



Using the KJ Method for the Construction of the Website Information Architecture of a Halal Information Portal

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Abstract

Information architecture (IA) has become an important research area within the field of human computer interaction. The growing interest has led to the realization of the need to have validated methods for constructing website IA. Past practice of IA reflected the inclination towards using intuitive mapping of the website builder's mental model. This paper reports the work that explored on the usability of using the KJ method to categorize and prioritize halal food information labels for the structural design of information space of websites whose content is rich with information on halal. A group of participants consisting of knowledgeable halal information consumers took part in this KJ method exercise to generate a halal hierarchical classification system. A prototype of a halal website using the classification obtained was constructed and tested for its usability and compared to the usability of an existing website for halal information portal. The results of the testing showed that the website IA from the KJ method generated classification produced better results than the existing website of existing halal portal.

Keywords: Information architecture, halal information management, KJ method;

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1. Introduction

Information design is concerned with the designing of the information presentation that facilitates the retrieval and understanding of information. A menu system is often used to facilitate the retrieval. The development of online menu systems is often achieved through the construction of a hierarchical structure that is mapped from the programmer's mental model. Often the process is very intuitive and the technique transparent to other developers. Information architecture (IA) is concerned with the design and development of systematic approaches to organize and present online information and encompasses the navigation, categorization, and labeling of information. Website IA is the structural design of the information space that facilitates intuitive access to content by facilitating user web browsing task. From its early conception, IA has largely remained in the knowledge realms of IA practitioners where practical aspect of IA is championed by [1] as early as 1998. Academic work on IA is seen in [2] for the process view approach of IA design and construction, [3] for navigational design of websites and [4], [5] and [6] for developing a theoretical framework for website IA. Despite the growing interest in IA, the literature on it does not extensively show methods that can assist the IA construction [7]. Attempts of using the card sorting method to develop website IA is seen in [7], [8] and [9]. However in [8] and [9] the research is concerned with the revelation of the cultural mental model of IA website domain and not on the strengthening of the IA construction method. Although card sorting is a popular method that is often used to organize content, the task in the card sorting is mostly done individually and the participants do not interact much with one another to categorize the information. This research seeks to explore the usability of the KJ method as a website IA construction method by looking into the problem of halal information classification.

2. Literature Review

This section discusses the literature on halal information management, website IA, and the categorization process of information.

2.1. Halal information management

The halal phenomenon triggered by the growing Muslims' product and information consumption needs, demand for the accessibility of information on halal products and services. In response, organizations that look into Muslims' affairs established their own websites that provide information on halal, covering aspects of the shariah and information of halal products and services. These include websites of Halal Malaysia, Islamic Religious Council of Singapore (MUIS), Halal India Directory, Halal Standard Institute of Thailand and Qatar Halal Portal. In addition Muslim community groups such as INFANCA has also established their website, the *zabihah.com* to provide information on halal food and other halal information needs of Muslims' travelers. An isolated study on the usability of a popular halal portal [10] revealed that the organization of the information in the portal does not facilitate easy information retrieval and this affects the usability of the portal. With the growing demand for information on halal, guidelines for IA of halal websites will be useful for those who are responsible for the construction of such websites.

2.2. The website IA design

Website IA focuses on the categorization and the labeling of information. The design of website IA consists of the matrix, hierarchical and tunnel design [11]. The matrix IA design embodies the principles of the originators of hypertext, HTML and Web where the fullest advantage of HTML's hyperlink capabilities is used to allow users to review all website content thus giving the users the freedom to pursue their interests by creating their own path through the content. The tunnel design is a step-by-step approach commonly used in e-learning courses content. Hierarchical design is common approach used in website IA. Here, information is organized in a *top-down* manner to allow users to review content in drill-down manner. However this design approach may be taxing on users if they have to drill down too deep inside the information nesting causing much confusion amongst users. This may be due to the fact that users' mental model of content grouping and its labels do not correspond to the way the content is organized on the website [12]. The work in [12] also emphasized on the need to match the mental models of users with the mental model of IA designers when comparing the differences between children's and adult's categorization scheme in the hierarchical IA.

2.3. Methods of the information categorization process

The structural properties of websites are dependent on the categorization system used in the IA [13]. Methods used for categorizing objects are variations of the card sorting method which is a common participatory technique for getting input from users about how an information structure of a website or other media should be organized. In the IA domain, card sorting is used to explore on how people group items, so that the information architect can develop structures that maximize the probability of users being able to find items on the classification scheme. Card sorting consists of the close and the open card sort. The former is used to validate an existing set of category names and category items while in the later the participants must create a structure for the categorization on their own. In practice open card sorting is used in the pre-design stage while close card sorting is use in the post design stage. Card sorting can be done on an individual basis or in a group. Group card sorting has shown positive results over individual card sorting as the later may impose mental overload on participants performing the card sorting task [14]. This is because in group card sorting participants can discuss their sorting decision aloud. Participants of card sorting may be novices or experts in the information domain being categorized. The concern of card sorting analysis is the reliability of the card sorting data as there may be variations of card sorting behavior between novice and experts. [15] showed that there is no expert-novice distinction in a card sorting exercise but the difference lie in the stacker-spreader categorization behavior of card sorters. However, the main problem in group card sorting is when no consensus between card sorters is reached leading to the categorization problem where different set of classification are produced with no consensus [16].

The KJ Method is a technique for categorizing and prioritizing ideas developed by Jiro Kawakita in the 1960s. It allows for group idea generation to be reached within a consensus on priorities of subjective and qualitative data [17], [18], [19]. This method taps a team's creativity and intuition through the use of affinity diagram or chart and the affinity process is a creative process rather than a logical one. The KJ Method bears much resemblance with card sorting except that in the KJ Method, participants need to

collaborate within the same time and space dimension to generate the ideas. The KJ method allows for a negotiation process between participants who may vary in terms of their expertise and classification behaviours to produce an emergent classification of concepts. The technique of the KJ method overcome the problems of classification behavior [15] and time consumption [20] that are faced in card sorting method and offers a better method for performing the categorizing of the process.

3. The Research Method

This section describes the use of the KJ method in constructing a website IA of a halal portal. Information content was gathered from websites that published information on halal and journals.

3.1. Data collection

Information on halal was gathered from selected websites consisting of Halal Malaysia, Islamic Religious Council of Singapore (MUIS), Halal India Directory, The Halal Standard Institute of Thailand, MalaysiaHalalfoods.com and Qatar Halal Portal (hahalhut.com) and other publications on halal information. A summary of the information gathered is shown Table 1.

Table 1. Summary of information gathered

Source of Information (Journals/Websites)	Information Type
MUIS (<i>Islamic Religious Council of Singapore</i>)	Information on Singapore Halal certification General Information Overview, Services, Recognition of Singapore Halal Mark, MUIS eHalal System, Singapore Muis Halal Quality Management system (HalMQ), Singapore Muis Halal standard , Singapore Halal directory, Frequently ask question Information for consumer Basic principles; Guide to Islamic slaughtering; Guide to preparation and handling of Halal food; Sources of Halal Food; Product Storage, Display and Servings; Product Processing and Handling; Hygiene and sanitation; Food Guide to Halal food selection; Guide to authenticate muis Halal certificate; Food additives listing; E-Code; Chemical Name; Description; Remarks; Online directory of Muis Halal; Certified premises/product Information for companies Halal certification benefit; Types of Halal certification schemes; Halal certification process; How to apply; Halal fees schedule; Halal certification terms & conditions; Halal circulars; Halal training
MUIS - General guidelines for the handling and processing of Halal food	Halal food handling and processing: General requirements; Storage, display and servings; Location; Hygiene and sanitation Religious rulings on beverages, plants and animals Ruling on beverages; Ruling on plants; Ruling on land animals; Ruling on marine animal; Ruling on amphibians; Ruling on birds Islamic slaughtering Criteria; The slaughter; The slaughterer
Halal Malaysia www.Halal.gov.my	Halal Directory based on : Companies; Products; Food premises; Menus; Slaughter Houses; Halal Additives Code; Additives name; Source; Function; Description List of Hotels and Resorts Updated certification information List of Approved Islamic Bodies List of approved international applicants
MalaysiaHalal foods.com	Scope of Halal food and Drinks Three major categories of Sources of food-mineral, plants and animal

The participants were later requested to group the ninety-seven cards in the following manner:

- a. Conduct affinity silently to encourage unconventional thinking and prevent one person from steering the procedure (Figure 3).



Figure 3. Classification process

At this stage participants were asked to:

- i. Look for two pieces of information that seem to be related in some way and place them together.
 - ii. Find information that are related to those already set aside and add them to the group.
 - iii. If other information that is related to each other is found, then establish new group.
 - iv. If there are information that do not fit any of the groups, let them stand alone without forcing them into groupings. React quickly to what they see to avoid deliberations and repeat all steps until all of the information are placed in groups.
- b. Redistribute (Fig. 4): Discuss and freely move information and rearrange them until the grouping makes sense. If by any chance consensus cannot be reached, make a duplicate of information and place one copy in each group.



Figure 4. Re-distribution process

- c. Find related group and decide whether higher-level information can be created as parent to two or more lower-level information.
- d. Finalize the information grouping and the level by reviewing the final diagram whether the grouping represent the semantic space sufficiently after the process is completed

The results of the prioritization process are then gathered in a diagram referred to as the Type A Chart (example in Appendix B).

3.4. Development and evaluation of the prototype of the halal portal with the new website IA

From the information classification a halal web IA was developed and illustrated through a prototype of an information portal for Halal food. Samples of the snapshots of the prototypes are shown in Fig 5 and 6.



Figure 5. Screen shot of sources of Halal Feed page
 Figure 6. Screen shot of sources of hygiene, sanitization and food safety page

A simple user testing was conducted to evaluate the usability of the information classification. Four participants took part in testing and were given four search tasks to perform to look for 5 items. The tasks given are:

- Task 1:** Try to find the ingredients of a rare product they intend to buy from the Halal portal.
- Task 2:** Try to look for the complete information on animal slaughtering procedure from the Halal portal.
- Task 3:** Try to check the Halal state of food additives out of curiosity.
- Task 4:** Try to gather information on restaurant hygiene procedures for Halal compliance.

Results and Discussion

This section discusses the results of the prioritization process performed in the KJ Method.

The ranking results

The ranking process has enabled the prioritization of key-information to guide the website IA for Halal information. Below are the ranking of the key information (highest to lowest) that was based on the criteria from MS1500:2004:

- | | |
|--|--|
| 1) Sources of Halal feed (highest) | 5) Hygiene, sanitation and food safety |
| 2) Slaughtering | 6) Product storage, display and servings |
| 3) Legal requirements | 7) Packaging and labeling |
| 4) Product processing, handling and distribution | 8) Frequently ask question (lowest) |

The KJ Method procedure had identified 8 key information and 97 halal information grouping and sub-grouping that were used in the development of halal website IA. Examples of the affinity grouping based on KJ Method is shown in Appendix B.

User testing of the halal information classification on the halal information portal

In the user testing, successful tasks are based on the number of information items found by the participants as requested and the comments by each of the users. The results of the user testing are shown in Table 2.

Table 2. Results of user testing

2. User	3.	4. Existing Halal Portal	5. New Halal Portal
6. 1	No of items found: Task success: Comment:	2 40% Information not sufficient.	5 100% No comments given
7. 2	No of items found: Task success: Comment:	2 40% 8. No comments given.	3 60% No comments given.
9. 3	No of items found: Task success: Comment:	0 0% User is confused with the navigation.	4 80% User is confused with one task but commended on the ease of use of the website
10. 4	No of items found: Task success: Comment:	0 0% Website is wordy and information categories are difficult to understand.	4 80% No comments given

Overall, the participant's information search is more successful through the new halal information portal compared to the information search task in the existing halal portal. This give some evidence that the classification obtain through the KJ Method produces a classification system that facilitate better search.

Conclusion

This work is an early attempt to show how the KJ Method can be used as a classification method to construct the website IA of a halal portal. In addition, the halal categorization produced in this work will be useful guide for halal websites IA. An extension of this work will include extensive information of halal to further test the usability of the IA.

References

[1] Morville, P., & Rosenfield, L. *Information Architecture for the World Wide Web*. Orielly Associates, 1998.

- [2] Richenauer, A. *LUCIA: Development of a Comprehensive Information Architecture Process Model for Websites*. PhD Thesis, University of Regensburg, Germany, 2005.
- [3] Benyon, D. Navigating Information Space: Website Design and Lessons from the Built Environment. *PsycoNology Journal*, 2006, 4(1), pp. 7-24.
- [4] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., & Shafie, M. Towards a Theoretical Framework for Understanding Website Information Architecture. *Proceedings of the 8th International Arab Conference on Information Technology*, Yarmouk, Jordan, 2006.
- [5] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., & Shafie, M. Incorporating the Cultural Dimensions into the Theoretical Framework of Website Information Architecture. In: *Usability and Internationalization, HCI and Culture, Lecture Notes in Computer Science*, 2007, 4559, Springer-Verlag, pp. 212 -221,
- [6] Wan Abdul Rahim, W. M. I., Nor Laila, M. N., & Shafie, M. [The Information Architecture Of E-Commerce: An Experimental Study on User Performance and Preference](#). In: Papadopolous et al. (Eds.), *Information Systems Development*. Springer Science + Business Media, 2009, pp. 723-731
- [7] Jones, W., Pirolli, P., Card, S. K., Fidel, R., Gershon, N., Morville, P., Nardi, B., & Russell, D. M. It's About the Information Stupid: Why We Need a Separate Field of Human-Information Interaction. In: *CHI '06 Extended Abstracts on Human Factors in Computing Systems*. ACM, Montreal, Quebec, Canada, 2006, pp. 65–68.
- [8] Nawaz, A. Evaluation of Information Classification on Websites and Impact of Culture: A Cross Country Comparison of Information Classification in Human-Computer Interaction - INTERACT 2011 - 13th IFIP TC 13 International Conference. Lisbon, Portugal, September 5-9, 2011, Proceedings, Part IV. *Lecture Notes in Computer Science*, 2011, 6949, pp. 390-393.
- [9] Petries, H., Power, C., Cairns P., & Seneler, C. Using Card Sorts for Understanding Website Information Architectures: Technological, Methodological and Cultural Issues, in Human-Computer Interaction - INTERACT 2011 - 13th IFIP TC 13 International Conference, Lisbon, Portugal, September 5-9, 2011, Proceedings, Part IV. *Lecture Notes in Computer Science*, 2011, 6949, pp. 309-322
- [10] Nurulhuda Nordin, Nor Laila Md Noor, Zainal Samicho, An empirical evaluation of Halal Portal, *Journal Halal*, JAKIM, 2008.
- [11] Danaher, B. G., McKay, H G., & Seeley, J. R. The Information Architecture of Behavior Change Websites. *Journal Medical Internet Research*, 2005, 7 (2).
- [12] Joon-Sang Baek, & Kun-Pyo Lee. A Participatory Design Approach to Information Architecture Design for Children. *Co-Design*, 4 (3), pp. 173-191.
- [13] Uddin, M. N., & Janecek, P. Faceted Classification in Web Information Architecture: A Framework for Using Semantic Web Tools. *The Electronic Library*, 2007, 25 (2).
- [14] Hannah, S. *Sorting Out Card Sorting: Comparing Methods of Information Architects, Usability Professionals and Other Practitioners*. MSc Thesis, University of Oregon, 2005.
- [15] Wolf, S. F., Dougherty, D. P., & Kortemeyer, G. *An Empirical Approach to Interpreting Card-Sorting Data*, [arXiv:1201.6601v1](https://arxiv.org/abs/1201.6601v1) [physics.ed-ph], 2012.
- [16] Kurniawan, S. H., & Zaphiris P. Web Health Information Architecture for Older Users. *IT & Society*, 2003, 1 (3), pp. 42-63.
- [17] Miura, M., Sugihara, T., & Kunifuji, S. GKJ: Group KJ Method Support System Utilizing Digital Pens. *IEICE TRANS. INF. & SYST.*, 2011, E94–D (3).
- [18] Lokman, A. M., & Kamaruddin, K. A. Kansei Affinity Cluster for Affective Product Design. *Proceedings of the International Conference on User Science and Engineering (i-USER)*, 2010, pp. 38-43.

- [19] Zunirah Talib, Suhaiza Zailani, & Yusserie Zainudin. Conceptualizations on Dimensions for Halal Orientation for Food Manufacturers: A Study in the Context of Malaysia, *Pakistan Journal of Social Sciences*, 2010, 7(2), pp. 56-61.
- [20] Tonkin, E. Multilayered Paper Prototyping for User Concept Modeling: Supporting the Development of Application Profiles. *Proc. Int'l Conf. on Dublin Core and Metadata Applications*, 2009.

APPENDIX A. LIST OF HALAL FOOD INFORMATION

1) Adulteration of food	57) Halal Food Production: Raw material
2) Agricultural produce and national food standards	58) Halal food service standard for tourism
3) Agriculture and farming	59) Halal standard
4) Animal slaughtering requirements according to Islamic law	60) Halal training
5) Assurance on ingredients, preparation, processing, hygienic and sanitation procedures	61) How to apply
6) Basic principles	62) Ingredient and additive
7) Categories of food and drinks prohibited in Islam: Prohibited by itself	63) Ingredients used in manufacturing
8) Categories of food and drinks prohibited in Islam: Prohibited due to external factors	64) Islamic processing techniques for Halal certification
9) Categories of food and drinks prohibited in Islam: Prohibited due to harmfulness	65) Islamic slaughtering: Criteria - Neck area to be severed
10) Categories of food and drinks prohibited in Islam: Prohibited due to impurity and filthiness	66) Islamic slaughtering: Criteria - The animal
11) Cleanliness and quality control	67) Islamic slaughtering: Criteria - The blade
12) Directory halal food services standard for tourist	68) Islamic slaughtering: Criteria - The slaughterer
13) Food additives	69) Islamic slaughtering: Criteria - The slaughterer
14) Food additives listing: Chemical Name	70) Islamic slaughtering: Procedure - After slaughtering
15) Food additives listing: Description	71) Islamic slaughtering: Procedure - Before slaughtering
16) Food additives listing: E-Code	72) Islamic slaughtering: Procedure - During slaughtering
17) Food additives listing: Remarks	73) List of approved international applicants
18) Frequently ask question	74) List of Approved Islamic Bodies
19) Guide to authenticate muis halal certificate	75) List of halal and non-halal ingredients: Ingredient
20) Guide to Halal food selection	76) List of halal and non-halal ingredients: Status
21) Guide to Islamic Slaughtering	77) List of Hotels and Resorts
22) Guide to preparation and handling of halal food: Hygiene and sanitation	78) Online directory of Halal Certified premises/product

23) Guide to preparation and handling of halal food: Product Processing and Handling	79) Packaging/Storage/Transportation
24) Guide to preparation and handling of halal food: Product Storage, Display and Servings	80) Procedure for slaughtering processing and other related operations as prescribes by Islamic rule.
25) Guide to preparation and handling of halal food: Sources of Halal Food	81) Processing/Units Operation: Conversion operation
26) Halal Additives: Additives name	82) Processing/Units Operation: Preliminary operation
27) Halal Additives: Code	83) Processing/Units Operation: Preservation operation
8) Halal Additives: Description	84) Processing/Units Operation: Product development
29) Halal Additives: Function (Technical)	85) Product labeling
30) Halal Additives: Source	86) Proper hygienic aspects unpracticed at processing premises
31) Halal Agriculture	87) Quality assurance: safety, hygienic and healthy food.
32) Halal Beverages	88) Raw materials, ingredients and products based on quality, sanitary and safety considerations.
33) Halal beverages	89) Religious rulings on beverages, plants and animals: Ruling on amphibians
34) Halal certification benefit	90) Religious rulings on beverages, plants and animals: Ruling on beverages
35) Halal certification process	91) Religious rulings on beverages, plants and animals: Ruling on birds
36) Halal certification terms & conditions	92) Religious rulings on beverages, plants and animals: Ruling on land animals
37) Halal circulars	93) Religious rulings on beverages, plants and animals: Ruling on marine animal
38) Halal Directory	94) Religious rulings on beverages, plants and animals: Ruling on plants
39) Halal Directory based on: Companies	95) Scope of Halal food and Drinks: Three major categories of Sources of food-mineral, plants and animal
40) Halal Directory based on: Food premises	96) Standard in food processing
41) Halal Directory based on: Menus	97) System of Halal: eHalal System
42) Halal Directory based on: Products	98) System of Halal: Halal Quality Management System
43) Halal Directory based on: Slaughter Houses	99) System of production and processing
44) Halal fees schedule	100) The Islamic way of slaughtering animals: Conditions for slaughter
45) Halal Food	101) The Islamic way of slaughtering animals: Methods of slaughtering:Stunning of animals prior to slaughtering
46) Halal food	102) The Islamic way of slaughtering animals: Methods of slaughtering:Mechanical slaughtering of poultry
47) Halal Food Additives	103) Total quality management practise for marketability

48) Halal food handling and processing: General requirements	104) Types of halal certification schemes: Eating establishment scheme
49) Halal food handling and processing: Hygiene and sanitation	105) Types of halal certification schemes: Endorsement scheme
50) Halal food handling and processing: Location	106) Types of halal certification schemes: Food preparation scheme
51) Halal food handling and processing: Storage, display and servings	107) Types of halal certification schemes: Poultry abattoir scheme
52) Halal Food Ingredients	108) Types of halal certification schemes: Product scheme
53) Halal Food Packaging	109) Types of halal certification schemes: Storage facility scheme
54) Halal food packaging, machinery and catering equipment	110) Types of halal certification schemes: Whole plant scheme
55) Halal food production guidelines	111) Updated certification information
56) Halal Food Production: Handling	

APPENDIX B. EXAMPLES OF TYPE A- CHARTS



