ABSTRACT
The quality of web communication depends on several factors. One of these, besides usability, is the effectiveness by which the intended brand values are actually conveyed to the users. Leveraging existing research in web branding communication, design and requirements engineering, we propose a systematic framework for evaluating the short-term communication impact of large, information-intensive branded websites. The communication impact is empirically investigated by eliciting and modeling the brand values that the website tries to convey and assessing whether and how much they are perceived by the intended target users. Results from two case studies show that simple and readable indicators can be constructed to identify flaws in the communication of the brand values and support designers and stakeholders to devise precise strategies to improve the design accordingly.

Categories and Subject Descriptors
H.5.3 [Information Interfaces and Presentation (e.g., HCI)]: Group and Organization Interfaces – evaluation/methodology.

General Terms
Design, Human Factors.

Keywords

1. INTRODUCTION
There is an increasing awareness that usability, meant as ease of use and task performance, is only one of many factors affecting the quality of the user experience on a website. For example, a study conducted by Jansen et al. [19] shows that, in comparative usability tests resulting in equal user performances, users were still 25% more inclined to prefer the content of websites which were well-known to them. In addition, a number of studies in brand research and online marketing have begun to demonstrate [2] [15] [23] [24] [25] [26] the established relation that exists between the brand of a company and the users of its website has a significant influence on the quality of the user experience [2] [15] [23] [24] [25] [26].

Designing branded communication on the web does not merely concern the appropriate designing and positioning of logo and colors, but it is rooted in the design of those messages that are intended to influence and shape user’s perception about the entity behind the website (company or institution) during the online experience.

Evaluating the effectiveness of the web based communication process, and its implications for the complexity of the design of the web communication artifact, did not receive enough attention from the design research communities, which focused on developing evaluation instruments on traditional aspects of usability, and, more recently, to aesthetics or emotional design [3] [17]. Providing conceptual tools to assess the outcome of the intended brand communication, which manifests itself in the design, content, and service provided, is of utmost importance to provide a holistic perspective on the quality of online applications.

The purpose of this paper is to present a systematic method to enable web communication designers to evaluate the short-term communication impact of a branded website. The essence of the method is verifying whether and how much the intended messages to be conveyed to the users have actually been perceived. The innovative approach that informs our research is value-driven, as we consider the notion of “value” [7] as a central pillar for operationalizing the multifaceted and often vague notion of brand into more analytical elements, elicited from interviews to key stakeholders or from website content. Our methodology applies to all content-intensive web applications which have significant brand messages to communicate to various audiences, and aims at reinforcing, establishing or repurposing their web brand communication.

The rest of the paper is organized as follows. Section 2 discusses existing research in brand communication and value-centered design as inspiring elements for our evaluation approach. Section 3 illustrates a framework for evaluating and measuring web brand communication impact, in its conceptual and practical methodological components. Then, the actual results of the
application of the framework to the case studies are reported and discussed in section 4. Section 5 summarizes the overall contribution of our research and outlines current and future work.

2. RELATED WORK
The research on web communication impact has been for long intertwined with brand research in online environments. Far from being a comprehensive survey, we briefly review some of the key work which outlined concepts from which we borrowed inspiration for our evaluation approach.

2.1 Brand Experience and Values
Communication
According to Knemeyer [22], “brand represents the intellectual and emotional associations that people make with a company, product, or person”. On the general level of “brand experience”, Ha and Perks evaluated brand experience with a website by measuring the amount of users’ “positive navigations,” and cookies that indicate users’ involvement in the website [15]. This approach can show whether a design team has enough understanding of users, whether their product makes positive contributions to an entity’s goals, and whether their product is attractive, all of which are key contributors to the overall “quality of experience” [2]. A key component of the brand experience is “brand trust”, defined by Delgado-Ballester as “a feeling of security held by consumers in their interaction with the brand” [11]. Ha and Perks suggest evaluating brand trust by the amount of functions of a product used by the users [15]. Tsygankov developed a detailed and practical framework to evaluate the “trustworthiness” of a website by relating brand trust to specific design elements [32]. Following more analytical approaches to online branding, value-based methods offer an important interpretation key to investigate the nature of brand communication. In this perspective, brand is a promise of values to the customers, and the communication impact of a site can be defined as the degree to which these values are perceived by the users [7]. Brand values can be defined as moral, ethical, social, or cultural beliefs which an entity is committed to [7]. As to their impact on interaction design, Cockton [8] argues that “quality in use” (usability) is only a basic requirement. Improving usability can only guarantee the quality of a product, but cannot increase the product’s value as brand does [20]. Communicating intended brand values to the intended users can be considered one of the most important challenges for online communication [10].

In this perspective, design approaches have been developed to consider the role of brand values in system or product development. For example, Value sensitive design (VSD) [13] [14] advocates that considering human values in the design process could generate more comprehensive design ideas. By transforming these ideas into a more structured approach, Value centered design (VCD) [9] proposes a method where the elicitation and analysis of values play a central role in the iterative design process from requirement analysis, design, to evaluation. As a complementary approach, worth centered design (WCD) [10] proposes a broader vision where brand values can be used not only during design but also during evaluation. In particular, brand values can serve evaluation for two purposes. On the one hand, intended brand values are related to the goals that an entity wants to achieve and this consideration can improve traditional design activities. For example, keeping in mind the brand values while doing usability testing, evaluators can find usability problems that are more urgent to be solved [10] [18]. On the other hand, whether the intended brand values are successfully communicated should also be tested per se while evaluating a product [8] [10]. For example, “beautiful scenic spot” may be a brand value that a tourism website wants to communicate to its visitors. However, the design should be reconceived if the evaluation results show that users do not think at all that the scenic spot introduced in the website is beautiful.

2.2 Brand Awareness, Image and Personality
Brand equity is a related important concept that has abundant meanings. Slotegraaf and Pauwels define it as “the value of a product with a brand name in comparison with that of the same product without a brand name” [31]. Brand equity has two dimensions: brand awareness and brand image [25]. Brand awareness has to do with brand familiarity, which means the more a user is familiar with a brand, the easier the brand will be chosen by the user over other brands [27]. Brand image is derived from users’ perception of the brand. It is “reflected by the brand associations held in consumer memory” [21]. Brand image has been divided into different sets of dimensions by different studies [1] [21] [29]. However, all of them consider “brand personality” as an important dimension of the brand image. Brand personality is analogous to human personality: “in the same way that every individual has his own personality, the brand can also be pictured from specific traits which define its identity” [25].

The experience with a website is an ideal condition to evaluate how well the website communicates the brand of its underlying entity (being it a company or an institution or an individual) and at which degree it contributes to form the brand image and personality that users should perceive and remember.

2.3 The Need for a Systematic Evaluation Method
Criteria have been proposed for measuring a brand. Gregory and Dubberly proposed a three-dimension criteria, “position,” “reach,” and “reputation” [24], while Young and Rubicam recommended a four-dimension: “differentiation,” “relevance,” “esteem,” and “knowledge” [24]. Müller even investigated how “visiting a website” can influence the general perception of the brand [26]. In his study, after using the website, users could judge whether the brand they perceived is consistent with what they have in mind (their prior knowledge about the brand) by choosing from a 7 point scale from “not at all representative” to “very representative” [26].

However, all of these studies on defining and using the evaluation criteria mentioned above have three major shortcomings:

• No repeatable method has been developed so far for evaluating the communication impact of an existing branded website (in any domain). Most of the existing approaches focus on general criteria, which do not provide analytic and reusable procedural elements to evaluate the specific characteristics of the brand communication of a given website.

• The concept of brand can be articulated along multiple concepts. Existing approaches do not offer any guidance to capture what elements of a brand are poorly communicated.

• Finally, the differences among user groups are not considered in the evaluation. Stakeholders typically want to communicate different brand concepts to different audiences thus a complex website should provide different messages to different targets. For example, for a museum website, people with no disabilities may consider the museum as good,
whether information about services for people with special needs is provided or not. However, disabled people would think the museum is not accessible for them if they cannot find that information. Therefore, it is important to be able to differentiate between user groups when evaluating the brand communication impact.

Based on the state-of-the-art of the research in this interdisciplinary area, we have found that there is no systematic method to analyze what brand values a particular website wants to communicate to a particular user group and test whether those users actually perceive them. The test results should be easily used by communication designers to make suggestions for improving a website’s ability to communicate certain brand values. In this paper, we advance and test an innovative proposal to meet this challenge.

3. A FRAMEWORK FOR EVALUATION

The evaluation framework that we propose is a substantial advancement on the concepts that are put forward by our former work in “Value-Driven Design (VDD)” [7]. VDD is an elaborated design framework used in web requirement analysis and conceptual design, which separates requirement analysis into two steps: communication analysis and application requirements analysis. In communication analysis, a goal-oriented approach [5] is used to elicit and analyze the brand values an entity wants to communicate to each stakeholder through its website. Then, the elicited brand values become the driver to define the requirements for the content, information architecture, navigation and graphics design.

The evaluation framework introduced in this paper adopts a “reverse process”, as it is intended to support the evaluation of the outcome of the communication design, rather than the requirement and design activity.

Our evaluation framework is useful to designers who want to answer the following question: Does our website actually convey our brand values to the intended users? In a nutshell, the evaluation framework has two phases (see Figure 1): a preparatory phase, and an execution phase.

The preparatory phase enables the evaluator to create and organize the elements necessary for a specific communication evaluation. It guides the evaluators in identifying and operationalizing the target user profiles of the website, and the brand values that the stakeholders want to communicate to them. Then, the procedure of how to use these instruments is introduced in the execution phase. It enables evaluators to ask specific users to carry out scenarios on the website to expose them to the intended brand values communication, and then to evaluate the short-term perception of these values.

To support the evaluation activity in all its aspects, we have also defined a simple data analysis procedure, which enables evaluators to get an overall score of the short-term communication impact of the website and allows pointing to design flaws and critical areas of the application that need improvement.

To vividly illustrate each component of the generic evaluation framework, we use two website case studies in which we have adopted the method: the National Gallery of Canada (NGC) website and Sun Yat-sen University (SYSU) website (see Figure 2 and 3).

Although we have used this approach on large websites in different domains (mainly in higher education, e-Tourism and e-Government), there are four reasons why we chose these two websites for this empirical study.

First, they are comparable in content intensity. NGC website contains about 68 content pages, while SYSU website has about 62 content pages. It is not easy to test their communication impact without a systematic method. Second, we wanted to test the actual use of our approach in websites coming from very different domains (museums and higher education), but still in the realm of institutional, branded communication. Third, they have different degree of usability. The NGC website is well designed: according to a preliminary usability evaluation, it does not present major usability breakdowns; by contrast, much more problems are found in SYSU website, such as inconsistent page layout, broken links, typos in some labels, and more cumbersome navigation. Fourth, the availability of actual users of the intended user profiles was a practical reason to choose these two sites.

3.1 Preparatory Phase

With a branded website at hand, the preparatory phase starts by identifying the user groups targeted by the applications. Then, according to the specified characteristics of the user groups, we unearth the stakeholders’ specified communication intentions to them and create the necessary evaluation instruments.

3.1.1 Stakeholders, User Profiling and Recruiting

The stakeholders of a website (e.g. decision makers for the project, the communication experts, but also designers, marketing experts and web project managers) are a primary source to elicit and identify the intended communication targets of the website [6] [28], i.e. the people [7] to whom the communication is directed. When it is not possible to directly access stakeholders, general target user groups can be identified by looking at the website content and structure and by relying on the evaluator’s domain knowledge. For example, for NGC, the communication targets are generic categories of current and potential visitors of the gallery such as schools, local families, family tourists, art experts and, also, the press.

From the wide spectrum of communication targets, the evaluators can then select and elaborate more specific user profiles that will be the focus of the evaluation activity. A user profile describes...
specific characteristics of an archetypal user and serves the evaluation for two very important purposes.

First of all, to control test participants’ prior knowledge of a website and the entity it belong to, which may significantly affect the communication impact induced by the use of the site. Incorporating all the different nuances of user’s prior knowledge may be very time consuming and complex to assess [4] [30]. Moreover, since a user’s first impression towards a website has great impact on whether or not he will further explore the site, it is valuable to test this first impression as condition to assess the communication impact [16]. Therefore, we suggest using people who do not have any prior knowledge about the website and the entity it belongs to, so we could get the “pure” communication impact of a website.

Secondly, as mentioned in the related work, the intended brand message for different user profiles is usually different. A clearly defined user profile helps define more precisely the corresponding brand image that is intended to be created or promoted.

3.1.2 Examples of User Profiles and Participants

First time visitor: a user profile we defined for NGC website. These users should have never been to and have no prior knowledge about the National Gallery of Canada and its website. Prospective international student: defined for SYSU website. They should be students who have never been to and have no prior knowledge about Sun Yat-sen University and its website. Then, we created pre-test questionnaires by incorporating these criteria into questions such as:

1. Have you ever been to the National Gallery of Canada?
2. Have you ever used the National Gallery of Canada website?

Only people answered “no” to all the questions were screened for participation. By administering the questionnaires, ten participants (7 male and 3 female) were recruited for NGC website, and ten (4 male and 6 female) for SYSU website.

3.1.3 Brand Image and Traits

Understanding the brand image that the stakeholders want to convey to specific user profiles is the next important step in the preparatory phase. As the brand image can be very articulate and multi-faceted, we propose to elicit specific traits of the brand image, defined as follows:

A trait can be defined as a recurrent theme in the communication that reveals an important facet of the overall brand image specifically targeted to a user profile.

For example, we elicited three brand traits for “first time visitors of the National Gallery of Canada”: Accessible, Excellence of Collections, and Engaging. The first two have been elicited from the mission statement page, while the last one has been extracted from the page of the welcome statement written by the gallery director. As for SYSU, we also elicited three traits of brand image for the prospective international students: Long History and Fine Tradition, Prestigious University in China, and International. These traits are prominently communicated in the page presenting the profile of the university. Therefore, rather than a single, well defined and coherent brand image, it is easier to initially elicit single traits of the brand that the site tries to communicate to specific user profiles. In this view, a brand image can be pragmatically considered as the collection of traits targeted to each one user profile.

The explicit traits of a brand image can be found in the entity’s mission statement, advertisement, or slogans, as well as through interviews and conversations with the informed stakeholders. The limit of extracting brand traits directly from the website content is that only explicit aspects of the brand are used for evaluation, i.e. those somehow already present in the design. Directly interviewing stakeholders would unearth a broader range of traits, which might not be easily identifiable with an analysis of the site.

3.1.4 Specifying Traits in Key Values

In online communication, a particular trait (e.g., “prestigious university in China”) is typically embodied in and reified by detailed, concrete messages (e.g. the university offers a wide variety of subject areas, it is situated in a beautiful environment suitable for studying and doing research, and it is known all over the country for high quality education). These messages reveal the values of the brand that support the communication of a particular trait and that should appeal and connect to a user profile. We therefore define these messages as key values [7], with the following definition:

Key values are concrete communication messages that substantiate the claim of a brand trait.
Key values are the deeper articulation of a particular brand trait and can be elicited with two main strategies:

1. Through interviews to key stakeholders focusing on the question – for each specific trait: “Why would you say that your university (<entity>) is a prestigious university in China (<trait>)?”

2. Through key value inspection, consisting in operationalizing traits into key values by inspecting web pages. The procedure for doing key value inspection can be summarized as follows:
   - List all the traits of brand image for a user profile
   - Print out all the web pages which are intended to be highly relevant to a user profile. With the list of traits of brand image at hand, read the web pages and extract all key values from it.
   - List all the elicited key values and code them
   - Relate key values to corresponding content units (pages or areas) of the website (see table 2 for a template that can be used).
   - Relate key values to corresponding traits. In case there are key values not matching any trait, consider to add a new trait (see table 3 for a template that can be used).

### 3.1.5 Examples of Brand Traits and Key Values

Key value inspections were carried out both for NGC (see Figure 4) and SYSU website. Table 1, 2 and 3 show the key value inspection results of NGC website. Similar tables are also created for SYSU website.

#### Table 1. Key Values for First Time Visitors of NGC

<table>
<thead>
<tr>
<th>Key Value Code</th>
<th>Key Value Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Value 1</td>
<td>Planning visit to the National Gallery of Canada is a pleasure</td>
</tr>
<tr>
<td>Key Value 2</td>
<td>Plenty of guides</td>
</tr>
<tr>
<td>Key Value 3</td>
<td>Interactive</td>
</tr>
<tr>
<td>Key Value 4</td>
<td>Accessible for people with special needs</td>
</tr>
<tr>
<td>Key Value 5</td>
<td>Reveal the past, celebrate the present, and probe the future</td>
</tr>
<tr>
<td>Key Value 6</td>
<td>Accessible for all Canadians</td>
</tr>
<tr>
<td>Key Value 7</td>
<td>International</td>
</tr>
<tr>
<td>Key Value 8</td>
<td>A sense of identity</td>
</tr>
<tr>
<td>Key Value 9</td>
<td>Specified education programs for different age group</td>
</tr>
<tr>
<td>Key Value 10</td>
<td>Specified education programs for people with special needs</td>
</tr>
</tbody>
</table>

It is useful to show where the key values are communicated in the website, in terms of content units located in the information architecture (see Table 2).

#### Table 2. Key Values in Relation to Website Content Units (NGC)

<table>
<thead>
<tr>
<th>Key Value Code</th>
<th>Content Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Value 1</td>
<td>Plan Your Visit</td>
</tr>
<tr>
<td>Key Value 2</td>
<td>Plan Your Visit&gt; Guided Tours</td>
</tr>
<tr>
<td>Key Value 3, 4</td>
<td>Plan Your Visit&gt; Accessibility</td>
</tr>
<tr>
<td>Key Value 5</td>
<td>Exhibitions</td>
</tr>
<tr>
<td>Key Value 6</td>
<td>Exhibitions&gt; Touring Exhibitions</td>
</tr>
<tr>
<td>Key Value 7</td>
<td>NGC Collection</td>
</tr>
<tr>
<td>Key Value 8</td>
<td>NGC Collection&gt; Canadian Art</td>
</tr>
</tbody>
</table>

We use Table 3 to put the key values under their related traits. It shows how articulate (in terms of key values) is every brand trait.

#### Table 3. Traits of Brand Image and Corresponding Key Values (NGC)

<table>
<thead>
<tr>
<th>Corresponding Key Values</th>
<th>Traits of Brand Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Value 2, 4, 6, 10</td>
<td>Accessible</td>
</tr>
<tr>
<td>Key Value 5, 7, 8</td>
<td>Excellence of Collections</td>
</tr>
<tr>
<td>Key Value 1, 2, 3, 9, 10</td>
<td>Engaging</td>
</tr>
</tbody>
</table>

These tables represent a reconstructed outline of the brand intentions of the website. They will be used in creating evaluation instruments and analyzing data.

Figure 4. Excerpts from the artifacts of Key Value Inspection (NGC): web pages that are highly relevant to first time visitors are used to identify the brand traits. Key values are then extracted from the pages content and associated to the related brand traits.

### 3.1.6 Task Scenarios

The aim of the task scenarios is provide means to evaluators to assess if users are exposed to the communication of all the intended key values targeted to them. Task scenarios are defined by building salient and plausible stories of use of the website that target user would naturally undertake to meet their needs and goals. The objective of evaluators is to detect if such scenario involve all the content units relevant to the key values targeted to the scenarios user profile (see table 2).

For example, the scenario created for NGC website is about a first time visitor who wants to plan a visit to the National Gallery of Canada. For SYSU it is about an American student who wants to explore opportunities to pursue graduate studies in China. These scenarios are then refined into specific tasks. The tasks for first time visitors of NGC include browse the exhibits and read their introductions, look for information about location, parking, ticket price, and services offered. The tasks for prospective international students of SYSU include read the introductions of the university, get to know the educational programs offered, and explore the educational resources.

Tasks should be designed to make sure that users try to read the content and look at pictures (to be exposed to the communication of the key values while trying to complete the tasks) and navigate in the information architecture.
3.1.7 Post-test Questionnaire

To record the communication impact after a user has finished the tasks, we created a post-test questionnaire, which consists of two sections. **Section one** contains key values statements, developed by translating each key value (see Table 1) into meaningful sentences. Each statement contains only one key value, and is accompanied by a 5-point Likert scale from strongly disagree to strongly agree. The aim of this section is to test whether users have actually perceived each key value and the degree to which they agree with it. For example, one of the SYSU key values “promote cultural exchange” was transformed into the following statement:

<table>
<thead>
<tr>
<th>Sun Yat-sen University promotes cultural exchange.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strongly Disagree</strong></td>
</tr>
</tbody>
</table>

The aim of **section two** is to elicit the user confidence on agreeing on overall brand traits, as emerged from the exposure to key values. For example, take the trait Accessible. Having been exposed to the key values: 2, 4, 6 and 10 (as listed in Table 3), how are users confident to say NGC is very accessible? Hence, we put each trait into the format “Are you confident to say …?” and use a 5-point Likert scale from not at all confident to extremely confident to capture users confidence level toward each trait. Following is another example:

<table>
<thead>
<tr>
<th>Are you confident to say Sun Yat-sen University is a prestigious University in China?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not at all confident</strong></td>
</tr>
</tbody>
</table>

These post-test questionnaires can be very agile: the ones we created had 13 questions for NGC website and 14 questions for SYSU website. After completing the questionnaire, we asked the users to comment on each question about the reason why they made a specific choice.

3.2 Execution Phase

3.2.1 Procedure

With all these elements at hand, carefully set up during the preparatory phase, it is now possible to carry out a full, actual evaluation of the communication design of a branded website. The main steps of the execution phase can be summarized as:

1. **Recruit participants** who best correspond to the predefined user profiles. As in usability evaluation, there is no golden numbers for "enough" users. According to the available time and budget, recruiting as many participants as possible for each user profile is always a recommendable advice.
2. **Screen users** with the pre-test questionnaire to test their prior knowledge about the entity and its website. Only people with no prior knowledge on both are screened in for the test.
3. After explaining to the users the purpose and the procedure for the evaluation, ask them to do the tasks defined in the assigned scenarios.
4. After they finish the tasks, let them fill out the post-test questionnaire.

3.2.2 Adjusting Traits through Reliability Analysis

As shown in Table 3, after the key value inspection, we created scales representing the relation between key values and traits. However, we created these scales based on our key value inspection, which may be prone to error. There is a chance that we ourselves think a key value explains a trait, but, in reality, there is no such a relation between them. Therefore, we conducted a reliability analysis with each scale to remove the improperly assigned key values.

For example, the Cronbach’s alpha shows that the last scale of NGC, Engaging, is not reliable (Cronbach’s alpha = 0.693). Having reviewed the correlation of each item in it, we found that key value 3 (interactive) was not well correlated with the others (r = 0.071). This means that people think interactivity has little to do with an engaging gallery. So we removed this item from the scale.

After the reliability analysis, we came up with more reliable scales to calculate the communication impact of each trait and the overall communication impact.

3.2.3 Communication Impact of Each Trait

Because we have eliminated the influence of users’ prior knowledge, the degree to which a trait is perceived by the users measures directly the communication impact of the trait (no need to subtract users’ prior knowledge from it). We calculate the communication impact of Trait X (CI(X)) using the following formula:

\[
CI(X) = \frac{\text{SUM}(KV)}{\text{SUM}(KV)_{\text{Max}}} \times \text{Conf}_X
\]

SUM(KV) stands for the total score of the corresponding key values of trait X. SUM(KV)_{Max} stands for the highest possible value of this total score, which is an ideal condition in which users perfectly perceive each key value (users choose strongly agree). This quotient indicates how much the key values for trait X are actually perceived by the users. However, even if they are 100% perceived, we are not sure whether they could adequately support the trait. Therefore, we multiply this quotient with users’ confidence level (Conf X) for the trait.

If a user chooses strongly agree for each related key value and extremely confident for the trait, the communication impact of the trait is 1.0, which means 100% of the brand trait is communicated to the user. If a user chooses neutral for each corresponding key value and somewhat confident for the trait, the communication impact of this brand trait is 0.3. This percentage could be used as an edge criterion to determine whether there is a positive or negative communication impact for that trait. In this view, a score over 0.3 is a positive communication impact, while a score below 0.3 is a negative communication impact for the trait.

Every brand trait in both of our case studies shows a positive communication impact even though some of them are not high above 0.3. For the NGC website, the trait Engaging has the highest communication impact (mean = 0.66, SD = 0.11), followed by Accessible (mean = 0.59, SD = 0.12), then Excellence of Collections (mean = 0.48, SD = 0.19). For the SYSU website, the trait Long History and Fine Tradition has the highest communication impact (mean = 0.66, SD = 0.20), followed by International (mean = 0.63, SD = 0.19), then Prestigious University in China (mean = 0.56, SD = 0.18).

3.2.4 Overall Communication Impact on a User Profile

The overall communication impact on a user profile means the degree to which the intended brand image for the chosen user profile has achieved. Its aim is to give an overall assessment of the communication design of the website. It is calculated by the following formula:

\[
CI_{\text{Overall}} = \frac{\text{SUM}(CI(X))}{N}
\]
To improve the communication of this key value, various design considerations need to be made. The existing collection pieces coming from all over the world should be presented in a more substantial manner in the short term, with more emphasis on the cultural authenticity of the collection. Assuming that the collection is what it is (and cannot be fundamentally changed), requirements can be discussed with the stakeholders. For example, multimedia galleries can be placed in the design, through richer images, or high impact exhibitions and titles were not clearly conveying the topic. We informed selection (e.g. there was no image for some of the exhibits). The latter is slightly higher than the former, but the difference is not significant (t(18) = 0.66, p > 0.05, r = 0.15).

Nevertheless, although a score over 0.3 is a positive communication impact, we cannot say it is good enough. Designers need to set their own standard they want to achieve. If the communication impact of a certain trait is below their expectation, they could refer to table 3 to see which of its key values has a low score. Then, they could use table 2 to get to know which content units that contain this key value and ask themselves the question “what improvement could be made to better communicate this key value?” This process will be exemplified in the next section.

4. DISCUSSION AND DESIGN INPUT

In this section, we will discuss the evaluation results of our case studies to illustrate an example of data interpretation and design feedback made possible by our framework.

From the results, we could see that both NGC and SYSU websites have a positive overall communication impact (> 0.3) on the chosen user profiles. On a general level, these data tell us that the recruited users do perceive the intended brand values that the websites try to communicate. However, the results of 0.58 (NGC) and 0.62 (SYSU) indicate that almost half of the brand communication potential is not perceived during a one-time experience with the website. In this perspective, thanks to our framework, we can more analytically look at the results to identify margins of improvements in the communication design.

Compared to Engaging and Accessible, the NGC website did not communicate very well the trait Excellence of Collections. Two of its three key values, International and A sense of identity, only have an average score of 2.4 and 2.6 respectively. First, as we look back to users’ comments, several users said the collections of the National Gallery of Canada were not very international because most of the collections listed on the website were Canadian arts. It did also list some European and Asian arts, but that was not enough to bring the user to perceive a truly “international” character of the collection. However, international is a key characteristic that the gallery director emphasizes in his article on the from the director page.

To improve the communication of this key value, various design requirements can be discussed with the stakeholders. For example, assuming that the collection is what it is (and cannot be substantially changed in the short term), more emphasis on the existing collection pieces coming from all over the world should be placed in the design, through richer images, or high impact multimedia galleries.

From our key value inspection, it is said on the about NGC page that NGC “strives to provide Canadians with a sense of identity with Canada’s rich visual-arts heritage”. However, when asked to choose an exhibit to visit, users found it very difficult, as the exhibition list offered insufficient information to make an informed selection (e.g. there was no image for some of the exhibitions and titles were not clearly conveying the topic). We assume the difficulty of this task was one of the reason why the users could not see how excellent the exhibits are, and how they communicate a Canadian’s sense of identity. To improve the communication of this key value, for example, a possible design improvement is to rethink the access to the exhibitions, with more anticipatory content in the list page, possibly with photos and explanatory titles.

As for the SYSU website, Prestigious University in China is a trait that is relatively not well communicated. The main reason is that the key values High quality education and High quality scholars and experts only have a score of 2.8 and 2.4 respectively. First, in fact, the website has a very long article talking about the high quality educational programs and resources of the university, but, to reach this article, the users need to click a link on a page where there is a very long article introducing the history and campuses of the university, by reading which the users already got tired, they did not feel like to open the link to read another long article. Therefore, our suggestion is to move the article to a more prominent place and restructure the page to achieve better readability. Second, we also found that there is a list of the names of the university’s famous scholars and experts, however, users cannot get extra information except names, which makes the list too dry to communicate the value High quality scholars and experts. Of course, users can click each name to read further information about an expert, but it is laborious to click the names one by one just to see few details. Based on this analysis, we suggest improving the original list by adding a brief introduction and a personal photograph to each name.

5. CONCLUSION AND FUTURE WORK

The innovative contribution of this paper is to provide web communication professionals a systematic method to evaluate the short-term, first usage communication impact of a branded, information-intensive website. Our approach is value-based, as we consider key values the core messages that stakeholders want to communicate as part of their corporate or institutional brand image. We define the elements and the process to evaluate whether users actually perceive these key values after they are exposed to the website. We highlight that stakeholders typically want to communicate different brand concepts to different audiences, and exploit the concept of trait to investigate the the communication impact of different aspects of a brand on different user targets.

We take into account the users’ confidence about the specific traits of the brand that they perceived. The evaluation results can be easily calculated from the elements of the framework and provide few, readable indicators. They not only show how much of the overall intended brand image is built in the user’s perception, but also whether the communication impact, concerning the overall brand and its specific traits, is positive or negative. By using the analytical instruments of the framework, designers can easily relate back the results to specific design issues, and discuss improvements accordingly.
Although what we propose is not a usability evaluation method, the design implications derived from the results of the communication evaluation can indicate improvements also concerning some aspects of the usability of the design. We consider usability as a facilitating (but not sufficient) factor to achieve a quality communication impact.

Our current and future research moves in three main directions. First, we are exploiting, validating and refining the evaluation framework on larger set of complex, branded websites. Secondly, we are organizing empirical studies with novice and expert web communication designers to have them use the framework in real-life project situations and gather feedback for improvement. Third, we are exploring the relationship between brand values perception and usability, by conducting usability evaluation in parallel to communication evaluation on selected websites.

6. ACKNOWLEDGMENTS
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7. REFERENCES