Online Mutual Aid, "RAQ":
A Study of Anonymous and Traceable Interactions

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Abstract—**Our study proposes mutual aid platforms for the resolution of uncommon or non-conforming cases in both administrative and commercial procedures. On reviewing inter-customer interaction, we came to rate RAQ over FAQ. We also reviewed former works on categorizing anonymity and related areas to support our research objectives.**

Conducting a study of knowledge search service, we were able to identify the differences between anonymous and traceable interaction in three non-conforming administrative cases. From a quantitative standpoint, we noted a tendency for anonymous communications to involve more participants. The accuracy of answers appeared not significantly variable, which was unexpected. From a qualitative view, more personal data were disclosed in anonymous interaction than in traceable interaction.

Index Terms—**mutual aid, anonymity, knowledge search**

I. INTRODUCTION

With digitization of administrative processes being under way in many countries, the Internet has come to allow citizens to share official and personal information when drawing on the services of either government or commerce [1].

Unfortunately, administrative routines, often referred to as "red tape," remain unable to handle the sheer diversity of cases with which they are addressed by the public. However, to ensure the dependability of the administrative process, we should expect both common as well as less common and non-conforming cases to be efficiently treated [2].

When cases which do not conform with the norm do occur, the enquiring party will often try to search for relevant information on the Net, and then take his or her case directly to a desk clerk. Usually, the less common the applicant's question, the more time may be required for its resolution.

In this paper, we focus on online mutual-aid "tools" used by people trying to resolve such less common questions. If, in a given situation, official information cannot be found on the web, the best way to get pertinent advice may be by accessing an online stock of cumulative experiences and knowledge or even enter directly into an exchange with other people. Fig.1 represents an illustration of this situation. For example, when a married woman wants to use her maiden name

as her working name, little information to justify her preference can be found on the public sector website because usage of maiden names is not supported by law but merely by discretion, or custom. As a result, the enquiring party may then decide to interact with other individuals informally to exchange relevant experiences and advice which may contribute to settle the matter.

It is of course difficult for ordinary people to obtain adequate information from a large number of web sites, even if all the relevant information were in fact published on the web. On the other hand, data aggregation to easily accessible FAQ (Frequently Asked Questions) may have the disadvantage of losing much detail of the original, individual records whose presentation to the physical clerk at his desk would ultimately be of crucial importance [3].

Such difficulties aside, it has in fact become much easier for individual users to express their views in terms of mutual aid based on so called "Web 2.0" technologies, such as blogs, Wikipedia, and so on. Also the rise of RSS and tagging technology has brought accurate subscribing of articles and effective syndication with similar entries.

The purpose of this paper is then to explore two types of mutual aid interaction on the Internet, anonymous and user-traceable, and verify the accountability of shared information provided by each.

Our paper is divided as follows. The next section focuses on mutual aid within the RAQ (Rarely Asked Questions) framework. Section 3 then reviews research on anonymity and mutual aids to date while Section 4 outlines our research questions and research design. Section 5 describes our study on "Yahoo! Chiebukuro (knowledge search, Japan)," and Section 6 summarizes the results of our study.
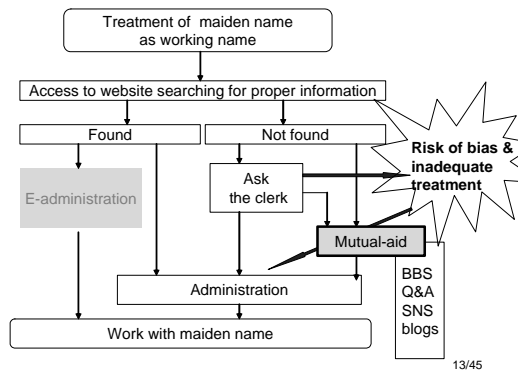
Figure 1. Example of solving uncommon cases

II. MUTUAL AID: FAQ AND RAQ

A. "Inter-customer interactions"

In the management information area, current studies show that individual customers are empowered not only by obtaining already disclosed information but also by sharing knowledge and experiences among themselves instead of going through a customer centre [4].

From the viewpoint of supporting consumers, studies in knowledge management such as on customer centers can also be referred to. The "Inter-Customer Interaction" model proposed by Kokuryo [5] depicts a relationship between general service providers (governmental, commercial) and clients/customers (Figure 2). Thanks to the Internet, interaction exists not only between officials and their clients but also among clients and customers themselves. They are able to help each other even when a customer center is not responsive. They are exchanging a variety of real and detailed comments evaluating commodities and services, with a view to supporting other customers as well. Those who come forward with similar questions, interests or experiences will support each other and give rise to reciprocal interaction on the Internet .
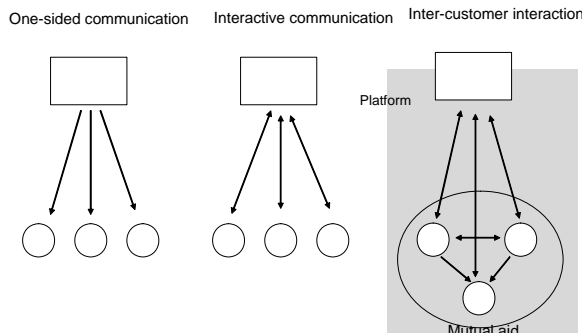

Figure 2. Inter-customer interaction
(Illustration based on J.Kokuryo[5])

B. Rarely Asked Questions (RAQ)

Frequently asked and answered questions, often called FAQ, arise from the interaction between

customer and company or government. Questions are systematically aggregated to be searched later. FAQ on the Net are pre-selected as a result of data mining of interactive communications or are intentionally edited.

Governmental and company websites edit FAQ which relate to the most common procedural cases or which overflow with description. For example, we can find out at a local governmental website how to fill in a marriage registration "choosing" the husband's surname for both marriage partners but we cannot find pointers as to how to enable choosing the wife's surname for that purpose even though it is allowed by civil law.

We suggest that it is cases and questions which FAQ does *not* cover that really need to be addressed. Details of such instances will be regarded as important by people with similar questions. The fact is that non-conforming and specific questions have been increasing with the diversity of our lifestyles and need to be taken care of.

In this light, we propose Rarely Asked Questions (RAQ) as cross-referential cycles of questions and answers which maintain diversity, neither overlooking minor detail nor aggregating questions [6]. The term, RAQ, is being used equivocally, but we use it to denote such questions as rare, but seriously important, including questions hesitatingly asked by individuals requiring answers to specific problems.

Table 1 shows our classification of FAQ and RAQ. As FAQ are being edited, the details of each case will be narrowed down by the process of aggregation. RAQ, on the other hand, do not need to be edited.

TABLE I.
FAQ AND RAQ

FAQ	RAQ
Frequent, for major, expected cases	Rare, but seriously important for someone
Aggregated, ordered for later use	Not aggregated
Edited. Details lost	As are. Details remain

Former interactions on BBS or Netnews, and current collections of blog entries arranged along given interests by RSS disclose personal questions and answers in detail. So called "Web2.0" technology brought with it also easier ways of searching and matching. For example, those who write their own blog can refer to the writings of others in their original form. Informative detail as well as an undercurrent of empathy also remain unless data is aggregated.
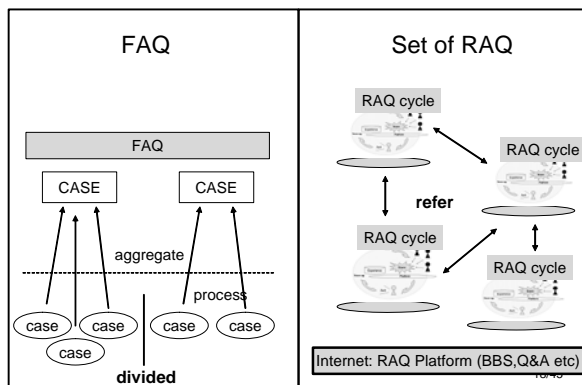
Figure 3. FAQ and set of RAQ

III. WORKS TO DATE

A. Categorizing anonymity

In this section we review research dealing with categorizing anonymity. "Anon Terminology" published by TU Dresden identifies three categories, listed below [7]. This document has been repeatedly updated since 2000. In the paper, anonymity is defined as "the state of being not traceable within a set of subjects, the anonymity set."

- Unlinkability
Unlinkability is a relatively strong property of anonymity.Unlinkability of two or more items of interest (IOI) denotes strong anonymity.

- Unobservability
From a user perspective, unobservability ensures that a user may use a resource or service without others being able to observe that the resource or service is being used.

- Pseudonymity
Pseudonymity is a weaker property of anonymity. A user may use a service without disclosing his or her identity, but still be accountable for that use[8]. Usage of nickname and handle are typical methods to ensure pseudonymity.

Our paper adopts this concept of pseudonymity.

B. Network theory

Network theory has been used to represent social relationships among individuals. Theories such as Burt's "Structural holes" or Granovetter's "The strength of a weak tie" predicted that more useful information is available in human networks which are weak and dispersed rather than dense and closed [9]. The spread of information occurring with new knowledge is caused by connecting people with separate attributes or in different social groups. From the structural view, anonymity can be explained as an escape from attributes [10]. Hiding attributes

leads to changing clusters to which one belongs. To switch the clusters one belongs to, one may choose which attribute to open or hide, which leads to partial anonymity.

C. Self-disclosure

In the computer mediated communications (CMC) area, anonymity has been thought of in terms of information associated with both negative aspects such as lack of trustworthiness or an incendiary tendency, and positive aspects such as uninhibited self-disclosure and avoidance of prejudice [11]. This paper focuses on the latter, positive aspects of anonymity.

On the Internet, anonymity in conjunction with minimal cost encourage participants to disclose their true condition more readily [12]. Those who would usually hesitate to reveal their personal circumstances, such as members of social minorities, patients and so on, tend to rely on anonymous communication, and while perhaps hiding needless attributes on the net, they gather to form a community. To establish legitimacy and authority by way of mutual aid, participants go ahead and disclose personal details and their physical or mental condition [3].

Anonymity not only protects the privacy of those who are asking or answering questions, but also removes prejudices, for example, gender, age or race from the issues discussed [13][14].

IV. RESEARCH DESIGN

A. Re-categorizing anonymous and traceable entities

In this paper, we are not concerned with the technical but rather the human communication layer of anonymity, i.e. interpersonal communication among entities. We now add the element of traceability, i.e. the extent to which we can track the history or record of an individual's activity on the platform, to the categories of anonymity discussed above. Traceability is a constituent part of pseudonymity, which itself is an element of anonymity.

We can regard traceability of personal data in terms of three levels (Figure 4): (Lvl.1) data disclosed to an escrow agent or similar, (Lvl.2) data disclosed to the users themselves, and (Lvl.3) data disclosed to other entities as well. At the lowest level, other entities, such as other users are not able to trace a person's history. Only the authorized escrow agent has control of the information. At the second level, the users themselves are able to trace their own history. At the third level, any participants on the same platform are able to identify other users and their communication behavior. In the following study, we still treat Lvl.2 as "anonymous" communication but regard Lvl.3 as "traceable" communication.
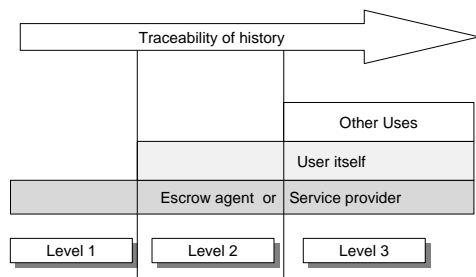
Figure 4. Traceability and anonymity level

B. Research Hypothesis

The objective of this study is to examine differences between anonymous (Lvl.2) and traceable (Lvl.3) types of communication.

H1: Anonymous communication attracts more participation than traceable communication.

H2: Traceable communication is more accurate and accountable than anonymous communication .

H3: Anonymous communication includes more personal questions than traceable communication .

V. STUDY ON KNOWLEDGE SEARCH

A. "Yahoo! Chiebukuro" Knowledge search

We chose knowledge search as an online service that supports RAQ.

"Yahoo! Chiebukuro "(Yahoo! knowledge search: http://chiebukuro.yahoo.co.jp/) is a part of services Yahoo! Japan provides the user with. A similar service is available in the U.S. as "Yahoo! Answers". Yahoo! Chiebukuro ran from April 2004 as a beta version until October 31, 2005. The current version of services was initialized one week later.

"Yahoo! Chiebukuro" has a BBS-like Q and A exchange system. A user posts a question once, then other participants post answers to it, limited to one answer per user. The questioner finally selects one "Best Answer", which closes this particular Q and A thread (Figure5). Readers can evaluate answers as useful answers or violations.
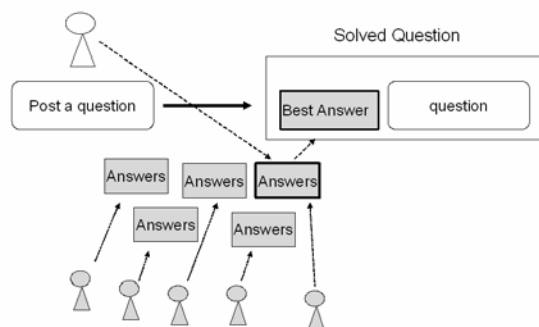

Figure 5. Procedure of Yahoo! Chiebukuro
(Knowledge Search)

The biggest difference between the beta and current version is the treatment of user IDs. The beta version allowed anonymous postings, completely hiding ID or nickname, though users had to login to their usual Yahoo! accounts. Users were able to choose whether or not to disclose their nickname or hide it. The history of posted questions and answers was open to the public but limited to traceable postings. However, in the current version, users must use sustainable nicknames, which are not always the same as their Yahoo! ID. Also, the history of all postings is open to the public.

Both anonymous and traceable postings got points when questioning, answering, and being selected as the Best Answer, while violent postings were penalized. The score only contributed to a ranking, but was not exchangeable for any other awards.

TABLE II.
BETA VERSION AND CURRENT VERSION

	Chiebukuro Beta	Chiebukuro
ID shown to others	Nickname or anonymous	Nickname
History	Traceable or hidden	Traceable
Incentive	Add points	Add points
Questions per day	12,560(2004.12)	8,000(2005.5)

There are another two major Q and A services in Japan, "OshieteGoo!"(provided by NTT Resonant) and "Hatena" (provided by Hatena: http://www.hatena.ne.jp/).Both services require registered IDs and users must show their nickname in the process of questioning and answering. In this study, we selected "Yahoo! Chiebukuro" for a comparison of anonymous and traceable communications.

B. Example of non-conforming case:"de facto"marriage

We chose "*de facto* marriage" as an example of non-conforming cases. According to Japanese civil law, married couples must choose one surname, and 98% of all couples take the husband's name. Though the number of women who want to keep her maiden name as their working name is increasing, there is no law to authorize a maiden name as the official one. Some couples are trying to keep their respective surnames under the current restrictive legal system in one of two ways; retain the woman's maiden name as the name by which she is known at her work place, or choose de facto marriage, which allows some of the same benefits with regard to social services[15].

In conservative, non-urban areas notations of de facto applications will be rejected by the administrative clerk. Applicants may not have friends to ask for advice, either. Even if the local government has local community web pages, they will not cover such an irregular and "anti-traditional" case.

We assumed that online mutual aid would contribute advice, knowledge and precedents to such kinds of issues. As we reviewed network theory and adopted "structural holes" [10] architecture to describe anonymity, we assumed that it would be difficult for

the applicant to consult his or her neighbors in a dense human network because dense networks limit the range of variety of information and also because the applicant would feel afraid of being estranged.

C. Study

To compare anonymous with traceable communications, we analyzed logs of Yahoo! Chiebukuro in both the beta and the current version. We tested for three keywords: "*de facto* marriage", "separate surnames", and "cohabit". In civil law in Japan, *de facto* marriage and cohabit are almost equally treated. *De facto* is the newer term.

We collected pairs of question and best answer (Table3), excluding gossip articles.

Period of data collection:

Beta version: 12/2004 - 2/2005 (3 months)

Current version: 12/2005-2/2005 (3 months)

TABLE III.
NUMBER OF Q AND A PAIRS

	De facto marriage	Separate surnames	cohabit
Beta (anonymous)	24	19	39
Current (traceable)	21	19	19

VI. RESULT AND DISCUSSION

A. Participation

To test H1, we compared the number of comments and pairs of Q and A, both anonymous and traceable. (Figure 6).The difference in the means of number of comments, i.e. comments on "*de facto* marriage," indicates significantly higher participation in the anonymous beta version than in the traceable current version (0.05 *t*-test with *P*=0.03). Also comments for "cohabit" show the same tendency (0.05 t-test with *P*=0.06) [1] . Only "separate surname" shows no difference between anonymous and traceable participation.

As for the number of Q and A pairs, in "cohabit", anonymous communication shows significantly more values. There is no significant difference with regard to "de facto marriage" and "separate surnames.".
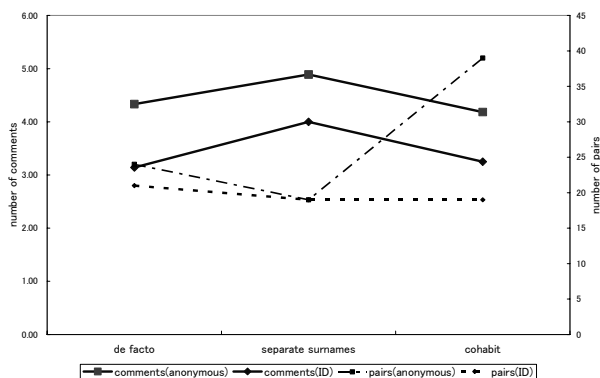

Figure 6. Number of comments and Q&A pairs

B. Accuracy, accountability

To test H2, we analyzed accuracy and time required for the "Best Answer (Figure7).

In "cohabit", traceable answers show significant accuracy (0.05 t-test with *P*=0.02) while in "*de facto*" and "separate surnames" there are no significant differences.

As for required time for the "Best Answers", either question shows no significant difference between traceable and anonymous answers. Stated as absolute values, anonymous interaction on "separate surnames" shows the shortest mean time (4hours 11min), while traceable interaction on "*de facto* marriage" shows the longest mean time (10hours 19min).
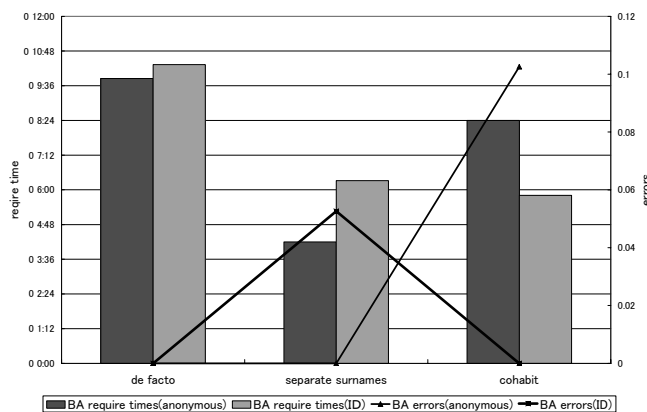

Figure 7. Required times for BA and ratio of errors

C. Self-disclosure

To test H3, we compared the description and expression of questions and answers, both anonymous and traceable. Anonymous descriptions in every word show tendency to disclose specific situations while traceable descriptions ask for general and abstract answers.

In traceable condition, questions of "de facto marriage", they post questions as "What is the difference between …?" , "What is the definition of de facto?" and so on. Meanwhile, in anonymous condition, questions are "My father is opposed to our marriage… ", "Is it better to register our marriage?"

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[1] Significant at .10 level

and so on. The meaning of latter questions of each is almost equal, but expression is different. There is the same tendency also in "separate surnames" and "cohabit".

VII. CONCLUSION

The purpose of our study of knowledge search service was to determine the differences between anonymous and traceable, or user-identifiable interaction. From a quantitative point of view, there is tendency for anonymous communications to involve more participants. The accuracy of answers is not significantly different, which is unexpected. From a qualitative view, more personal cases are disclosed in anonymous interaction than in traceable interaction.

The finding of our study is that accountability of mutual aid is guaranteed not only on the traceable but also on the anonymous, pseudonym-based RAQ platform. As for "Yahoo! Chiebukuro", a scoring and evaluation system is provided for both anonymous and traceable
ID users.

Our classification by traceability, Lvl.2, allows users themselves to track histories and evaluations such as scores. Accordingly, accumulation of personal history would assure accountability even though users cannot get linked to real identities. This finding will contribute to design more effective RAQ platforms and make better use of pseudonymity which would support both traceability and self disclosure.

Our study is limited in several ways. Only small numbers of Q and A pairs were included and we explored only data relating to the "marriage and surname" case. Analyses of other issues with their own special characteristics are needed to support the validity of our findings.

ACKNOWLEDGMENT

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