# Exposing Different Orientations of Website Users: An Exploratory Analysis using Q Methodology

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***Abstract:*** *The purpose of this study is to explore and conceptualize different cognitive patterns found among website users in accessing and using websites. Following procedures defined in Q methodology, twenty one graduate students were recruited and asked to classify thirty seven website usability measures in terms of personal importance, in using their university websites. Three different cognitive patterns in using websites are identified: (1) use-focused, (2) goal-focused and (3) information-focused. Use-focused group concerns mostly about easy navigational features, error-free functionalities, and so on while goal-focused cares for explicit segmentation for different functionality, educationspecific content and features, etc. Information-focused desires integrated search functions, information protection, timely update, etc. This research successfully applies Q methodology in identifying different cognitive patterns in play in accessing and using websites. Results provide convincing evidence to support different cognitive patterns in using websites, and suggest that these patterns be recognized and managed in constructing and maintaining websites.*

**Keywords:** Website, Website Assessment, Usability, Cognitive Pattern, User Orientation, University Websites, Q Methodology

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## 1. Introduction

Websites are now becoming dynamic places for communication and interaction, not just for storing information in a static manner. Studies have been conducted both attempting to expand the usability of websites by developing evaluation criteria for different aspects and perspectives. In these studies of website evaluation criteria, most measures are primarily related to design and usability. However, website users' attitude analyses are not common except a few [10, 22]. The objective of this study is to explore, expose and conceptualize different cognitive patterns found among website users in accessing and using websites in order to identify and conceptualize subjectivity (Q-factors) of website users, and ultimately understand how websites are perceived by their users.

## 1. Literature Review

Studies have been conducted to identify, develop and describe factors for evaluating websites [2, 12]. In evaluating commercial websites, categories were surfaced as critical in these studies: information content, cognitive outcomes, enjoyment, privacy,

user empowerment, visual appearance, technical support, navigation, organization of information content, credibility, impartiality, business functions, credibility, reliability, attractiveness, navigation [1, 5, 7, 11, 16, 18, 21]. Also, it is found that certain features might be equally important across different domains, but some are found to be important for a domain, but not necessary in other domains [8, 9, 11, 13]. For example, websites related to finance seems to place importance on timely update and accuracy of information while visual appeals and navigational responsiveness are more critical in entertainment related websites and having search function is critically important in education, government, medical, and e-commerce [23]. However, some common features are also found to be shared across different domains [21].

Despite the abundance of website assessment studies, few studies have addressed the website users' attitudes or innate orientation in using websites. In marketing research, attitude towards advertisement is known to mediate between brand attitudes and purchase intentions [4], and researched extensively. In this regards, website user's attitude toward a website would be critical in evaluating websites use in general. Attempts to examine users' perceptions towards websites are found in designed-related studies. Despite that evaluation criteria for website are primarily based on users' subjective perceptions towards websites, but few studies attempted to identify actual attitudes that may be different from user to user. In this regard, this study attempt to identify different cognitive patterns that may exist among users in using websites using a qualitative technique of Q-methodology.

## 2. Methodology and Data Collection

This study uses the Q-methodological approach to explore and describe the cognitive patterns exhibited by users of websites. Q-methodology is geared towards the systematic study of subjectivity. Goal of this study is to identify, categorize, and understand the attitudes of users in using websites. Q-methodology uncovers and identifies the range of opinions regarding a specific topic under investigation, and involves three stages: (1) select a set of statements to be sorted, (2) recruit participants to sort the statements along a continuum of preference, and (3) analyze the data and interpret.

For this study, the Q samples are gathered from prior studies of website assessment.Total 37 Q-samples were collected in this process. To purify and refine the Q sample, five university students were recruited. The focus group of these students comes up with the final Q sample. Final Q sample is composed of thirty seven items.

One of the most salient characteristics of Q-methodology is the use of a small sample, which is possible because intraindividual differences rather than interindivid ual differences are considered significant. Therefore, a sample of 21 participants who were graduate students in Seoul, Korea that have experiences in using their university websites, and a snowball sampling approach was used to recruit the participants. Data were successfully collected from 21 participants. Of the 21 participants in this study, 57% were female and 43% were male. The age range was from 24 to 35.

### 2.1. Q-sorting

The instrumental basis of Q methodology is the Q sort technique which conventionally involves the rank-ordering of a set of statements from agrees to disagree [3, 15, 17]. It requires the participant to evaluate (or sort) a number of items along a continuum from, for example, '*very like me*' to '*very unlike me*' [14,17]. The respondent arranges the statements into a forced normal distribution of most to least agreement, yielding a model of subjective preferences within the given '*universe of discourage*'. The Q sort is usually a self-directed process. To carry out a study there needs to be something for the participants to rank. This usually consists of between the Q samples. The activity of sorting them is known as 'Q sorting'. Items are ordinarily provided on cards or on paper which the participants are asked to cut up themselves.

The Q sample is randomly numbered, put onto cards, shuffled and offered to participants who are asked to use them to model their view or account by sorting them into categories, e.g. from most like my attitude (+4) to least like my attitude (-4) with a central neutral category (0). Typically, one or two descriptors are placed in the extremes and the majority is placed toward the center, resulting in a normal distribution. The distribution is usually '*forced*' and is recorded by the participant on a response grid. Analysis of the responses then takes place. Q methodology employs a particular form of multi-variation analysis, in order to identify and describe the different '*stories*' that can be told about a particular topic or issue—it usually does this by examining the way people respond in systematically different ways to propositional samples of discourse [17]. While participants were Q sorting, a researcher and participants communicated continually and participants were interviewed to give the reasons why they chose specific statements of the items they placed in the extreme columns-most disagree (-4) and most agree(+4). These reasons are adapted to aid in describing the Q factors in a general sense.

**2.2. Data analysis.**
After the Q-sorting, the results were converted into scores. For example, the cards in -4 category was converted into 1, the cards in 0 was converted into 5, and the cards in +4 category was converted into 9. Then, the data was processed by QUANL program for principal component analysis.

## 3. Results

### 3.1. Factor Analysis
In Q-methodology, basic data analysis technique is the by-person factor analysis. In this by-person factor analysis, factors are extracted not from variables, traits, or statements, but rather from the persons – the evaluators. This technique correlates people to others by comparing the similarities of opinions based on their Q-sort [6,17]. Rather than groupings traits or statements reducing the complexity of variables involved, this by-person factor analysis produces grouping of expressed opinion profiles based on the similarities and differences in which the statements (q-samples) are arranged by each participant.

The by-person factor analysis of the data collected for this research produces three factors – three differently oriented user groups in using and assessing university websites. As suggested by the Q-methodologists [6], the factors structure was rotated using varimax technique for easier interpretation. Results of this by-person factor analysis are that eigenvalues of each category are 6.0749, 2.5436, 1.7002, respectively. Eigenvalues are greater than 1.5. Variances are 0.2893, 0.1211 and 0.0810, respectively for each factor. The accumulated variance is 0.4914, implying that 49.14% of the variance in the matrix is accounted for by these three factors.

As suggested by Brown (1996), correlation among these factors was analyzed. It should be noted that Q-Sort correlations are rarely of any interest in and of themselves. This is because we are not as interested in how closely two people correlate as we are in tapping dominant perceptions of the group in its entirety. Hence, the correlation matrix represents merely a phase through which the data pass on the way to factor analysis.

As a next step of analysis, demographics of each factored group are compared against each other. We found no remarkable relationship with age and sex. This suggests that factors we discovered are not subject to demographic bias. Factor weight of P sample in each factor can be deemed high when it is more than 1 [17]. In this byperson factor analysis, higher factor weight means that the corresponding person is located closer to the axis of the type but farther from the starting point.

People are likely to be typical or representative of the factor, and thus when the P sample's characteristics and interview data are reflected, the interpretation of the factor can be made more accurately and faithfully.

### 3.2. Three Different Orientations
For interpreting the factors produced by this by-person factor analysis, we went through three steps. First, q-statements of strong affirmations (Z-Score $\geq +1$) and strong negations (Z-Score $\leq -1$) loaded on each factors were carefully reviewed to see if these statements point to specific dimensions or orientation. Second, to give a meaningful and differentiating explanation of each factor (group of people), our analysis was focused on the relative differences in statement items of each factor in terms of standardized z-score. Finally, the factor analysis results were triangulated with indepth interviews conducted afterwards with each respondents with relatively higher loadings on corresponding factors.

A description of each factor is presented below with demographic details of participants loaded significantly on that factor. Statement rankings exceeding the z-score critical value (+/-1.00) were used in in-depth analysis of each factor. Rankings of relevant items are also provided. Participants' comments are quoted when necessary, in italics. Common Q methodological practice was followed in naming each factor. As with the practice of other naming, the intent is to provide a cognitively easy to grasp handle with risks of over-simplication.

**Factor 1: Use-Oriented Users**
This factor consists of users who want a convenient use of websites. The important indices in this group are related to ease of use such as '*the site maintains proper response speed*' (#35, Z-Score = 1.94), 'the site has low frequency of errors in screen, links, contents' (#33, Z-Score=1.93), '*the site provides quick links to other related sites, critical menus and function*' (#22, Z-Score = 1.10) and '*the site provides easy navigational features such as labels for current position, path indicators, etc*' (#21, Z-Score = 1.02)and information structure such as '*the site provides cohesively grouped main page*' (#23, Z-Score = 1.10).

| Item No. | Statement(Q sample) | z-Score |
|---|---|---|
| **35** | the site maintains proper response speed | 1.94 |
| **33** | the site has low frequency of errors in screen, links, contents | 1.93 |
| **5** | the site provides convenient student services such as, scholarship application, military registration, enrollment, etc. | 1.54 |
| **3** | the site provides digital library services | 1.45 |
| **10** | the site provides, or tries to provide, relatively accurate information | 1.23 |
| **23** | the site provides cohesively grouped main page | 1.10 |
| **22** | the site provides easy navigational features such as labels for current position, path indicators, etc. | 1.10 |
| **21** | the site provides quick links to other related sites, critical menus and functions | 1.02 |
| **6** | the site provides classified services for different client group such as faculty, staff, alumni, visitors, etc. | −1.12 |
| **37** | the site complies with the web accessibility standards such as support for text only version, keyboard only interface, etc. | −1.15 |
| **17** | the site design is specialized for educational purpose | −1.21 |
| **16** | the site can be differentiated from other schools' sites | −1.31 |
| **2** | the site provides pages ore languages with similar service quality as Korean pages | −1.71 |
| **28** | the site ovides handica d s cialized features | −1.99 |

Table 1. Descending array of z-scores (> +1 or < -1) and item descriptions for Factor 1, "*Useoriented user*"

A 30-year-old male student in the second semester of his master's degree with typical characteristics of this type (P#10, weight=1.1877) strongly suggested, in the interview, the reason for counting some items to be important as follows: "Websites have to be convenient to use. I feel satisfied when the screen response time is fast and there were no errors such as broken links or blurry screens. If the website can't satisfy me, it has no value to use." A 26-year-old male student in the fourth semester of his master's degree with another typical characteristics (P#1, weight=1.3675) said, "*When using the websites, I felt inconvenient if moving between pages were inadequate or the website didn't offer shortcuts for main functions. In particular, I'm not satisfied at all if the screen opened too slowly or it had many errors*." *In the interviews with the respondents in this type, their responses mostly contained the phrase of "… when I use the websites in general*." A female student in the second semester of her master's degree showing the factor weight of 1.1366 states: "I think speed and error-free operation is most important when using the university websites as well as undergraduate support services and digital library services." Respondents in this type generally paid great attention not to particular contents or services but to the convenience when using the websites.

There was significant difference with other types in disagreed items among the respondents. Statements like '*the site design is specialized for educational purpose*' (#17, z-Score=-1.21) was considered as strongly agreed items in factor 2, but it was

assessed as negative items in factor 1. This result shows that respondents in factor 1 don't associate university websites with unique characteristics of the university such as education or learning.

Considering the characteristics of users in this group, the university website managers need to focus more on ease of use and convenience features. Splendid flashes of the university identity, icons or logos would not be necessary for this group, but system errors such as slow response time, broken links, or any other the technical problems including lack of traffic handling capacity would affect this type of users negatively. This type of users would not differentiate university websites based on its content or give leeways because it is a kind of school websites designed by amateurs. They are more focused on whether the website is usable for them rather than useful. Henceforth, this group is named 'Use-Oriented.' user type.

**Factor 2 : Goal-Oriented Users**

The strongest agreement item in this user group is: 'the site provides educational multimedia services such as lecture streaming, lecture notes, class bulletin boards, etc.' (#11, z-Score = 1.65) and also users in this group agreed strongly with 'the site provides news, events and other notices appropriately,' 'the site design is specialized for educational purpose,' and "the site provides university information, such as, history, location map, contact information, etc., accurately on easy to find web page" (#13, 17, 14). This means that they see the university website as more like an online university and expect the site to provide information and services for the purpose of the appropriate educational institution. Compared to the use-oriented group, respondents in factor 2 agree with "the site provides classified services for different client group such as faculty, staff, alumni, visitors, etc." (#6, z-Score=1.58), which reflects their desire to get services according to their visiting purpose following customer classifications such as students, parents, graduates and the public. They strongly want services like educational content or university information which are consistent with their purpose for visiting.

Respondents in this group mostly disagreed with items in technical characteristics or design. It is interpreted that they don't agree with items not related with learning or educational purposes. In particular, they strongly disagreed with personal services such as blog or webhard (#8, a-Score = − 2.00) including information sharing activities such as leaving comments (#32, z-Score = − 1.60).

These characteristics are reflected in an interview with a 29-year-old female student in the second semester of her master's degree who was considered to have typical characteristics of factor 2 (P#6, weight = 1.1454). She responded: "*University websites have to be designed and provide services suitable for their educational purposes. I think it's important to provide contents for education and information on curriculum. For this reason, overall design of the website has to be provided appropriate for the purpose of the educational institution*." Meanwhile, a 30-year-old male student in the third semester of his master's degree (P#7, weight=1.0939) stated: "*University is an educational institution. Therefore, university websites have to provide various educational contents such as online lectures and useful information to complete the courses*." Their replies show that the respondents understand and use university websites only for education.

A 24-year-old female student in the second semester of her master's degree with typical characteristics of type 2 (#8, weight=1.7359) explained the reason for her negative items as follows: "*University websites provide information and services for education, but leaving comments or providing personal contents seem to be irrelevant to education. In addition, personal content services like e-mail or blog have smaller capacity and lower quality than existing services, so I don't want to use them*." That is, users don't have to use low-quality service of the university website instead of their high-quality personal services like e-mail and blog, and they don't expect these services at first providing that they are not suitable for the purpose of the university website.

Website managers in dealing with this user group can think of strategies expanding education related content and services Users in this type don't want to use e-mail or blog services of university websites because of the low quality and lock-in of other

personal services. Therefore, if managers support resources for various services like any other portal site, they won't get satisfactory results, because they would not have enough resources to adopt the commercial services. Instead, if they concentrate on services suitable for education and provide and manage high quality content, the satisfaction level would increase. In conclusion, we named '*Goal-Oriented*' user type because the users in this type think providing services suitable for education and learning is most critical.

**Factor 3 : Information-Oriented Users**

Respondents belonging to this third user type strongly agreed with "the site provides convenient student services such as,

scholarship application, military registration, enrollment, etc." (#5, z-Score = 2.22) and "the site provides digital library services"

| Item No. | Statement(Q sample) | z-Score |
|---|---|---|
| **11** | the site provides educational multimedia services such as lecture streaming, lecture notes, class bulletin boards, etc. | 1.65 |
| **13** | the site provides news, events and other notices appropriately | 1.61 |
| **6** | the site provides classified services for different client group such as faculty, staff, alumni, visitors, etc. | 1.58 |
| **17** | the site design is specialized for educational purpose | 1.35 |
| **5** | the site provides convenient student services such as, scholarship application, military registration, enrollment, etc. | 1.33 |
| **3** | the site provides digital library services | 1.32 |
| **14** | the site provides school information, such as, history, location map, contact information, etc., accurately on easy to find web page | 1.11 |
| **10** | the site provides, or tries to provide, relatively accurate information | 1.06 |
| **28** | the site provides school information, such as, history, location map, contact information, etc., accurately on easy to find web page | −1.14 |
| **32** | the site provides appropriate user notices, such as, system maintenance, etc. | −1.15 |
| **27** | the site maintains proper number of global navigation menu bars and menu items | −1.35 |
| **31** | the site provides interactive information sharing services such as commenting and replying on postings | −1.60 |
| **37** | the site complies with the web accessibility standards such as support for text only version, keyboard only interface, etc. | −1.65 |
| **8** | the site provides personal spaces such as webmail, webhard, blog, etc. | −2.00 |

Table 2. Descending array of z-scores (> +1 or < -1) and item descriptions for Factor 2, "Goal Oriented user"

(#3, z-Score=2.04), which were the items with a standard score of more than 2.0 among the factors considered important in common in all the three types (consensus items). Other agreed items included "the site provides news, events and other notices appropriately" (#13) and "the site maintains proper response speed" (#35) as agreed in the first user type "the site provides educational multimedia services such as lecture streaming, lecture notes, class bulletin boards, etc." (#11); and "the site provides, or tries to provide, relatively accurate information" (#10), "the site provides features for personal information protection" (#29) and "the site is timely updated" (#12). All of the nine agreed items were associated with "information."

This type of respondents reported that they visited the university websites to get information they need as students. The respondents most strongly agreed with statement concerning the student support services that provide information about administrative procedures (i.e., enrollment, scholarship or leave of absence for military service), fulfilling students' need to continue their studies and helps them follows these procedures. Second most strongly agreed item concerns the online library service for information retrieval: "the site provides integrated search function,"(#15). They have a stronger desire to retrieve and obtain information perceiving university websites thoroughly from the prospective of information seeking, which is thought to be the reason why they also strongly agreed with the "the site provides features for personal information protection" item, unlike other users in other groups.

Also, the information-oriented respondents considered design-related factors as relatively less important. Five of six items they did not strongly agree with were associated with design. For example, "the site continuously promotes the use of the information within the site by setting up events and providing online community(#7)."

A 34-year-old female student in the second term of the master's program, who is most prominent in this group(P#12, weight=1.0821), commented why she strongly agreed with these items: "I visit the website whenever I need information about my academic

| Item No. | Statement (Q sample) | z-ore |
|---|---|---|
| **5** | the site provides convenient student services such as, scholarship application, military registration, enrollment, etc. | 2.22 |
| **3** | the site provides digital library services | 2.04 |
| **13** | the site provides news, events and other notices appropriately | 1.40 |
| **15** | the site provides integrated search function | 1.37 |
| **35** | the site maintains proper response speed | 1.37 |
| **11** | the site provides educational multimedia services such as lecture streaming, lecture notes, class bulletin boards, etc. | 1.13 |
| **29** | the site provides features for personal information protection | 1.10 |
| **12** | the site is timely updated | 1.01 |
| **10** | the site provides, or tries to provide, relatively accurate information | 0.99 |
| **26** | the site maintains presentation permanence and stability of contextual sub site controls | −1.25 |
| **7** | the site continuously promotes the use of the information within the site by setting up events and providing online community | −1.32 |
| **16** | the site can be differentiated from other schools'sites | −1.56 |
| **27** | the site maintains proper number of global navigation menu bars and menu items | −1.59 |
| **17** | the site design is specialized for educational purpose | −1.60 |
| **24** | the site provides consistency in layout, style, color, use of images, icons, and fonts, etc. | −1.90 |

Table 3. Descending array of z-scores (> +1 or < -1) and item descriptions for Factor 3 " *Information- Oriented user* "

activities and paper work. The purpose of my visit is to quickly find the information I need, so I will be happier if information is easily and conveniently available on the website." A 25-year-old female student in the second term of the master's program (P#15, weight=1.3221) responded: "I think it's absolutely important for a university website to have a well-organized e-library. The primary reason for my visit to the website is to find necessary information, so the design of the site or the involvement-rovoking services is of no or little importance to me. I don't want the website to have annoying banner ads or pop-ups like online shopping malls, and it should not be designed like an illegal site. It matters to me. Of course, I don't think there is such a university website, so the design-related elements are not important considerations to me."

For information-oriented users, most of all, the site operator will have to place greater priority on strengthening information retrieval functionality, maintaining information quality, and keeping information updated. In particular, if the website aintains the student support service and online library service at higher-quality levels, it will be able to provide the best possible utility to this type of users. Information-oriented users expects the universities sites provide quality content and information for students and students should be allowed to retrieve, find and acquire/obtain information they need, easily from the website. Henceforth, this group is named as "information oriented."

## 4. Discussions

Using most popular website assessment indices, a q-methodology analysis of users are conducted here. It is revealed here that website users may have different orientations in terms of what they expect from the websites, in this case, the university websites. Three different orientations are identified: Use-orientation, Goal-orientation and Information-orientation. Each type exhibited different emphasis in using websites. Use-oriented users focus on ease of use and system functionalities, while goal oriented users focus more on the goal of the website, in this case, the educational purpose of the site. Information-oriented users are mostly concerned about retrieval, quality and update of information in the site.

In developing and designing websites, it may be important to take these differences into consideration. Depending upon the composition of user groups and situation, efforts need to be made to focus on different foci such as use, goal or information. This differentiation would be critical in increasing users' satisfaction level as different user groups may have different concerns. Use-oriented user group faced with completely goal-oriented website may have more to complain that faced with useoriented sites. Expectations need to be met in terms of users' preference or orientations. If the site does not have a lot of users, but only a limited number, users may be surveyed for their orientations, so that it can be reflected in the design.

However, it would not be easy or critical if the site is serving general public on which the group differentiation would not be so imminent. In these cases, the size and scope of websites would be very large and the number of webpages would be much larger. In these cases, website structures are becoming more and more complicated as the size and scope of information covered increases. This complication, in most cases, involves the complication of search or traversing paths of use rather than the structure of information itself. Many different paths are created to reach same information. For example, the information page about a professor can be reach by way of college and department, or faculty grouping, or research centers, or via a search facility. Departmental information can be obtained via current student pages or visitor pages, in case of most current university websites.

In this regard, in most websites with many pages, the different path structure consisting of different intermediate pages and functions need to be developed and designed. These structures need to be defined taking in consideration the user groups different orientations. For example, goal oriented users would feel more comfortable with typical college and departmental structure in searching for pages that they want while use oriented group users may prefer quick access through functional features such as search and refine. We may have already seeing this trend shown up in real practice. Website designers may define and develop different sets of paths and functionalities, geared towards different groups of users with different orientations.

This study belongs to a stream of research trying to identify individual and group differences in using websites. One note of caution is in order at this point. User's orientations seem to better be considered in the design of website and pages. However, more in-depth research would be needed in clarifying details of these orientations. For example, it would be probably too early to determine whether these orientations are based on individual 'genetic' traits that are unchangeable or personal characteristics that are malleable by training.

From website managers' perspective, the outcome of this study is a suggestion. They need to maintain a healthy skepticism with

this suggestion in mind that assessments of user's orientation should be used as a basis for website designs.

## 5. Conclusions

This study was intended to distinguish how differently users perceive and use the websites. To identify different orientations of users, a set of websites assessment indicators are presented to users using q-methodology procedures, and the results were analyzed for the differences of users' subjective perception towards the use of websites by asking to classify information according to the level of importance. For research purpose, university websites were used with graduate students as assessors.

The results revealed that users perceived websites from three different perspectives: use-oriented type, goal-oriented type and information-oriented type. The useoriented users perceived it as important to use their university websites fast and conveniently without error, probably like when using other websites. The goal-oriented users perceived their university websites as educational sites for teaching and learning and wanted the websites to provide necessary services for academic purposes. For the information-oriented user type, it was perceived as most important to get accurate information they need for student activities promptly and conveniently by navigating the websites.

The present study has limitations in generalizing its results as the sample is limited to a small number of graduate students. Therefore, future studies will need to be conducted with a more representative P sample of users from different demographic groups including undergraduate students, prospective college students, parents of students and other ordinary people, even in evaluating the university website users.

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