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ABSTRACT

This study attempts to investigate socio-technical gaps in online collaborative consumption (OCC) in order to improve its user experience, and interaction design requirements. A new combined methodological framework, "predictive ethnography", is proposed to evaluate OCC. Due to its features as a community where OCC takes place, Etsy is the focus of this study. The results from this study, suggest that the sociability issues have more significance in this community compared to the usability problems. The most significant socio-technical gaps concerned Trust creation features such as customers' reviews and rating systems, Relevant rules of behaviour, Clear displayed policies, and Social presence tools.

Categories and Subject Descriptors

H.5.2 [**User Interfaces**]: Evaluation/methodology.

General Terms

Design, Experimentation, Human Factors.

Keywords

Online collaborative consumption (OCC), socio-technical gaps, predictive ethnography.

1. INTRODUCTION

Online social interactions are evolving and affecting many aspects of our lives. This evolution might be one of the most exciting experiences of our era, where individuals share content, experiences, ideas, and expertise and contribute to the collective power. However, constant changes in social activities and interactions lead to gaps between users' requirements and existing technological capabilities. This study attempts to investigate these gaps in the social activities of online collaborative consumption (OCC) in order to improve user experience, and the quality of design requirements from a socio-technical perspective.

OCC activities are computer mediated interactions among people that facilitate sharing, swapping, trading, or renting products, services and resources. They transform consumption habits by using fewer materials in more efficient ways enabling access to products and services over ownership. Automobiles, home, and tool sharing for example, provide access to materials for people who do not own them. OCC reveals the value hidden in our resources and in skills we have developed. It allows us to share and trade them, and in some cases, to make money from them. OCC inspires open collaborative projects such as open software and Wikipedia by distributing tasks between individuals to solve a problem that serves the need of individuals and, at the same time, provides a sense of belonging to the community. OCC is part of a new economy based on community-oriented activities with the aid of internet technology that combine global intellectual collaboration with local production. As an instance of OCC, this study focuses on Etsy, an established online marketplace and community dedicated to trading handmade and vintage craft items. The Etsy community enables members to actively support each other to create alternatives to mass produced objects. It focuses on connecting buyers and sellers in a meaningful way [1].

A new combined methodological framework that we call "predictive ethnography" is proposed to evaluate Etsy. In this framework, online ethnography complements predictive evaluation with the aid of heuristics that serve as metrics to investigate the issues in the Etsy community. These heuristics identified in previous research as success factors for online communities include sociability, usability, and user experience items.

The first section of this paper covers a discussion of the literature on OCC, Etsy and socio-technical gaps preceded by a description of the methodological framework. Then the heuristics are presented, followed by the methodological procedure and the presentation of frequencies of identified heuristics. The final sections of the paper are comprised of discussion of findings and conclusions.

2. ONLINE COLLABORATIVE CONSUMPTION

There are various definitions for the term "collaborative consumption". It was first used by Felson and Speath [2]. They defined it as "events in which one or more persons consume economic goods or services in the process of engaging in joint activities with one or more others" [p. 614]. This incredibly broad definition that includes diverse activities such as drinking beer

with friends, speaking on the telephone and even watching a football game in a group recently became narrower. In a more focused definition, Botsman and Rogers [3] describe collaborative consumption as activities that combine and shape groups to find something or someone to create many-to-many interactions including *product service systems, redistribution markets, and collaborative lifestyles* [p. xvi]. Collaborative consumption and sharing economy often overlap and have very similar definitions. "Sharing economy is an economic model based on sharing underutilized assets from spaces to skills to stuff for monetary or non-monetary benefits" [4]. For example, ride sharing platforms such as Lyft. John [5] considers collaborative consumption a subset of the sharing economy. Belk [6], however, considers collaborative consumption "a middle ground between sharing and marketplace exchange, with elements of both". He pointed to activities wherein "people [are] coordinating the acquisition and distribution of a resource for a fee or other compensation" [p. 1597]. This definition includes bartering, trading, and swapping, but excludes non-monetary sharing activities such as CouchSurfing. Although, both collaborative consumption and sharing economy have so much in common, it needs to be noted that collaborative consumption often involves transfer of ownership; that does not occur in sharing economy.

Collaborative consumption and sharing activities have always played an active role in our lives as people have traditionally shared, bartered, swapped, lent and rented their resources. Within last two decades Internet technologies and Web 2.0 in particular, started to enhance collaborative consumption practices and created new ones by providing effective instant sharing and communication platforms. Web 2.0 allows users to contribute content in many online venues, and to connect with others [7].

OCC is driven by two core values. First, the rise of communities' dynamics as an essential factor in doing business. Communities empower productive human relationships and increase social capital through communication networks and in particular the Internet [8]. Second, online technologies enable the collective production of value and intellectual property.

OCC has the potential to provide a new sustainable collaborative economy whose key indicators are: "localisation, reducing ecological footprints, community building, collective action and creating new socio-economic institutions" [9]. OCC is a rapidly growing phenomenon in varied domains such as: transportation (Lyft and Uber), products and goods (Etsy and Ebay), space (Airnnb and Sharedesk), money (Zopa and Kickstarter), services (Taskrabbit and Odesk), food (Eatmeal and Meal sharing), education (Coursera and Udemy), and many more. These companies use different models to utilize resources to work, create value and to accomplish economic activities, and/or to foster local connections and communities. While many of these firms creating more equal, sustainable, and socially cohesive activities, in some cases, as they become established, they could behave similar to conventional capitalist companies. For example, Zipcar started by focusing on carbon footprint reduction. Nonetheless, some of its later activities such as, partnership with Ford Motor Company to offer sport utility vehicles and putting cars on college campuses, where cars were not common before, could increase the car usage. On the other hand, many other firms withstand their sustainability goals particularly where their products or services are low-impact like Etsy [10].

3. ETSY: CASE STUDY DATA GATHERING PLATFORM

Etsy is a large, established online marketplace and community that connects buyers and independent craftspeople for buying and selling handmade and vintage craft items, as well as arts and crafts supplies. Etsy, enables individuals to communicate with and trust each other so they can do business. Buyers come to Etsy to find unique things from real people. They want to know the story behind what they are buying and from whom they are buying. Etsy's community features include Teams, Forums, offline events, and online workshops. Etsy is a diverse and growing community with 30 million members in 200 countries [11]. In this study, data was gathered from Forums and Teams, which are active communities where members share information about running a business, learning new skills, obtaining advice from other members, and discussing their problems.

4. SOCIO-TECHNICAL GAPS

Socio-technical gaps have been defined by Ackerman as, "The divide between what we know we must support socially and what we can support technically" [12]. These gaps are the main challenge for socio-technical systems. Given that technology and social activities are two main pillars of OCC, this study applies a socio-technical approach as a framework to understand interaction between humans, technology and the environmental elements of the work system.

Organizations have a tendency to emphasise solely on technological factors in knowledge management systems; therefore, ignoring the users' behaviour occurring in the social factor of the system might cause a serious failure in the systems [13]. In addition, often system designers tend to detect human, social and organisational issues as problems of the Human computer interaction (HCI). As a result they disregard the relationship between interaction of individuals and the social organisation of work, and above all how the latter can impact the former [14]. The socio-technical approach provides a vision to consider and investigate both social and technological factors affecting design, and their capabilities to support each other.

5. METHODOLOGY

Standard usability evaluation methods evaluate users' performance in specified tasks in a controlled context. They are not convenient for evaluating online communities which are much more than ordinary websites. Online communities allow users not only to consume information but also to contribute to the content and to build durable human relations. Therefore, a holistic approach is needed to focus on social components to assess purpose, protocols, and codes of behaviour, in addition to usability and user experience to evaluate the ease of use and user satisfaction. A new combined methodological framework is proposed in this paper to evaluate OCC. Ethnography is combined with predictive evaluation through heuristics, which include sociability, usability and user experience (UX) items drawn from previous research.

5.1 Predictive Ethnography

Ethnography and qualitative research methods are recommended by Preece et al. [15] as suitable approaches for studying social interaction and sociability. This approach enables us to study the users' behaviour within their context and to better understand the culture of online community. However, while ethnography

provides valuable insights regarding the evaluation of system design, it is less effective when it comes to concrete design solutions and recommendations [16]. Consequently, complementing ethnography with other methods could increase its strength and reliability, particularly in HCI and qualitative research methods. In this study, we complement ethnography with predictive evaluation.

Predictive evaluation makes use of heuristics to predict usability problems [17]. These heuristics are useful guidelines in eliciting the usability issues. However, they are not always accurate in testing interactive interfaces such as those in online communities. Like other methods, they need to be customized specifically for evaluating sociability [18]. Predictive evaluation has been criticized regarding the validity of the data since evaluators are substitute users. It does not involve real users in the testing [19].

This study intends to propose a new way of using these heuristics by accompanying them with online ethnography, what we call predictive ethnography. These heuristics will be used as the baseline to enable the ethnography to predict the success of an online community. Ethnography and predictive evaluation complement each other and improve each other's effectiveness and efficiency. The heuristics could provide structure to the ethnography and help the ethnographer in predicting the issues.

They can help to translate ethnographic insights into design recommendations and requirements. These heuristics have been identified as success factors in previous research (Table 1). In this study of OCC, these heuristics serve as guidelines to investigate and predict the issues related to the success of Etsy community.

5.2 Heuristics as Success Factors

Etsy can be considered as an interest, trade, and transaction community, since people with similar interests are engaged in trade and transactions in addition to knowledge exchange. The success of collaborative communities depends on a number of interdependent constructs within social and technological domains. These constructs consist of a number of heuristic items. These heuristics include sociability, usability, and user experience items drawn from previous research and can be seen in Table 1.

Table 1. Heuristics *(S: Sociability/ U: Usability)*

Constructs	Items	Sources
Social relationship	**S1:** Network creation (e.g. individuals with similar interest)	[20]; [21]
	S2: Face to face communication (e.g. offline meetings & events)	[22]; [23]
	S3: Dynamic interaction (e.g. verbal, gestural & emoticons)	[15]
	S4: Social & emotional support	[24]
Reciprocity	**S5:** Information exchange	[25]
	S6: New product & innovation	[25]
	S7: Achieving a collective goal (knowledge creation/ problem solving)	[26]
Trust (Privacy & Identity)	**S8:** Different level of anonymity (limit of privacy)	[27]
	S9: Persistent identity	[28]
	S10: Members profiles and pictures (creativity in self- presentation & identity construction)	[29]; [30]
	S11: Transparency (e.g. exposing identity of content providers)	[27]
	S12: Clear establishing of self-goals for the community	[27]
	S13: Trust creation features (e.g. reputation model)	[31]
Content creation / member contribution	**S14:** Social recognition & self-expression	[32]; [33]
	S15: Fast & informal interaction (commenting & rating contents)	[33]
	S16: Rewards & recognition for contribution	[32]
	S17: Feedback to motivate (public& private)	[32]
	S18: Volunteerism	[20]
	S19: Self-satisfaction	[34]
Purpose, policies & procedures	**S20:** Relevant rules of behaviour & clear displayed policies	[15]
	S21: Different members' roles (e.g. contributor and reader)	[35]
	S22: Suitability & functionality of content	[21]
Information design & presentation	**SU23:** Advanced & filter search for content	[18]
	SU24: Easy information obtaining	[36]
	SU25: Discussion board organization	[15]

	SU26: Subgroup formation (facilitate interaction & discussion in different subtopics)	[37]; [20]
technology Support	**SU27:** Awareness tools (e.g. calendaring tool for meeting)	Preliminary Ethnography
	SU28: Social presence tools(e.g. status info, camera connection, IM, graphical presentation of activity & avatar)	[33]
	SU29: Other tools (chat, mailing list, UseNet news, etc.)	[38]
Navigation	**U30:** Consistent & easy navigation	[15]; [17]
	U31: Intuitive layout	
	U32: Visibility of site (what is going on in the site…)	
User control	**U33:** Feeling in charge of system	[15]; [17]
	U34: Error prevention & correction	
Reliability	**U35:** Access to system always to be available	[39]
	U36: Easy to remember search sequence	[40]; [35]

5.3 Procedure

A Preliminary ethnography carried out in parallel to the selection of the heuristics. This preliminary work helped to understand the culture, norms, and behaviours of Etsy community members, and assisted in the selection of the relevant heuristics (success factors) from previous literature. (Table 1).

The finalized heuristics helped in predicting, collecting, and coding the relevant textual interactions related to the success of Etsy from the Forum and Teams discussions. The textual discussions happen in "Threads" as topics, and the smallest unit of discussion considered as "Post". We looked for the community support for the heuristics and new possible heuristic items. The coding process started by creating nodes using Nvivo software. Each node represents one item from heuristics. Once all the nodes have been created, each "post" has been coded to a heuristic (node).

The data collection has been carried out within three weeks in February and March 2015. In total, 1011 Posts have been collected and coded from 97 Threads. These posts have been selected based on their relevance to the heuristics.

6. DISCUSSION OF FINDINGS

The results demonstrated that the coded data are within scope of 21 items, out of 36. Three new items *(SU25: Convo organization, U35: Update Users with new Policy & Design changes & U36: Easy customer feedback)* have been identified and added to the heuristics. These results revealed that the socio-technical gaps for this community are associated with these 21 heuristics. The frequency of identified heuristics demonstrate their level of importance, since the members of the community discuss and raise issues that are more important for them. (Figure 1.)

These results show that sociability has been discussed more compared to usability issues. This finding is in line with Hart et al. [41] study on Facebook, in which they found that users are less concerned about the bad usability of the system when there are enjoyable aspects that compensate the usability inadequacies. Additional observation on collected data focused on how the lack of enough support for these heuristics create socio-technical gaps.

The identified gaps come as follow.

Trust

Trust creation features: feedbacks and rating system are very significant for increasing trust and reputation in using virtual environments and have been one of the most frequently discussed issues in this community.

Sellers' feedback: Etsy community enable the customers to write feedback for the sellers but they cannot write feedback for the customers. Our observation revealed that many of the community members wants to have this feature as well.

Negative feedback: often the sellers want to be able to somehow remove the negative feedbacks, however there are a mixed opinion among members regarding this issue. The other problem discovered was that the reviews in Etsy are considered for the entire shop rather than for item or order. *Items' review:* many Etsy members believe that reviews should be on quality of items rather than having so much power over a shop reputation.

Cultural differences in rating system: despite the fact that the rating system is extremely significant for the Etsy sellers, this sensitivity might vary in different cultures. For example, an Etsy member from Holland remarks that: *"I learned that in the US it is normal to give 5 stars if you are happy. In Holland I think that people use 4.5 or 4 also as a satisfied number to give. 4 is also good they think, it is a culture difference".*

*Digital products feedback: g*iving feedback for the digital products also create some concerns. The product review in this community is designed for the ordinary (non-digital) products that take some time for delivery. The feedback form is sent to buyers after a period of time but the digital products deliveries are instant and require different options for providing feedback.

Non-admin login: sometimes members have difficulties to manage and do all the admin work of their shops and they need to hire someone to do it for them. Since they do not want to give access to all of their account, they would rather give a partial access, such as Non-admin login, which is missing in this community.
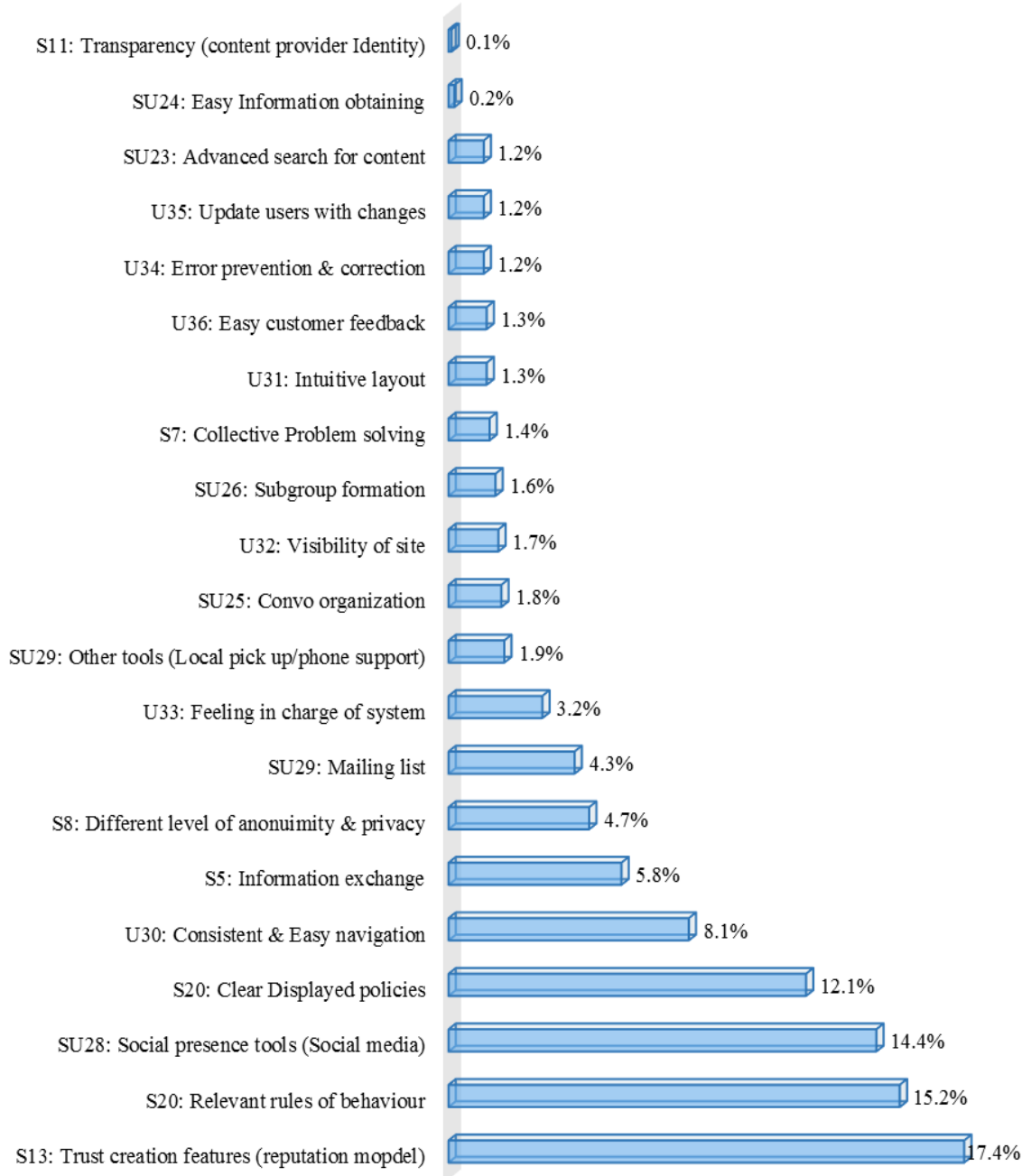
Figure 1. Frequency of identified heuristics

Guest checkout: enables the people who are not member of the community to buy items without registering and becoming member. Our observation revealed that this feature is lacking in Etsy and several members requested this option.

Sellers' contact number: the other issue regarding the limitations of privacy is finding the sellers' contact number online by the buyers and contacting them by the phone. There is a mixed opinion between members; although some sellers prefer to be contacted by the buyers, others don't like to be contacted on certain hours since they do business from their home. One solution used by some Etsy members is the "google voice account". It provides a separate business number that could be used in their same phone and the business calls could be accepted in certain hours.

Purpose, policies & procedures

Relevant rules of behaviour & clear displayed policies: are the most discussed and important topics in this community that affects all aspects of members' collaboration and behaviours. *Lack of clarity in policies and guidelines:* in this community created several concerns and confusions over how the rules are working. Often confusion was created by language and words that were difficult to understand. They also request to have detailed and in depth policies.

Copyright: our observation revealed that considering the nature of this community that is related to art and handcraft "Copyright" is one of the main concerns. This issue cause concern in virtual environments where the boundary of copying and inspiration is not clear and individuals can be inspired and get new ideas from others' design and products. It has been revealed that there are mixed opinions among members regarding this issue. Therefore, there is a need for relevant rules of behaviour regarding how to define the copyright policies in these communities. Copying photos and product descriptions from others also created concerns in this community. Watermarking the photos could be a possible solution for protecting the photos' copyright. Some members are asking for better solution such as a feature to be designed by Etsy to detect and prohibit the copyright violated contents.

Lack of return policy: our observation also exposed that Etsy community users often encounter problems due to lack of return policy when people buy products. For example, one member was asking: *"I wish Etsy make a compulsory tick box"*, other members suggested to comply with *"Distance selling regulatory"* law in the UK, since they were based in the UK. However since these online communities go beyond the geographical borders and the local laws and regulatory between countries might differ; there is a need for a standard policy for these communities.

Technology support

Social Media: are very effective tools that help individuals to have a better online social presence and to promote themselves. But it has been revealed that due to a large number of them (e.g. Instagram, Facebook, Pinterest, etc.) they became very time consuming and unmanageable. Often individuals have to get a third party program to manage them. The collective discussion observed suggested to: *"master 1 or 2 (which are the best for you), keep it simple, not use same content in all, don't obsess, use 3rd party program"*. The other effective promotion tool is the video commercial. *Supporting YouTube links* enable members to have video promotion, which is absent in Etsy.

Spam: is one of the most common issues in the virtual environments that also create several concerns in Etsy. For example, shop owners want to promote their products and sometimes ask for feedback by sending emails to their customers. However, many people don't like to receive these emails and they could cause frustration. A solution for this problem could be a *Newsletter* for product updates and *mailing list* asking the customers to sign in to receive emails.

Support for digital products: our observation revealed that as digital products (e.g. photos, post cards, etc.) becoming more and more popular, they require different supports compared to other products. For example, they were causing problems such as printing layout and delivery confirmation. Therefore, there is a need for a standard format for printing these products as well as online delivery confirmation. Moreover, as mentioned earlier, they require a different timing for feedback.

Local pick up: it has been noticed that this option was required for items, which are not suitable for shipping and should be collected by person.

Reciprocity

Bad advice is among the main issues in virtual communities. Bad or wrong advices come from the lack of expertise of members and they could be very costly since individuals take and apply these advices. One solution for this problem could be rating the expertise of the individuals in specific fields and to reveal who knows what. Another possible solution could be rating the comments and advices by users to reveal their usefulness. The other issue discovered in this community was related to written communication problem. Several members have problem of understanding the technical explanations as well as knowing the right words to ask their questions.

Scam awareness: scam is a common concern particularly in virtual environments. Our observation revealed that due to the active and collaborative nature of this community, as soon as someone raises a concern about a suspicious case they collectively solved the problem and detected that. However, there is a lack of a specific space and systematic awareness for these issues.

Reliability

Updating users with new policy & design changes: as observed in this community, when changes happen they create panic and frustration between members. In many occasions the members were not sure when the policy changes start and how they work. The design changes without earlier notice also created panic as members were thinking there is something wrong with their pages. Therefore it is vital to have the policies as clear as possible and help the members in better understanding them. It is also important to update the members about these changes.

Easy customer feedback: Etsy requires a minimum number of words for giving feedback and a simple "thank you" does not work, this create frustration and customers could leave without giving a feedback. However, as some members suggest repeating the words or putting few dots could work, but having this restriction does not make the job easier.

Navigation/ Information design & presentation

Convo organization: the visibility help members to understand what is going on in the page and what features are available to facilitate them. This usability issue has been observed in several instances in the community. This issue also could create navigation problems. The most significance visibility problem observed was related to the "Convo system" that is the messaging

system in this community. In "Convo" inbox all the messages are not shown until the invisible "All" option clicked. This issue cost many members losing their messages and buyers and contacts as a result. There is also lack of visibility in sent messages option.

<u>User control</u>

Disabling Review reminder: if buyers do not want to write a review on a purchase the review reminder appears every time they go to their page until about 45 days after the purchase date and there is no option to disable it. Our observation revealed that despite causing the frustration in buyers, there are mixed opinions among members whether to have this option or not. Other problems have been noticed such as, lack of option to turn off some notifications and announcements.

Turning off promoted listing: promoted listing is a service in Etsy that cost members money. It has been revealed that stopping this service and turning it off is confusing and costs a lot of money for some members.

7. CONCLUSIONS

The results from this study suggest that the sociability issues have more significance in this community, since they have been discussed more compared to the usability problems. The most important gaps concerned *Trust creation features* such as customers' reviews and rating systems, *Relevant rules of behaviour, Clear displayed policies*, and S*ocial presence tools*. Several studies verify that trust, one of the main findings of this study, as the most important factor in OCC and sharing economy [3, 10, 42]. Relevant rules of behaviour and Clear displayed policies, other major gaps in our findings, point to regulations, which have also been considered as challenges [43] and the most important barriers to the future of sharing economy [44]. This finding demonstrates that, conventional regulations and policies are not always applicable to the new business models enabled by OCC. It also reveals the significance of well-defined and clear rules of behaviour that are relevant to the purpose of the online communities.

These results suggest that the new proposed methodology, predictive ethnography, is practical and effective in evaluating OCC communities such as Etsy. Ethnography enabled us to better understand the culture of the community by studying users within their context. The holistic nature of this approach allowed us to comprehend how issues are developed and uttered within the community. In data collection stage, the heuristics acted as guidelines and helped us in selection of the relevant discussions associated to the success of community. Coding the collected posts to associated heuristics enabled us to categorize systematically our data and to quantify the importance of different social and technical requirements in scope of the heuristics. The heuristics also gave a better structure in exposing the socio-technical gaps and assisted us to convert the ethnographic insights into design requirements and recommendations. The findings of this study, include problems, solutions and recommendations,

which mostly come from the naturally occurring conversations of real users, increase the validity of the results.

This study visualised and augmented socio-technical gaps in Etsy in terms of 21 heuristics. It also identified a number of new heuristics as success factors not discussed in the literature until now *(Messaging system organization, Update users with new Policy & Design changes, Awareness tools such as calendaring for meetings, and Easy customer feedback).* All of these heuristics could be useful in evaluating the online communities similar to Etsy. While the revealed socio-technical gaps in this study are specific for Etsy, they could be valuable in defining quality socio-technical requirements and enhancing the design of similar OCC platforms.

In further research, we intend to investigate social capital formation within Etsy community. This could complement our findings and help us to reveal collaboration patterns and social requirements in OCC.

Future research could be conducted to evaluate other online communities by applying the predictive ethnography approach. It would be interesting to see how the issues and gaps vary; and which success factors are more common within different online communities.

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