USING CERAMIC ANALYSIS TO UNDERSTAND USAGE OF SPACE AT CERRO BLANCO

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ABSTRACT

Cerro Blanco is an archeological site in the Huanangue Valley on the north-central coast of Peru. It was documented by Dr. Kasia Szremski in 2008. The site once served as an administrative center for the Chancay civilization between 900 and 1570 CE, during the Late Intermediate and Late Horizon periods. There is very little known about the site and its previous functions. The use of ceramic analysis in combination with architecture analysis can inform research in how spaces were once used by exploring the functionality of the ceramic vessels in tandem with the physical and visual accessibility of the architecture. In this paper, I use ceramic analysis to better understand how different parts of the site were used.

Keywords: Chancay, accessibility, storage, ceramic vessels
DEDICATION AND ACKNOWLEDGEMENTS

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INTRODUCTION

Cerro Blanco is a Chancay administrative center, located in the Huanangue Valley of Peru, that was first documented by Dr. Kasia Szremski in 2008, however, little is known about the site and its function. In 2019, I participated in a summer excavation of the site, which revealed evidence that some structures of Cerro Blanco had restricted accessways, whereas others were more open. My hypothesis for this project is that the areas with restricted access were used for storage and the areas with open access were used for domestic or other purposes. A confirmation of this hypothesis would show large, undecorated ceramic sherds found in the unit of the site with restricted access, while small, decorated ceramic sherds would be found in the plaza and the open-access units. To test my hypothesis, I looked at ceramics from the site to determine what types were found in each of the units. I then analyzed them in combination with the site’s architecture to conclude what the purpose of each unit once was.

BACKGROUND AND HISTORY

The archaeological site of Cerro Blanco, located in the Huanangue Valley in the north-central coast of Peru, was once occupied by the Chancay civilization between 900 and 1570 CE, during the Late Intermediate and Late Horizon periods. The Chancay were not centrally organized, but rather were made up of independent groups, which formed a type of confederation that was organized in a heterarchical manner (Szremski, 2019). The site of Cerro Blanco spans 9 hectares and occupies the floors of two-sided quebradas, or ravines, looking out into the surrounding valley. The site was used as one of the administrative centers of the Chancay. It served as a key zone for the exchange of resources and goods between the Chancay groups that lived along the coast and those that lived within the valley, and between the Chancay and their
neighboring groups (Szremski, 2016). The largely independent groups that made up the Chancay likely came together in union due to their mutual dependence on large amounts of trade between one another, which helped the group maintain unity (Szremski, 2018).

During archaeological excavations, which took place from 2017 to 2019, evidence was uncovered that at least some of the structures located near Cerro Blanco’s plaza had baffled entryways, which is indicative of restricted access (see Figure 1) as well as other forms of restricted access. The areas of the site used for this project include part of a plaza, open-access masonry-walled structures, and one masonry-walled structure with a baffled doorway. The walls are built up of large stones to form rectangular rooms. Since previous research also suggests that the plazas may have been used for temporary marketplaces, I hypothesize that the rooms near the plazas with restricted access may have served as storage areas. As such, this paper analyzes ceramics from the 2018 and 2019 season to confirm this hypothesis. The 2017 materials had already been turned in to the Peruvian Ministry of Culture, so those ceramics were not available to be used for this project.
Figure 1: Drone image of Cerro Blanco, Unit 3, taken by Dr. Kasia Szremski. The baffled doorway (indicated by the arrow) and the narrow doorway (circled) would have restricted access to this unit of the site.
LITERATURE REVIEW

There is a wide body of literature available that enables us to understand how architecture and ceramics can help us learn about past Andean peoples. Jerry Moore (1996), argues that architecture is more than just a space where things happen. It can actively shape how people perceive and interact with others and the environment. He describes a number of examples of how humans experience the world through “existential space.” In the past, many archaeologists have tended to view prehistoric architecture as more of a place for action, rather than having a large psychological impact on the people who used those spaces. According to Moore, the built environment creates important patterns in how people experience the world. Domestic architecture is representative of everyday patterns and activity, and the economic and social status of individual households. Public architecture is representative of social motives and effort. Since archaeologists cannot ask anyone directly what architecture from the past meant, they can instead look at how the built environment communicates meaning, even without knowing exactly what is being communicated. For example, intersecting pieces of architecture communicate that these two built-environmental ideas were somehow linked, even if their true meaning is not clear. Another example of this is illustrated in viewing monumental architecture. If a monument is in an open, visible space, it is meant to be accessed visually by everyone in the society, and therefore has meaning that is accessible to all. However, if a monument is blocked off and visually obstructed, its meaning was likely meant for a select group of people. Moore (1996) further argues that by using ritual, meaning routine or patterned behavior, as context, archaeologists can infer more about the built environment and how architecture can shape culture. With this in mind, we can use the architecture of Cerro Blanco to understand the behaviors of the Chancay. For example, in Unit 3, where there is evidence of restricted access, we can infer that only important members of the administrative state would have entered this
space to handle the stored goods, and are able to infer that the general public did not have access to this space.

Moore (1992) further describes the purpose of space using archaeological theory to explore the use and meaning of public architecture in the Prehispanic Chimú state (900-1470 CE), located in the north coast of Peru, and how it relates to social control. Architecture carries two types of functional meaning. Primary-sign functions indicate the typical, basic usage of a construction, while secondary-sign functions indicate more complexity in meaning, such as that used in ritual contexts. Architecture creates social control through primary-sign functions as it can communicate who is allowed into certain areas and who is restricted from them by using gates, doorways, and corridors to block entry. When a space is not strictly defined by its architecture, this is indicative of socially free, open access. For the Chimú, some storerooms were held in restricted buildings and contained a much larger quantity of goods than the typical storerooms located in more accessible areas. Access can be analyzed by looking at the number of vertices, edges, and locations of doorways in a construction and comparing constructions to one another. This can also be used to explore line-of-sight, which is another example of access restriction. In Cerro Blanco, we can use this information to better understand the restrictions of Unit 3. For example, in this unit, the baffled doorway contains more edges and vertices than a typical doorway, which indicates more less access to the space.

Detailed analyses of architecture from other administrative centers in the Andes can provide insight into how we can better understand the use of space at Cerro Blanco. For example, in their analysis of space at the old Inca administrative center of Huanuco Viejo, located in the Northern central highlands of Peru between Cuzco and Quito, Morris and Thompson (1970) demonstrate how the relationships between architecture and ceramics can tell us what occurred in different spaces. Inka administrative centers were generally similarly built, featuring a plaza
and storage facilities, called *qollqa*, and were set up by the Inca rulers to aid in the expansion and continuation of the state. Studies of the Huanuco Viejo site have led to the discovery of connections between the center and the villages under its domain. For example, the broader architectural and ceramic styles that were characteristic of the city were found in the villages, and the goods that were produced in the villages were found in large storage centers within the main city. The ceramics show great similarity to those found in Cuzco, but include variation in the detail work, which suggests they were inspired by Cuzco and made locally, rather than brought in from outside the villages. Huanuco Viejo also contained 497 storehouses and 30 buildings that were connected to the processing and administration of the storage. Using this information, we can further our understanding of the relationship between the architecture and ceramics found at Cerro Blanco. For example, in the plaza, where there is wide, open space, we discovered a large range of decorative styles in the ceramics. This indicates that the space was open to a large amount of people, where a variety of stylized ceramics could be exchanged, providing evidence of trade in this space. We can also apply this information to the architecturally restricted Unit 3, which indicates that the area was only accessible to a small number of individuals. The ceramics in this unit were mostly undecorated and larger in size, which is indicative of storage use. As we also discovered shellfish shells in Unit 3, we can potentially connect this space to the processing of some goods for storage in this space.

Additional work by Morris (1986) focuses on storage, and can provide insight in how to identify those spaces. Across the Inka state were many large storehouses, which contained a huge variety of items, including food, clothing, sandals, armor, tools, and weaponry to supply to their soldiers as they moved throughout the state. It is important to look at the use of these storehouses through the political and economic system of the entire state. This is because the rulers had to collect all of the goods from villages, store them until they were needed or were no longer useful,
and eventually redistribute or dispose of any surplus. Able-bodied, married citizens paid a *mit'a* labor tax by performing labor for the state, allowing the Inka to build vast systems of roads, terraces, monumental architecture, and storehouses. The state was also in charge of redistributing the goods made in each area to the other parts of the state, such as maize, cotton, and coca leaves for wool, meat, and other services. The goods collected were not stored for individual villages, however store houses spread throughout the state were used to store food surplus. Specifically, the storehouses in Cusco, the capital, were used mainly to store high quality and high-status material goods for the elite from around the state. Morris also acknowledges that in other times and locations throughout history, extensive storage systems may have functioned as markets. In Cerro Blanco, we have evidence of a similar system of storage in Unit 3, as well as a temporary marketplace in the plaza.

Looking at Cerro Blanco, there is a clear connection between the architecture and usage of the site. As described by Moore (1996), the physical and visual accessibility of spaces can indicate what the space was used for, and who was allowed to enter it. The units we have excavated in Cerro Blanco include units with open doorways and an open, unwalled plaza. These areas would have been easily accessed and viewed by anyone in the site, indicating that they were used for potential public, administrative, and/or trade purposes. Excavations also revealed at least one structure with a baffled doorway, which makes access to that room more difficult, and can cut off the line of sight into that space. Goods would have been stored in the large vessels in the restricted unit, and trade would have occurred in the plaza or other openly accessible units. The baffled doorway would have served as a physical, architectural barrier which would have barred individuals from entering without permission. Since this unit had less physical and visual accessibility in comparison to the other spaces, we can conclude that it was not meant to be accessed by everyone in the general population, but rather by important members.
of the administrative state. Morris and Thompson (1970) also found that administrative centers were typically built with a plaza and storage facilities, like we discovered in Cerro Blanco. This provides further evidence for these conclusions of the functionality of our site.

We can also apply this information to the ceramic vessels themselves. According to Morris and Thompson (1970), different types of ceramics are linked to different types of behaviors and activities. For example, large ceramic vessels are associated with storage use, as they were able to hold large amounts of resources. These larger storage vessels are typically undecorated, as they would not have been moved around or handled by many people. Smaller ceramic vessels are associated with more domestic activity and trade, as these are much easier to transport. These small vessels are much more likely to be decorated than the larger ones, as they could be used in daily life by any individual. Using this information, we can determine what different units of Cerro Blanco were used for based on a comparison between the distributions of different ceramic styles in restricted versus non-restricted spaces at Cerro Blanco.

METHODOLOGY

To understand the distribution of different ceramic styles across the site, I conducted a ceramic analysis, categorizing the rim sherds found at the site during the 2018 and 2019 excavations. I examined the color, length and width, collar shape, type of impression, whether or not it had traces of soot, and type of decoration of each sherd. We chose to focus the study on the ceramic rims, as these pieces provide insight on the size and shape of the whole vessel, and are more likely to be decorated. Descriptive statistics (specifically frequency counts) were then used to find more information on the width, decoration type, and collar type. I then systematically listed them and placed them onto the Geographic Imaging Systems (GIS) maps using ESRI
ArcGIS 10.7, based on the sector, unit, locus, and lot in which each piece was discovered. The purpose of the ceramics analysis was to discover what types of ceramics were found in the different types of units, particularly the restricted areas versus the open access areas. Based on this data, I looked more specifically at the types of ceramics that were used in the restricted areas, and then made predictions about what other areas of the overall site also likely had restricted access.

The rim sherds were split up by size into small, medium, large, and extra-large, based on width in centimeters. The categories were determined based on the standard deviations from the mean found in the initial statistical analysis performed on the 2018 pieces, which was calculated as 6.367 centimeters. Sherds with a width within one standard deviation above or below the 2018 mean width were categorized as medium (sherds with a width that was greater than or equal to 3.7 centimeters, and less than 9.1 centimeters). Sherds with a width below one standard deviation from the mean were categorized as small (less than 3.7 centimeters in width). Sherds with widths between one and two standard deviations above the mean were categorized as large (greater than or equal to 9.1 centimeters and less than 11.8 centimeters). Sherds with widths greater than two standard deviations above the mean (11.8 centimeters or greater) were categorized as extra-large, as depicted below in Figure 2.
Figure 2: The ceramic distribution by size, measured by using ceramic width in centimeters.

For the decoration analysis, ceramics were categorized in three distinct ways to determine their overall decorative pattern. First, the pieces were split up by their type of collar (shown below in Figure 3). Sherds with no collar were labeled ‘1,’ sherds with a rounded collar were labeled ‘2,’ and sherds with a triangular collar were labeled ‘3.’ Next, these pieces were categorized based on whether or not they were impressed (shown below in Figure 4). Impressed rims were labeled ‘A,’ rims with no impression were labeled ‘B,’ and rims with molded impressions were labeled as ‘C.’ Finally, these pieces were categorized based on the type of impression they had (shown below in Figure 5). The categories we used were coded as follows: circle ‘c,’ circle and dots ‘d,’ point ‘p,’ line ‘l,’ crescents ‘h,’ and shallow rectangles ‘r.’
**Figure 3:** The possible collar shape categories for our ceramics. The categories used were 3, 4, and 10. These images used for categorization were created by graduate students Stacy Dunn and Ashley Heaton from Tulane University for the PICA project in 2010.

**Figure 4:** The possible decoration type categories for our ceramics. The categories used were 0, 2, 3, and 4. These classifications were created by graduate students Stacy Dunn and Ashley Heaton from Tulane University for the PICA project in 2010.
Figure 5: The possible impression type categories for our ceramics. The categories used were 0, 1, 2, 3, 5, 7, and 9. These classifications were created by graduate students Stacy Dunn and Ashley Heaton from Tulane University for the PICA project in 2010.

We ran frequency counts of the data using SPSS (Statistical Package for Social Sciences) Statistics software in order to quickly assess the number of sherds that belonged to each category. We then cleaned the data sheets and used them to create shapefiles in ArcMap. We systematically overlaid the data onto the GIS map of the site by placing the ceramics as points on the map using their coordinates. The points were displayed based on the units within which those rim sherds were found. Pie charts were made for each individual unit using ArcMap in order to display patterns in the data based on unit location.

RESULTS

The total number of ceramic fragments used in the final analysis for this research project was 445 ceramic rim sherds. 362 of these pieces came from the 2018 summer excavations and 83 of these rims came from the 2019 summer excavations. Out of the total number of rims used, 28
came from Unit 1, 252 came from Unit 2, and 83 of the rim sherds came from Unit 3. In the size
distribution analysis, which used width in centimeters to determine size categories, we found 48
small sherds, 327 medium, 44 large, and 26 extra-large pieces. The decoration analysis was split
into collar shape, decoration type, and impression type. We matched the rims of 161 of the
sherds to the group containing collar shapes 3 and 4 (labeled as ‘2’ in the final categories), and
39 rims were matched to collar shape 10 (labeled as ‘3’ in the final categories), with the
remaining ceramics having no collar (labeled as ‘1’ in the final categories). For the decoration
type, 4 rims were painted, 177 were impressed, and one rim had molded decorations. The
remaining rims were undecorated. For the types of impressions, there were 100 rims with circles,
19 with circle and dot impressions, 42 with points, 10 with lines, 4 with crescents, and 2 with
shallow rectangles.
Figure 6: This map illustrates the distributions of the ceramic collar and impression types across the entire site. The pie chart in the middle illustrates the distribution of the restricted unit, Unit 3.
Figure 7: This map illustrates the ceramic collar and impression types from within Unit 3, which illustrates how much less diversity of decorations the ceramics found there have compared to those discovered in the other spaces of the site. As you can see, the decorations in Unit 3 are much more homogenous, primarily belonging to category ‘1B’ (No Collar, Unimpressed).
Figure 8: This map shows the size distribution of the ceramics across Cerro Blanco, which illustrates how the ceramics found in Unit 3 have a higher percentage of Large and Extra-Large pieces in comparison with the rest of the site.
ANALYSIS AND DISCUSSION

Ceramic sizes and decorations are linked to different types of usage, behaviors, and activities (Morris and Thompson, 1970). For example, ceramic vessels that are larger and undecorated, are associated with storage use, while smaller, decorated vessels are associated with more domestic activity and trade. One pattern we found in the ceramics of Cerro Blanco was that decorations tended to be reserved for the small and medium sized sherds, while large and extra-large sherds tended to be undecorated. Units 1 and 2 of the site contained a highly diverse sample of ceramic sherds with various decoration types. The ceramics from these units were also mostly smaller in size, indicating that the vessels used in these areas of the site were small, decorated ones. This is evidence that these areas were not used for storage, and may have been used for domestic or other purposes. The ceramic pattern found in Unit 3 of the site, which contained the baffled doorway indicating restricted access, was quite different. In this unit, we found that it contained more large, undecorated ceramic sherds from large vessels. This is strong evidence that this room was used to hold large vessels for the storage of goods. In this unit, we also found a number of mollusk shells, indicating that this unit may have maintained a space for marine shellfish processing, which could have been some of what was stored in these large vessels. On top of this, the walls of the unit were not very high, with most reaching no more than a meter high. We did not find remains of any materials that could have been used for roofing, such as plant, so we determined that the site was likely open, and may not have had roofing. This is further evidence that Cerro Blanco was an administrative site for trade, and not somewhere that the Chancay were living in daily.
CONCLUSION

As illustrated in this project, the analysis of ceramics in combination with architecture can be an extremely useful tool when attempting to determine what kinds of behaviors people once participated in within a space. Ceramics can tell us what a site would have likely been used for, such as storage or other purposes, based on the size and decoration of the sherds, making ceramic analysis an extremely important tool in archaeology. Architecture can also illustrate how areas of a site were used based on its physical and visual accessibility. When a space is easily accessed and can be viewed from any point in a site, we can conclude that it served a public purpose, while when a space has low accessibility and is blocked from most lines of sight, we are able to conclude that it served a more monitored and restricted purpose, and was not used by the general public.

My original research question for this project asked how the types of ceramic vessels vary by location within Cerro Blanco, and how that information may be applied in order to infer what the Chancay people used different spaces for. My hypothesis is that areas with restricted access were used for storage and would thus have more storage vessels, whereas areas with open access would have had domestic or other use, and thus we would expect to find a greater variety of ceramics in these spaces. According to my ceramic analysis of the 2018 and 2019 ceramic rim sherds, I believe that the data supports my original hypothesis. We discovered ceramic rim sherds from large storage vessels were primarily located in the unit with restricted access. This information allows us to conclude that this room was used to hold these large vessels filled with stored resources. These resources were somewhat safe-guarded, likely from the majority of the Chancay population, until they were ready for distribution and trade by the administrators at the site. From this research, I am able to further hypothesize about what may have occurred in other areas of the overall site. Specifically, I would argue that the other areas of Cerro Blanco with
restricted access will also likely contain sherds from large, undecorated vessels. I think there are likely multiple parts of the site, like the one from our research study, which were once used for storage. I also predict that the areas with open access, like the accessible rooms and the plaza, were likely used for domestic life, trade, or other purposes. This is because it is common for small, decorated sherds, like the ones found in these units, to be used domestically. Studying the relationship between architecture and ceramics allows us to infer more about what spaces were once used for. This will be a key tool for future research in Cerro Blanco, as there is much more to learn about the site and the Chancay.
REFERENCES


