

99E023I

99E023I  
SJW-VEIS-48

## Information Management at the Palazzo Ducale

An Interactive Qualifying Project Report

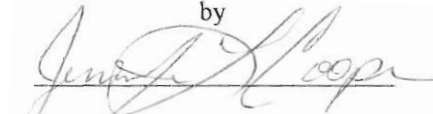
submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

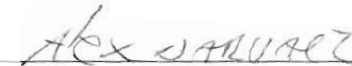
by



Jennifer Cooper



Michael Mahan



Alex Narvaez



Nathaniel Wieselquist

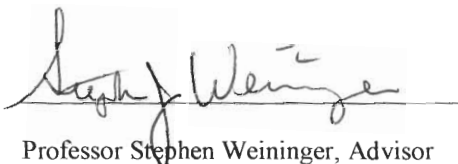
SPONSOR:

The City of Venice Department of Civic Museums

Date: July 30, 1999

Approved:

\_\_\_\_\_  
Professor Fabio Carrera, Advisor



Professor Stephen Weininger, Advisor

## **ABSTRACT**

The Palazzo Ducale is a civic museum of Venice, Italy. It is both a wealth of historical information and a cultural experience. To fulfill a need of the Palazzo Ducale, a computerized database was developed of the Palazzo Ducale's armory collection. This important resource will help the Palazzo Ducale as well as interested scholars. To facilitate long-term planning and enhance the visitor experience, information was collected covering important museum characteristics via two surveys. This project contributed to the enhancement of the visitor experience at the Palazzo Ducale.

## **Information Management at the Palazzo Ducale Acknowledgments**

As a group we would like to thank Professors Weininger and Carrera for their support and the staff of the Palazzo Ducale for their assistance in this project. Natalie Mello was also of great help in delivering our laptop computer.

## **Jennifer Cooper's Acknowledgements**

I would like to thank God, my friends and family for their continued support throughout this project.

## **Michael Mahan's Acknowledgements**

I would first like to acknowledge my friends, family, and girlfriend for keeping me sane throughout this project. There's no need for names, you know who you are.

## **Nathaniel Wieselquist's Acknowledgements**

I would like to thank Trey Anastasio, William F. "Axl" Bailey, Farookh Bulsara, John Coltrane, Miles Dewey Davis III, Vincent Guaraldi, Saul Hudson, Professor Marinus, Brian May, Charles Parker, Robert Van Winkle and of course, the folks at Parmalat. . Of great help throughout the entire course of this project were all of my friends and family in the United States, especially Carla and my Parents for coming to visit, and making my month a little brighter.

## Authorship Page

Section	Writers	Peer Editors
Abstract	JC, AN, NW	
Introduction	MM	JC, AN, NW
Executive Summary	JC, AN, NW	
Background	MM	JC, AN, NW
Literature Review	JC	MM, AN, NW
Methodology, 5.1 – 5.3	MM	JC, AN, NW
Methodology, 5.4	NW	JC, MM, AN
Methodology, 5.5	MM	JC, AN, NW
Results and Analysis, 6.1	MM	JC, AN, NW
Results and Analysis, 6.2	NW	JC, AN, NW
Results and Analysis, 6.3	MM, AN	JC, NW
Results and Analysis, 6.4 – 6.9	JC	AN, NW
Conclusions	JC, AN, NW	
Bibliography	JC	

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1-1</b>
<b>2</b>	<b>EXECUTIVE SUMMARY .....</b>	<b>2-1</b>
<b>3</b>	<b>BACKGROUND.....</b>	<b>3-1</b>
3.1	VENETIAN HISTORY AND CULTURE .....	3-2
3.1.1	<i>Foundations of Venice .....</i>	3-2
3.1.2	<i>The Power of Venice Grows.....</i>	3-3
3.1.3	<i>The Downfall of the Empire .....</i>	3-6
3.1.4	<i>Venice Today.....</i>	3-9
3.2	THE PALAZZO DUCALE .....	3-9
3.2.1	<i>History of the palace.....</i>	3-9
3.2.2	<i>External Architectural Characteristics of the Palazzo Ducale.....</i>	3-11
3.2.3	<i>Interior Characteristics of the Palazzo Ducale .....</i>	3-13
3.2.4	<i>Current Layout of the Palazzo Ducale.....</i>	3-15
3.2.5	<i>The Armory .....</i>	3-18
3.2.6	<i>Evolution of the Structure Through the Centuries.....</i>	3-19
3.2.7	<i>Fires at the Palace Throughout History .....</i>	3-20
3.3	CURRENT STATISTICS RELATING TO THE PALAZZO DUCALE .....	3-21
3.4	PREVIOUS PROJECT WORK COMPLETED AT THE PALAZZO DUCALE.....	3-23
<b>4</b>	<b>LITERATURE REVIEW.....</b>	<b>4-1</b>
4.1	FURNITURE.....	4-1
4.2	<i>Weaponry.....</i>	4-1
4.3	VENICE.....	4-3
4.4	GENERAL .....	4-3
<b>5</b>	<b>METHODOLOGY .....</b>	<b>5-1</b>
5.1	PROBLEM STATEMENT .....	5-1
5.2	PROJECT TASKS .....	5-3
5.3	CATALOG COMPONENTS .....	5-4
5.3.1	<i>L'Armeria del Palazzo Ducale .....</i>	5-5
5.3.2	<i>Mobilia del Palazzo Ducale .....</i>	5-9
5.4	GRAPHICAL USER INTERFACE (GUI).....	5-10
5.5	SURVEY DEVELOPMENT AND ADMINISTRATION .....	5-15
5.5.1	<i>Survey Questions .....</i>	5-15
5.5.2	<i>Single Question Survey Administration .....</i>	5-17
5.5.3	<i>Multiple Question Survey Questions.....</i>	5-19
5.5.4	<i>Multiple Question Survey Administration.....</i>	5-21
5.5.5	<i>Survey Correlation .....</i>	5-21
<b>6</b>	<b>RESULTS AND ANALYSIS.....</b>	<b>6-1</b>
6.1	DATABASE.....	6-1
6.1.1	<i>Armeria del Palazzo Ducale Originale.....</i>	6-2
6.1.2	<i>Armeria del Palazzo Ducale Dettagliata .....</i>	6-2
6.1.3	<i>Querysys Armor Database .....</i>	6-3
6.1.4	<i>Concerns for the Database Contents.....</i>	6-4
6.1.5	<i>Mobilia del Palazzo Ducale .....</i>	6-4
6.2	PALAZZO DUCALE COLLECTION INFORMATION MANAGEMENT SYSTEM .....	6-6
6.3	SINGLE QUESTION SURVEY .....	6-12
6.3.1	<i>Visitor Knowledge Level Questions.....</i>	6-13
6.3.2	<i>Public Awareness Questions .....</i>	6-17
6.3.3	<i>Armory Specific Questions.....</i>	6-20
6.3.4	<i>Level of Services Questions.....</i>	6-22
6.4	IN ORDER FOR THE PALAZZO DUCALE TO INCREASE TYPES OF VISITORS .....	6-27

6.4.1	<i>Increase Learned Visitors</i> .....	6-27
6.4.2	<i>Increase Visitors to Fulfill a Mission of Public Education</i> .....	6-30
6.4.3	<i>Repeat Visitors</i> .....	6-32
6.5	SCENARIO TWO DECREASE VISITOR POPULATION.....	6-36
6.6	DIRECT IMPLEMENTATION FROM SURVEY RESPONSES .....	6-36
6.6.1	<i>Armory Evaluation</i> .....	6-36
6.6.2	<i>Museum Labelling System</i> .....	6-36
6.6.3	<i>Directional Signs</i> .....	6-40
6.7	STATISTICAL VALIDITY OF SINGLE QUESTION AND EXTENDED SURVEY .....	6-40
6.8	DEFICIENCIES IN SURVEYING TECHNIQUES .....	6-41
6.9	COUNTING VISITORS AND TOUR GROUPS .....	6-42
<b>7</b>	<b>CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>7-1</b>
7.1	CONCLUSIONS .....	7-1
7.1.1	<i>Database</i> .....	7-1
7.2	SURVEY.....	7-2
7.2.1	<i>Direct Implementation</i> .....	7-2
7.2.2	<i>Armory Presentation</i> .....	7-2
7.2.3	<i>Public Awareness</i> .....	7-3
7.2.4	<i>Beneficiaries</i> .....	7-4
7.3	RECOMMENDATIONS .....	7-4
<b>8</b>	<b>BIBLIOGRAPHY .....</b>	<b>8-1</b>
8.1	FURNITURE RELATED WORKS.....	8-1
8.2	WEAPONRY RELATED WORKS .....	8-1
8.3	VENICE RELATED WORKS.....	8-2
8.4	SOCIAL AND ART WORKS .....	8-2

## Table of Figures

FIGURE 3-1 MAP OF THE MUNICIPAL BOUNDARY OF THE CITY OF VENICE .....	3-3
FIGURE 3-2 MAP OF SAINT MARK'S SQUARE .....	3-10
FIGURE 3-3 VIEW OF THE PALAZZO DUCALE .....	3-11
FIGURE 3-4 CORNER CAPITAL .....	3-12
FIGURE 3-5 ORIGINAL LION'S MOUTH .....	3-14
FIGURE 3-6 LION MOUTH AFTER NAPOLEON .....	3-14
FIGURE 3-7 FLOORPLAN OF THE 1ST FLOOR OF THE PALAZZO DUCALE .....	3-16
FIGURE 3-8 FLOORPLAN OF THE 2 <sup>ND</sup> FLOOR OF THE PALAZZO DUCALE .....	3-17
FIGURE 3-9 SCALA D'ORO .....	3-18
FIGURE 5-1 DATABASES CREATED FOR THE PALAZZO DUCALE .....	5-3
FIGURE 5-2 A SAMPLE RECORD FROM THE PAPER CATALOG .....	5-5
FIGURE 5-3 DATABASE CREATED FOR THE ARMORY OF THE PALAZZO DUCALE .....	5-9
FIGURE 5-4 INTERFACE FLOW DIAGRAM .....	5-10
FIGURE 5-5 SPLASH SCREEN OF THE GUI .....	5-11
FIGURE 5-6 MAIN PROGRAM WINDOW OF THE GUI .....	5-12
FIGURE 5-7 DATA ENTRY FORM IN THE GUI .....	5-13
FIGURE 5-8 GRID VIEW OF THE GUI .....	5-14
FIGURE 5-9 TABLE DEFINITION WINDOW IN THE GUI .....	5-14
FIGURE 5-10 SURVEY BOXES .....	5-19
FIGURE 6-1 .....	6-3
FIGURE 6-2 SAMPLE RECORD FROM THE <i>MOBILIA DEL PALAZZO DUCALE</i> DATABASE .....	6-6
FIGURE 6-3 COMPARISON OF PULL-DOWN MENUS OF THE GUI AND MICROSOFT WORD .....	6-9
FIGURE 6-4 SCREENSHOT OF THE DATA ENTRY WINDOW IN THE GUI .....	6-10
FIGURE 6-5 PORTION OF DATA ENTRY WINDOW .....	6-11
FIGURE 6-6 VARIOUS DATA ENTRY WINDOWS OF THE GUI .....	6-11
FIGURE 6-7 PASSWORD ENTRY WINDOW IN THE GUI .....	6-12
FIGURE 6-8 VARIOUS FUNCTIONAL WINDOWS IN THE GUI .....	6-12
FIGURE 6-9 PERCENTAGE OF VISITORS WHO CAN READ ITALIAN OR ENGLISH .....	6-14
FIGURE 6-10 PERCENTAGE OF VISITORS WHO HAVE ATTENDED UNIVERSITY .....	6-15
FIGURE 6-11 PERCENTAGE OF FIRST-TIME VISITORS TO THE PALAZZO DUCALE .....	6-16
FIGURE 6-12 PERCENTAGE OF VISITORS WITH PRIOR KNOWLEDGE OF THE PALAZZO DUCALE .....	6-17
FIGURE 6-13 PERCENTAGE OF VISITORS WHO USE THE INTERNET .....	6-18
FIGURE 6-14 PERCENTAGE OF VISITORS WHO USED THE INTERNET TO FIND INFORMATION ABOUT THE PALAZZO DUCALE .....	6-19
FIGURE 6-15 PERCENTAGE OF VISITORS STAYING IN VENICE OVERNIGHT .....	6-20
FIGURE 6-16 PERCENTAGE OF VISITORS SATISFIED WITH THE ARMORY .....	6-21
FIGURE 6-17 PERCENTAGE OF VISITORS WHO HAVE BEEN TO OTHER ARMORIES .....	6-22
FIGURE 6-18 PERCENTAGE OF VISITORS WHO RENTED AN AUDIOGUIDE SYSTEM .....	6-23
FIGURE 6-19 PERCENTAGE OF VISITORS WHO READ LABELS IN OTHER MUSEUMS .....	6-24
FIGURE 6-20 PERCENTAGE OF VISITORS WHO WOULD LIKE TO SEE LABELS ON ART THAT IS UNLABELED ..	6-25
FIGURE 6-21 PERCENTAGE OF VISITORS WHO WOULD LIKE TO SEE MORE DIRECTION SIGNS AT THE PALAZZO DUCALE .....	6-26
FIGURE 6-22 PERCENTAGE OF VISITORS WHO HAD TROUBLE FINDING THE EXIT .....	6-27
FIGURE 6-23 .....	6-28
FIGURE 6-24 .....	6-29
FIGURE 6-25 .....	6-29
FIGURE 6-26 .....	6-30
FIGURE 6-27 .....	6-30
FIGURE 6-28 .....	6-31
FIGURE 6-29 .....	6-32
FIGURE 6-30 .....	6-32
FIGURE 6-31 .....	6-33
FIGURE 6-32 VISITOR POPULATION VIA EUROPEAN OR NON EUROPEAN .....	6-33

FIGURE 6-33 .....	6-34
FIGURE 6-34 .....	6-34
FIGURE 6-35 VISITOR NATIONALITY .....	6-35
FIGURE 6-36 .....	6-35
FIGURE 6-37 .....	6-36
FIGURE 6-38 .....	6-36
FIGURE 6-39 .....	6-38
FIGURE 6-40 .....	6-38
FIGURE 6-41 .....	6-39
FIGURE 6-42 ALTERNATE LANGUAGES SPOKEN BY MUSEUM VISITOR .....	6-40
FIGURE 6-43 .....	6-40
FIGURE 6-44 .....	6-42
FIGURE 6-45 TOTAL VISITOR COUNT .....	6-43
FIGURE 6-46 COUNT OF TOUR GROUPS OVER TIME .....	6-44



# 1 Introduction

The Palazzo Ducale is a civic museum located in Venice, Italy. Formerly, the Palazzo was the seat of the Venetian government; it now exists solely as a museum for interested tourists and citizens to visit. A varied assortment of historical artifacts is located within the Palazzo, reflective of both Venetian and Italian history. Due to the large number of items present, however, there existed no accurate inventory system. In addition, the sheer volume of visitors passing through the Palazzo each day made it hard to determine the overall satisfaction with the presentation of these pieces.

Our project team, The Palazzo Ducale Collection Information Management team, was comprised of four engineering students devoted to devising solutions to these problems. The Musei Civici di Venezia, in conjunction with WPI, sponsored our efforts at the Palazzo Ducale. In short, there were two tasks before us: the cataloging of the museum contents and the surveying of the visiting population. Using the program Microsoft Access, a database was developed to store the records of all the items within the armory. Once this was completed, a Graphical User Interface (GUI) was created in order to make this database more accessible and useful. To address the issue of visitor opinion, two surveys were conducted over the course of the project; the survey questions were aimed at providing the museum staff with visitor opinion regarding the current status of the Palazzo Ducale. Through the course of this paper, as described below, the reader is able to trace the development of techniques as well as view the results of these efforts.

The Executive Summary (Chapter 2) is a synopsis of the entire project report. In it, the reader will find an overview of our methods, results, and conclusions.

The Background (Chapter 3) section contains information relevant to the understanding of our project. A brief history of Venice and the Palazzo Ducale is provided in this section, as well as information relating to prior WPI studies performed at the museum.

The Literature Review (Chapter 4) is an annotated bibliography of all the works referenced and used for background information. A short description is included for each separate work.

The Methodology (Chapter 5) contains a listing of the procedures for accomplishing the project goals. This is inclusive of, but not limited to, methods used for the database and GUI creation, and the survey techniques used. The rationale behind each of these methods is also included in this chapter.

The Results (Chapter 6) section is made up of the final results of our work. In this chapter, a synopsis of the database contents as well as the actual survey results are presented.

The Analysis (Chapter 7) chapter consists of the analysis of the survey responses and an examination of the effectiveness of the Graphical User Interface.

The Conclusions and Recommendations (Chapter 8) section of the report contains all significant conclusions drawn from our analysis. In addition, recommendations for the Palazzo Ducale staff, as well as for future work, are included in this chapter.

The Bibliography (Chapter 9) is a complete listing of all reference literature used throughout our project.

Finally, the Appendices consists of all information collected over the course of the project that was not included in the main body of the report.

## 2 Executive Summary

The Palazzo Ducale of Venice, Italy was the seat of power of the Duke of Venice until the fall of the republic in 1797. The Palazzo Ducale, a palace built in the gothic architectural style, continues its' life as a civic museum containing a wealth of historical information and offering a glimpse into the lives of Venetian's in years past. The Palazzo Ducale has four main sections, the government related rooms, the apartment of the doge, the armory, and the prison section. The armory is a unique section of the palace because of its compilation of over 2500 pieces of arms and armor; some of these arms were used for defense but a multitude was collected from the spoils of war. This project continues the work of the 1998 W.P.I. Palazzo Ducale project team and delves deeper into the issues that confront the museum every day.

The project team focused on the aging paper catalog of the armory and the museum's visitor population. The main objectives towards completing the goals of the project were the creation of a usable database structure for the armory, a coordinating user-friendly interface, and visitor surveys to provide information for the staff for direct implementation and long term planning.

A usable electronic catalog was created in order to manage the contents of the Palazzo Ducale's armory. This solution was devised to allow the museum to integrate state-of-the-art relational database technology with its' 500 year old collection of arms and armor. The original database consisted of the contents of the paper record of the Palazzo Ducales' armory. The original catalog was studied and further categorized in order to allow for more powerful use. The result of this study produced a second database, *Armeria del Palazzo Ducale*, this was the foundation for the user-friendly

interface. This database was then optimized to serve as an intermediary between our armory database and that of the *Musei Civici di Venezia*'s data storage system, entitled Querysys.

In order to complete the second objective, we conducted two different types of surveys among the people visiting the Palazzo Ducale. All questions were made in a yes/no answer format in order to simplify survey completion. To be able to cover the understanding of as many audiences as possible, we prepared the survey in five different languages. The survey questions were divided into four categories, public awareness, visitor knowledge level, armory specific, museum services. The first survey was developed to cover the entire population visiting the Palazzo Ducale. This coverage was obtained by interviewing a random sampling of the people and administering one question from a set of fourteen questions with a minimal refusal rate. The decision to create the second multiple question survey was made to allow for the correlation of survey responses. The multiple question survey consisted of the entire first survey in addition to demographic questions. Correlating information was important despite the smaller sample size caused by the larger refusal rate inherent in such a survey.

These methods of surveying allowed us to be confident of our results and analyses. From our results, ninety-seven percent of museum visitors would like to see labels on art that is currently unlabeled, we concluded that additional labels on significant or historical works of art would address this concern. Another direct result was the translation of the armory placards into other languages than Italian; a majority of those surveyed read labels in museums and a minority of the visitors read Italian.

Over seventy percent of the visitors speak English, French or Italian as a primary language. The visitors that do not speak English, French or Italian as a primary language do speak these three primary languages as an alternate language. This means that the Palazzo Ducale could effectively cover the entire visitor population by printing any additional labels in English, French and Italian.

From the Museum Services category, we examined the visitor perceptions about the directional signs that are placed in the rooms and corridors of the Palace. From the data collected, we found that seventy-four percent of the people visiting the Palazzo Ducale would like to see more directional signs. We also asked the visitors if they had difficulty finding their way to the exit. The answer to the latter question resulted in a nineteen-percent of yes responses. Correlating these two questions, we concluded that in addition to more directional signs, they have to be more explicit.

We found that seventy-seven percent of the people visiting the Palazzo Ducale use the Internet yet only eighteen percent of the people used the Internet to find information about the Palazzo Ducale. Our group realized that if an official web page for the Palazzo Ducale were published, the percentage of people looking at information about the museum would increase.

We completed an electronic catalog of the armory and a collection of interesting visitor information. The complete catalog of arms and armor is a powerful inventory and research tool. Beneficiaries of this electronic catalog include the Palazzo Ducale staff, the department of civic museums of Venice, and interested visitors and scholars. Generalizations of the visitor population will help the Palazzo Ducale in long term planning. As a result of our analysis the visitor museum experience could be enhanced

directly through the addition of art labels and direction signs. The 1999 WPI Palazzo Ducale Collection Information Management team contributed to the enhancement of the visitor experience at the Palazzo Ducale in the most serene republic of Venice, Italy.

### **3 Background**

This chapter serves as an introduction to information regarding the Palazzo Ducale. The facts presented act as a base of knowledge for the reader and will assist in the further understanding of the topic at hand. This chapter is divided into several subsections, ranging from the history of several areas of relevance to a study of various methods that have been used in other applications similar to this project.

From this chapter, the reader should learn how the Palazzo Ducale has continuously played a major role in the culture of Venice. Conversely, it will be shown how the culture of Venice has indeed acted as an influence on the evolution of the Palace. Furthermore, the value of the Palace to the people of Venice, as well as to the citizens of Italy and the rest of the world, will be discussed. Finally, this chapter provides a detailed picture of the status of the Palazzo Ducale Museum prior to our arrival in Venice.

#### **3.1 *Venetian History and Culture*<sup>1</sup>**

Although Venice is an Italian city, its culture and foundations are unique in comparison to the many other cities of Italy. Therefore, it is important to achieve a clear understanding of what makes Venice different. This section gives a brief overview of the history of Venice throughout the rise and fall of the Venetian Republic.

##### **3.1.1 Foundations of Venice**

The first known records of the Venetian people date back to 1000 BC, when a group of Illyrian people, who called themselves the Veneti, settled around the upper



Adriatic Sea. These people established themselves as farmers and traders; they lived in peace for almost 800 years, until the area was annexed by the Roman Empire in 190 BC. After that, the Veneti became a part of the Roman region under the control of the city of Padova.

Around 375 AD, the Huns began to sweep into Europe. Their presence ultimately led to the splitting of the Roman Empire; Venice became a part of the Eastern Roman Empire, often referred to as the Byzantine Empire. Fugitives from the mainland of the Veneto province, seeking refuge from the various tribes of Barbarians, took to the islands in the Venetian lagoon. In 452, the Western Roman Empire finally fell. At this time, some of those who had migrated to the lagoon returned to the mainland, where they remained in peace for a brief period of time. However, in 568, the Lombards took control of northern Italy; the Veneti once again migrated to the lagoon. This repeated migration between the lagoon and the mainland continued for a long time, eventually leading to a permanent island settlement in the Venetian lagoon.

The lagoon in which these early inhabitants settled was approximately 50 kilometers from north to south, with Venice proper located in its center. Several strips of land, called the Lidi, separate the Lagoon from the Adriatic Sea to the east. These act as a barrier to excessive water flow since there are only three main inlets connecting the Adriatic and the lagoon (Figure 3-1). The city of Venice itself consists of over 120 small islands, most of which were inhabited during the time of the Republic. Over ten centuries of construction have produced the city of Venice that exists today.

---

<sup>1</sup> Lane, Frederic C. Venice, A Maritime Republic. The John Hopkins University Press. Baltimore, 1973.

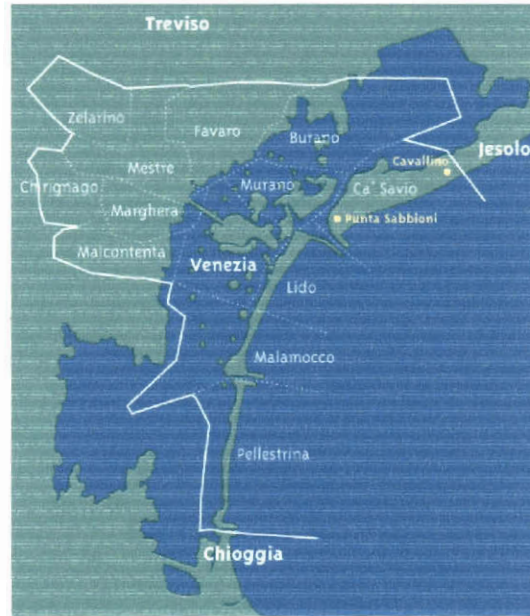


Figure 3-1 Map of the municipal boundary of the city of Venice

### 3.1.2 The Power of Venice Grows

The Veneto, the economic center of the developing Venetian Republic, was originally located on the island of Eraclea. By the year 500 AD, the capital was relocated to the island of Torcello as the population in the lagoon began to grow. Around the year 690, the capital of the Veneti was once more relocated, this time to the island of Malamocco. Malamocco is currently known as the Lido.

In the year 812, Pippin, the son of Charlemagne, had conquered the Lombard kingdom of Italy. He next turned his attention to Malamocco in an attempt to secure the lagoon area. However, since the area was still considered to be a part of the Byzantine Empire, the emperor sent a fleet into the lagoon as a reaffirmation of his authority. Shortly thereafter, a treaty of peace, known as the Treaty of Aachen, was reached between Charlemagne and the Byzantine Emperor. In recognition of the success that the Venetians

had in defeating Pippin, the Eastern Roman Empire granted Venice the status of a free state.

In 828, legend has it that two merchants, Bouno of Malamocco and Rustico of Torcello, journeyed to Alexandria, Egypt and bribed the guards to allow them to smuggle the corpse of Saint Mark out of its tomb and back to Venice. They succeeded in passing by the customs agents with the body by hiding it in a cart loaded with pork. The guards, being Muslim, would not touch the pork and therefore did not discover the body. Upon being returned to Venice, Saint Mark replaced the Greek Saint Theodore as the patron saint of Venice. The Republic soon adopted the winged lion that symbolizes Saint Mark as their official symbol.

Throughout the 9<sup>th</sup> and 10<sup>th</sup> centuries, Venice continued to expand its power by manipulating its trading influence. During this time, the Venetians gained control of the Adriatic Sea and secured trading privileges in a large number of Mediterranean seaports. From this newfound trading success, Venice managed to achieve independence as a republic, which allowed Venice to fully realize the economic benefits available from its location. With access to both the Adriatic and the Black Seas, the ports of Venice became important trading crossroads between the East and West. Over time, the city thrived and grew into a powerful empire.

The Fourth Crusade of the 12<sup>th</sup> century proved to be an important event in the rise of the Venetian Empire. The overseers of the Crusade had arranged a deal with Venice to have transportation provided to the Holy Lands by the Venetian fleet. Venice mobilized

its carpenters and succeeded in constructing several thousand vessels for this purpose; however, preparations for the Crusade did not proceed as planned. Venice found itself owed a large sum of money from the would-be crusaders. In return for relief of their debt, the crusaders agreed to stop at Constantinople on their way to the Holy Land. The city was sacked and put under the control of the Venetian empire; the debt was considered repaid.

As Venice grew, Genoa, another maritime republic, was also growing in power on the opposite coast of Italy. The inhabitants of Genoa had become wealthy through trade, and as a result, the city-state began to expand her region of influence. It was inevitable that the two rival powers, Venice and Genoa, would eventually clash over issues such as land and boundaries. Over the centuries, the two republics went to war several times; none of these conflicts ever produced a clear victor. In 1379, during the fourth Genoese War, the Genoese fleet managed to reach the Venetian lagoon and seize the city of Chioggia, greatly endangering the Venetian trade routes. The Venetians made a desperate and partially successful counterattack, which ultimately led to the signing of a peace treaty at Turin in 1381. Although the treaty was strongly in Genoa's favor, its population had been exhausted by the conflict and wracked by domestic strife; they never again posed a serious threat to the Venetians, and Venice remained the undisputed power of the seas.

By the opening of the 15<sup>th</sup> century, Venice had spread its power to the mainland, discovering the agricultural industry in the process. Taking full advantage of their wealth, the Venetian elite built country homes on the mainland hills nearest to Venice. These homes served as both beautiful residences and centers for major agricultural endeavor. By

1454, the Venetian Republic had spread as far north as the Alps and as far west as the Adige River. It had also become allied with major cities such as Florence and Milan. At this time, the population of the Venetian Empire had risen to a staggering 1,700,000 inhabitants.

### 3.1.3 The Downfall of the Empire

In the year 1453, the Ottoman Empire conquered the city of Constantinople; this posed a threat to the Venetian Empire. Venice soon negotiated a treaty with the Turks in order to maintain her trading markets. These negotiations resulted in the loss of many overseas possessions to the Ottoman Empire. Another blow was struck to the livelihood of Venice by Columbus' discovery of America in 1492. This event ultimately resulted in the shifting of much of Venice's trade towards the Atlantic. In 1498, the Portuguese sailed around Cape Horn and opened a new route for trade to the Far East, further injuring the Venetian trading empire. Venice was no longer the great and powerful center of trade that it once was.

In addition to the trade problems Venice was facing, internal problems related to governmental functions plagued the republic, which clung to its old aristocratic government and outdated institutions. This hurt Venice as newer ideas of government were implemented elsewhere. As the 16<sup>th</sup> century drew to a close, the Venetian Empire was shattered and the Republic's military and commercial powers were in shambles.

During the 16<sup>th</sup> century, Venice fell victim to the deadly bubonic plague, or the Black Death. In 1575, a two-year epidemic hit Venice, reducing its population by one-third

In the year 1793, the governing bodies of Venice settled on a neutral stance toward the current war between the French and the Austrians. Northern Italy was located in the middle of the conflict, yet Venice chose to remain uninvolved. Napoleon viewed this as a sign of weakness and on May 1, 1797, he marched his troops into Venice and overthrew the government with nary a fight. On May 12, the Grand Council of Venice, under the last Doge, Ludovico Manin, voted itself out of existence with 512 votes in favor and 21 against. Soon after this incident, Napoleon transferred ownership of Venice to the Austrian Empire through the Treaty of Campoformio. Venice remained under Austrian control until 1805, when Venice became a member of the Kingdom of Italy, which was still under Napoleon's rule. After the fall of the Napoleonic Empire in 1815, Venice was once again returned to Austrian control. During this period, the Venetians made numerous unsuccessful attempts to rise up against the Austrian ruling powers. By 1848, it became clear that the intentions of the Austrians were to turn Venice into a mainland city connected by railroads. While under Austrian rule, many of the original canals were filled in as an attempt to attach Venice into the mainland.

In 1866, the people of Venice unanimously voted to become united with the Kingdom of Italy, nullifying all foreign connections. This unity succeeded due to the efforts of the movement organized by Garibaldi and Mazzini. In September of 1870,

Rome became a part of the Kingdom of Italy, marking the completion of the reunification of Italy. For the first time since the Western Roman Empire, Italy was a united nation.

During World War I, Venice found itself on the front lines, and was soon evacuated. Fortunately, only a few buildings were damaged during the battles. Venice managed to survive the Great War, and in 1927, the various islands in the Venetian lagoon and parts of the mainland bordering the lagoon were incorporated into the municipality of Venice. As a result, city planners had to begin to take into account both the interests of the mainland and those of the islands. In 1932, to facilitate commerce and communication between the two, an additional train track and another vehicle bridge were added to the already existing railway link between Venice and the mainland.

Venice also succeeded in surviving World War II without serious damage; however, in 1966 a major flood occurred which caused significant damage to a large section of the city. This flood, called the *acqua alta*, prompted the development of plans and ideas to remedy the problem of the gradual sinking of the city.

#### **3.1.4 Venice Today**

Modern day Venice depends on tourism as an important component of its economy. The number of tourists seen in Piazza San Marco and in the vicinity of the Rialto Bridge alone is very high. Streets are often crowded so that walking from one section of the city to another along the most popular routes is, at best, a slow journey.

### 3.2 The Palazzo Ducale

The Palace of the Doge serves as a perfect reflection of Venice as a vast, rich, and powerful empire. This image was a perpetual characteristic of Venetian culture. From the seventeenth century onward, no fundamental alterations have been made to the Palace. As a result, the Palace has preserved its appearance since that time of Venetian glory.

#### 3.2.1 History of the palace

As seen in Figure 3-2, the Palazzo Ducale is located adjacent to Saint Mark's Basilica in Piazza San Marco. The palace was built in or shortly after 811 as a castle for the duke, Agnolo Participazio. Since the time it was built, the Palace has undergone

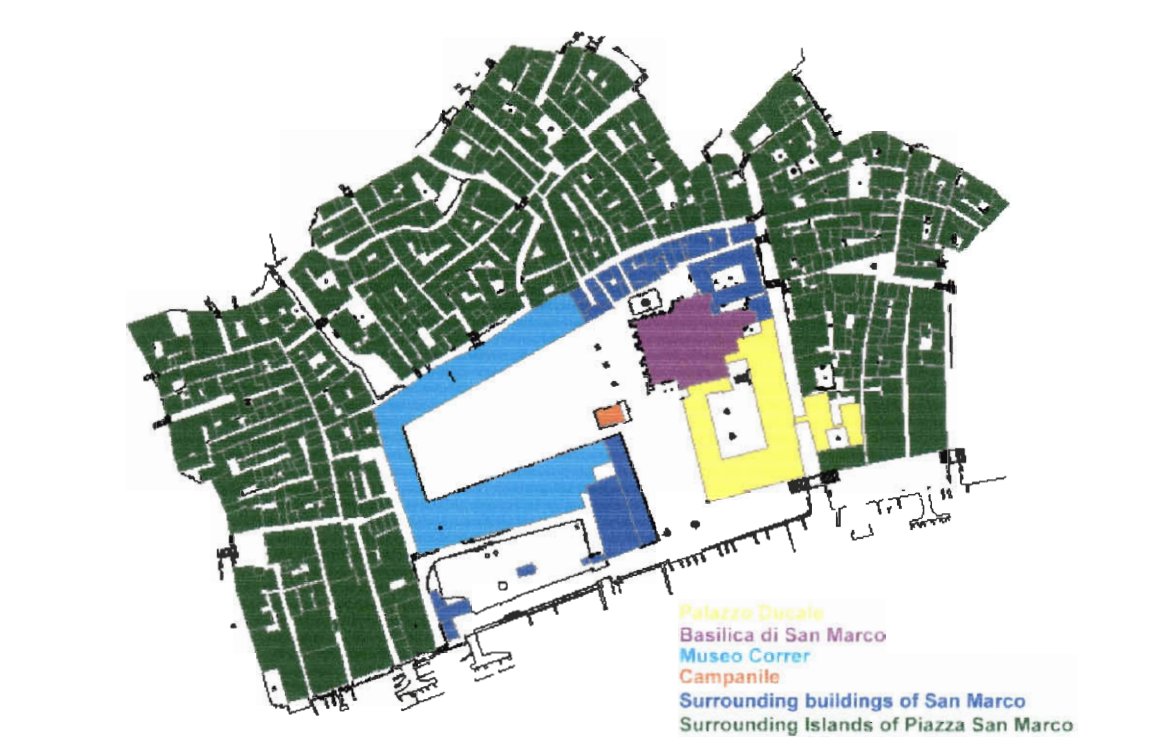


Figure 3-2 Map of Saint Mark's Square



several reconstruction efforts and expansions, leaving no traces of the original structure visible. The creation of the structure as seen today was not initiated until around the year 1340; it was constructed in various stages over the next one hundred years.

The Doge of Venice, as well as the administration of the Republic, called the Palace home for almost one thousand years. Besides serving as a residence, the Palazzo Ducale was also an early storage facility for some of the armory of the Venetian soldiers. It housed the prison and also contained the courtroom for the judicial aspects of the Republic. The Palace served not only as a town hall for the city of Venice but as the capital of the entire Venetian Empire as well. Unlike other medieval Italian government buildings, it is not a fortress. Its open loggias, picturesque decorations, and graceful structure bear witness to the security that the Venetian rulers felt here in the center of their stable, prosperous state. A more detailed description of both the internal and external characteristics of the Palace can be found in following sections.

Since May 12, 1797, when the Grand Council voted itself out of existence, no ruler or head of state has lived in the Palazzo Ducale. During the eighteenth and nineteenth centuries, Venice only maintained the building and made a few non-structural additions, such as adding pictures, to some of the less important and less decorated rooms. During these centuries, the restoration of some of the priceless works of art became necessary due to deterioration. Although a great deal of restoration was undertaken, the preservation of original paintings was not the primary concern. Rather, worn or damaged portions of paintings and sculptures were re-done in accordance with the tastes of the

period. As a result, it is often difficult to know whether a painting or sculpture is in its original form or has been modified through restoration.

### 3.2.2 External Architectural Characteristics of the Palazzo Ducale

The Palace, shown in Figure 3-3, is a square shaped mansion decorated externally in the Gothic style. Although historic documents have provided the names of



Figure 3-3 View of the Palazzo Ducale

stonecutters, masons, engineers, architects, painters, and superintendents, they do not divulge the name of the original designer of the building. The designer expressed the new style and the many characteristic features of fourteenth century Venetian architecture. The Grand Council and the Senate would have chosen the designer, because these two branches of government made all of the final decisions about works to be carried out on the Palace. This clearly demonstrates that it was the property of the Republic and not of the Doge.

The external decorations to the Palace include many beautiful sculptures. For example, there is a sculpture at each of the external corners of the Palace (Figure 3-4) depicting symbolic biblical scenes which have become famous and have left an impression on all of those who have visited the palace. When the government commissioned the artist to make these sculptures, they wanted to create an impression by letting the figures serve as a reminder of the stories of their past.



Figure 3-4 Corner Capital

An example of one of these corner capitals is a sculpted representation of the planets and the creation of Adam. Above this is a relief showing the temptation of Adam and Eve. Further up, one can see the Archangel Michael armed with the sword with which he expelled the first humans from the Garden of Eden. On the opposite corner, nearest Saint Mark's Basilica, is the Judgment of Solomon.

### 3.2.3 Interior Characteristics of the Palazzo Ducale

The rooms of the Palazzo Ducale were intended to illustrate the history of Venice through decorative canvases painted by some of her greatest sixteenth century masters. The art includes great triumphs, from her mythical foundation and institutions to the military victories. Also included is art whose subject is simply the everyday bustle of the city and its inhabitants.

With each new Doge, new personal touches were added to the art and structure of the palace. Occasionally, the new Doge would alter or completely eliminate some of the changes made by the past Doges because they were not to his taste or simply because the new Doge's own pride could not allow the work of the past Doges to be so prominent. One example of this type of personal glorification is the family coat of arms of each Doge. One can view these on the walls and hidden within some of the paintings since it was not proper for the Doge to glorify himself with extravagant masterpieces. However, the painters and masonry men honored their Doge by placing these coats of arms in their works. After centuries of added personal characteristics by each Doge there resulted a menagerie of art that is both splendid to look at and representative of the changing culture of Venice through its history.

Another interesting characteristic of the interior of the Palace is the location where the "Lion's Mouths" used to be (Figure 3-5). Slits were cut into the walls outside a select number of the meeting rooms. They resembled a locked mail slot in that the envelope could only be inserted through the lion's mouth on the outside of the room, and it could only be recovered from the inside of the room with the use of a key. The purpose of the

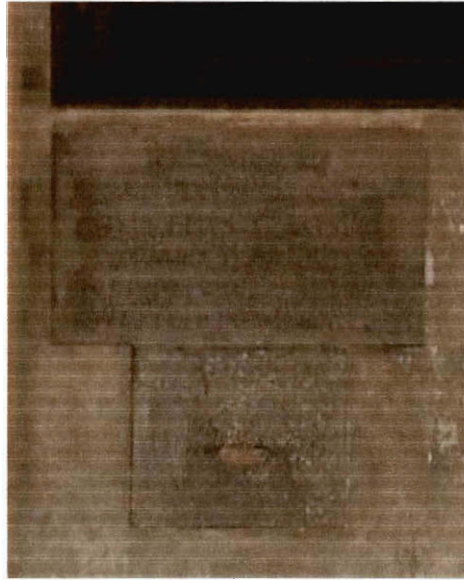


Figure 3-5 Original Lion's Mouth

slots was to allow people to deposit secret accusations against other people in matters relating to state security. The accusation could be made anonymously and the accuser



Figure 3-6 Lion Mouth after Napoleon

knew that only the Council of Ten or other related bodies would receive the envelope.

Once an accusation had been made, the Council went about the process of gathering evidence against him/her until enough had been found to charge the violator with the crime. When Napoleon seized Venice in 1797, he had all but one Lion's Mouth carved out of the walls because they did not suit his tastes and because they represented the old regime. The only surviving Lion's Mouth (Figure 3-6), is now located in an exhibit in the secret itinerary tour.

#### 3.2.4 Current Layout of the Palazzo Ducale

The ground floor of the Palazzo Ducale contains the entrances, ticket office, and audio guide rental desk. The only exhibit room on the ground floor is the Museo dell'Opera. This room contains some of the original external columns of the Palace depicting many different scenes of history. After entering the Palace, visitors are located in the courtyard. From there, the Giant's Staircase, the roof of the Basilica di San Marco and the surrounding Palace architecture can be viewed. There are only a few exhibit rooms on the next floor up, the Loggia floor, such as the entrance to the lavish Scala d'Oro (Golden Staircase), and several of the more minor institutions housed in the palace. These institutions included the Chancellery, the Censors and the Provveditori Della Milizia da Mar, which was in charge of equipping Venice's galleys. Another institution that met on the first floor of the Palace was the Avogaria, which examined cases of law. The Giants' Staircase is also found on this floor. This staircase is decorated with the statues of Mars and Neptune and symbolizes the Venetians' domination of land and sea, and was used for the Doge's inaugurations.

The first floor (Figure 3-7) is where tours normally begin. This floor of the Palace was once the residence of the Doge. Nothing remains today of the original layout of the Doge's residence, which was destroyed as a result of a fire in 1483. However, the original ground plan was preserved and some of the layouts of the existing rooms are still

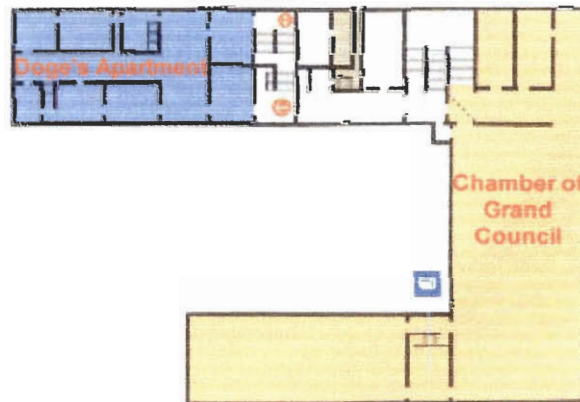


Figure 3-7 Floorplan of the 1st floor of the Palazzo Ducale

in traditional Venetian forms. A rebuilt and modernized version of the Doge's apartment has been in existence since the first years of the sixteenth century. Despite alterations made during the following centuries, the residence has evident fifteenth-century characteristics and is a striking example of the interiors of wealthy patricians homes until the end of that century.

The first floor is also where the chamber of the Grand Council and the rooms of the Quarantia Civil are located. The Grand Council held its sessions in the Hall of the Grand Council. This is the largest chamber in the Palace and was inaugurated in 1419. In the Hall of the Grand Council, one can notice that there are no columns holding up the ceiling. This engineering marvel remains the largest suspended ceiling in existence today. The original ceiling had the same shape as the roof of the Palace, convex and meeting at a

triangular point, and was actually destroyed by a fire in 1574. When the new ceiling was constructed, eaves were left between the ceiling and the roof of the building. This allowed space to walk above the Hall of the Grand Council. The ceiling literally hangs from the ends of metal rods that are attached to the support beams of the roof. Spaces were intentionally left in the ceiling to allow for movement and shifting of the canvases over time.

Located on the second floor of the Palace (Figure 3-8) is the well-known Sala delle Quattro Porte (Room of the Four Doors), the Sala del Collegio (Room of the College), and the Sala del Senato (Room of the Senate). Also on the second floor are the rooms in which the Seignory met, the Doge received foreign ambassadors, and the Sala del Consiglio dei X (the room where the Council of Ten assembled). The Sala dei Tre



Figure 3-8 Floorplan of the 2<sup>nd</sup> floor of the Palazzo Ducale

Capi was the room used by the three heads of the Council of Ten. Also located on this floor is the room the State Inquisitors used when questioning those who had been accused of various crimes against the state.



The Doge also had direct access to Saint Mark's Basilica, the Senato and the Collegio from the second floor through a private staircase. Direct access also existed between the Doge's private apartments and several other sections of the palace.

The Scala D'Oro (Figure 3-9) is the richly decorated main staircase. The first flight of steps leads to the level of the Doge's apartments, while the second provides

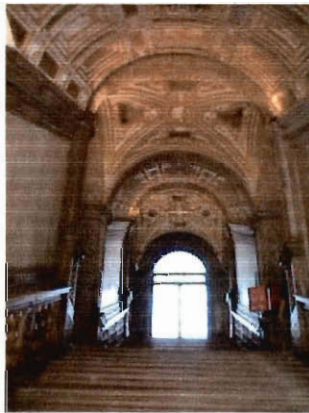


Figure 3-9 Scala D'Oro

access to the Hall of the Four Doors (the Sala delle Quattro Porte) and then to the very heart of the Palace. The staircase is designed to give access to two key points of the building, one looking over the canal and the other onto the courtyard.

### 3.2.5 The Armory

An exquisite exhibit within the Palace is the collection of weapons that were formerly shown only on special occasions and to visitors of high rank. The collection has always been housed in the upper rooms of the old tower close to the rooms used as prison cells for important or dangerous prisoners. Originally, the armory consisted of weapons kept in the Palace for the purpose of defense, but more modern weapons and weapons collected from battles with enemies have since been added to it. Also included in the

armory is armor that was presented to the Republic as gifts, such as the suit of armor from King Henry IV of France.

After the fall of the Republic in 1797, the weapons were removed to the Arsenal and the rooms were converted into offices for the Marciana Library, the Biblioteca Marciana, which had been transferred to the Palace. The weapons were brought back to the Palace in 1921 and are now housed in the Sala delle Munizioni.

### 3.2.6 Evolution of the Structure Through the Centuries

The oldest known document referring to the need for building repairs was discussed. The document describes that during this time the architectural style was Veneto-Byzantine, and was actually very similar to many of the other structures built in the twelfth and thirteenth centuries.

Several events throughout the centuries resulted in necessary changes to the original structure of the palace. The growing power of Venice, new forms and components of the government and a succession of fires and old age were only some of these events. As Venice grew richer and the empire expanded, each governing body, such as the Grand Council, the Senate, the Seignory, and the Council of Ten, had to have a seat worthy of its dignity. Hence, the need to supply new chambers for the various bodies became the main goal of several of the reconstruction efforts.

The second half of the fourteenth century is the period during which a clear picture of the development and transformation of the palace begins to appear through documents.

During this time, the apartments housing the government offices and the court began to be rebuilt. Prior to this, they were located in adjacent buildings. An examination of the existing buildings (i.e. floor plans, foundations, and architectural features) shows obvious points of junction of the buildings. From this one can see that the present palace is actually a product of the fusion of older buildings. These components, together with one side of Saint Mark's Basilica, the canal under the Bridge of Sighs, the Doge's residence and the Palace of Justice, enclose the inner courtyard today.

### 3.2.7 Fires at the Palace Throughout History

Several fires have caused damage to the Palace over time. The original fortress, completed in 814, burned down in 976, as did its replacement in 1106. By 1419, the Palace was in its third and final incarnation. Many additions were made between this date and 1550 when most of the work was completed, but a fire destroyed several new sections of the Palace in 1574, followed by another fire in 1577. The last two fires not only destroyed masterpieces by some of Venice's greatest painters, but also threatened the entire building with collapse.

On December 20, 1577, a fire was discovered in the Palace in the section of the old library now called the Sala dello Scrutinio, close to the St. Mark's Basilica. The flames, aided by the wind, spread so quickly that they burned the entire ceiling of the library and then spread to the Hall of the Grand Council. Many original paintings by famous painters were ruined. Further damage was avoided thanks to the courage of the staff of the Arsenale, which acted with very little hesitation in quenching the flames. The damage was said to be so immense that reparations of the palace were felt impossible.

Some of the most famous architects of the time had already worked in Venice as well as in specific rooms in the older parts of the Palace; these architects now turned their attention toward the reconstruction of the Palace. The work progressed with unprecedented swiftness; it took only sixteen months to completely rebuild the damaged sections of the Palace. Although the work seems to have been done hastily, it is known that the leading architects of the time were consulted. All of them had different opinions on what needed to be done to rebuild the Palace, and each architect influenced the reconstruction in some manner.

In the end, it was decided that the building should be rebuilt just as it had formerly been. This was most likely due to economic reasons, as it was cheaper to do so. The structure of the building was altered as little as possible but the interior was completely modernized. New paintings for the walls had to be commissioned. The paintings were composed on canvas, rather than the fresco of the previous paintings. The designs for the ceilings had to be recreated as well. As a result, the paintings in the hall are representative of the tastes of Venetian painters towards the end of the sixteenth century. They do not bear famous names and are more interesting for their content rather than for their artistic quality.

### ***3.3 Current Statistics Relating to the Palazzo Ducale***

Currently, the Palazzo Ducale enjoys approximately six thousand (6,000) visitors per day. It is open every day except Sunday, between 09:00 – 19:00 hours. The prices for admission are as follows:

Age Group	Price for Admission
Full admission	17,000 lire
Students (age 7 – 14)	6,000 lire
Students (age 15 – 29)	10,000 lire
Children (age 6 and under)	Free

Table 3-1: Admission prices at the Palazzo Ducale

This price of admission also includes admission to the Museo Correr, the other museum located in the Piazza di San Marco. In January of 1998, a new policy went into effect that allowed the ticket for the Palazzo Ducale and Museo Correr to be used at four additional museums, for a total of six possible museum visits using the same ticket. Currently, there is not a membership program available for frequent visitors or for those who would like to visit the museum only for temporary or special exhibits or programs.

It is possible for any visitor to join a tour group with a guide provided by the museum for an additional 10,000 lire. Outside tour groups are also welcome to visit the museum and are charged a group rate. There is a separate entrance to the museum for groups.

Audioguides are available for rental at a cost of 7,000 lire per visit. The audioguides are available in Spanish, English, Japanese, Italian, German and French. Unfortunately, there are only 125 available units, thus creating a shortage of units during peak times.

Almost all the information available to museum visitors is in Italian with an English translation. This includes a history and description of the Palace itself at the entrance of the museum. Brochures and other informative literature are available in all of the six languages that the audioguides are offered in. However, the placards within the armory of the Palazzo are only printed in Italian, lacking translations into any other language.

In each room, the visitor can find a poster written in both English and Italian that contains limited information about points of interest there. However, the majority of the exhibits, furniture, paintings and weapons lack individual labels, as the museum management does not wish to clutter and detract from the beauty of the palace with such a labeling system. As a result, it can be difficult to determine exactly what an exhibit is.

### **3.4 Previous Project Work Completed at the Palazzo Ducale**

During the summer of 1998, a team of WPI students completed a project at the Palazzo Ducale, entitled *Multimedia Catalog and Visitor Information Management Plan for the Collections of the Palazzo Ducale in Venice, Italy*. This was a pilot project that focused on developing a catalog of the contents of the museum as well as a survey of the visiting public.

Upon its completion, that project generated several preliminary databases detailing the contents of the Palazzo Ducale; of these databases, only one was complete. That database, entitled, *Palazzo Ducale Collezione Dipinti* (Doge's Palace Collection of Paintings), fully detailed the collection of paintings located within the museum. The remaining two databases, *Prigioni, Sculture e Suppellettile del Palazzo Ducale* (Prisons,

Sculptures and Furnishings of the Doge's Palace), and *L'Armeria del Palazzo Ducale* (Armory of the Doge's Palace), were not completed by that project.

The survey conducted during that project was only distributed for a period of ten days; thus, the results generated could not be accurately applied to the entire visiting population. At the conclusion of the 1998 project, the students recommended that another survey be performed at the museum aimed at generating a larger number of responses over an extended period of time.

## 4 Literature Review

This chapter provides the resources of knowledge used to accomplish the tasks of this project. In order to quickly evaluate the works from a specific section, this chapter takes the form of an annotated bibliography.

### 4.1 Furniture

1. Eberlein, Harold. *Interiors Fireplaces and Furniture of the Italian Renaissance*. New York: Architectural Book Publishing. 1927.

Included in this book are several plates of the Ducal Palace fireplace and rooms.

2. Bishop, Robert; Patricia Coblenz. *Furniture 1*. USA: Smithsonian Institution. 1979.

This book has examples of furniture styles from prehistoric through Riccoco.

3. Ash, Brunhammer, et al. *World Furniture*. Ed. Helena Hayward, New Jersey: Chartwell Books. 1977.

An extensive and thorough collection of form, type and explanation on furniture.

4. Hinckley, F. Lewis. *A Directory of Antique Furniture*. New York: Bonanza Books, 1953.

This book is a useful tool for identifying and tracing different schools of furniture tradition through different countries. It also gives a good basic knowledge of what the furniture community considers furniture i.e. mirrors are considered furniture.

5. *Oxford Companion to Decorative Arts*, 1975.

This dictionary of furniture provides basic knowledge of different types of craft makers. Special note is made for the back of the chairs where artisans often left the signature aspect of the time.

### 4.2 Weaponry

6. Franzoi, Umberto. *L'Armeria del Palazzo Ducale a Venezia*. Treviso: Canova, 1990.

This book describes each piece of armor and arms in the Doge's Palace. This book is written in Italian.

7. *Dizionari Terminologici: Armi Difensive Dal Medioevo All'Eta Moderna*. 2 Vols. Firenze: Centro Di. 1982.



4.2.1 These books provided diagrams explaining the parts of armature and weaponry.

8. DeVries, Kelly. *Medieval Military Technology*. New York: Broadview Press Ltd. 1992.

This book gives a readable history of medieval arms, armor and technology.

9. Hewitt, John. *Ancient Armour and Weapons*. London: Random House. 1996.

This book contains useful illustrations, expanded documentation and a good deal of primary sources.

10. Ffoulkes, Charles. *The Armourer and His Craft*. New York: Frederick Ungar Publishing. 1967.

This gives an account of the artisans of Europe. Notable are names, tools, designs and material selection. Extensive dictionary included as well as listing of armourers marks.

11. Umberto, Franzoi. *Armoury of the Doge's Palace in Venice*. Stamperia di Venezia Editrice, 1966.

This book provides a thorough description of the armor in the Doge's Palace. The book includes pictures, dates, location within the Palace, and brief history of the piece.

12. Trassuk, Leonid. *Italian Armor for Princely Courts*. Chicago: The Art Institute of Chicago, 1986.

This book highlights armor made explicitly for the upper classes and is useful for learning what those interested in armor and weaponry are interested in. Of particular note is the descriptions of the artisan practices such as damascening, an inlaying of gold and silver accompanied by several examples.

13. Luciano, Rebuffo. *Italian Armour*.

This book describes Italian armor through history focusing primarily on the principal creators of the armor, the Milanese.

14. Grancsay, Stephen V. *John Woodman Higgins Armory Catalog of Armory*. Worcester: Davis Press, 1961.

This reference material has an excellent history of armor as well as a sample catalog of an armory.

15. Grancsay, Stephen V. *Arms and Armor*. New York: The Metropolitan Museum of Art. 1986.

A very broad collection of essays ranging from artisan to Far Eastern armaments.

16. van Cuveld, Martin. *Technology and War: From 2000 B.C. to the Present*. New York: The Free Press. 1989.

This book views the history of war and technology on three basic fronts: field, siege, and naval warfare. Throughout incorporation is made to the ability of technology to influence war.

### **4.3 Venice**

17. Griesbach, C.B.. *Historic Ornament: A Pictorial Archive*. New York: Dover Publications, 1975.

A pictorial analysis to help identify particular aspects of ornamentation in Venice. The books contains pictures with relevant dates and places.

18. Muir, Edward. *Civic Ritual in Renaissance Venice*. New Jersey: Princeton University Press. 1981.

This is an informative book on the traditions of the Venetian government. For instance since a member of any part of government was not in office very long special tradition keepers were apart of the government such as the savii and the maestro cerimoniale or cavalier of the doge. Information on the ducal procession might further our understanding of objects in the palace.

19. Oliphant. *The Makers of Venice: Doges, Conquerors, Painters and Men of Letters*. New York: A.L. Burt Publishing. 1927.

A historical look at the makers of Venice with special consideration on the first main families.

### **4.4 General**

20. Kreitler, Hans, Shulamith Kreitler. *Psychology of the Arts*. North Carolina: Duke University Press, 1972.

This book attempts to pull together several theories on art psychology into one. The four main theories it incorporates are: psychoanalysis, Gestalt, behavioristic, and information theory. This book contains a detailed analysis of the effect of art in realms of: color, sculpture, accoustics, emotion, expectation, meaning, and science.

21. Martin, F. David, Lee A. Jacobus. *The Humanities Through the Arts*. New York: McGraw Hill, 1975.

This book defines art which is an important element of this research as to whether or not to include artistic fields in the database. The definition of art relies on four concepts: participation, form, content, and subject matter. A possible part of the survey might

relate to participation of the Doge's Palace patrons to the works and whether or not they consider the works art.

22. Verdenne, Elisabeth. *Living in Venice*. Thames and Hudson, 1990.

*Living in Venice* is an interesting book expressing some of the uniqueness encountered by Venetians with regard to furniture. Both traditional and modern places in Venice are featured. The use of lace, glass, and reflections is noted throughout the book. Notable designers are also noted as are styles which could be an important aspect of a furniture database.

23. Huse, Norbert; Wolters Wolfgang. *The Art of Renaissance Venice*. Chicago: The University of Chicago Press, 1986.

This book contains useful information on the art of Venice with special consideration as to whether the Venetian is artist or artisan.

## **5 Methodology**

This chapter provides an overview of the tasks at hand, followed by a specific description of the methods used to complete those tasks.

### **5.1 Problem Statement**

Current statistics suggest that every day over 3,500 tourists visit the Palazzo Ducale. These visitors are of a wide variety, each seeking the best possible experience during their museum visit. For this reason, it is essential that the museum be properly organized so that it is easily navigable for visitors. In order to do this it was necessary for us to learn the expectations and desires of the average visitor passing through the Palazzo Ducale.

For us to gain an appropriate understanding of these desires it became necessary to complete several separate tasks, as described in the following section. These tasks focused on both determining what the Palazzo Ducale had in its possession as well as devising a way to best present these materials to the visiting public.

Once we had accomplished these goals, we then had to decide upon a method to properly archive this information. Furthermore, it was in the interest of our sponsors, the *Musei Civici di Venezia*, that our archives be compatible with their current system of documentation in use at the Museo Correr.

## 5.2 Project Tasks

One of the major tasks at hand was contributing to the completion of a computerized catalog of the museum collections, which was to contain a complete listing of those items located within the Palazzo Ducale, including but not limited to paintings, furniture, arms, and armor (see Figure 5-1). As previously noted, in 1998 another team of students from WPI had created a database containing records of all of the paintings located in the Palazzo Ducale; this database was entitled *Palazzo Ducale Collezione Dipinti* (Doge's Palace Collection of Paintings). Our task now was to complete what this previous team had begun, by constructing two additional databases. The first of these was entitled *Armeria del Palazzo Ducale Dettagliata* (Armory of the Doge's Palace), and would contain a complete listing and description of the different items located in the Armory section of the museum. The second database was named *Mobilia del Palazzo Ducale* (Furnishings of the Palazzo Ducale); it consisted of records of the various furnishings spread throughout the museum. The methods used in designing and completing each of these databases will be explained in detail in the following sections of the Methodology.

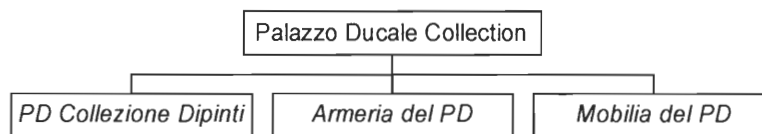


Figure 5-1 Databases created for the Palazzo Ducale

Once we had developed these primary databases, the team had to then develop a secondary database for the express purpose of transferring the Palazzo Ducale data to the *Musei Civici di Venezia's* data storage system, a program entitled Querysys. This new

database would make it easier for future users to make the transfer from the Palazzo Ducale database to Querysys.

A corollary task was the development of a Graphical User Interface (GUI) to further facilitate use of our primary databases. This GUI would provide the museum staff, as well as others interested in the contents of the Palazzo Ducale, with a relatively user-friendly program for viewing and adding to the databases. The techniques used in developing this Interface are described later in this chapter.

Our final task focused on the visitor's opinions and concerns in regard to some of the current practices of the Palazzo Ducale. A survey was conducted to determine what these were, which provided the museum administrators with information regarding both general visitor demographics and specific visitor information. Once we had collected this information, it was organized into a format that facilitated analysis; from this analysis, a series of recommendations could be made to the staff of the Palazzo Ducale. The remainder of this chapter is divided into several sections, each describing specific methods for accomplishing the tasks listed above.

### **5.3 Catalog Components**

As described in the previous section, we divided the various records of the items within the Palazzo Ducale among three separate databases: *Palazzo Ducale Collezione Dipinti*, *Armeria del Palazzo Ducale Dettagliata*, and *Mobilia del Palazzo Ducale*. Within each of these databases, further division was necessary; we separated each database into different tables, and then subsequently divided those into various fields.

Since the database entitled *Palazzo Ducale Collezione Dipinti* had already been developed, our task focused on creating the remaining two databases. This section describes the different methods used in creating each of these, and provides a detailed explanation of the hierarchical structure of each one.

### 5.3.1 L'Armeria del Palazzo Ducale

The armory located within the Palazzo Ducale consists of an extensive collection of arms and armor. This collection is displayed in numerous glass cases and displays, each containing hundreds of artifacts relevant to Venetian history. Our goal was to catalog each of these pieces into a format more easily usable by the museum staff.

The Palazzo Ducale was in possession of a large collection of data relating to the contents of the armory. This collection had been created in 1988 and existed in paper form, as shown in Figure 5-2; this figure also appears in greater detail in Appendix B.

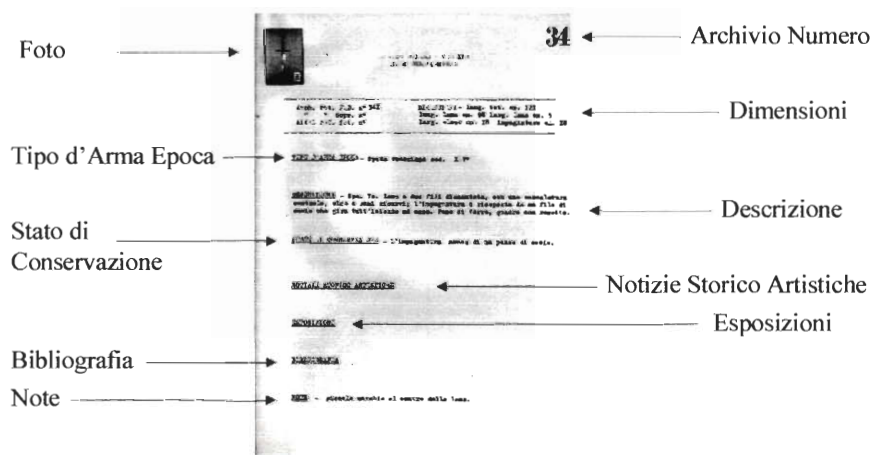


Figure 5-2 A sample record from the paper catalog

In the paper catalog, each individual piece was assigned a unique number, as can be seen in the upper right-hand corner of each record (Figure 5-1). Located directly

below this **Archive Number** (*Archivio Numero*) are the dimensions of each piece in metric units; this is the *Dimensioni* field. It is important to note that depending on the type of arm or armor that is described, there are different sub-fields within the *Dimensioni* field. For example, a record describing a *spada*, or sword, would have sub-fields such as *lung. tot.* (total length), *larg. elsa* (width of hilt), and *lung. impugnatura* (length of handle). In this manner, the *Dimensioni* field differs from record to record.

In many cases a picture was affixed to the record in the upper left-hand corner of the page. While a large number of the records possessed these pictures, there were those that did not. In these cases it was difficult to match the paper documents to a corresponding archived photograph. The field located directly below the picture is supposed to provide the number of such an archived photograph; this field, though, was rarely filled in.

Following the *Dimensioni* fields are seven additional categories, each one describing a particular facet or property of the piece in question. The first of these is *Tipo D'Arma Epoca* (Type of Armor and Period of Origin); this field usually describes the type of armor, its place of origin, and its period of construction. Below this category is the *Descrizione* field, which contains a general description of the piece. Following the *Descrizione* field is a category entitled *Stato di Conservazione* (State of Conservation), which describes the present condition of the piece. Generally, an entry of *buono* or *ottimo* (“good” or “excellent”) is recorded in this field, referring to the overall



condition of overall object. Occasionally, however, we found entries that made note of a specific flaw or evidence of deterioration of that particular piece.

The next category in the paper records was *Notizie Storico Artistiche* (Historical Artistic Notes). We usually found this field to contain information relating to the craftsman of the piece, or general historical information related to the item. The next field was *Esposizioni* (Exposition); this category listed various places, if any, where the piece had been displayed other than the Palazzo Ducale. Following the *Esposizioni* field was one entitled *Bibliografia* (Bibliography) which contained a listing of those texts, if any, that referenced the piece. Finally, each record contained a *Note* (Notes) category, which listed any miscellaneous information that had not been listed in the other fields.

Below the descriptive fields, in the lower right corner of each record, was stamped the word *Sala* (Room) followed by a number; this stamp cannot be seen in Figure 5-1. We discovered that this number corresponded to the armory room in which piece had been displayed at the time of the paper catalog's compilation. As there are four rooms of the armory, most records were typically assigned numbers one through four.

The group decided that the layout of our database, *Armeria del Palazzo Ducale Dettagliata*, would follow the layout of the museum's paper catalog. We decided to divide several of that catalog's categories into smaller, more descriptive fields. However, so as not to compromise the integrity of the original data, we first created a database in Microsoft Access that solely contained the information as presented in the paper records. In this way, future users could easily reprint the records in a form very similar to their current appearance. This database was titled *Armeria del Palazzo Ducale Originale*; its

structure is shown in Appendix C-1. An example of a reprinted paper record is located in Appendix F.

Once we had entered the data into *Armeria del Palazzo Ducale Originale*, we created a more defined, searchable database, entitled *Armeria del Palazzo Ducale Dettagliata*. In it, the original category, *Tipo D'Arma Epoca* (Type of Armor and Period of Origin), was separated into three smaller categories: **Type of Armor**, **Place of Origin**, and **Period of Construction**. An example of this is the treatment of the sword pictured in the record in Figure 5-1. In the paper archives, the category *Tipo D'Arma Epoca* would contain an entry such as “*spada Veneziana sec. XV* (Venetian sword from the 15<sup>th</sup> century).” We entered this information into the three new fields within the database *Armeria del Palazzo Ducale Dettagliata*. In the field **Type of Armor**, there would be an entry of “*spada*”. In the next field, **Place of Origin**, we entered the piece’s origin; in this particular case, the field would contain the word “*Veneziana*”. Finally, the **Period of Origin** field would consist of a numeric entry signifying the 15<sup>th</sup> century. A view of the database design is available in Appendix C-2.

Once we had divided the pre-existing fields as needed, we scanned the thumbnail photos present on the original paper records. Each image was saved with a file name representative of its archive number and armament type. If a particular piece did not have an accessible picture, it was noted within the database record pertaining to that piece. These files were then linked to the *Armeria del Palazzo Ducale Dettagliata* database; in this way, the user could review the information available on a given piece while at the same time view a picture of that item.

With the completion of *Armeria del Palazzo Ducale Dettagliata* database, we created a database that our sponsors could use to translate the information we had acquired into their database system, Querysys. This program is widely used in Italy, but presently lacks direct support for Access files. Since the import format currently supported by Querysys is rather complicated and an Access import is forthcoming, we chose to create a special Access table according to the formats and field names adopted by Querysys. These field names follow the standard set forth by the *Istituto Centrale per il Catalogo e la Documentazione (ICCD)*, an extract of which is included in Appendix C-3. Data within *Armeria del Palazzo Ducale Dettagliata* database was mapped to the corresponding fields of the *Querysys Armor Database*; in some cases, fields were combined, while in others, fields had to be broken down further. Once this database was completed, a total of three databases had been created for the Armory of the Palazzo Ducale, as shown in Figure 5-3.

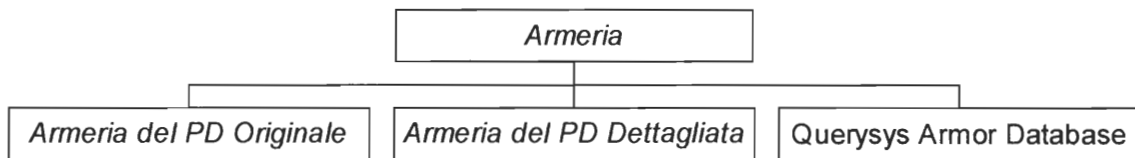


Figure 5-3 Database created for the Armory of the Palazzo Ducale

### 5.3.2 Mobilia del Palazzo Ducale

Each piece of furniture evaluated was measured and categorized; once this was done, this information was entered into the *Mobilia del Palazzo Ducale* database. The location of each furniture item was noted and processed into a geographical mapping system known as MapInfo. Using this program, the locations of the furniture pieces can be linked to the database containing relative information. To view the *Mobilia del Palazzo Ducale* database structures, see Appendix C-4.

## 5.4 Graphical User Interface (GUI)

To allow the museum staff to more easily access and interact with the archived information in the database, a Graphical User Interface (GUI) was created, entitled Palazzo Ducale Collection Information Management System. Through the use of this interface, the staff would be able to view, edit and add to the data in a relatively user-friendly format. In order to encompass all aspects of the database while still maintaining simplicity-of-use, the GUI was created using Microsoft Visual Basic, which has built-in support for Microsoft's Jet relational database engine, the same engine used by Microsoft Access.

The use of Visual Basic allowed us to achieve the two main objectives originally desired in creating the interface: to design a database that was simple to understand and use, while making use of different levels of security to prevent unauthorized users from entering restricted areas of the database. By combining these two objectives, an effective GUI structure was developed and implemented. The code for the GUI is contained in Appendix D-1.

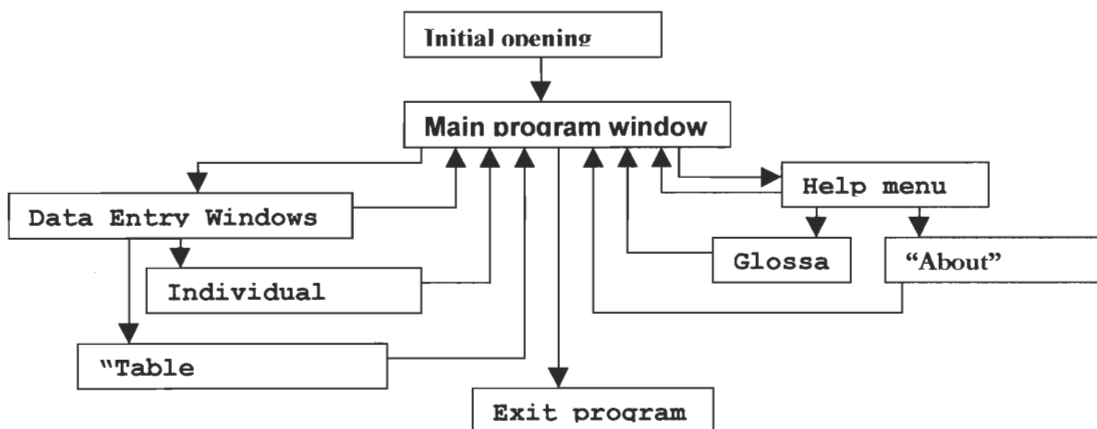


Figure 5-4 Interface flow diagram

Figure 5-4 shows the operating flow of our interface. It can be seen that all users must begin using the program at the initial opening screen (splash screen); from this screen, all of the features of the program may be accessed. Figure 5-5 is a screenshot of this splash screen.



Figure 5-5 Splash screen of the GUI

Once the user has begun using the program, they are prompted for a password; based upon the password entered, the interface will call up the database in either read-only or write mode. While the database is in read-only mode, the user will not be allowed to make changes to the actual data contained within the records. In this manner, it is possible for the interface to secure access to the database to a limited group of users. Upon password entry, the interface displays the **Main Program Window**, as seen in Figure 5-6. From this window, the user can progress to the main features of the interface, including the `Data Entry Forms` and the `Table Definition` window. Other

accessible features include an Italian/English armory glossary and an informational window about our project team.

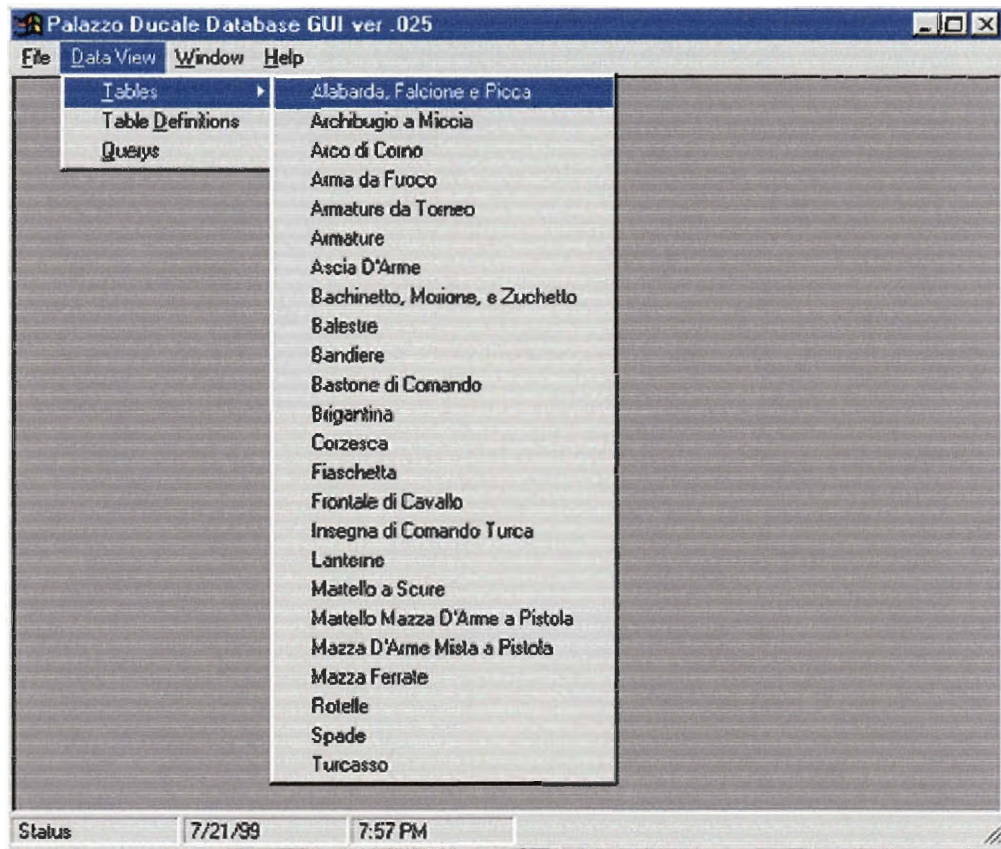


Figure 5-6 Main program window of the GUI

Figure 5-7 shows a screen shot of one of the data entry forms, which can be accessed by clicking on the appropriate table name in the Data Entry Forms menu. This window contains those input/display fields necessary for interaction with each of the fields in a particular table. The controls at the bottom of the screen allow the user to page through the records in a sequential fashion. With the first button of this control, the user can move to the first record in a table; the second button moves back one record. The third button moves forward one record, while the fourth button moves to the last record in the table. From the data entry forms, records can be easily added to the corresponding

table by clicking on the “Add” button. Once the new data is entered, the screen can be refreshed so as to show changes by clicking on the “Refresh” button; this is necessary in

The screenshot shows a data entry form for a 'Mazza Ferrata'. The form is organized into several sections:

- Left Column:**
  - Archivio Numero: 121
  - Arch Fot Sopr: 0
  - Altri Ref Fot: 0
  - Lung tot, cm: 71
  - Larg tot, cm: 12
  - Lung Impugnatura, cm: 0
  - Larg Mazza, cm: 0
  - Lung Costola, cm: 14
  - Altezza Costola, cm: 5
  - Lung Alettone, cm: (empty)
  - Larg Alettone, cm: (empty)
  - Peso, kg: 1.4
  - Tipo d'arma: (Mazza ferrata (arma da bo...))
  - Origine: (empty)
  - Epoca: 1500
- Right Column:**
  - Stato di Conservazione: Buono
  - Notizie Storico Artistiche: (empty)
  - Espositori: (empty)
  - Sala: 1
  - Bibliografia: De Lucia
  - Note: la descrizione è ricaricata dal De Lucia
  - Foto:
  - Machio:
  - Materiale: Ferro
  - Colori: (empty)
  - Impugnatura Materiale: Legno
  - Manico Materiale: Legno
  - Marca: (empty)
- Image:** A small photograph of the 'Mazza Ferrata' object is shown on the right side of the form.
- Description:** A text area at the bottom left contains the following text: "Mazza ferrata di ferro forbito, con punta quadrangolare, a quadrio costole (o alettone) rinforzati con una punta nel mezzo, manico vuoto con anima di legno; impugnatura cilindrica pure di legno, con nove anelli."
- Buttons:** At the bottom right, there are navigation buttons: Home, Left, Right, End, Grid, Add, Delete, Refresh, and Update.

Figure 5-7 Data entry form in the GUI

order to view parallel changes made externally to the database. Finally, by clicking on the “Grid” button in the data entry form, the user is able to view the grid view window. The grid view, as shown in Figure 5-8, is available to allow more competent users to enter data more quickly.

Each data entry form can be displayed in a window of maximum size 800 by 600 pixels; the computers in use by the museum staff are set to run at this resolution. This ensures that the entire form will be displayed onscreen at once without the necessity of scrolling, an important feature for easy data entry. The Table Definition window is displayed in Figure 5-7; this window is accessed by clicking on Table

Definition in the Data Entry menu. The 24 individual tables of the database are displayed here in tabular

Archeo	Numero	Arch Fot Sopr	Altri Ref Fot	Lung tot. cm	Larg tot. cm	Lung Impugnatura. cm	Larg Mazzo. cm	Lung
150	0	0	0	71	12	0	0	0
150	0	0	0	61	0	0	20	12
151	0	0	0	67.5	0	0	20	12
152	0	0	0	62	0	0	19	11.5
153	0	0	0	63	0	0	21	11.5
154	0	0	0	64	0	0	19	13
155	0	0	0	63	0	0	22	11.5
156	0	0	0	59	0	13	0	14
315	0	0	0	46	11	0	0	0
316	0	0	0	56	12	0	0	0
317	0	0	0	76	11	0	0	0
318	0	0	0	63	11.5	0	0	0
319	0	0	0	69	12	0	0	0
320	0	0	0	68	12	0	0	0
321	0	0	0	61	12.5	0	0	0
322	0	0	0	64	12	0	0	0
323	0	0	0	63	12	0	0	0
324	0	0	0	68	13.5	0	0	0
966	0	0	0	66	0	24	0	0
967	0	0	0	64	0	23	0	0
1083	0	0	0	14	0	0	0	0
1084	0	0	0	62	0	0	0	0
1085	0	0	0	63	0	0	0	0
1086	0	0	0	71	0	0	0	0
1087	0	0	0	70	0	0	0	0
1088	0	0	0	62	0	0	0	0

Figure 5-8 Grid view of the GUI

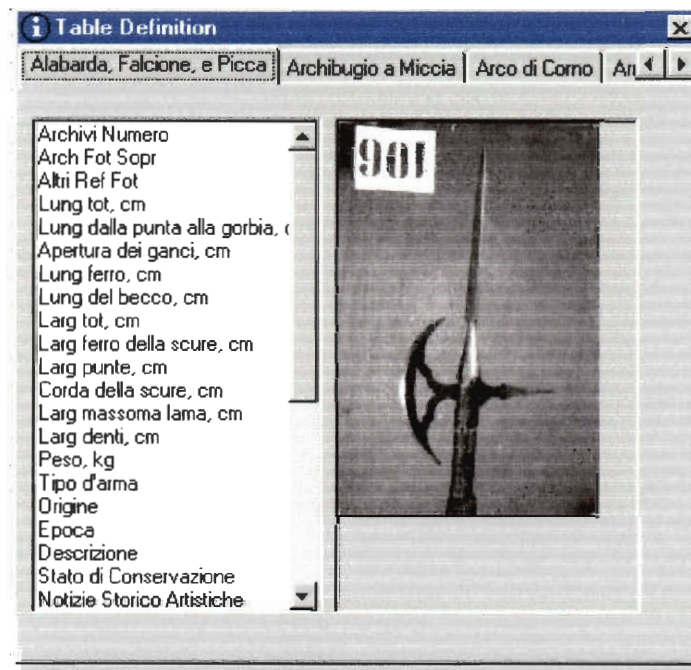


Figure 5-9 Table definition window in the GUI

format, with the individual fields of each table listed and a picture representative of the particular item of each table.



Once the GUI had been developed, a test script was performed on one of the members of the group proficient in database entry. To review the test script administered, see Appendix D-3. In addition, a more technical description of the functions of the GUI can be found in Appendix D-2. Finally, the user manual for the GUI is in Appendix D-4.

## **5.5 Survey Development and Administration**

As stated previously, one of the objectives of our project was for us to gain input from the visiting public in regards to the present conditions of the Palazzo Ducale. We created a list of questions to help us to gain insight into a particular area of the museum's operation. This section addresses all aspects related to the survey, beginning with the survey questions themselves and the rationale behind each one. Following this will be a description of the actual methods of implementation, as well as an explanation of the techniques used to analyze the data generated from these questions. Further analysis and recommendations are provided in the **Results and Analysis** section of this report.

### **5.5.1 Survey Questions**

In designing the survey questions, the group had to consider both the audience for the information collected and the methods towards obtaining this information. Four categories of questions were devised that would most assist the Palazzo Ducale in assessing possible areas of improvement: **Visitor Knowledge Level Questions, Public Awareness Questions, Armory Specific Questions, and Level of Services Questions.** Each of these categories of questions addressed a particular area of interest for the museum staff.

The following sections discuss the four categories of the survey questions. The complete rationale behind each question is given in Appendix E-3.

#### *5.5.1.1 Visitor Knowledge Level Questions*

Our first set of questions dealt with determining the level of knowledge that the average visitor possessed upon entry into the Palazzo Ducale. There were four of these questions in this section:

- Can you read Italian or English?
- Have you attended a university?
- Did you have any knowledge of the Palazzo Ducale before you visited the museum?
- Is this your first visit to the Palazzo Ducale?

#### *5.5.1.2 Public Awareness Questions*

The next series of questions addressed advertising issues concerning the Palazzo Ducale. This category focused on the validity of expanding the museum's advertising to include the Internet as well as local hotels:

- Do you use the Internet?
- Did you use the Internet to find information about the Palazzo Ducale?

- Are you staying in Venice overnight?

#### *5.5.1.3 Armory Specific Questions*

These questions focused on the presentation of the objects in the armory section of the Palazzo Ducale:

- Were you satisfied with the explanation of the arms in the armory?
- Have you ever visited other armories?

#### *5.5.1.4 Level of Services Questions*

This section of the survey sought to determine how the visitors generally felt about the museum on a functional level:

- Did you rent an audioguide system?
- Do you normally read the labels placed in museums?
- Would you like to see labels on art that is unlabeled?
- Would you like to see more direction signs at the Palazzo Ducale?
- Did you have difficulty finding the exit?

#### **5.5.2 Single Question Survey Administration**

Once we had determined those questions that warranted asking, the group had to devise a method of asking them in a manner that would generate an optimal response. To

accomplish this, we decided to structure each of the questions so that they could be definitively answered with a “yes” or “no”. By using this format, we ensured that the responses gathered from the survey could be easily tabulated; also, the simplicity of the survey would ensure that a large sample of the public would be willing to complete it. After we developed the questions to fit this format, they were translated from English into French, German, Italian, and Spanish, making the survey more understandable to the polylingual visiting public. The survey questions are listed in Appendix E-1.

We decided to administer this survey by printing each question on a separate slip of paper; the question would appear in all five of the languages on each piece. We then chose a particular question to hand out each day over a period of approximately three weeks. Thus, most questions would be distributed on two separate occasions.

As we had phrased the questions in a yes/no format, we decided to create two boxes for the visitors to place their responses in, one labeled “yes” in the five various languages, while the other was labeled “no”. The visitor would then place the slip in the box corresponding to his or her answer to the chosen question.

These two boxes were placed at exit corridor of the Palazzo Ducale. The exit corridor was chosen as the survey location point, because it was the only point at the museum where the visitors are allowed to go through in order to exit the Palazzo Ducale. Other location points such as the entrance and the cafeteria were analyzed as possible surveying points, but they were not as appropriate as the exit. The cafeteria did not cover whole population visiting the Palace, and the entrance did not permit us to ask the entire number of questions contained in the survey.

The single question survey was distributed to the visitors as they left the museum. A member of the group stood in front of the boxes and directed the participants to place the slips in the boxes. The boxes are shown in Figure 5-10.



Figure 5-10 Survey Boxes

Once we had established the location where we would hand out the single question survey, we decided upon a time schedule for distributing the questions. In order to generate a random sample of responses, we decided to survey the visitors for two shifts, one during the morning, the other in the afternoon. These shifts were two hours in length each. To further ensure that the sample was random, one survey slip was distributed each minute within these two-hour time slots.

At the close of each survey session, we emptied the boxes and tallied the responses to the question. This data was then entered into a Microsoft Excel worksheet for further examination, correlation, and analysis.

### 5.5.3 Multiple Question Survey Questions

In addition to the Single Question Survey, we developed an extended version of the survey to be distributed among a smaller segment of the visiting public. This survey

would present all of the questions of the Single Question Survey concurrently, along with several demographic questions that could not be administered using the “yes/no” format. The following five demographic questions were included in the Multiple Question Survey:

**1. Nationality:**

- Italian       English
- German       Spanish
- Japanese       French
- American
- Other \_\_\_\_\_

**2. What is the primary language that you speak?**

- Italian       English
- German       Spanish
- Japanese       French
- Other \_\_\_\_\_

**3. Do you speak any additional language(s)?    Yes    No**  
**If yes, please check the additional language(s) you speak:**

- Italian       English
- German       Spanish
- Japanese       French
- Other \_\_\_\_\_

**4. Age: \_\_\_\_\_**

**5. What is your gender?**

- Male       Female

By adding these questions to the original fourteen questions presented in the Single Question Survey, we were able to better analyze how responses to each individual question correlated with each other, thus expanding the information collected in the single question survey. For example, from the Multiple Question Survey, one could find

out what percentage of English speaking people between the ages of 25 and 30 and the number of visitor who rented an audioguide system. A printout of the Multiple Question Survey is contained in Appendix E-2.

#### **5.5.4 Multiple Question Survey Administration**

The Multiple Question Survey was distributed to a smaller selection of visitors than the Single Question Survey; this was due to the fact that it took longer for the visitor to complete. The actual implementation of this survey consisted of a team member distributing the survey to randomly selected visitors with a clipboard and a pen. In order to maintain a sufficient degree of randomization, every sixtieth person exiting the museum was asked to complete the survey.

This visitor would choose the survey that appeared in his native language, English, Spanish, Italian, German, or French. Once the visitor had completed the survey, we would record the time at which the questionnaire had been distributed and continue with our surveying process.

#### **5.5.5 Survey Correlation**

Once the two separate surveys had been distributed, the answers were correlated using several statistical techniques. Each survey technique possessed a particular advantage over the other; with their combination, accurate analysis could be performed. For instance, the Single Question Survey answers could be applied to a large population of visitors. Conversely, the Multiple Question Survey provided us with more detailed

information regarding a smaller sample population. These correlation techniques can be found in the **Results and Analysis** sections of this paper.



## 6 Results and Analysis

This chapter contains the results and analysis regarding the databases, graphical user interface, and surveys. The survey analysis section also includes several scenarios that the museum can use to facilitate long term planning and direct implementation.

### 6.1 Database

Upon completion, the databases contained a complete listing of the various items found within the palace. In total, four separate databases were constructed: *Armeria del Palazzo Ducale Originale*, *Armeria del Palazzo Ducale Dettagliata*, *Querysys Armor Database*, and *Mobilia del Palazzo Ducale*. Each of the armory databases was made up of the same information; in each one, however, the division of the data was different. The completed portion of the *Mobilia del Palazzo Ducale* database was applied to the geographical information system, MapInfo. This section details how we divided the information within each armory database, as well as the maps created from the furniture catalog.

#### 6.1.1 Armeria del Palazzo Ducale Originale

The structure of the database, *Armeria del Palazzo Ducale Originale*, was based entirely on the format of the pre-existing paper records. A table was designed for each category of armor present; in total there were 24 separate tables within this database. The fields of each of these tables were the same as those in the paper catalog; to view this database structure, see Appendix C-1.

### 6.1.2 Armeria del Palazzo Ducale Dettagliata

The second database designed by our group was entitled *Armeria del Palazzo Ducale Dettagliata*. This database was structured similarly to the *Armeria del Palazzo Ducale Originale* database; as before, 24 tables were in this database. The fields within these tables, however, were divided so as to be more descriptive and specific. For instance, the *Descrizione* field of *Armeria del Palazzo Ducale Originale* was often divided into three or more separate fields in the *Armeria del Palazzo Ducale Dettagliata* database. As each particular table was devoted to a different type of arm or armament, the divisions within these tables were based specifically on the characteristics of that type of piece. Thus, each individual table was broken down in a unique fashion; the final table structures appear in Appendix C-2. Analysis could be performed on this broken down catalog an example of this is from the swords table as given in Figure 6-1.

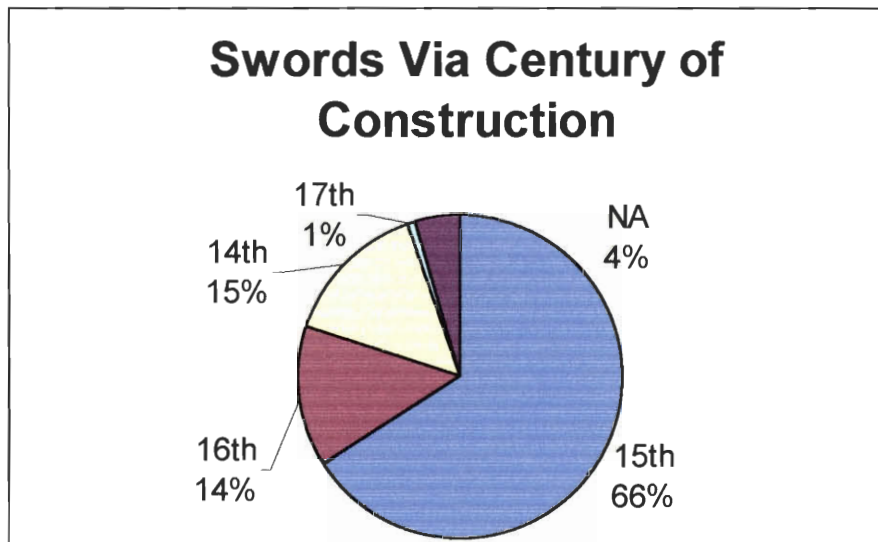


Figure 6-1

### 6.1.3 Querysys Armor Database

The final database we constructed was entitled *Querysys Armor Database*. This database was to serve as a link between the *Armeria del Palazzo Ducale Dettagliata* database and the program currently in use by the Museo Correr, Querysys. In order to ensure that the data could be easily transferred from our database into this program, we developed the *Querysys Armor Database*. The fields within this database were designed to be identical to the fields used by the Museo Correr. The information contained in *Armeria del Palazzo Ducale Dettagliata* database was then imported into this database using a series of queries. To view the structure of the *Querysys Armor Database*, see Appendix C-3.

### 6.1.4 Concerns for the Database Contents

Error in the databases can be attributed to several sources. The paper records were inconsistent with respect to capitalization, spelling and format. This can be seen in the *Bibliografia* field; when filled, the entry read either DeLucia or G. DeLucia. Furthermore, on several occasions, the name was accompanied by a page number or DeLucia's comments regarding the particular piece in question, which were copied in their entirety. Also, the dimension fields for the Arma da Fuoco were inconsistent in units; some calibers were given in millimeters and others in centimeters. The error in the database was further exacerbated by the unfamiliar, to those entering the data, Italian system of using a comma in place of an American period and a period in place of an American comma. Thus some records have misleading fields; several entries in centimeters should most likely probably be in millimeters. All efforts were made to copy

the Italian catalog exactly; however we were not proficient in Italian nor had the time to physically cross check each piece of armament to eliminate this source of error.

### 6.1.5 Mobilia del Palazzo Ducale

When completed, the *Mobilia del Palazzo Ducale* database will be a descriptive, searchable and mappable source for information regarding the furniture within the Palazzo Ducale. At the end of this study, the furniture catalog was not complete; this was primarily due to time constraints. We felt, however, that completing the base and structure of this database for the museum staff was important. At the close of this project, the furniture items in approximately half of the rooms of the second floor had been entered into the database. Once we had completed the preliminary furniture database, MapInfo layers were created to show the position of each piece, as shown in .

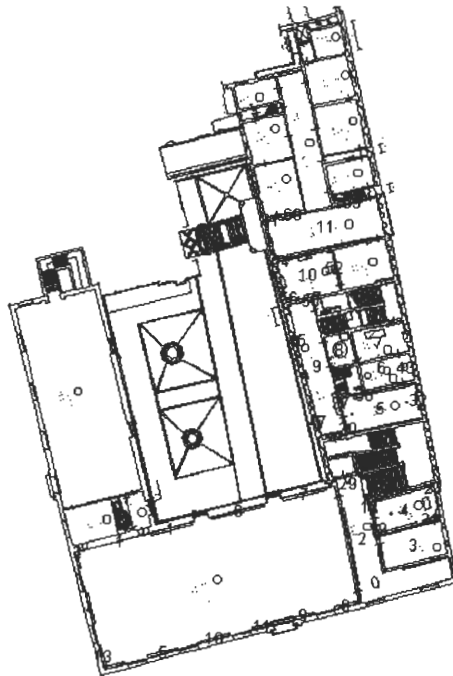


Figure 6-2 MapInfo layer including furniture locations

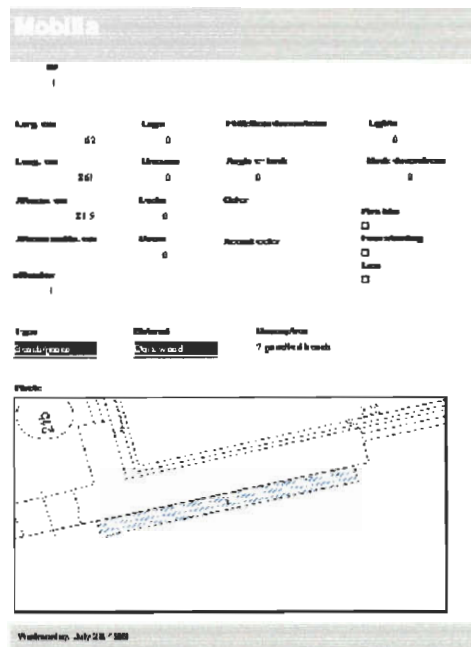


Figure 6-2 Sample record from the *Mobilia del Palazzo Ducale* database

Once we had created the MapInfo layer, the relevant area of the map was linked to each piece within the database. For example, the record of a piece found in Room 7 would include a section of the above map that was enlarged to show that particular room. An example of one of these records is shown in Figure 6-2; Appendix G contains the entire collection of these records.

## 6.2 Palazzo Ducale Collection Information Management System

The test script, as detailed in the Methodology section, was completed using the *Spade* field of the database. The results, as per the test script guidelines, fall into the two main categories of subjective and objective results.

For the subjective test, we timed the test subject while entering data from one paper record. The user entered data first using Microsoft Access, and then entered the

same data using our GUI, the Palazzo Ducale Collection Information Management System. The user required 135 seconds to enter the data using Microsoft Access; using the GUI, the user required 143 seconds.

The objective results to the test script focused more on the users preferences in relation to the two programs. The results to these questions are found in the list below.

**GUI:**

- Question: “What did you think was wrong with the interface?”
  - “check boxes were too far apart in the ‘*spade*’ form and too high, close to the top”
  - “navigation between input boxes was difficult”
  - “color scheme was not ‘colorful’ enough”
  - “queries need to be easier to use”
  - “input fields should not be filled in with zeroes upon the creation of a new blank record”
  - “it was hard to make a distinction between the ‘update’ and ‘refresh’ command buttons”
- Question: “What did you like or feel was particularly good about the interface?”
  - sensible layout
  - forms for input were already complete, as opposed to those in Access

- customized to armory database
- input fields were all viewable and easy to edit on one screen

**Microsoft Access:**

- Question: “What did you think was wrong with the interface?”
  - “input fields do not fit on one screen”
  - “navigation between input boxes was difficult”
  - “color scheme very bland and non-original”
  - “difficult or inconvenient to create an input form”
- Question: “What did you like or feel was particularly good about the interface?”
  - “layout is very familiar”
  - “data is quickly entered”
  - “queries are very powerful”

We analyzed the Palazzo Ducale Collection Information Management System interface both objectively and subjectively. The objective portion of the graphical user interface test consisted of determining the total time for the input of one paper record. The subjective portion of the test focused on asking the test subject a series of questions regarding the interface’s ease of use.

From the examination of the test question results, one can see that the user enjoyed the overall look and feel of the interface. The main points that contributed to this satisfaction were the layout of interface features, the customized forms, and the form view. One example of the layout that the user cited as “good” was the familiar feel of the menus. The reason for this resemblance can be clearly seen in Figure 6-3. This figure shows a comparison of two screenshots, one of our interface and one of Microsoft Word. As can be seen from a comparison of the “File” menus of each program, they are alike in both content and format, disregarding the fact that Microsoft Word is much more complex.

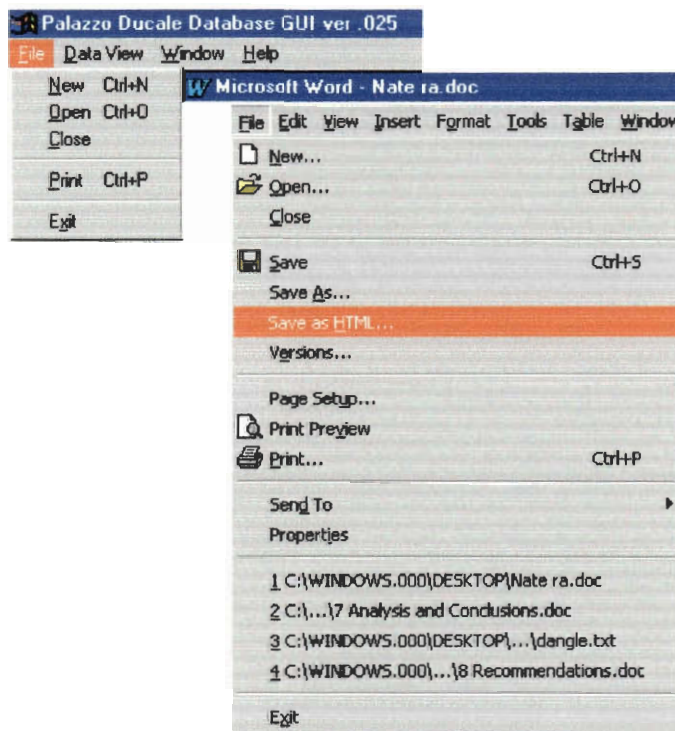


Figure 6-3 Comparison of pull-down menus of the GUI and Microsoft Word

Special attention was paid to the window layout as can be seen in the Data Entry window in Figure 6-4. For instance, all of the fields relating to easily measurable data,



Archivi Numero:	123	Stato di Conservazione:	Sono state messe delle borchie in rame attorn
Arch Fot Sopr:	0	Notizie Storico Artistiche:	
Altri Ref Fot:		Sala:	1
Diameter of Shield, cm:	58	Esposizioni:	
Diametro l'ombone, cm:	0	Bibliografia:	De Lucia
Altezza, cm:	0	Note:	
Larg tot, cm:	0	Foto:	<input type="checkbox"/>
Peso, kg:	6	Marchio:	<input type="checkbox"/>
Tipo d'arma:	Brocchiere d'acciaio (scu	Leone:	<input checked="" type="checkbox"/>
Origine:		Sigle:	
Epoca:	1600	Materiale:	Acciaio
Descrizione:	<input type="checkbox"/> Ricoperta: <input type="checkbox"/> Colori:		
Brocchiere circolare d'acciaio, contornato da un tondino a torciglione; ha l'orlo con fregi e figure all'acquaforte fra i quali "leone di S. Marco" e lo stemma di casa "Mula" nella parte centrale omati			

Figure 6-4 Screenshot of the data entry window in the GUI

such as the dimensional characteristics and the weight are grouped together within the red circle. Armor characteristics that are not as easily measured or tabulated are located within the dotted orange rectangle, these include such fields as the Bibliographia and Note field, because of their somewhat larger nature they are also given more space within the window. The Descrizione field, located within the dashed blue rectangle, was given a large window due to the fact that it was deemed necessary for the relevant text to be easily read. Finally, the check boxes are all located together within the purple octagon. This allows the user to easily check off all of these boxes at once, rather than switch from keyboard to mouse three separate times. All of these refinements allow for better interaction between the user and the interface.

Another feature of the interface that was notable was the ease in which the user could switch from one data field to another. A screenshot of a portion of a data entry window is included in Figure 6-5. To switch from one field to another the user could

simply press the “tab” key rather than the switching input devices from the keyboard to the mouse. This was both a time saving mechanism as well as a user-friendly element.

Archivi Numero:	76
Arch Fot Sopr:	0
Altri Ref Fot:	0

Figure 6-5 Portion of data entry window

As can be seen in Figure 6-6, the Data Entry windows contain the same basic layout for each table. This makes data entry easier which ultimately makes the task of the entry of thousands of records not only possible but feasible with our interface.

Alabarda, Falciene, e Picca	Archibugio a Miccia	Arco di Corno	Arma da Fuoco
Archivio Numero: 76	Archivio Numero:	Archivio Numero:	Archivio Numero: 217
Arch Fot Sopr: 0	Arch Fot Sopr:	Arch Fot Sopr:	Arch Fot Sopr: 0
Altri Ref Fot: 0	Altri Ref Fot:	Altri Ref Fot:	Altri Ref Fot: 0
Lung tot, cm: 0	Lung tot, cm:	Apertura dell'arco, cm:	Lung tot, cm: 36
Lung dalla punta alla:	Cannone Lung, cm:	Tipo d'arma:	Canone Lung, cm: 22
Apertura dei ganci, cm:	Calcio, cm:	Origine:	Calcio, mm: 0
Lung lerso, cm: 0	Cal, mm:	Epoca:	Diámetro of barrel, cm: 2.3

Figure 6-6 Various data entry windows of the GUI

Figure 6-7 shows a combination of screenshots consisting of the password entry window and a portion of a Data Entry window. The data entry fields located within the red circle, are grayed out and are easily viewable but not editable. This shows that when a user enters a password that only allows high level, or read-only access, that user is not able to edit fields in the Data Entry windows. This prevents the user from editing the contents of the database. This makes a novice user more comfortable working with the interface and database, as they know that they cannot corrupt any of the data within the database.

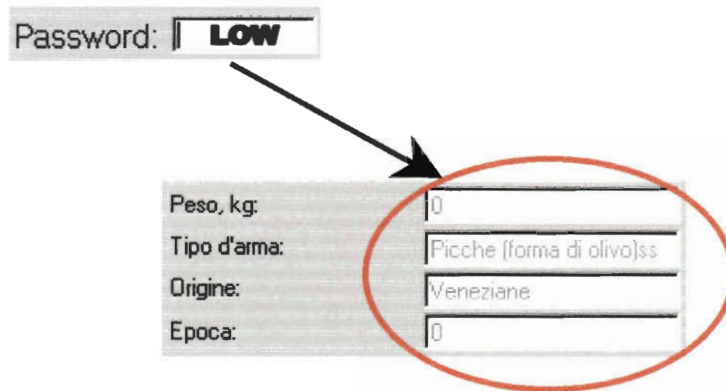


Figure 6-7 Password entry window in the GUI

In Figure 6-8, another combination screenshot is shown. Contained within the red circle, the “Grid” button easily allows the user to load the Grid view window, which is pointed at with the arrow. This window uses the same data entry view and conventions as Microsoft Access. The dotted blue circle contains the “Print” button that loads the Print window, allowing the user to print a record. Finally, the dashed green square encircles the VCR buttons; these features allow the user to easily navigate within the table.

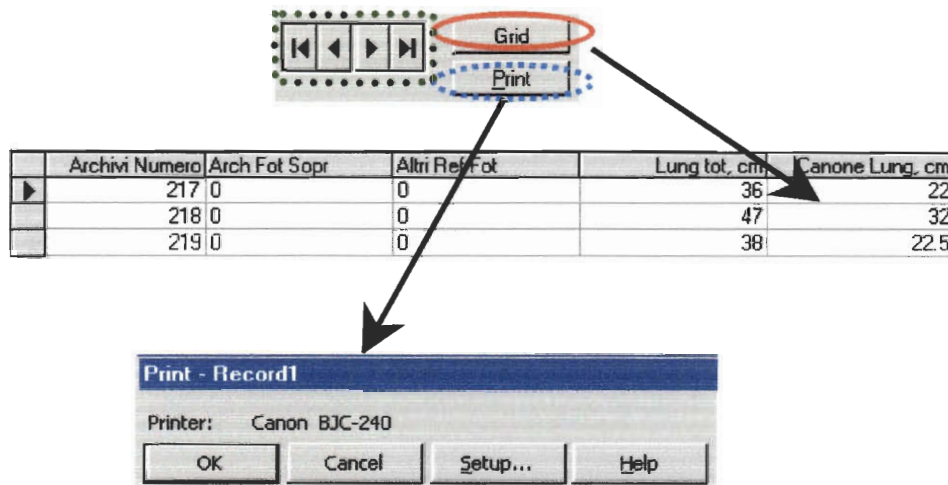


Figure 6-8 Various functional windows in the GUI

The customized forms also tested very well with the subject; this was because the test subject did not have to create them with a tool such as Microsoft Access's form wizard.

Main dislikes of the test subject were particularly centered on the layout of each data entry form. The color scheme and the general feel of the input environment were issues of the interface that needed to be addressed. The color scheme proved to be low contrast and also non-pleasing to the eye. The overall feel of the environment was said by the test subject to be much to be generic in some ways and too unique in others. The interface could be considered generic because of the main menu structure, which is in keeping with the standard Microsoft layout. The interface could also be considered unique because of the non-standard layout of the text fields and buttons on the input forms. Other problem points were cited as the titles of the menus and the structures of some of the tab strips.

### **6.3 *Single Question Survey***

The Single Question Survey was distributed over a period of three weeks; during this time, each question was distributed once, with the exception of the question relating to the duration of the visitors' stay in Venice. This question was distributed on four separate occasions, as described later. Approximately 100 visitors were surveyed for each question; on some instances, the number of responses was strayed from this number. This inconsistency can be attributed to the varying number of visitors who exited the Palazzo Ducale during the survey time.

Once we had completed the survey distribution, we tallied the results and entered them into a table using the program Microsoft Excel. This section contains the graphs generated from the data contained within these tables, as well as an analysis of the results obtained.

### 6.3.1 Visitor Knowledge Level Questions

We asked the question, “*Can you read Italian or English?*” to 124 visitors. The results gathered from this question are shown in Figure 6-9.

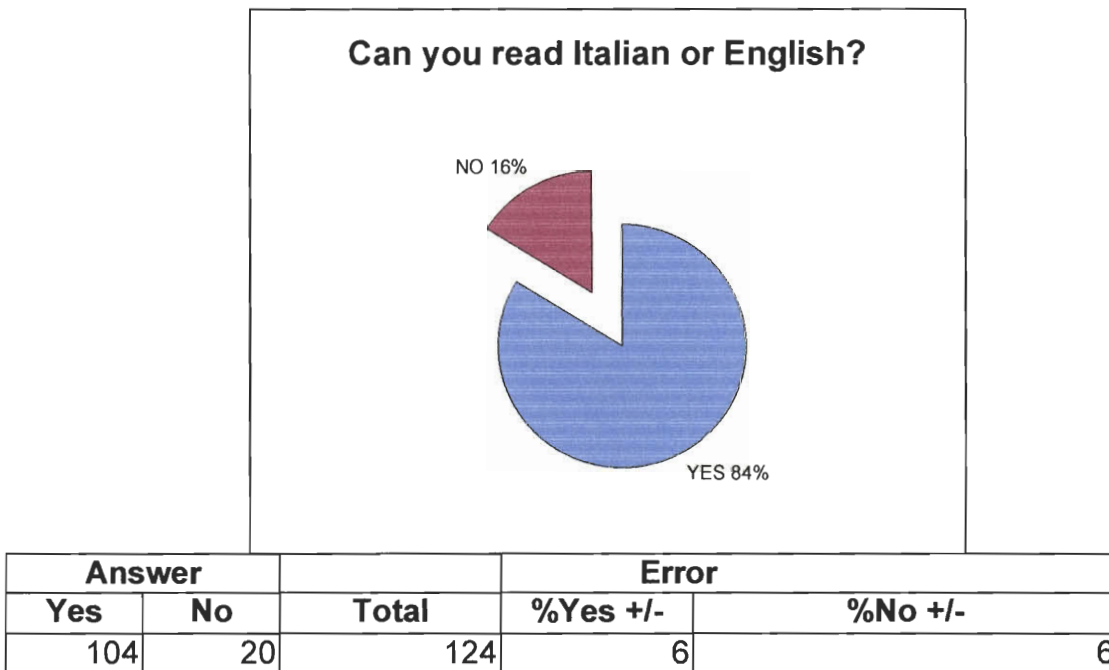


Figure 6-9 Percentage of visitors who can read Italian or English

From these results, we were able to determine that 18% of the visitors to the Palazzo Ducale were unable to read Italian or English. As noted earlier, all of the labels in the museum are primarily in Italian; the room description posters are also presented in English. Thus, it would prove useful for the Palazzo Ducale to translate these posters

**Pages 6-14-6-19  
missing in original**

**IQP/MQP SCANNING PROJECT**



**George C. Gordon Library  
WORCESTER POLYTECHNIC INSTITUTE**

the museum early in the morning; the Palazzo Ducale could perhaps use this information by advertising through the local hotels.

### 6.3.3 Armory Specific Questions

The first survey question from this section was, “*Were you satisfied with the explanation of the arms in the armory?*” We distributed this question to 102 visitors; the results are as shown in Figure 6-16.

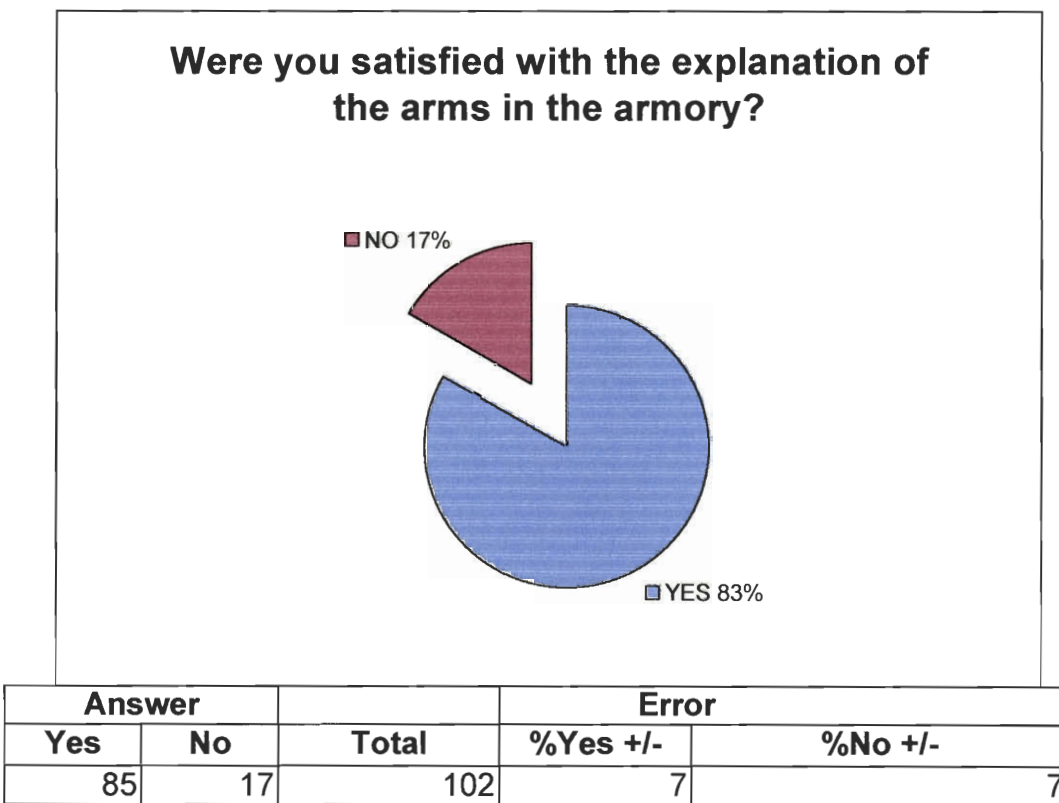


Figure 6-16 Percentage of visitors satisfied with the armory

We found that 83% of the museum visitors were satisfied with the explanation of the arms presented in the armory. This was contrary to our assumption that because the armory labels were only presented only in Italian, visitors would be unsatisfied.

We designed the second question in this section in conjunction with the first question in order to gain insight as to how the armory in the Palazzo Ducale compared to other armories. The question read, “*Have you visited other armories?*” We asked 129 visitors this question; the results of this question can be viewed in Figure 6-17.

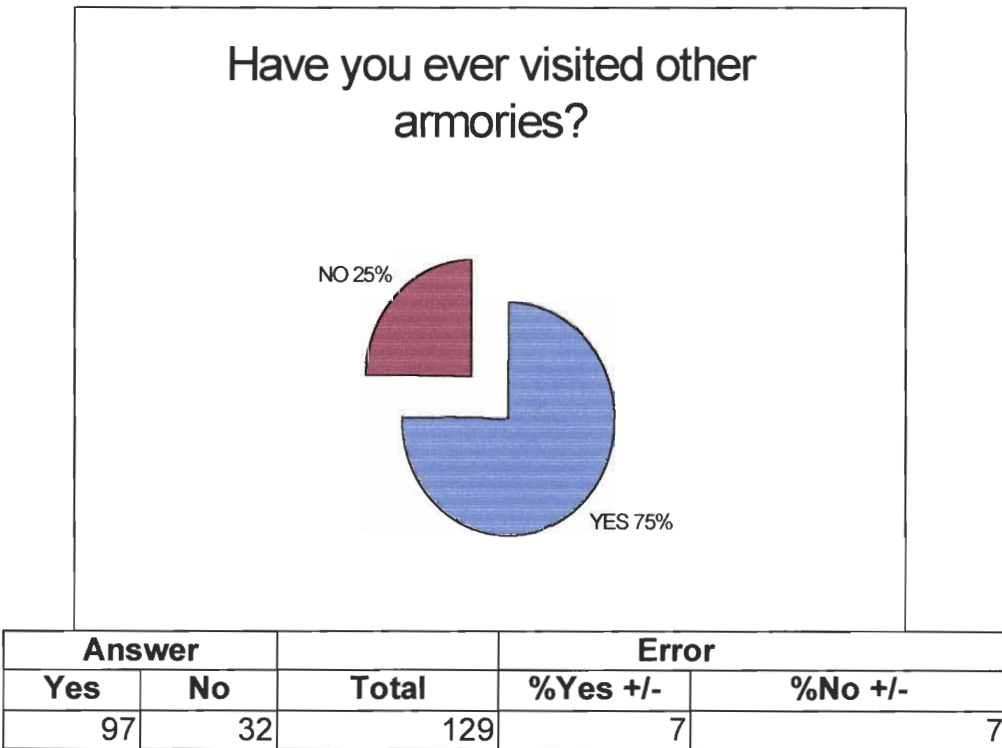


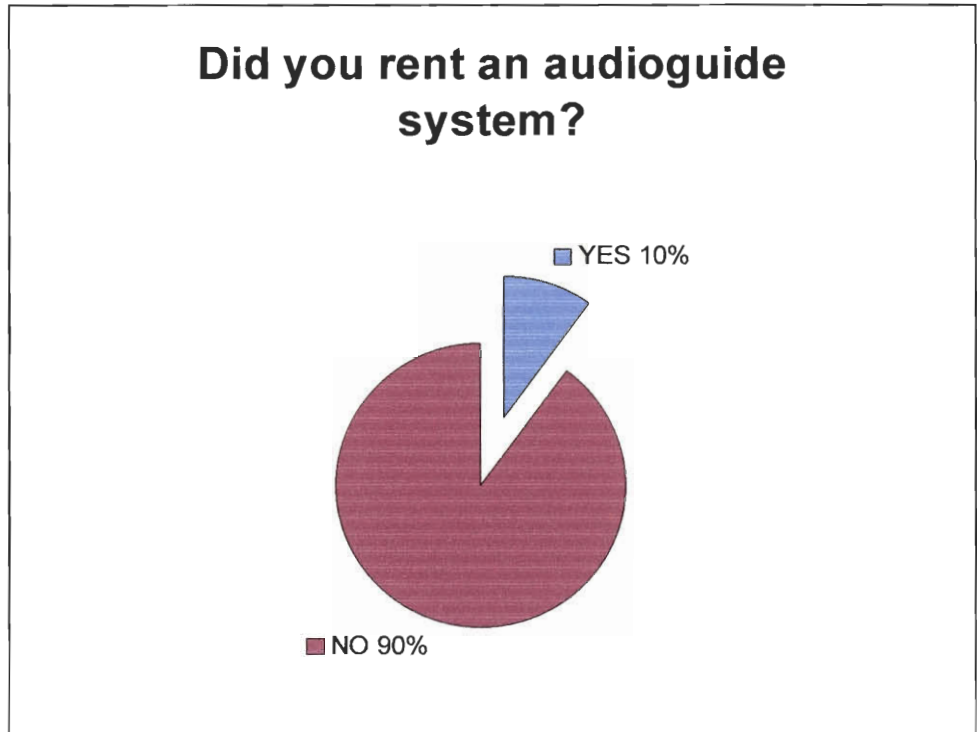
Figure 6-17 Percentage of visitors who have been to other armories

A high percentage of the people visiting the Palazzo Ducale have been to another armory exposition (75%). This response can be analyzed in two ways; first, one can say that as a large percentage of the visiting public have prior experience with armories, a higher level of explanation could be offered and understood. Second, in conjunction with the previous question, we find that a large percentage of people have visited other armories *and* are satisfied with the presentation of the armory in the Palazzo Ducale. Thus, one can conclude that the armory in the Palazzo Ducale is presented with a level of quality comparable to other armories.



### 6.3.4 Level of Services Questions

We distributed the question, “*Did you rent an audioguide system?*” to 91 visitors. Once the results were tallied, we obtained the results shown in Figure 6-18.

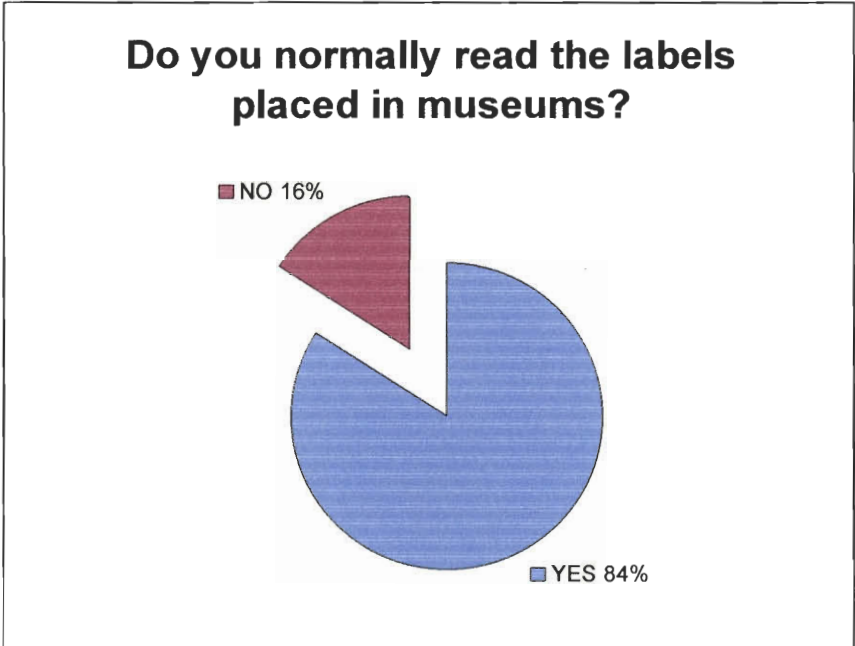


Answer		Error		
Yes	No	Total	%Yes +/-	%No +/-
9	82	91	6	6

Figure 6-18 Percentage of visitors who rented an audioguide system

From these results, we see that only 10% of the visitors to the Palazzo Ducale rented an audioguide system. Currently, the museum offers little or no advertisement for the use of these systems; perhaps by promoting them more on altering the rental cost (currently 7,000 lire), the use of the audioguides would increase.

The next question we asked sought to determine why the average visitor came to the Palazzo Ducale. As mentioned in the survey rationale (Appendix E-3), there are typically two types of museum visitor: those who come for knowledge attainment, and those who come for visual displays. The question asked was, “Do you normally read the labels placed in museums?” We asked 119 visitors this question; the results are shown in Figure 6-19.



Answer		Error		
Yes	No	Total	%Yes +/-	%No +/-
100	19	119	7	7

Figure 6-19 Percentage of visitors who read labels in other museums

We see that 84% of the visiting public normally reads labels in museums. Thus, the museum could increase the average visitor’s enjoyment of the Palazzo Ducale by adding more labels to the exhibits within.

The next question in this section, “*Would you like to see labels on art that is unlabeled?*” was aimed at determining the number of visitors who felt that more of the art should be labeled. The question was handed out to 119 people, the results are as shown in Figure 6-20.

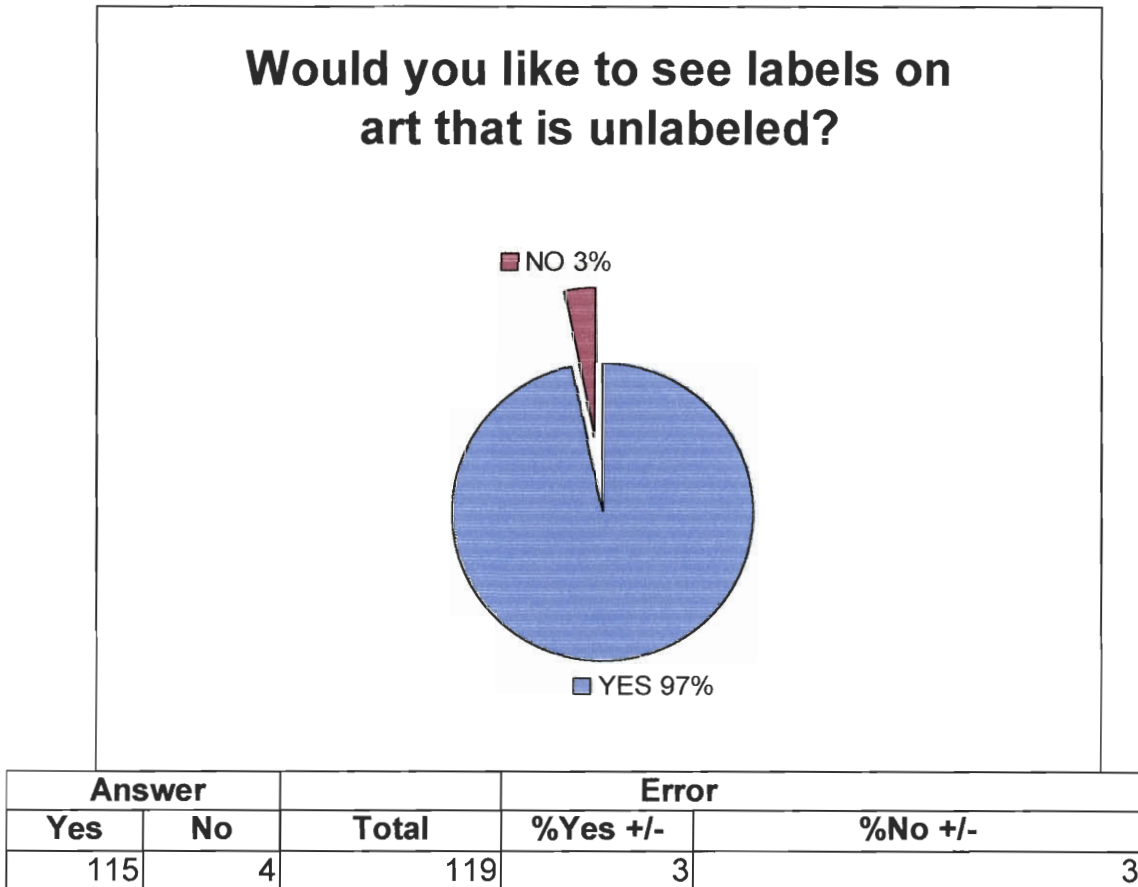
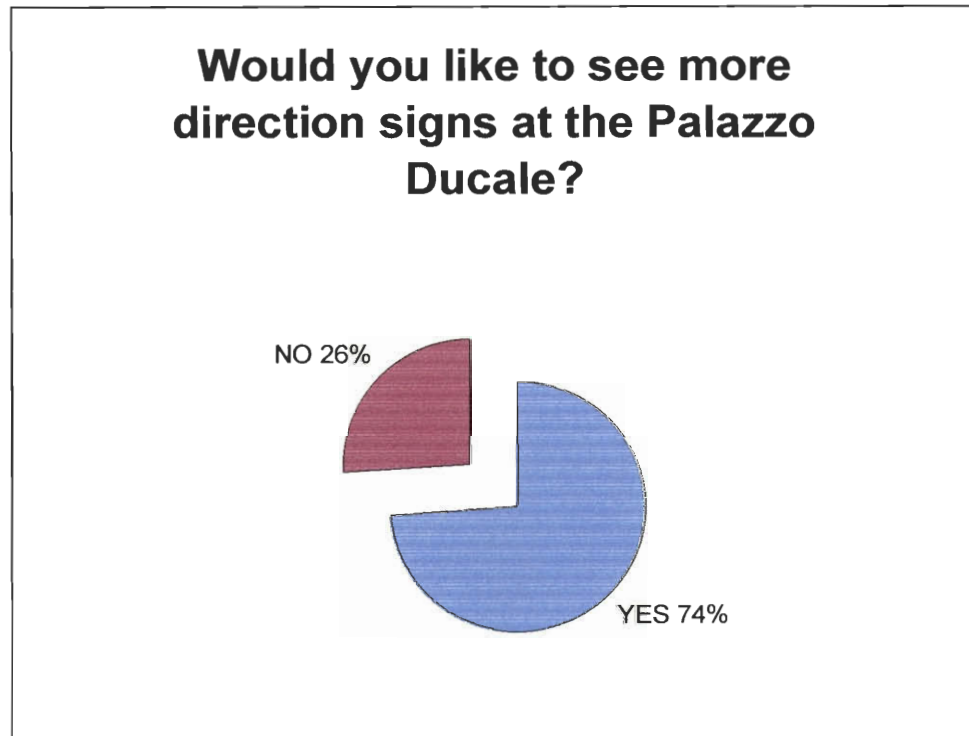


Figure 6-20 Percentage of visitors who would like to see labels on art that is unlabeled

We found that an astonishing number of visitors, 97%, would like to see labels on unlabeled art. As most of the art within the Palazzo Ducale does not have labels, these results would suggest that the museum could please the majority visitors by developing a labeling system for the artworks.

We distributed the question “*Would you like to see more direction signs at the Palazzo Ducale*” to 100 visitors. The results may be viewed in Figure 6-21.

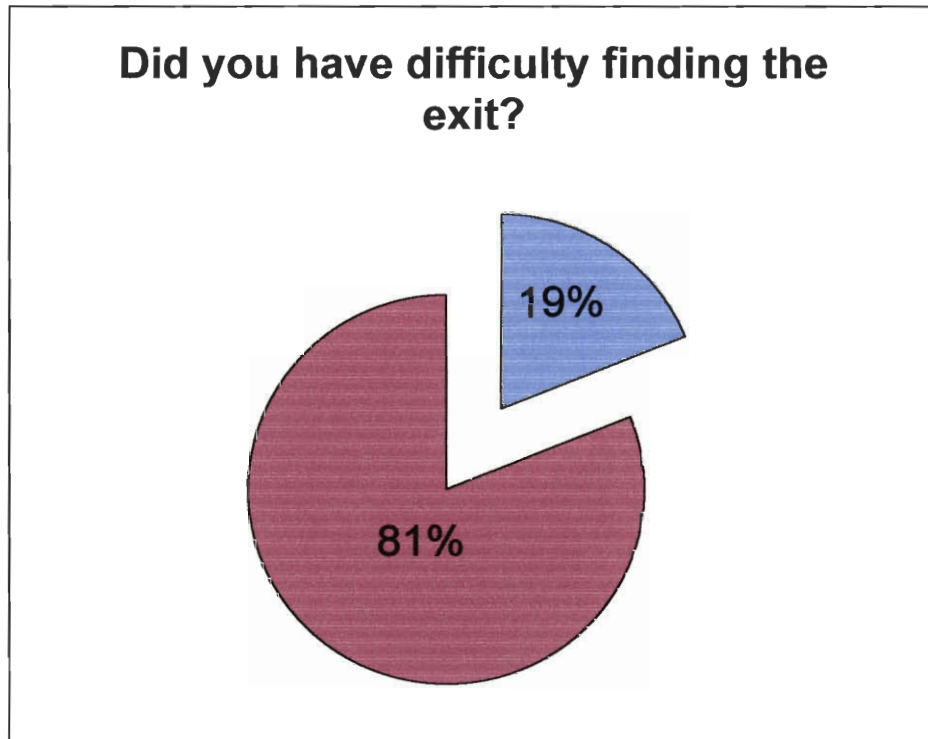


Answer		Error		
Yes	No	Total	%Yes +/-	%No +/-
74	26	100	9	9

Figure 6-21 Percentage of visitors who would like to see more direction signs at the Palazzo Ducale

We found that 74% of the visitors to the Palazzo Ducale would like to see more direction signs. As mentioned in the **Background** section of this report, the signs placed throughout the museum are scarce, often adding to the visitor’s confusion regarding the order they should travel through the Palazzo. Placing more directional signs in the museum, perhaps with more detailed graphical representation, would make it easier for the visiting public to travel through the museum.

The last question in the Single Question Survey focused particularly on the placement of *exit* signs throughout the museum. The question “*Did you have trouble finding the exit?*” was handed out to 106 people; the results are shown in the graph in



Answer		Total	Error	
Yes	No		%Yes +/-	%No +/-
20	86	106	7	7

Figure 6-22 Percentage of visitors who had trouble finding the exit

We found that 19% of the visitors had trouble finding the exit. While this number is lower than we expected, it is important to note that this number comprises a full fifth of the visiting public. Thus, the Palazzo Ducale could still be benefited by adding more exit signs, or perhaps increasing the detail on those provided.

#### **6.4 In Order for the Palazzo Ducale to Increase Types of Visitors**

If the museum staff finds the need to increase the number of visitors to the Palazzo Ducale then our results support the following recommendations.

##### **6.4.1 Increase Learned Visitors**

If the museum would like to increase the number of learned visitors to the Palazzo Ducale then the following are viable options according to our analysis. First a learned visitor would be a visitor that had any of the following credentials: prior knowledge of the museum, visitation of other armories, university attendance, or tri-lingual. This group of visitors would require special consideration as in general they are looking more for information from the palace than for the experience of being in the palace.

##### **6.4.1.1 Internet Expansion**

Our results show that 69% of university attendees are Internet users.

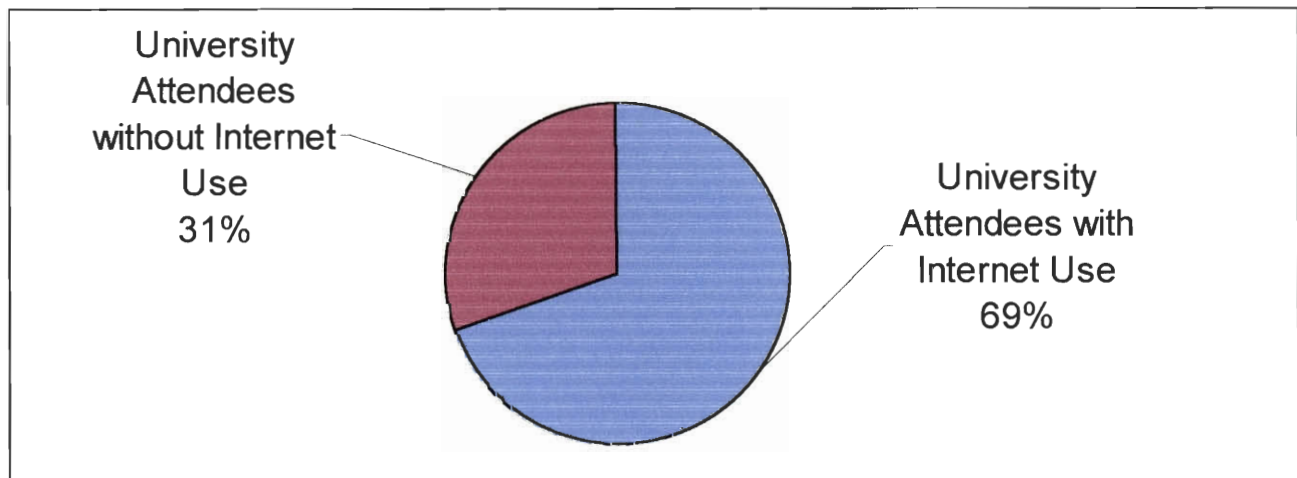


Figure 6-23

Of these visitors only 4% used the Internet to find information on the Palazzo Ducale.

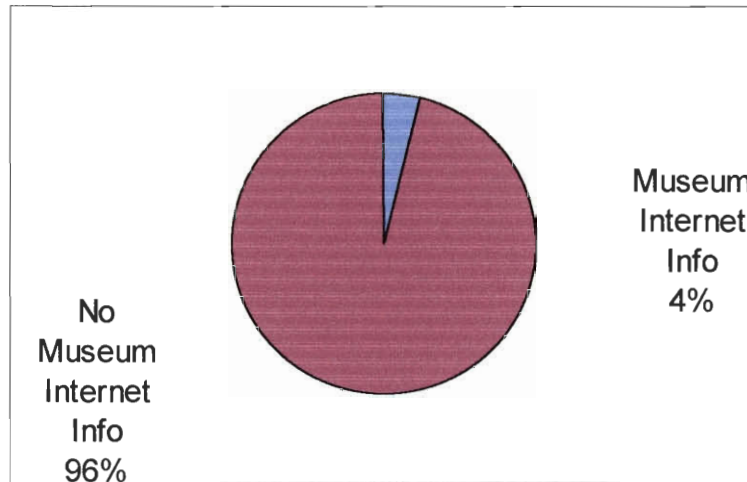


Figure 6-24

Similarly, 89% of tri-lingual visitors use the Internet yet none of this group found information regarding the museum on the Internet.

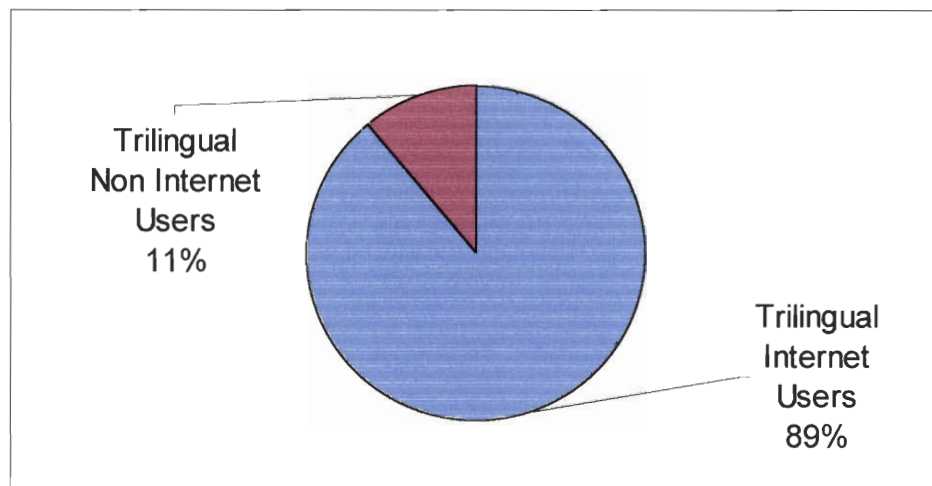


Figure 6-25

One could construe this data to assume that of these two groups both had high percentages of prior knowledge of the Palazzo Ducale before coming to the museum, however, this neglects the fact that many Internet users expect all major institutions to

have a web page. Therefore the Internet expansion would address this concern and allow for powerful yet relatively cheap advertisement.

**6.4.1.2 Hotel Advertisement**

These survey responses confirm the fact that learned visitors are more likely to stay in Venice overnight than the rest of the visitors of the museum.

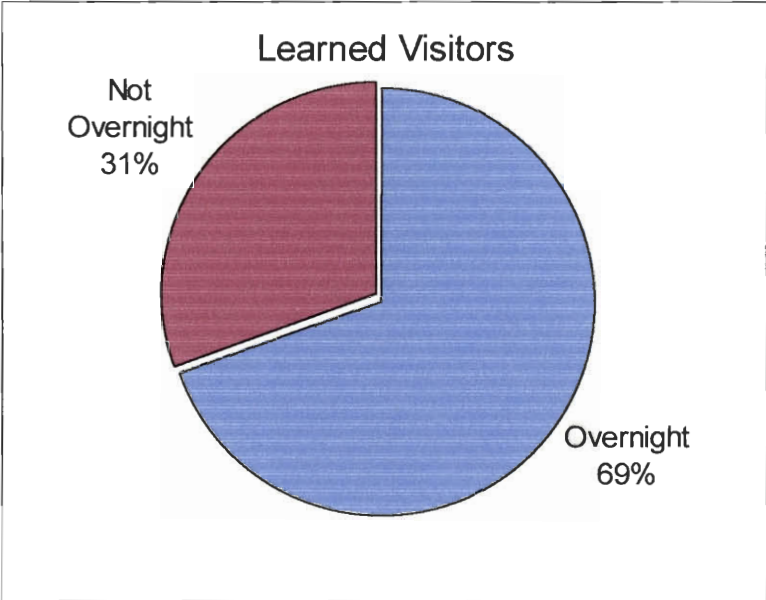


Figure 6-26

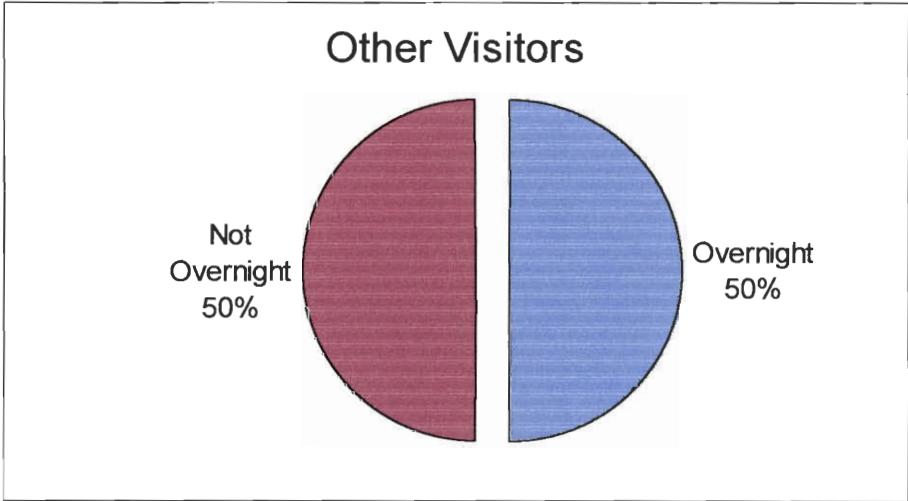


Figure 6-27



This could then translate to the museum having more advertisements at the hotels of Venice. These brochures could be made to cater to this specific population which already has a basic knowledge of the palace.

#### 6.4.2 Increase Visitors to Fulfill a Mission of Public Education

Often museums have a desire to educate the visiting public by means of presentation of informational artifacts. Visitors to target for this type of mission would be categorized by being under 25 years old and/or not having prior knowledge of the Palazzo Ducale.

##### 6.4.2.1 Internet Expansion

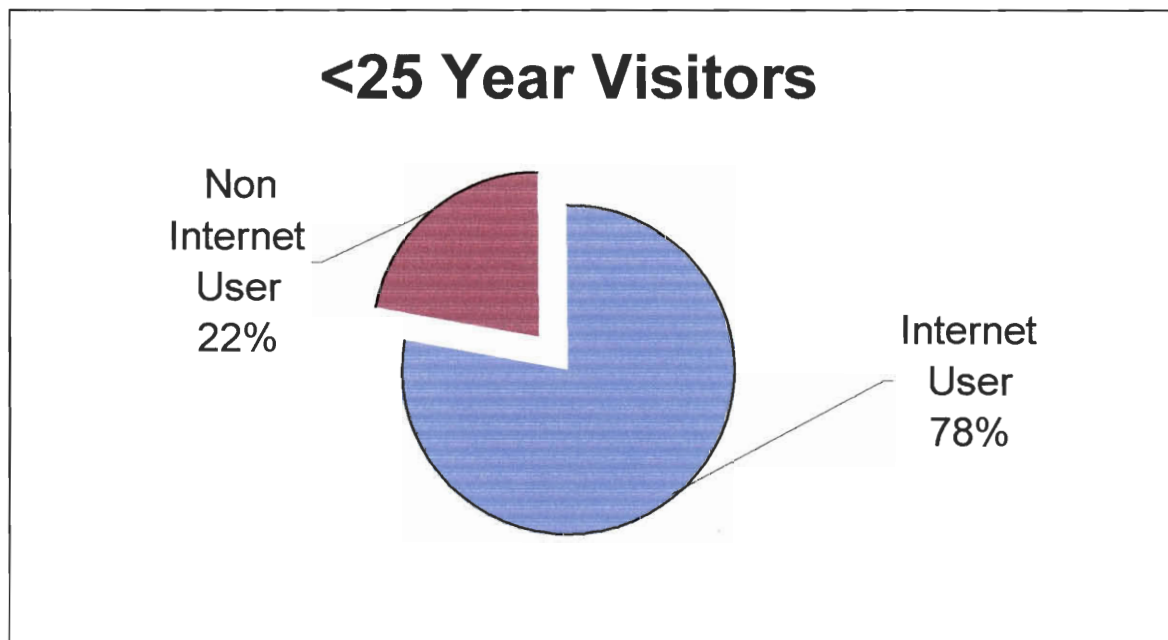


Figure 6-28

## >25 and <55 Visitors

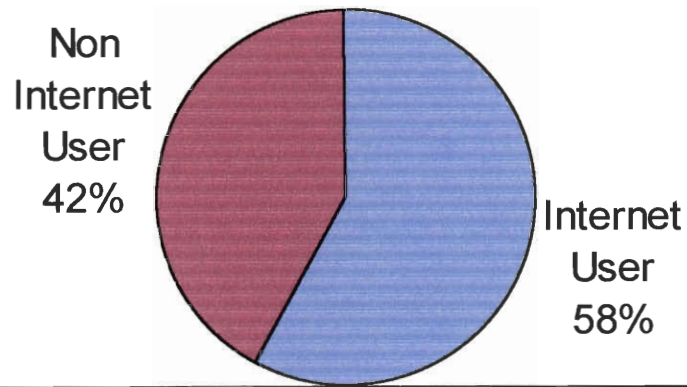


Figure 6-29

## Visitors Over Age 55

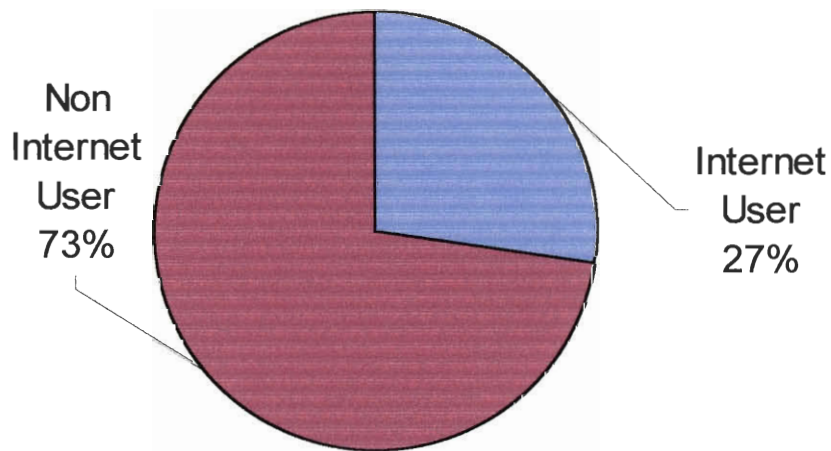


Figure 6-30

78% of the young age group use the Internet thus they are the largest age group to use the Internet as shown in Figure 6-28, Figure 6-29, and Figure 6-30. This is significant because despite their possible ignorance of Italian history and culture young,, as shown in Figure 6-31, Internet users expect very high grade web page presentations because they have been using technological applications including the Internet for a greater percentage of their life.

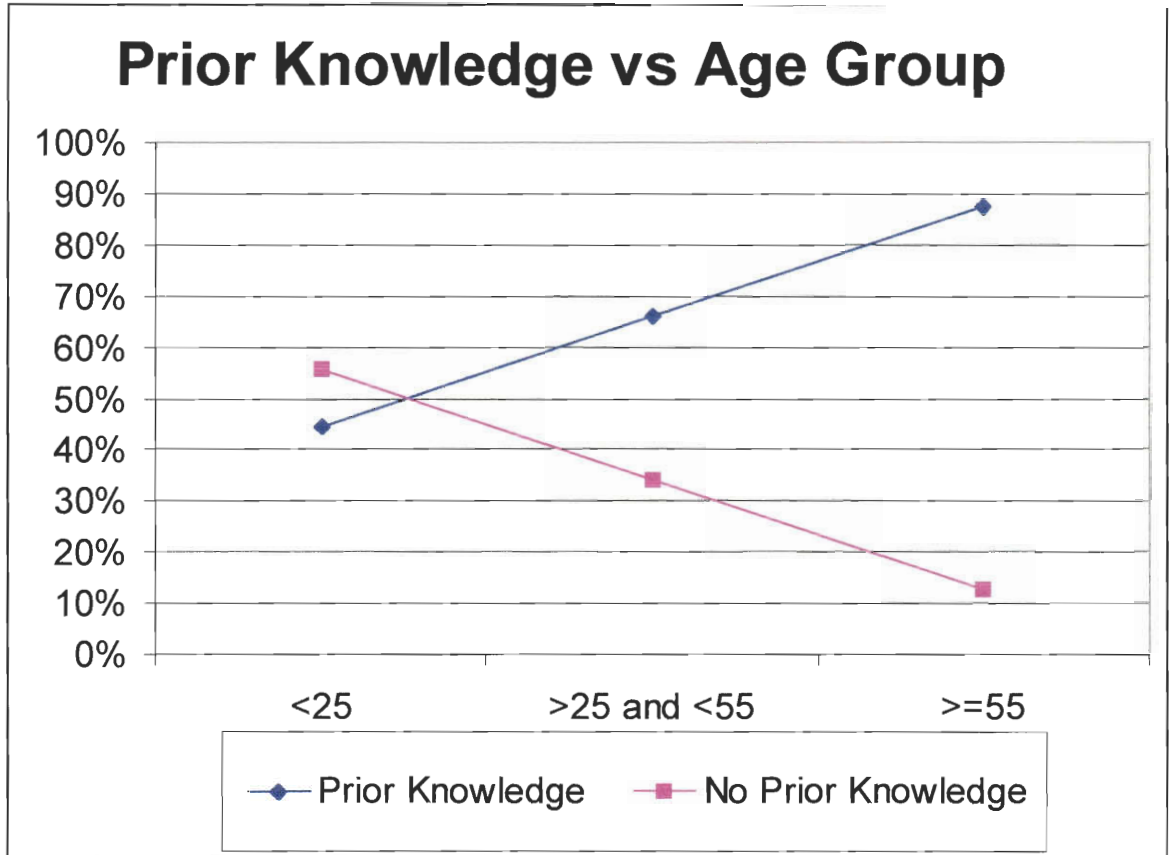


Figure 6-31

### 6.4.3 Repeat Visitors

Europeans make up the majority of visitors to the Palazzo Ducale, see Figure 6-32.

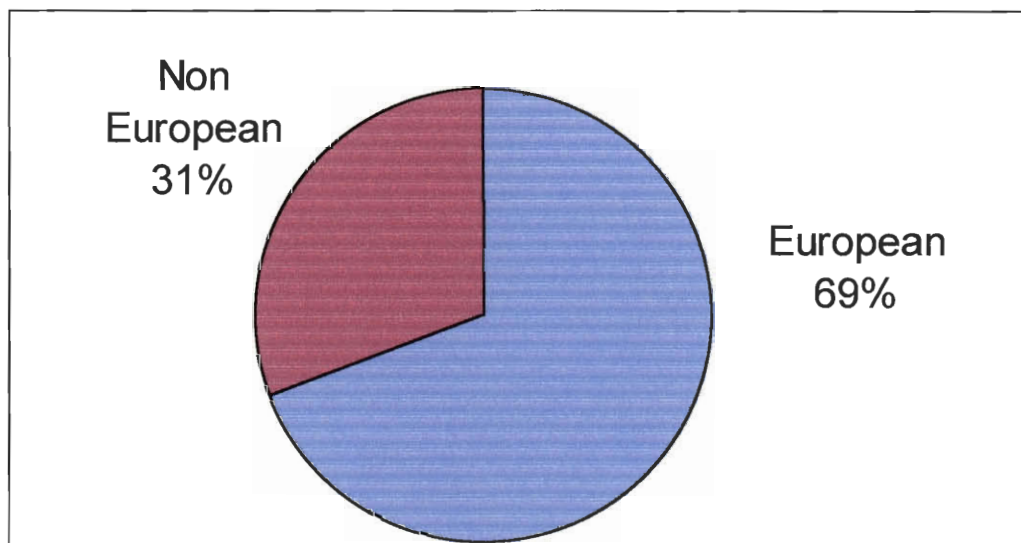


Figure 6-32 Visitor Population Via European or Non European

As Figure 6-33 shows, Europeans are more likely to re-visit the Palazzo Ducale than non-Europeans as shown by Figure 6-34. This information could be used to attempt

to attract Non-European visitors to return or allow for more European visitors to repeatedly visit the palace.

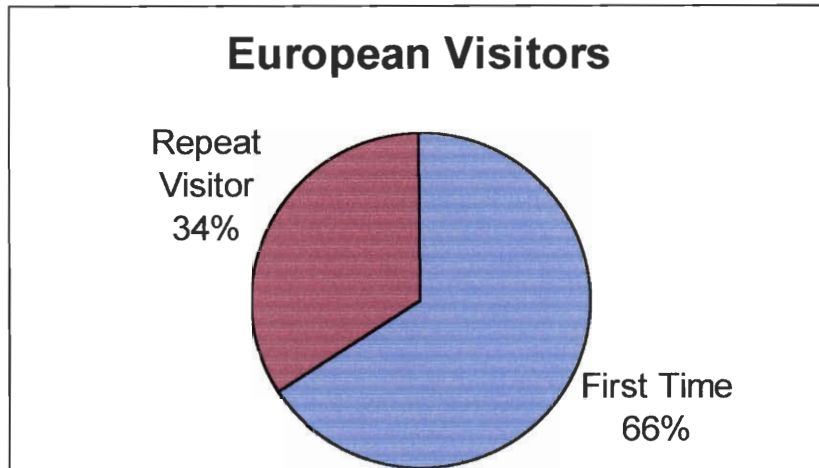


Figure 6-33

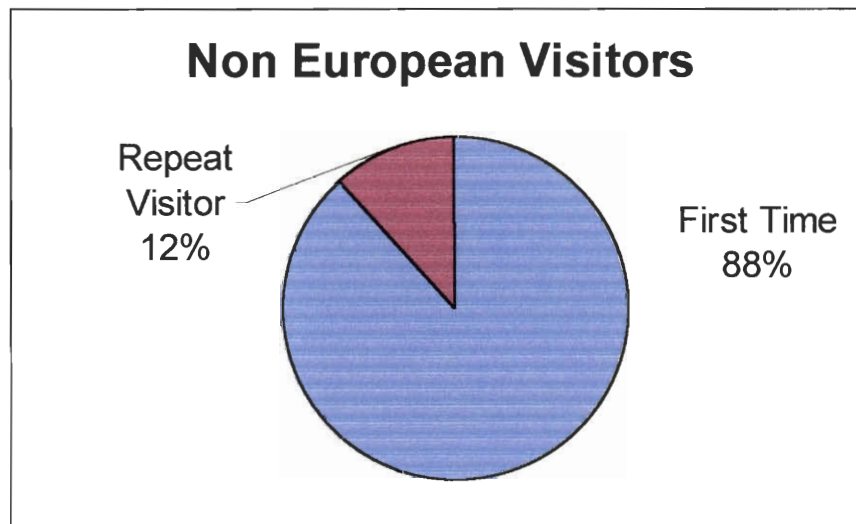


Figure 6-34

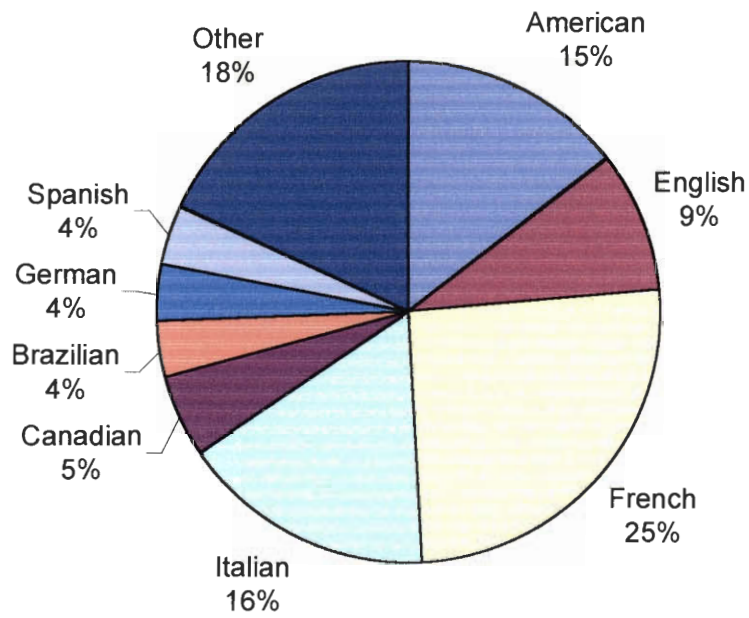


Figure 6-35 Visitor Nationality

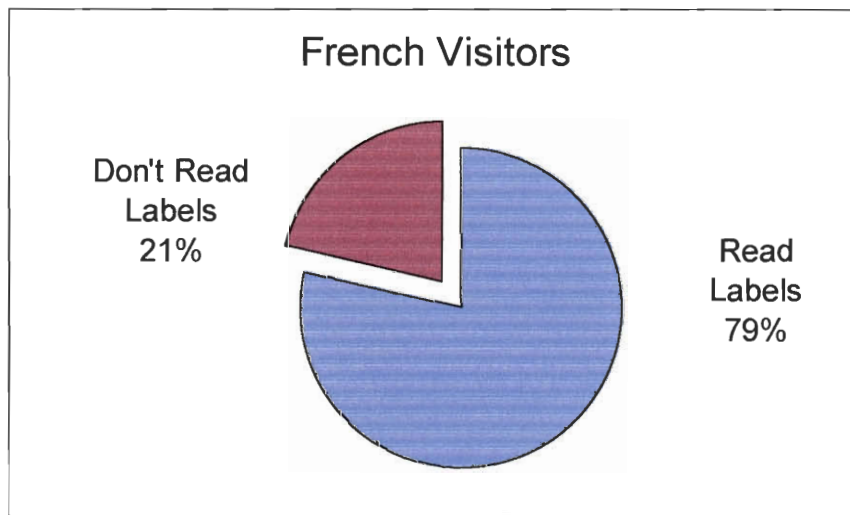


Figure 6-36

French visitors make up 25% of the population and 79% of these normally read placards in museums. Adding their native language could greatly enhance their experience at the Palazzo Ducale. It should be noted though that of European visitors 61

% are more likely to not stay in Venice overnight, thus, the overall contribution to the Venetian economy would be smaller than their non-European counterparts.

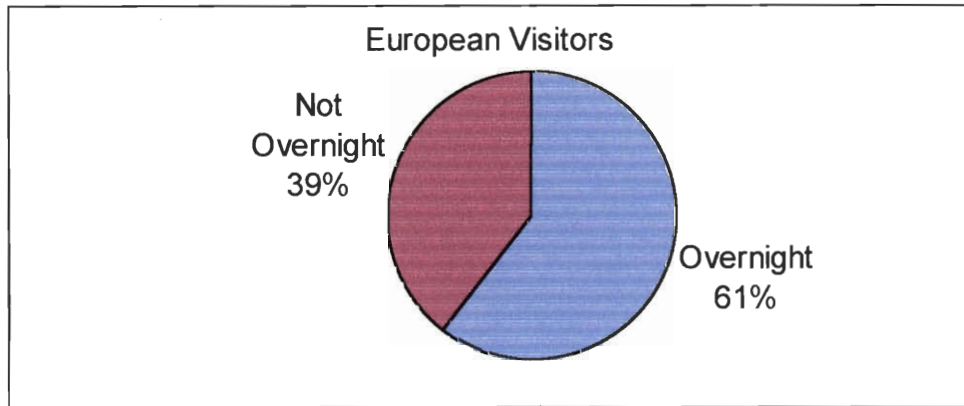


Figure 6-37

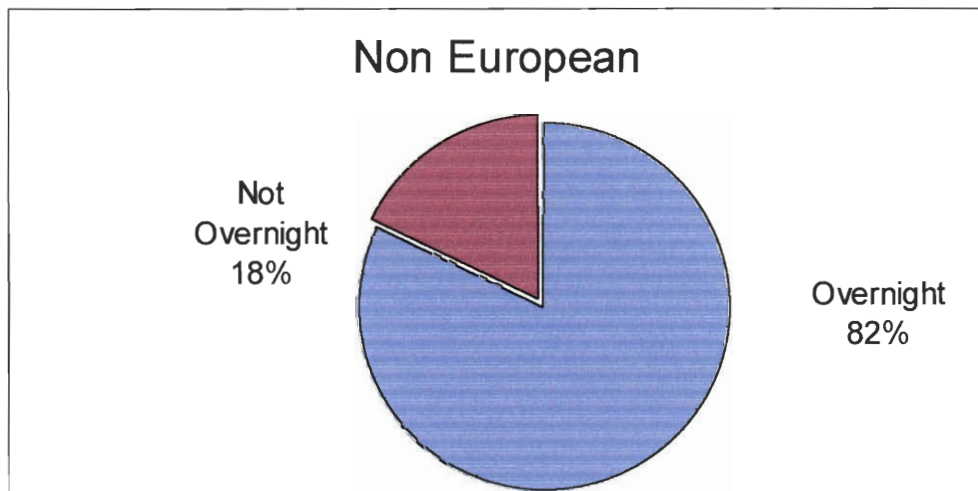


Figure 6-38

## **6.5 Scenario Two Decrease Visitor Population**

We realize that the staff might wish to decrease the number of visitors for a variety of reasons ranging from fire codes to staff shortages. The easiest way to accomplish this would be to limit ticket sales.

## **6.6 Direct Implementation from Survey Responses**

Survey responses concerning the armory and additional art labels allowed for suggestions of direct implementation.

### **6.6.1 Armory Evaluation**

Having studied armament and Venetian history to a large degree in preparation for this study we expected that a larger percentage of the arms and armor in the museum would be labeled. Furthermore we were surprised by the aesthetically pleasing rooms of the armory, specifically the room with the Henry IV suit of armor on display, since all of our research at other armories had focused on labeling systems. The two armory specific questions were designed to explicitly determine whether or not visitors were satisfied with the armory or if they had visited other armories. The responses were overwhelmingly in favor of the current method of presentation style.

### **6.6.2 Museum Labelling System**

More non-Italian speaking, as a primary language, visitors disliked the armory as according to Figure 6-39

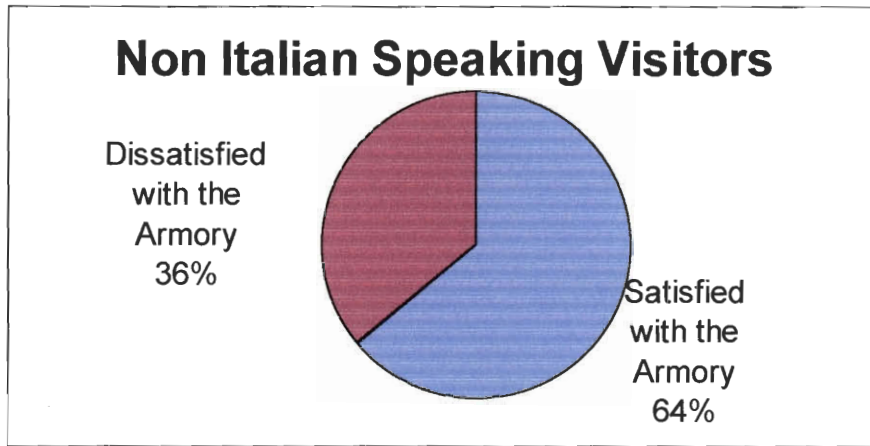


Figure 6-39

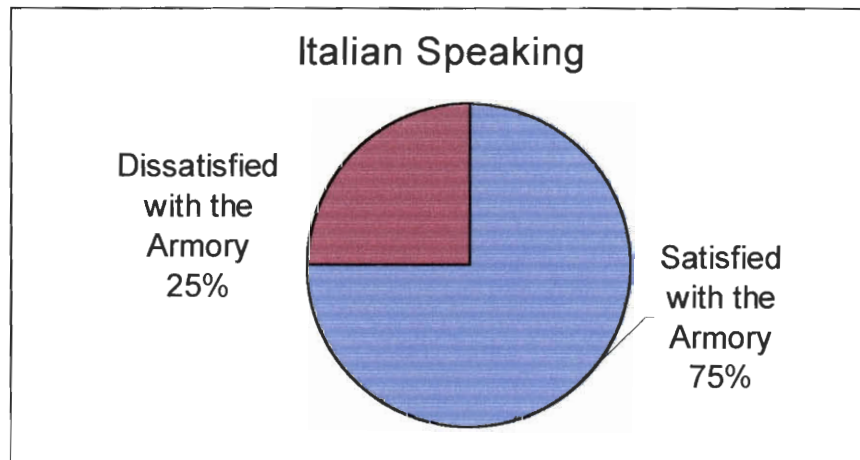


Figure 6-40

Italian speaking visitors were more satisfied with the armory as shown in

Figure 6-40. A possible reason for this would be the fact that the labels are only in Italian. A useful enhancement to the armory would be the addition of English and French translations to the labels already present in the armory. Furthermore to account for the visitors that normally read labels and were dissatisfied with the armory it could be



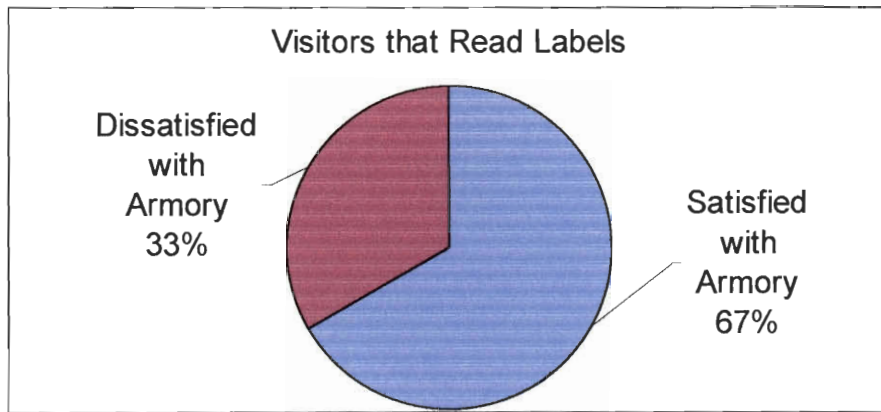


Figure 6-41

helpful to have significant or interesting piece descriptions on sheets of laminated paper at the entrance to the room.

We were further surprised by the overwhelming desire of the visitors to have more labels on art that is unlabeled. An example of this is the painting in the “map room” that is used also on the scaffolding of the palace as well as for the advertising of the palace on the posters for the museums of Saint Mark’s Square does not have any description as to its importance to the palace or restoration data or painter characteristics.

If more labels are implemented then our data shows that the museum has several options as to the choices of languages translated for these labels. The current dissatisfaction with the armory by non Italians suggests that printing the labels only in Italian would not be the best course of action. Beyond that a summary of the primary language spoken by the visitors is given in Figure 6-42. Figure 6-43 shows that 73% of the visitors speak English, French or Italian as their primary language. The 27% that speak another language as their primary language 98% do know English, French or Italian as an alternate language. This leads to the conclusion that Spanish and German translations might be unneeded.

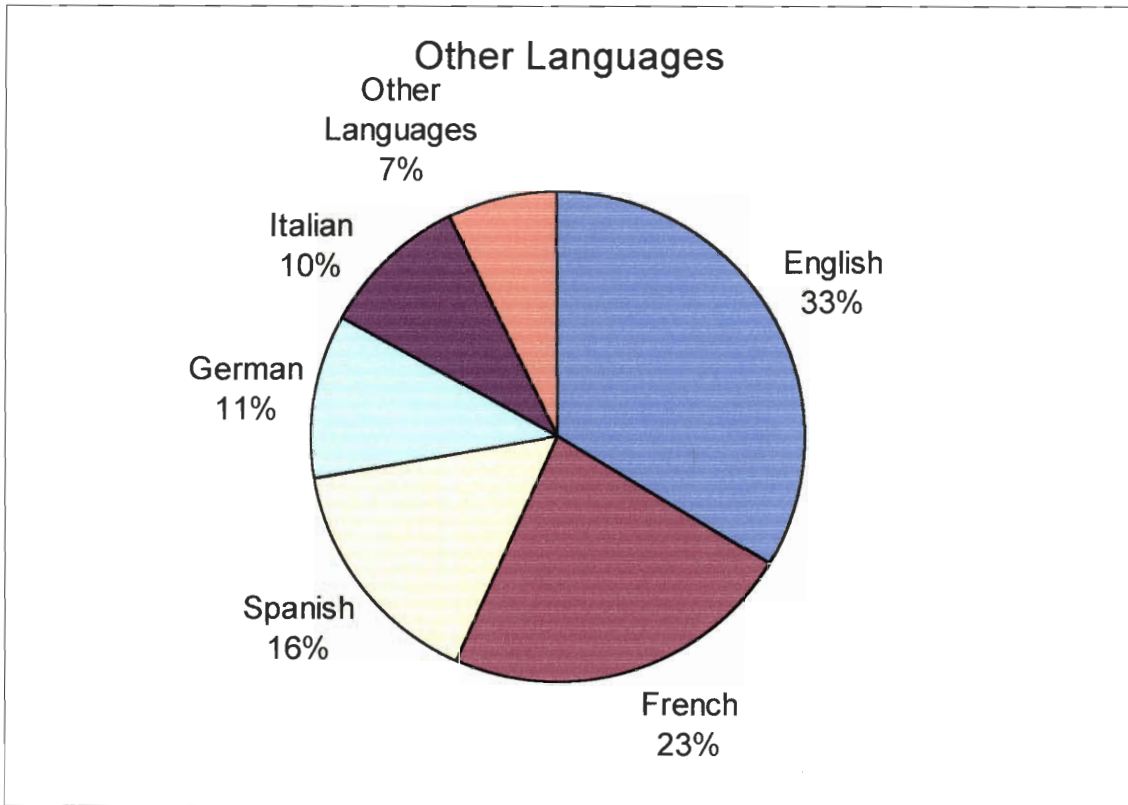


Figure 6-42 Alternate languages spoken by museum visitor

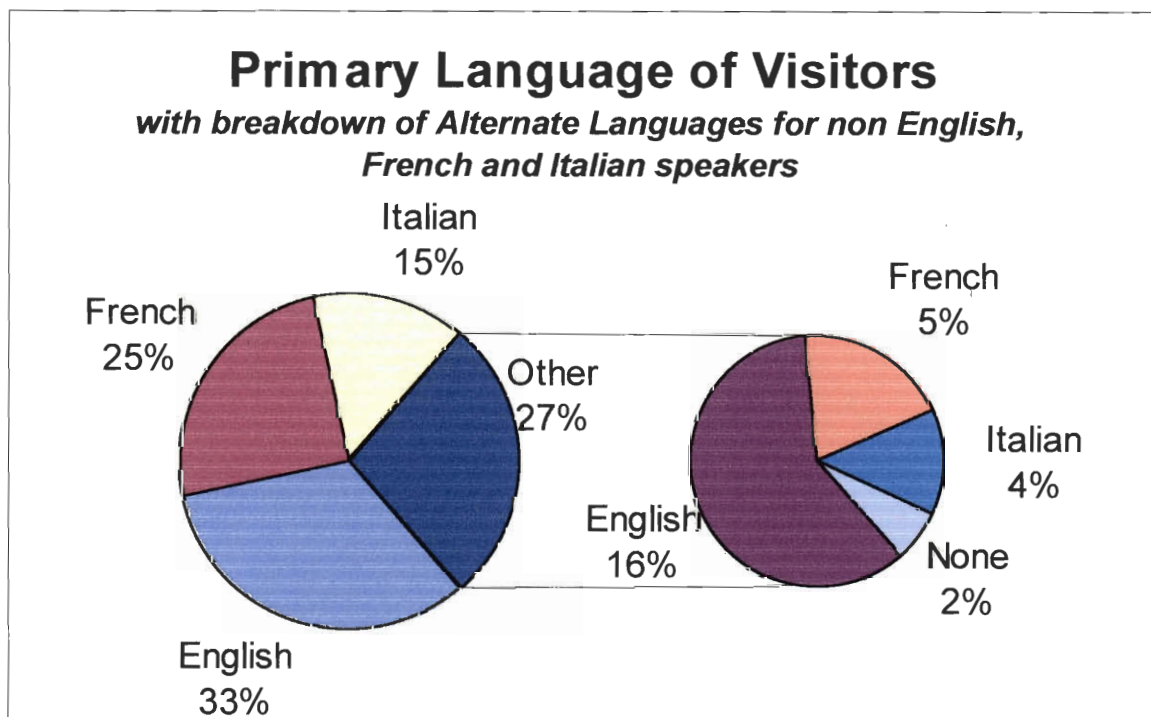


Figure 6-43

### 6.6.3 Directional Signs

The Palazzo Ducale collection exhibition is distributed over four floors. Each floor consists of many rooms. Different directional signs are placed in almost every room and corridor in the palace yet from the data collected from the survey we found that seventy-four percent of the people visiting the Palazzo Ducale would like to see more directional signs. We also asked the visitors if they had difficulty finding their way to the exit. The answer to the latter question resulted in a nineteen-percent of yes responses. Correlating these two questions we found that in addition to more directional signs, they have to be more explicit, maybe with the addition of pictures; so disabled visitors or visitors without the understanding of the languages in which the signs are written, would be able to use them.

### **6.7 *Statistical Validity of Single Question and Extended Survey***

Several factors contributed to errors within the two surveys we conducted. Self selection was a biasing factor in the extended survey. That is, when conducting a survey of this nature, the people who agreed to complete a questionnaire were in essence selecting themselves as the survey population. It was evident that this played a significant factor in the Extended Survey results because of the high rejection rate, which was 30%, Figure 6-44.

Some visitors who refused to fill out a survey expressed concerns regarding the length of the multiple question survey, 2 minutes, and the languages it was presented in; others were simply disinterested in the survey entirely. The single question survey did not have the same magnitude of rejection. The rejection rate was not precisely quantified

for the single question survey, but was no more than 5 people per two hour period for every 120 survey participants; this translates to approximately 4%.

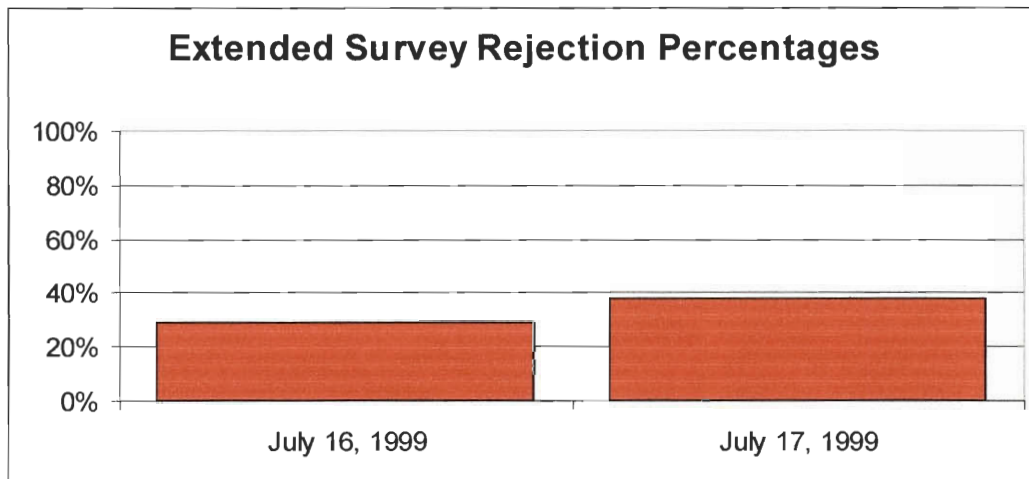


Figure 6-44

However, the single question survey procedure was ambiguous to some participants whereas the extended survey procedure was obvious to all participants.

### **6.8 Deficiencies in Surveying Techniques**

The primary weakness of the surveys was the inability to question the tour groups. These visitors made up a large portion of the populace touring the Palazzo Ducale and due to their inherent nature were inaccessible to be surveyed, since the members of a guided tour are often struggling to hear the guide, take photos, and stay with the group. In addition to the lack of cooperation from the guides, another difficulty with tour groups was the fact that their numbers often prevented administration of the single question survey; when a large group of people exited at once, the “yes/no” boxes were often blocked and thus could not be used.

## 6.9 Counting Visitors and Tour Groups

In coordination with the multiple question survey, full day counts of the visiting populace as well as the number of tour groups were made. This was done on both a weekday and a weekend day during the Festival of Redentore. These numbers are of special importance since the number of excursionists increases during the Redentore.

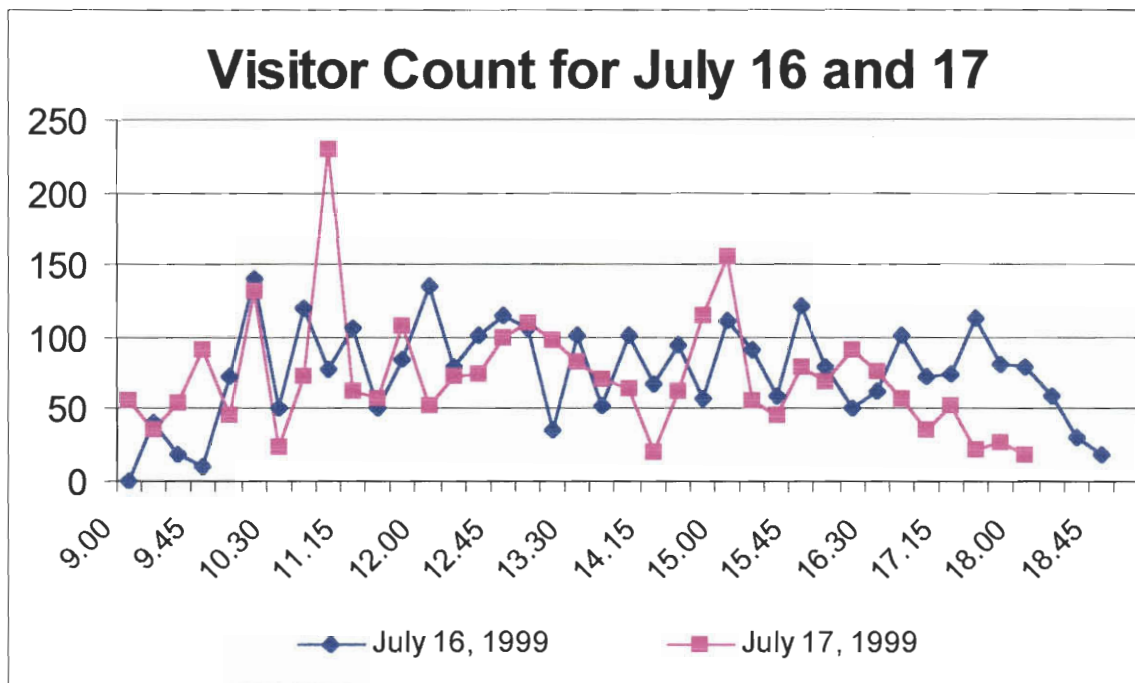


Figure 6-45 Total Visitor Count

The counting was done on Friday July 16, from 9am to 7pm. On Saturday July 17, the counting was performed from 9am to 5:30pm; the low number occurring at 1:15 pm is probably due to a switching of counting personnel. Due to the Redentore Festival counting was taken up again on Sunday from 5:30pm until 6:15pm. Exiting visitors were less than 60 over a 45 minute period so counting ceased. Tour groups were also counted and the resulting graph is shown in Figure 6-46.

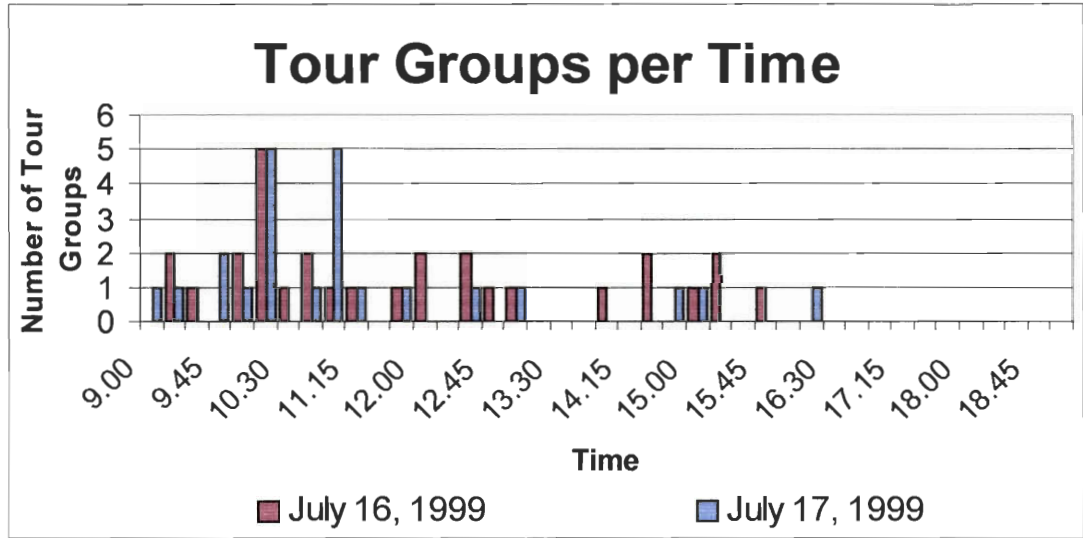


Figure 6-46 Count of Tour Groups Over Time

## **7 Conclusions and Recommendations**

### **7.1 Conclusions**

The Palazzo Ducale now has the ability to better manage its collection. In addition, informative correlations of important characteristics and desires of the visitor population were created. The primary goal of the project was aiding the overall improvement of the Palazzo Ducale; steps towards accomplishing this goal are listed in the following table.

<b>Databases</b>
<i>Armeria del Palazzo Ducale Originale</i>
<i>Armeria del Palazzo Ducale Dettagliata</i>
Querysys Armor Database
<i>Mobilia del Palazzo Ducale</i>
<b>Palazzo Ducale Collection Information Management System</b>
<b>Survey</b>
Single Question Survey
Multiple Question Survey

#### **7.1.1 Database**

In conclusion, three databases were created from the paper catalog of the armory. The exact duplicate catalog reprinted for the Palazzo Ducale was for the replacement of the archived paper collection. The Querysys catalog allows for the transformation from Access to the Querysys software package. The Querysys catalog allows for compatibility with the department of civic museums of Venice for inventory and research purposes. The Collection Information Management System allows for the greatest dissemination of this information with multiple users in different locations above and beyond the paper catalog. Features of the interface allow for easier use and more secure access.

In addition a prototype was created to catalog the Palazzo Ducale's furniture holdings. Notable features of this database include the simple yet rational field structure and a connection to precise geographical layout of the palace. Once completed, this database will allow for full mapping of the furniture pieces in relation to the museum's layout and photos for archival and informational purposes.

## **7.2 Survey**

The information gathered from the single question and the multiple question survey supports the following conclusions:

### **7.2.1 Direct Implementation**

These conclusions arise from direct review of the results and did not require significant analysis.

- More labels should be placed on art that is unlabeled.
- The directional signs should be more efficiently and strategically placed.

### **7.2.2 Armory Presentation**

According to our results the overall the presentation of the armory is satisfactory. Taking into account that a majority of the visitors to the Palazzo Ducale normally read labels, yet a minority of the visitors to the museum read Italian, it would be beneficial to translate the placards into other languages. The armory placards could be expanded to laminated sheets containing descriptions of unique artifacts in four languages placed in a box near the entrance of the room. The four languages would be English, Italian, and French as well as a basic Asian language, to cover the large number of Asian tourists that visit the museum.



### **7.2.3 Public Awareness**

These conclusions are a result of analysis performed on several parameters in relation to the public awareness of the visitors.

#### ***7.2.3.1 Visitors Staying in Venice Overnight***

The Palazzo Ducale draws tourists that plan to stay overnight. Mature visitors are more likely to stay overnight than any other age group; however mature visitors also have previous knowledge of the Palazzo Ducale. Thus the hotels of Venice contain a mature population that know about the museum. Advertisements made that focus on this group of visitors would be of benefit to the museum.

#### ***7.2.3.2 Internet***

The Internet is a forum for exchange of ideas. The World Wide Web has the ability to expand the conveyance of Venetian history and culture beyond the walls of the Palazzo Ducale and into multiple media. An institutional Internet presence could attract Internet users who did not know about the Palazzo Ducale before coming to Venice, beyond that, an Internet presence is already expected by those who frequently use the Internet. We conclude that an official web page would address this area of concern.

### **7.2.4 Beneficiaries**

The primary beneficiary of this study is the Palazzo Ducale staff. The Museum Correr, the parent museum of the Palazzo Ducale, also benefits through now having a compatible inventory management system. The databases and surveys fulfill the same goal of improving the museum because many visitors would like to see more exhibit information displayed and the WPI databases allow the museum to easily accomplish

this. The armory catalog will aid future authors working with the Palazzo Ducale and any interested scholars.

### **7.3 Recommendations**

We would like to propose that for future studies that the work started last year with the painting catalog, continued this year with the armory catalog be completed to contain the entire museum holdings. The prototype furniture database could be expanded to include photos of each piece of furniture. Also concerning the palace would be a study comparing audioguide system and the room description posters. If the museum would like to further explore the categorization of types of visitors then an additional study solely focusing on the administration of the surveys could be necessary. Concerning the department of civic museums of Venice, an analytical comparison of the labeling systems could also be of great use.

We completed an electronic catalog of the armory and a collection of interesting visitor information. The complete catalog of arms and armor is a powerful inventory and research tool. Beneficiaries of this electronic catalog include the Palazzo Ducale staff, the department of civic museums of Venice, and interested visitors and scholars. Generalizations of the visitor population will help the Palazzo Ducale in long term planning. As a result of our analysis the visitor museum experience could be enhanced directly through the addition of art labels and direction signs. The 1999 WPI Palazzo Ducale Collection Information Management team contributed to the enhancement of the visitor experience at the Palazzo Ducale in the most serene republic of Venice, Italy.

## **8 Bibliography**

### **8.1 Furniture Related Works**

1. Eberlein, Harold. Interiors Fireplaces and Furniture of the Italian Renaissance. New York: Architectural Book Publishing. 1927.
2. Bishop, Robert; Patricia Coblenz. Furniture 1. USA: Smithsonian Institution. 1979.
3. Ash, Brunhammer, et al. World Furniture. ed. Helena Hayward, New Jersey: Chartwell Books. 1977.
4. Hinckley, F. Lewis. A Directory of Antique Furniture. New York: Bonanza Books, 1953.
5. Oxford Companion to Decorative Arts, 1975.

### **8.2 Weaponry Related Works**

6. Franzoi, Umberto. L'Armeria del Palazzo Ducale a Venezia. Treviso: Canova, 1990.
7. Dizionari Terminologici: Armi Difensive Dal Medioevo All'Eta Moderna. 2 Vols. Firenze: Centro Di. 1982.
8. DeVries, Kelly. Medieval Military Technology. New York: Broadview Press Ltd. 1992.
9. Hewitt, John. Ancient Armour and Weapons. London: Random House. 1996.
10. Ffoulkes, Charles. The Armourer and His Craft. New York: Frederick Ungar Publishing. 1967.
11. Umberto, Franzoi. Armoury of the Doge's Palace in Venice. Stamperia di Venezia Editrice, 1966.

12. Trassuk, Leonid. Italian Armor for Princely Courts. Chicago: The Art Institute of Chicago, 1986.
13. Luciano, Rebuffo. Italian Armour.
14. Grancsay, Stephen V. John Woodman Higgins Armory Catalog of Armory. Worcester: Davis Press, 1961.
15. Grancsay, Stephen V. Arms and Armor. New York: The Metropolitan Museum of Art. 1986.
16. van Cuveld, Martin. Technology and War: From 2000 B.C. to the Present. New York: The Free Press. 1989.

### **8.3 Venice Related Works**

17. Griesbach, C.B.. Historic Ornament: A Pictorial Archive. New York: Dover Publications, 1975.
18. Muir, Edward. Civic Ritual in Renaissance Venice. New Jersey: Princeton University Press. 1981.
19. Oliphant. The Makers of Venice: Doges, Conquerors, Painters and Men of Letters. New York: A.L. Burt Publishing. 1927.

### **8.4 Social and Art Works**

20. Kreitler, Hans, Shulamith Kreitler. Psychology of the Arts. North Carolina: Duke University Press, 1972.
21. Martin, F. David, Lee A. Jacobus. The Humanities Through the Arts. New York: McGraw Hill, 1975.
22. Verdenne, Elisabeth. Living in Venice. Thames and Hudson, 1990.

23. Huse, Norbert; Wolters Wolfgang. The Art of Renaissance Venice. Chicago: The University of Chicago Press, 1986.