5	1.7	272	94.8
5	10	3.5	282	98.3
6	5	1.7	287	100.0

Frequency Missing = 1

DEM5	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	34	12.0	34	12.0
2	28	9.9	62	21.8
3	175	61.6	237	83.5
4	47	16.5	284	100.0

Frequency Missing = 4

DEM6	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	73	26.2	73	26.2
2	61	21.9	134	48.0
3	52	18.6	186	66.7
4	33	11.8	219	78.5
5	60	21.5	279	100.0

Frequency Missing = 9

DEM7	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	8	2.8	8	2.8
2	38	13.2	46	16.0
3	65	22.6	111	38.5
4	101	35.1	212	73.6
5	76	26.4	288	100.0

DEM8	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	31	10.8	31	10.8
2	256	89.2	287	100.0

Frequency Missing = 1

DEM9	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	20	7.0	20	7.0
2	62	21.6	82	28.6
3	18	6.3	100	34.8
4	78	27.2	178	62.0
5	71	24.7	249	86.8
6	38	13.2	287	100.0

Frequency Missing = 1

DEM10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	174	60.6	174	60.6
2	49	17.1	223	77.7
3	47	16.4	270	94.1
4	6	2.1	276	96.2
5	11	3.8	287	100.0

Frequency Missing = 1

TEST SAMPLE CRONBACH'S ALPHA RELIABILITY DATA

Correlation Analysis

9 'VAR' Variables: MOT1 MOT2 MOT3 MOT4 MOT5 MOT6 MOT7 MOT8 MOT11

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
MOT1	283	4.27915	0.99457	1211	1.00000	5.00000
MOT2	283	4.04240	1.04082	1144	1.00000	5.00000
MOT3	283	2.84452	1.39294	805.00000	1.00000	5.00000
MOT4	283	3.03180	1.67238	858.00000	1.00000	5.00000
MOT5	283	1.57597	1.00198	446.00000	1.00000	5.00000
MOT6	283	1.54417	0.97885	437.00000	1.00000	5.00000
MOT7	283	1.75618	1.16719	497.00000	1.00000	5.00000
MOT8	283	3.02473	1.65331	856.00000	1.00000	5.00000
MOT11	283	2.20141	1.60840	623.00000	1.00000	5.00000

Correlation Analysis

Cronbach Coefficient Alpha

for RAW variables : 0.645332
for STANDARDIZED variables: 0.675664

	Raw Variables		Std. Variables	
Deleted Variable	Correlation with Total	Alpha	Correlation with Total	Alpha
MOT1	0.149822	0.649836	0.171651	0.685669
MOT2	0.214106	0.639321	0.226608	0.674721
MOT3	0.257395	0.634059	0.236328	0.672758
MOT4	0.366621	0.608462	0.357218	0.647668
MOT5	0.539946	0.580702	0.573405	0.599568
MOT6	0.552730	0.579713	0.592284	0.595164
MOT7	0.485463	0.583688	0.518593	0.612166
MOT8	0.275367	0.635237	0.269137	0.666073
MOT11	0.246291	0.642086	0.246268	0.670743

TEST SAMPLE SPLIT-HALF RELIABILITY DATA

Correlation Analysis

2 'VAR' Variables: ME MO

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
ME	283	11.64311	3.35962	3295	4.00000	20.00000
MO	283	12.65724	3.56687	3582	6.00000	23.00000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 283

	ME	MO
ME	1.00000 0.0	0.51057 0.0001
MO	0.51057 0.0001	1.00000 0.0

Correlation Analysis

2 'VAR' Variables: EE EO

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
EE	282	20.81560	2.98419	5870	8.00000	25.00000
EO	282	16.19858	2.84404	4568	4.00000	20.00000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 282

	EE	EO
EE	1.00000	0.68822
	0.0	0.0001
EO	0.68822	1.00000
	0.0001	0.0

Correlation Analysis

2 'VAR' Variables: TE TO

Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
TE	286	8.49650	3.10602	2430	4.00000	20.00000
TO	286	8.21678	3.39275	2350	4.00000	18.00000

Pearson Correlation Coefficients / Prob > |R| under Ho: Rho=0 / N = 286

	TE	TO
TE	1.00000 0.0	0.53681 0.0001
TO	0.53681 0.0001	1.00000 0.0

APPENDIX 4: CROSS TABULATION OF QUESTIONNAIRE ITEMS

EASE IN LOCATING MUSEUM VERSUS DISTANCE TRAVELED

TABLE OF TRANS1 BY DEM2

TRANS1 DEM2

Frequency Percent Row Pct Col Pct	1	2	3	4	Total
1	0 0.00 0.00 0.00	1 0.35 12.50 2.27	1 0.35 12.50 6.25	6 2.10 75.00 3.55	8 2.80
2	8 2.80 34.78 14.04	2 0.70 8.70 4.55	1 0.35 4.35 6.25	12 4.20 52.17 7.10	23 8.04
3	8 2.80 19.51 14.04	4 1.40 9.76 9.09	2 0.70 4.88 12.50	27 9.44 65.85 15.98	41 14.34
4	11 3.85 23.91 19.30	9 3.15 19.57 20.45	1 0.35 2.17 6.25	25 8.74 54.35 14.79	46 16.08
5	30 10.49 17.86 52.63	28 9.79 16.67 63.64	11 3.85 6.55 68.75	99 34.62 58.93 58.58	168 58.74
Total	57 19.93	44 15.38	16 5.59	169 59.09	286 100.00

Frequency Missing = 2

EFFECTIVENESS OF SIGNS VERSUS DISTANCE TRAVELED

TABLE OF TRANS2 BY DEM2

TRANS2 DEM2

Frequency Percent Row Pct Col Pct	1	2	3	4	Total
1	5 1.75 38.46 8.77	1 0.35 7.69 2.27	2 0.70 15.38 12.50	5 1.75 38.46 2.96	13 4.55
2	4 1.40 18.18 7.02	3 1.05 13.64 6.82	0 0.00 0.00 0.00	15 5.24 68.18 8.88	22 7.69
3	9 3.15 20.93 15.79	6 2.10 13.95 13.64	1 0.35 2.33 6.25	27 9.44 62.79 15.98	43 15.03
4	12 4.20 23.53 21.05	5 1.75 9.80 11.36	2 0.70 3.92 12.50	32 11.19 62.75 18.93	51 17.83
5	27 9.44 17.20 47.37	29 10.14 18.47 65.91	11 3.85 7.01 68.75	90 31.47 57.32 53.25	157 54.90
Total	57 19.93	44 15.38	16 5.59	169 59.09	286 100.00

Frequency Missing = 2

EASE IN READING DISPLAY INFORMATION VERSUS AGE

TABLE OF EVAL6 BY DEM1

EVAL6 DEM1

Frequency Percent Row Pct Col Pct	1	2	3	4	5	6	Total
1	0 0.00 0.00 0.00	1 0.35 25.00 3.45	3 1.05 75.00 6.12	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 1.39
2	3 1.05 17.65 5.26	1 0.35 5.88 3.45	5 1.74 29.41 10.20	3 1.05 17.65 5.36	2 0.70 11.76 4.65	3 1.05 17.65 5.66	17 5.92
3	5 1.74 33.33 8.77	1 0.35 6.67 3.45	0 0.00 0.00 0.00	4 1.39 26.67 7.14	3 1.05 20.00 6.98	2 0.70 13.33 3.77	15 5.23
4	18 6.27 21.69 31.58	14 4.88 16.87 48.28	15 5.23 18.07 30.61	17 5.92 20.48 30.36	10 3.48 12.05 23.26	9 3.14 10.84 16.98	83 28.92
5	31 10.80 18.45 54.39	12 4.18 7.14 41.38	26 9.06 15.48 53.06	32 11.15 19.05 57.14	28 9.76 16.67 65.12	39 13.59 23.21 73.58	168 58.54
Total	57 19.86	29 10.10	49 17.07	56 19.51	43 14.98	53 18.47	287 100.00

Frequency Missing = 1

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Vita

Captain William J. Wosilius was born on 26 June 1968 in Valparaiso, Indiana. He graduated from Valparaiso High School in 1986 and entered undergraduate studies at Bloomsburg University of Pennsylvania. In 1987, he transferred to the United States Air Force Academy in Colorado Springs, Colorado. He received his Bachelor of Science degree in Management and received his commission on 29 May 1991.

Upon completion of the Aircraft/Munitions Maintenance Officers Course at Chanute AFB, Illinois in December 1991, Captain Wosilius was assigned to the 3rd Wing, Elmendorf AFB, Alaska. During his tour, he held several positions within the wing as an aircraft maintenance officer including Officer-in-Charge of Sortie Generation in the 90th Fighter Squadron and Officer-in-Charge of Munitions Flight in the 3rd Maintenance Squadron. In May 1996, he entered the School of Logistics and Acquisition Management, Air Force Institute of Technology, Wright-Patterson AFB, Ohio. Upon graduation in September 1997, Captain Wosilius assumed his current duties as an Integrated Logistics Support Manager at the F-22 System Program Office, Wright-Patterson AFB, OH.

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13. ABSTRACT (*Maximum 200 Words*)
Research was conducted to determine a viable museum visitor evaluation method for use at the USAF Museum, Wright-Patterson AFB, OH. A 44 item questionnaire was developed, tested, and administered to 288 visitors to measure attitudes and collect information regarding the USAF Museum visitor base. Constructs in the questionnaire included: motivation for visiting, evaluation of the museum experience, transportation issues, general awareness of museum services, and demographic information. Analysis of the data indicated that enthusiasm for aviation and aviation history were the primary motivating factors and that advertising had little or no effect on visitation. In addition, the USAF Museum was rated as one of the best museums overall that respondents had visited. Also, a large percentage of visitors came from outside a 150 mile radius from Dayton, OH and found the USAF Museum relatively easy to locate. Finally, a significant percentage of respondents were not aware that admission to the USAF Museum was free. The data presented valuable information for museum management for decision making purposes, and presented a model for future modifications to or development of visitor evaluation measurement instruments.

14. Subject Terms
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