Turk-Life in India

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ABSTRACT
Previous studies on Amazon Mechanical Turk (AMT), the most well-known marketplace for microtasks, show that the largest population of workers on AMT is U.S. based, while the second largest is based in India. In this paper, we present insights from an ethnographic study conducted in India to introduce some of these workers or 'Turkers' – who they are, how they work and what turking means to them. We examine the work they do to maintain their reputations and their work-life balance. In doing this, we illustrate how AMT's design practically impacts on turk-work. Understanding the 'lived work' of crowdwork is a valuable first step for technology design.

Categories and Subject Descriptors
H.5.3 Group and Organizational Interfaces – Computer Supported Cooperative Work

General Terms
Human Factors

Keywords
Crowdsourcing, crowdworkers, Amazon Mechanical Turk (AMT), Turkers, requesters, ethnography, relationship-based crowdsourcing

1. INTRODUCTION
Crowdsourcing, the practice of using a potentially large, anonymous and undefined body of workers to carry out tasks, covers a wide set of activities and relationships. An original idea was that crowdsourcing would enable, *"everyday people [to use] their spare cycles to create content, solve problems, even do corporate R&D"* [9].

The most popular crowdsourcing platform is currently Amazon Mechanical Turk (AMT), and it is primarily used for microtasks that typically take a matter of minutes and are paid in cents. AMT is, in effect, a labour marketplace where interactions between requesters (employers) and providers (Turkers) are mediated through the AMT platform. Both researchers and journalists have been intrigued by this new form of work and have endeavoured to understand how AMT functions, what it is used for and by whom. Since the marketplace is wholly technologically mediated, the design of the platform impacts the marketplace in numerous ways, including: how tasks are created and managed; what types of tasks are available; how workers find and access tasks; and the relationships between requesters and providers. The circumscribed nature of requester-provider relationships in AMT has been found to be problematic for providers [5,13,32]. AMT is something of a 'black box.' That is, while Amazon does publish their terms and conditions, little information is released about how these policies are specifically realised. Furthermore, the decision making process is not transparent and there are no public processes for dealing with complaints or grievances. One of the themes of this paper is how this lack of information practically impacts the working lives of the Indian Turkers in our study.

AMT has remained relatively unchanged since its initial public launch in November 2005, and as a crowdsourcing platform it raises various concerns [6]. From the requesters' perspective it does not provide adequate functionality for many tasks [25] and from the Turkers' perspective it has multiple disadvantages, even while providing a valued source of income. This is an area ripe for technology design and understanding the lived work of crowdwork can help design better systems [3,4,27].

Turkers themselves are mostly concentrated in the USA and India [12,13,14] primarily because AMT pays in money in these regions, as opposed to Amazon vouchers used elsewhere. Until now there have been few qualitative analyses of Turkers [23,31,32] and to our knowledge no observational studies of the lived work of turking. In this paper, we describe the findings of, what we believe to be, the first ethnographic study of Indian Turkers. We describe how the conditions of working in India (e.g. culture, education, infrastructure, cost of living, and time difference with the US) impact practically on day-to-day turking. This is valuable, since crowdsourcing has the potential to bring more work to emerging markets. While the particulars of these conditions will certainly vary from market to market, it is likely that roughly the same set of features will come into play.

In elaborating this rich picture of turking in India, we reflect on a number of themes in the crowdsourcing literature. One is fundamental to the original idea of crowdsourcing, that is, as a way to fill spare cycles with profitable activity. The second, is Turking as fun as opposed to work [16]. The third is more fundamental to AMT, rather than crowdsourcing in general –

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information deficit and asymmetry, or the ways in which the AMT marketplace operates as a black box.

2. RELATED WORK

In this section, we describe the body of crowdsourcing research, to which this paper contributes. The majority of which focuses on Amazon Mechanical Turk, partly because this is one of the most widely used platforms and partly because it is easy to access.

By far the greatest body of research on AMT takes the perspective of the requesters [18,20,22]. In contrast, this paper adds to the growing body of research that seeks to understand the crowdworkers themselves. A deep understanding of the work of crowdwork is important ethically and socio-organisationally, since questions have been raised about the ethics of current crowdsourcing practices [1,31,32]. Silberman, Irani and colleagues used various methods (e.g. holding discussions on turk-related forums, interviews on Skype) to create a 'Turker's Bill of Rights' [31]. This bill of rights pointed to some of the issues faced by Turkers, primarily, unfair rejection of work, uncertain or slow payment, low wages, and lack of proper communication with requesters and AMT [31,32]. Understanding crowdwork is also important practically. In the field of HCI and cooperative work it has long been acknowledged that a deep understanding of how work is actually done can help designers and software engineers who are developing tools to support that work [3,4,10,11,33]. An exemplar study on the design of platforms is the study of low-income workers in India, which explored the barriers preventing such workers working on crowdsourcing platforms [17]. Such barriers included understanding the *intent* of the tasks, complex instructions and user interface, issues with navigation and sequencing of tasks, and the difference in cultures. Based on these findings, Khanna et al., designed and tested an interface with improved instructions, video tutorials and language localization; which produced a significant increase in the quality of work of the workers [17].

Survey-based demographic studies [12,13,29] show that Indian workers form the second largest population on AMT (36%) with an average age of around 26-28 years old, mostly male, and with significantly small annual incomes. In terms of education, 41% of the Indian Turkers had Bachelor degrees and 18% had Graduate degrees. Indian Turkers on average earned a pay of $1.58/hour on AMT, as opposed to $2.30/hour on average for US Turkers as of Nov. 2009 [29]. Over 50% of the Indian Turkers reported earning an annual income of less than $10,000 [12,13]. Approximately 27% of Indian Turkers reported that they required AMT sometimes or always 'to make basic ends meet,' compared to around 14% of U.S. Turkers [29].

Martin et. al [23] analysed the publicly displayed posts of Turkers (primarily from the U.S) on the Turker Nation forum to understand their reasoning about work, community, and Turker-requester relationships. The highest earnings reported by the Turkers to each other were ~$15k per year, but this was extremely rare. Turkers used AMT both as a sole source of income, as well as a complementary income. Turkers oriented their expectations of pay around the minimum wage in the US. Turkers' biggest concerns were to find 'good requesters' and keep their approval ratings high. In later sections of this paper, we will examine some of the above-mentioned aspects of turking and the notion of 'invisible work[1]' [33] in relation to the Indian Turkers.

Beyond AMT, some crowdsourcing platforms take a more positive design approach. For example, platforms that provide microwork via mobile phones (e.g. TxtEagle[2] – now Jana), provide training for work (e.g. Samasource[3]), or simply a provide platform with a mission of 'doing meaningful work for a fair wage' (e.g. mobileworks[4]). These platforms try to provide opportunities within developing nations.

In a country like India, infrastructure plays a big role in the ability to do computer-based jobs. Some experiments have tested these waters. Gawade et al. [8] explored whether or not cybercafés could become informal centres of work, by providing employment through microtasks. They recruited cyber cafés in India and Kenya, where they deployed a crowdwork application. After the experiment they found that 99% of the participants wanted to continue working in the cybercafé. Similarly, eight of the nine participant café owners reported willingness to continue hosting such a setup. While the workers were relatively slow, they were skilled enough to earn acceptable wages in the range of $0.50-$1.75 per hour. This study showed that, when provided with decent infrastructure crowdwork can thrive in developing countries [8]. This finding was also validated by the 18-month long Kelsa+ project which showed that even low-income workers with limited literacy in English and computers, have the potential to develop these skills when provided access to resources, peer support and the freedom to learn at their own pace [28]. The research insights in this paper give further depth to this desire to *learn* and *work*.

3. SETTING AND METHOD

As stated our aim is to flesh out the details of crowdwork– what it consists of and how it is accomplished – and what it means to be a crowdworker. In this case, specifically what it is like to be an Indian crowdworker working on AMT. By its nature, crowdwork is highly distributed and the workers are typically anonymous, we therefore used a mixture of methods (observations, interviews and surveys) to access and understand the population.

Through business contacts we had access to an initial pool of 69 Turkers in India who had waived their anonymity by making direct contact with the business about previous crowdwork tasks that they had completed for that company. We emailed them asking if they would be interested in participating in a survey and or interview about their crowdwork experiences. The survey consisted of 25 questions and was designed to collect basic demographic information and details of their crowdworking. It was posted as a HIT on AMT, where participants had to contact the requester (the authors) to receive the survey link. On

[1] 'Invisible work' is a concept about perspectives on and understanding of work. It relates to the fact that some forms of work are poorly understood because many aspects of them are hidden from society at large and even employers. This can lead to troubles in getting it recognised, respected and remunerated.

[2] www.jana.com/

[3] samasource.org/

[4] www.mobileworks.com/

completing the survey (hosted on Bristol Online Surveys, a university survey tool), participants were given a completion code to enter into AMT to receive payment. Our idea was to use the survey as a means of collecting basic information but also as a route to getting access to doing more substantial qualitative, ethnographic work.

Beyond the surveys, we conducted open-ended semi-structured interviews through Skype, telephone and face-to-face, typically lasting between 40 – 75 minutes (and longer for in-person interviews). In the interviews, we asked participants about the various activities they undertook during crowdwork, their thoughts and experiences about AMT, requesters and other Turkers. Interviews gave us a more in-depth view of the turker's work life. For instance, we discussed interesting, memorable HITs and what made them so, challenges with turking based on skills, technology, information available, expectations from turking, AMT, requesters, thoughts on AMT as a system, the support network of people who helped them manage and organise their work and so on. Where relevant we asked them to demonstrate using various artefacts (screen captures, emails, AMT itself).

During the observations we visited participants in their respective workplaces (typically their homes, offices or hostels). We requested them to show us how they worked, how they dealt with challenges in the tasks, how they searched through various tasks available on AMT and to articulate what they were doing as they were doing it. We recorded these using audio-video recordings and screen captures where permitted and through extensive note-taking.

The participants were paid $2.50 for completing the survey HIT, $7.00 for an interview and $20.00 for an observation. Whilst we started our recruitment from the initial group of Turkers in India we had received from business contacts, this was expanded through word-of-mouth referrals and through other Turkers who contacted us after having seen the survey HIT on AMT. At the end of the data collection period, we had 78 survey responses, 32 virtual interviews, 3 in-person interviews, and 12 observations at 5 different locations. Participants who were interviewed and observed were subsets of those completing the survey and there was some overlap between them.

The aim of this paper is to provide an in-depth look at the work of crowdwork from the perspective of those doing that work and to make "*observable the social practices in and through which members produce and manage [that] work*" [4] (p8). We therefore focus primarily on the material from the interviews and observations. Our data has been analysed from a broadly ethnomethodological (EM) perspective [7] as this has been shown to be useful for producing a rich picture of the setting and informing the (re-)design of systems [3,10,27]. The findings and themes outlined here were emergent, that is, they came from the data itself. Within this article we focus on some of the key aspects of crowdwork in the everyday lives of the Turkers who made up our participants. We do not say that our population of Turkers is representative of all Turkers, or even of all Indian Turkers. However, the "typicality, general applicability, reliability and trustworthy character of EM findings is furnished in identifying the recurrent social practices in-and-through which members manage the contingent happenings which constitute setting's daily work *as a matter of course*" [4] (p8). We illustrate our findings with vignettes that capture common aspects of how work is managed, giving an idea of what unites and differentiates the activities and practices of our participants.

4. FINDINGS

We start with an introduction to our participants – who they are, where they turk, with whom, and what technologies they use. We then describe what crowdwork looks like from the workers' perspective, which is something that has not, to our knowledge, been given a detailed treatment. We describe how the black box nature of AMT impacts directly on how Turkers organize their work and how the burden of reputation management falls on individual Turkers. We examine the idea that turking can be fun and take a closer look at crowdwork as a way to make profit from spare cycles.

4.1 Introducing the Turkers

All of our participants used AMT regularly to find work, whether for a few hours a week or as full time job. Many of the Turkers we interviewed were students or recent graduates from privately owned government-affiliated colleges. We also came across housewives, househusbands, retirees, and people with full-time jobs elsewhere (including a dentist, software engineers, ex-call centre employees, and entrepreneurs). Over 50% of the people we surveyed, said they do crowdwork 'whenever I can find time', and around 25% said they do it 'after full-time work/school/college'. Our Turkers came from Tier 1 cities (or the metros Chennai, Bangalore, Delhi, etc.), Tier 2, Tier 3 cities[5] and even some suburban and rural settings. Their place of residence had a clear influence on their work in terms of infrastructure, resources, and exposure to English.

Some Turkers made a full-time living from AMT and others would have liked to have been able to. Nonetheless, many (although not all) of those with professional qualifications or technical expertise, e.g. in computer networking, software engineering, quality assurance, were either actively looking for more conventional jobs or were planning to move to platforms like Odesk where they could make use of their domain expertise. We examine some of the elements that affect turking below.

4.1.1 English and Computer Literacy

Whilst the range of education levels was wide, we found two factors of particular consequence for Turking; literacy in English and computers. The nature of the work on AMT (primarily serving businesses in the US and English speaking world) means that all of our Turkers had at least some level of literacy in English. Computer literacy includes literacy in the use of digital devices like computers, mobile phones and smartphones as well as software applications, web search and other internet applications.

Unsurprisingly, computer literacy typically arises from access to and regular use of computers. For example, the participants that

[5] A classification system used by The Government of India for cities/towns 'X, Y and Z', more commonly known as Tier-I, II, III, on the basis of their population. A list of these cities can be found here: http://www.cag.gov.in/html/Allowances.pdf Areas not covered by this structure fall under villages and towns classification as found in Govt. of India's Census 2011's directory of town and villages. http://censusindia.gov.in/2011census/censusdata2k11.aspx

were students or graduates of Computer Science or IT in our sample had a much higher level of computer literacy than students in other disciplines, including engineering disciplines such as aeronautical engineering, who did not have regular access to computers in college. Computer literacy itself impacts turking in various ways, ranging from typing speed and knowledge of keyboard shortcuts, to using scripts and widgets. For instance, plugins such as "Approval Time" (displays auto-approval time) and "Today's Projected Earnings" (calculates and displays expected earnings) save Turkers time and worry. To illustrate, Mansoor, a recent Computer Science graduate from Hyderabad, described how borrowing a friend's laptop while his was being fixed really slowed him down: "*In my own laptop I use Chrome and have installed many scripts [...] I am usually much faster and better on it."*

The level of English literacy of our participants depended, in part, on where they were living, as well as their socio-economic status. Exposure to the English language is much greater in the metros (large cities) compared to tier 3 cities, in both daily life (TV, films, newspapers, etc.) and education. Basic education (in schools) is typically in English in Tier 1, 2 cities and the local language in Tier 3 cities. The level of English literacy impacts on the types of tasks that Turkers can do successfully. Even visual tasks, such as link checking, image tagging and digitisation typically have English instructions [28]. To illustrate the full range of English literacy, and its effects, we describe two participants from different ends of the spectrum. Rahim is a computer science graduate from a private college from Hyderabad in his early 20's and Nagen, a tradesman turned entrepreneur in his 50's who runs an internet café-cum-DTP (desktop publishing) in a small town near Kanyakumari.

Rahim had a high level of English and computer literacy, which enabled him to complete tasks quickly and accurately. When he started turking, he used forums and other resources to learn how to find quality HITs and requesters. Now, however he primarily works for specific favourite requesters that directly contact him when they post HITs. He has installed plugins to help him save time on the various accounting processes. Rahim started turking in the final year of his studies and when, after graduating, the placements from his college didn't impress him he was able to turk full-time, akin to a regular day job. That said, he is not intending to make a career of turking. Even if he can't find work 'in his own field' he hopes to get a government job[6].

Nagen, in comparison, had a Civil Engineering diploma (which can best be described as a vocational qualification which begins at 14 after 10 years of schooling) and little English proficiency. He worked for several companies for 20 years before moving back to his native town. Nagen's internet café was something of a crowdsourcing hub, where 5-6 people worked on AMT when the computers were available or the café owner required help. As he had limited English, he was restricted in the HITs that he was able to complete successfully. When Nagen started a new task, one of his customers or his teenage son would help him learn how to complete it. They would translate and explain the instructions, then help him practice until he was confident enough to do the task on his own. If there was an especially problematic task, they would simply do the tasks for him. The types of tasks he did included link checking, simple digitisation and video transcription (although for this latter task someone else would do the work for him). There were drawbacks to working on tasks with limited mastery of English: sometimes his understanding was not precise enough to do the task correctly or he might incorrectly believe a task to be the same as the one he had trained on, for example, where requesters post variations on a task. Small changes in instructions were problematic and could mean he did tasks incorrectly, without understanding why. This ambiguity had led to the suspension of his account by AMT, but they had lifted the ban after a heartfelt plea. However, during our period of research he was suspended a second time, ultimately losing his account.

[6] Here a 'Government job' typically means a job with the central or state government public sector e.g. banking, health, transportation, defence services, etc. The selection criteria for such positions includes a Bachelors or engineering degree.

4.1.2 Technology, Infrastructure and Turking

Both the hardware that Turkers work on and the infrastructure through which they access the internet impact their turking. Participants accessed the internet from home, work or internet cafes, through data cards or broadband connections. Many of our participants used mobile phones to turk, others used laptops or computers acquired from relatives or bought second hand, whilst still others had ready access to computers at home and at school or work, or they were provided laptops by their universities or companies. There is of course a financial element to access to computers, i.e. those from more well off families were more likely to have computer and internet access at home. Participants who had access to multiple devices and internet connections typically adjusted their activities on AMT according to their current technological constraints and device usage. The interplay between turking, technologies and locations is of course situational. Turkers decide whether they can Turk and what they can do depending on various factors such as what work is available, what skills they have, how much time they have, what technologies they can access and so on. In Vignette 1, we see how multiple devices are used to accommodate Sapna's turking to her current circumstances.

Vignette 1

Sapna, a dentist who works in a dental clinic in an Indian metro city told us how she accepts HITs at work, *"if there is a HIT which has a sufficient amount of time given i.e. 24 hours or 2 days because I can't complete the HIT when I am sitting with somebody. So normally I accept those HITs (on my smartphone) and keep them; and after I come back home I do them. Sometimes when there are no patients at the clinic, or no appointments also I login just to have a check if there is anything or not."* (Transcribed from skype interview)

Sapna either snatches time to select tasks to be done later at home on her laptop, or uses longer periods of free time at work to complete tasks. This would seem to be a classic example of crowdsourcing as making use of spare cycles to make money. In this case multiple devices are needed to realise this flexibility.

In another example, we observed Pandit, a final year engineering student who had recently acquired a second-hand laptop and had bought a smartphone with his AMT earnings. Based out of Nagen's Internet café, Pandit had a faster internet connection through the café's wi-fi on his mobile phone than on his laptop. He also found it simpler to scroll for jobs on his phone. Pandit

used the two devices in parallel – accepting jobs on his mobile phone and completing them on his laptop. In both examples, task selection was done on the mobile whilst the task itself was completed on a computer. This is because, while some tasks such as smartphone application testing are best carried out on a mobile, in general the computer is better suited for a wider range of tasks because of screen real-estate and ease of typing.

As well as devices the speed and quality of the internet connection plays an important role in crowdwork.

Vignette 2

Gopal, a Software Engineer lives in shared accommodation in Chennai in the week and spends the weekends with his parents in his native town, "*On weekends I go to my hometown enjoy working in turk and roam around with friends. I work for 5–6 hours only on weekends when I am at parents' house because we have broadband there. Once I worked for 5–6 hrs and earned $200 in a day doing $.50 HITs collecting information about schools (holiday/term time etc.)[..] I work from Chennai if I can get hold of a laptop and I am not tired*." (Translated from phone interview in Tamil-English)

During the week, Gopal uses a datacard with limited internet usage and shares a laptop with his friends in his accommodation. But on the weekends when he is in his parents' home he works on his desktop PC with an unlimited broadband connection. Data cards are cheaper, but slower and this limits the types of jobs one can do. Images, buttons and other functionality of tasks that are large in size often fail to load over slow connections, and a lot of time gets wasted just waiting for such tasks to load. For example, in our observations even a simple business card digitization task took around 30 seconds to load at the Internet cafe – greatly increasing the time required to complete the task and making such low paying tasks even less desirable[7].

Connection quality and speed can also cause problems in task completion, as many tasks display a completion code at the end of a task, which must then be entered into AMT for payment. However, this method is not robust enough for dodgy connections and when the code fails to load or display properly, the Turker will not be paid and their time is wasted, even though the requester still gets their data. This arises because the tasks themselves are hosted outside of AMT, with AMT being used for recruitment and payment only. Decisions about which tasks our participants specialized in were therefore partly based on what technology and infrastructure was available to them.

4.1.3 Types of Jobs

Our participants completed a whole range of jobs including image tagging, categorization and filtering, link checking, digitisation, address verification, research (surveys and experiments), writing (articles, blogs, reviews, etc.), testing smartphone apps, usability testing of websites, transcription and some translation (often into regional languages but two participants translated into Spanish). They specialised in particular tasks according to their abilities and preferences, their access to technology and infrastructure, as well as their qualifications on AMT (individual Requesters can set up qualification tests for Turkers to be eligible for particular tasks). Typically our participants had a range of skills/tasks/requesters in their portfolio – completing their preferred ones when available and doing others, such as transcription, which is time consuming, as back-up tasks when needed.

Vignette 3

A 21 year old final year engineering student from Chandigarh, Aman, says, "*Some of the audio transcription tasks, they are very long and with less pay like $0.50 for 20-30 mins [of work]. So often I try to work on them, [thinking that] I can easily work. But when is going.. going.. going..*[i.e. it takes too long to load] *I didn't understand; it feel its boring so I reject that task – I have the option to return the task, [so] then I returned it [..] I don't want to waste much time for less pay*." (Transcribed from skype interview)

A common way of selecting preferred jobs was by *requester*; Turkers came to know particular requesters who paid reasonably and offered jobs they could comfortably complete without error. Individual requesters also favoured the most proficient Turkers. That is, requesters would email them when a batch of HITs was uploaded, typically after the Turker had passed some qualification test set by the requesters. We believe that this type of relationship between requesters and specific Turkers, where jobs are unavailable on the open AMT market, is quite common. We also found out that some jobs might have migrated off AMT (i.e. they are exchanged and completed through direct electronic communication). Such specialisation enables the Turkers to become highly skilled in particular types of work and thus more efficient. The relationship can ensure a steady amount of work and minimize the amount of time spent locating work. The established relationship is more reliable and dependable, and appears to be preferred in a number of cases for both sides, as opposed to the fully open, dynamic, anonymous market.

4.1.4 Online, But Not Isolated

Our participants worked from home (whether their family home, a hostel or other accommodation), work, college or cyber cafes. Often they were part of a small networks of Turkers – either with family and friends who also Turked, or as members of online communities. For example, Sapna, the dentist, describes how she is embedded in a mini-network with her daughter and cousin, where they share passwords and help each other out by informing one another of good HITs, even accepting them on one another's behalf.

Vignette 4

"Normally I share it [discussions about mturk] *with my daughter and my cousin who also works on mturk. Sometimes she also helps me out… Sometimes if she* [her cousin] *gets a HIT and I am at my workplace and the HIT has a time period of 24 hours, so she calls me or my daughter, you accept this HIT on her behalf. Anybody can accept the HIT on my behalf if they have the password and I come back and do that HIT. Earlier this used to be, but nowadays you get very less HITs where you can do such things… Sometimes it's the other way around [also]. If I get a good HIT or if I learn that a good requester with a generous amount of bonus, so we skype or call each other."* (transcribed from skype interview)

[7] Even watching the video made the researchers twitchy at the slow download, however for the Turker it is business as usual. He occupied himself by flicking between the task and his email.

Similarly, Rafiq, uses his network of family and turking acquaintances to share information about HITs (see Vignette 8). He quit his job in the city and moved in with his family to a suburban area, making a full-time living from AMT. He has a large network of fellow Turkers as he runs teaching and discussion groups about AMT on Facebook and Skype. As he reports in Vignette 8 he snatches sleep when he has run out of good HITs, but stays 'in the loop' by asking his network to call him *"if those HITS have been uploaded please wake me up."* Communities of Turkers also crop up around physical places, such as the internet cafe we visited. The Turkers who work from there, share information on requesters, HITs, their experiences on AMT and even help each other out with difficult HITs. Such networks provide mutual benefit, and even training and development opportunities for the Turkers. This is important because there is typically little in the way of feedback and training provided by the requesters themselves, yet such feedback and training can significantly improve performance [21].

As well as their colleagues on AMT, our participants were often supported in their work by their families - bringing them tea, coffee and meals - so that they can concentrate on turking. Whilst communities of fellow Turkers offer practical, moral and social support, families often tend to the physical comfort of Turkers. Despite being online and home based, among our participants turking is socially embedded and only one of our interviewees mentioned missing out on the 'social aspect of working with colleagues.' This is in contrast to the studies of homeworkers for a Business Process Outsourcing company [24] in the US who more frequently mentioned isolation as being a downside of homeworking with fewer opportunities to share knowledge, experience or collaborate with fellow workers.

While some families were fully supportive of turking and glad of the income it provided, others were less content and put pressure on the Turkers to find more suitable, regular employment within their domain of expertise. This was a nagging concern, especially for some of our graduates who had completed their degree 1 or 2 years ago[8]. In contrast, those with family circumstances preventing them from easily finding work elsewhere, such as househusbands and wives, were typically glad of the flexibility offered by crowdworking (see Vignette 5).

We have presented a picture of *who* our participants are, we now taking a closer look at crowdworking as a filler of 'spare cycles'.

4.2 Rhythms of Crowdwork

Earlier we mentioned that over 50% of our participants said they do crowdwork "*whenever I can find time"*. On the surface this seems to fit with Howe's idea of converting 'spare cycles' into productive time. However, when we dig a little deeper we see that the picture is not so clear. Firstly, the concept of crowdsourcing as using 'spare cycles' becomes rather fuzzy for our participants who actually spend a considerable amount of their working time on AMT. That is, while some of their turking takes place in *liminal* (transitional) places and moments it is also clear that turking is managed through multi-tasking and finding time and space within their lives. There is prioritization in relation to other activities, whether this is 'down time' (however one defines it), spending time with family or getting some decent sleep. Whilst turking certainly does allow some flexibility in working hours, in that it can be fitted around other activities (to a greater or lesser extent), it is certainly not the case that Turkers can log onto AMT whenever they like and find work (that they are willing or able to do), as the following vignettes illustrate.

Vignette 5

Ketan, a house-husband from Chennai says *"I worked as an assistant to the Principal of a reputed local engineering college for 10 years. I gave up work to care for our kids at home, and tried various "work-from-home" options then found and started working on Turk. I have been working on AMT for over a year[..] My wife works in the Police force, you can't expect her to stay at home, her job doesn't permit it, so I do that. I do the chores, drop and pick up kids from the school, get groceries etc during the day. I also try and look for work on MTurk when I have some time, but mostly I work at night because that's when there are some jobs available. I like this freedom, not having to bow in front of anyone and being your own boss, all while I am at home with my kids."* (translated from phone interview in Tamil-English)

Vignette 6

Mansoor, a recent graduate from Hyderabad who is enrolled in a professional short course says *"You cannot find much work on AMT during the day… in the morning I go to institute for BBA for taught and practical classes. Class starts at 11.30 am, I leave home at 10.30am, we have 1 hour theory, 1 hour practical and then we practice for 1 – 2 hrs.. and then I come back at 4 pm and rest. Then do work on AMT. I do the most work at night time after 7.30 sometimes till 1, 2 or 3 am at night… I also have to do house work in the morning* […] *but if I got more work in the mornings I am willing to sit and work all day."* (translated from interview in Hindi)

Vignette 7

Navin a network programmer from the state of West Bengal tells us, *"While I brush my teeth in the morning I check on my phone if there are any HITs available that I can do in 20 minutes, if yes, then I'd take them up, otherwise I'll just get ready and go to work"* (translated from skype interview in Hindi-English)

The picture we get from our participants is that their working life on AMT is heavily dictated by the availability of HITs. This manifests itself in two primary ways. There are only occasionally available HITs during what might be called 'spare cycles' throughout the day, with most of the quality hits available at night. This is because the majority of requesters on AMT are US-based, so HITs are available and their working day coincides with India's night and early morning.

Almost all of our participants described the impact of limited work availability in some way or other. As we described above, Turkers have particular types of jobs or requesters they are happy to work for. However, there are more workers than *good*[9] jobs making availability of work a real issue. While, in theory there

[8] Other concerns about the longer term viability of Turking include the continuing availability of enough work and whether AMT will remain open for business (at all or to Indian Turkers).

[9] Of course what is considered a good job varies from individual to individual according to the fit between their circumstances and the jobs characteristics.

might always be *some* HITs on AMT that someone *could* do, in practice there are often no HITs that they are willing or able to do – whether because of pay, difficulty or bandwidth. Almost all of our participants would have liked to have access to more work and several said that when there is work available they will sit and do extra hours, or work in long spells until the 'good work' is gone. These Turkers therefore, are by necessity adaptable to the rhythms of work availability and have developed strategies for juggling work and other activities, so that they can find the 'good jobs.'

Vignette 8

Rafiq, an ex-QA engineer from suburban India says, *"(For) a regular Turker in mturk, has no kind of any predetermined schedule because of work in mturk. We work when there is a work, not 'we', I. If I am sleeping also I let others to keep concentrating on some HITs "if those HITS have been uploaded please wake me up." Since 2 years I've never slept for* [...] *I sleep for 6 hours very few times, continuously. I sleep in partly, like 2 hrs or 4 hrs.* […]*When there is work I work, when there is no work I am taking rest. When there is no work I am just concentrating on the sleep."* (transcribed from skype interview)

This example gives the lie to the idea of working when you want, as it would be rather extreme to characterise sleep as a 'spare cycle.' The picture we get is of flexible working, but it is not always clear who gets the most benefit from 'flexible' work hours. Are the requesters benefiting from being able to employ workers according to their needs, or are the Turkers benefiting from being better able to achieve a Turk-life balance? From our analysis we believe that, to a large extent, it is the *Turker* who has to *be* flexible to fit into the rhythms of work on AMT (see [2] for a discussion of the concept of flexibility in relation to self-employed work).

4.3 Turking for fun?

Many of our participants talked about the enjoyment that came from Turking.

Vignette 9

Niveditha, a Masters student: *"these days, for the past 1 month, I am doing it at home, after I return to my room, I find it more comfortable because I have the privacy and all to do better work when I am at my room.* […] *If it's a survey based job, then I do it at work, but if its writing, then I don't want to do it in a hurry, it's something that I enjoy so I come back to room and then sit at my computer"*

Vignette 10

A retired Education officer says *"I am retired and have loads of time on my hand. I do turking for 'timepass' and to earn some money.* […] *while working I tend to take it easy – I don't do complicated HITs or HITs whose instructions are too high-end because there are high chances of rejection. I don't want all that tension. While on computer I also listen to old songs and bhajans (prayers) on youtube or downloaded by family. I am very happy with turk."*

Although on first glance such comments might seem to add fuel to the research which argues that Turkers primary motivation is fun [12,16,30], we suggest that the enjoyment and pleasure our turkers talk about might be better cast as *job satisfaction*. For our participants, as for others [23] turking is clearly work, but this does not mean there is no pleasure to be had. Even those Turkers who did zero dollar hits did them because they had a rationale (sadly not necessarily correct) that they would get paid somewhere down the line for them, for example, in the form of a bonus or access to other higher paying HITs. For these Turkers, job satisfaction comes from a variety of aspects of the work, including: taking part in research, working for US companies, flexibility, not having a boss, doing 'easy' jobs which don't require much concentration or conversely doing tasks which exploit particular skill sets. The work itself can also be fun, for example, some of our crowdworkers actively searched out amusing tasks such as taking pictures of the contents of one's fridge, playing games on smartphones, or solving puzzles.

Since the cost of living in India is much lower than in the US, the Indian Turkers can earn comparatively high wages – which is likely to be key in giving greater job satisfaction. In a country where $250-$300/month is a pretty good wage (15-20k rupees) the earning potential from AMT is a lot higher than in the US, across a wider set of jobs. This also decreases the need to work at such a high pace, meaning the 'working conditions' are more favourable. However, as the Turkers earn in dollars, but are paid in rupees, currency fluctuations can have quite an impact on their earnings for better or worse. The falling rupee at the time of research therefore worked in favour of our participants, as they ended up with more disposable income in rupees. Currency differentials aside however, the majority of our participants do discriminate and care about price, preferring higher paid work. Reducing pay is therefore, just as likely have a negative impact on the quality of workers and work in India as in the US.

4.4 Reputation, Reputation, Reputation

We now turn to one of the Turkers key concerns – reputation. The availability of good, higher paying HITs for any Turker is dependent on their ratings (e.g. rejection rate, approval rate etc.), their reputations and relationships with requesters and fellow Turkers, their AMT qualifications, e.g. Masters, and sometimes qualification tests set by individual requesters. Maintaining a good reputation is therefore one of the foremost concerns of all of the Turkers in our study. However, aspects of their reputation are not completely in their hands, and in this section we will explore the practical methods and concerns of Turkers in relation to reputation given the opaque nature of AMT.

While qualifications are sought after because they are the route to access better jobs and pay, blocking (by requesters) and suspensions (of the account by AMT) were feared and actively avoided. As has been mentioned elsewhere, requesters can reject work or block workers without giving any reason [23,31,32]. A block may be done legitimately, because the worker has made too many errors, or because the requestor is unscrupulous (e.g. don't pay for good work) or has poor quality assurance (QA) methods or bad HIT design. Turkopticon is a plugin designed to help guard against unscrupulous requestors, enabling the Turkers to review and rate requestors [13] but only a few of our participants used it.

An example of poor practice relates to surveys. A common method for requestors to ensure a 'one survey per person' model is to block Turkers on completion of a survey – they are meant to put a note on the block giving the reason, but this does not always happen, meaning these are then treated as 'hard blocks.' Being

blocked by requesters can result in the suspension of the worker's AMT account, meaning they can no longer work and their funds (earnings so far) in the account can be forfeited. The problem with blocks and suspensions is there is very little information on why something has happened – it is rarely clear to them why they have been blocked or if it is deserved since there is typically no feedback on their error rate. The only feedback they have is in terms of work accepted and rejected by requestors, but whilst this is likely to bear some relation to error rate, it certainly does not follow that it is closely correlated. In terms of account suspension, the general belief is that AMT operates a 'three strikes and you're out' rule – three blocks equals a suspension. In addition there is no official appeal process and Turkers are left with only the possibility to write an email to Amazon or specific requesters hoping for clemency.

Returning to the topic of qualifications, we look at qualification tasks set by requesters, as these can provide gateways into and access to good HITs.

Vignette 11

Mansoor tells us "*Taste of the World has a score system and he* [a friend and fellow-Turker who has stopped going to a local institute to upgrade his domain expertise] *has scored 100, that's why he still has a lot of work to do, and I don't. 'qualification match' requires that I should have done 5000 HITs, my value is 42000, it says 'I meet this qualification requirement'. The reviewer value required is 100 and mine is 50, basically meaning mine is below 100, so I am not qualified. If I could work on these HITs even I would not go to my institute. Now HITs are available 24X7 for these guys (who have score of a 100) and I see them everyday but can't do them, which hurts a little. I was careless when the Requester was testing Turkers with qualifications, so my score is less. I should have worked hard* [...] *but I was in a rush."* (translated from interview in Hindi)

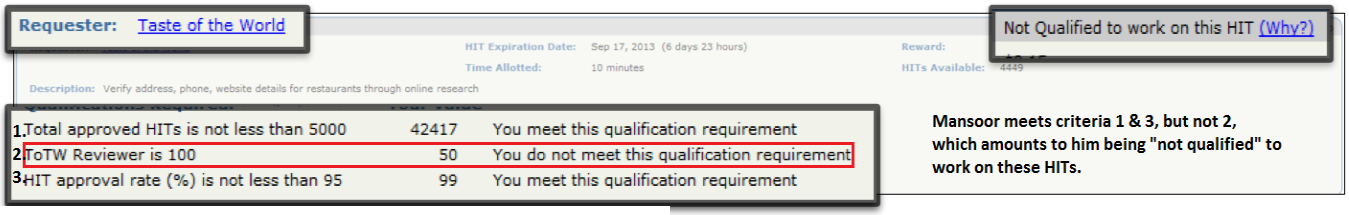

Figure 1. Mansoor's desired HIT (Vignette 11)

In this case, Mansoor did not score well in the qualification test – his requester-specific approval rate is only 50, whereas if he had scored 100 he would be qualified to do higher-paying work. His low score has implications for him in terms of the ability to make a full-time income off AMT, just like it might in a more traditional workplace.

Our Turkers showed an overriding fear of being blocked and many of their turking strategies were devised to protect against this possibility. As mentioned above, it is not exactly clear what causes a Turker to be blocked or to have their account suspended by AMT. Certainly making too many errors on a task will often result in a block, but how about accepting, then returning uncompleted tasks? Does this affect their reputations? Certainly many of our Turkers thought so. Furthermore, Turkers report getting blocked for complaining to requesters[10]. For most of the Turkers in our study, AMT was an important source of income and they frequently chose to implement defensive practices that required extra work, in the name of protecting their reputations. This work is an example of invisible work - the unpaid and unacknowledged "work to make the Turking work" [23]- and is illustrated in the vignette below.

Vignette 12

Pandit tells us *"If in a HIT the survey link is provided I click on the survey, open it and do it before accepting the HIT because sometimes the completion code doesn't load on the last page of the survey, which is bad for my rating* [...] *It also shows if the requester is genuine… and this also means that I can evaluate if the survey is hard to do or not, whether I can complete it. I have done this many times and 'submitted' HITs successfully but sometimes it doesn't work because by the time I complete the survey the HIT disappears." (translated from interview in Tamil)*

This Turker has developed a strategy to maintain his reputation, which covers a few of the potential problems he might run into that could negatively impact his rating. Namely, the survey might be too difficult for him to complete, the completion code might not load or the requester might not be genuine. This Turker is well aware that any of these problems, even though they may lie outside of his sphere of control, can negatively impact his reputation and he prefers to risk losing the HIT (as when, for example, it has been completed by the maximum number of other Turkers before he accepts it). This type of defensive practice was common for Turkers, especially when they were unsure of exactly what a task might involve. Another strategy was to accept the HIT first and then return it if it was too hard. This is a safer strategy in terms of safeguarding the HIT for oneself, but our participants had the belief that too many returns would negatively impact their reputation. The problem of HITs disappearing before acceptance was a problem that a number of our participants had experienced and it seemed to occur more commonly with certain types of task.

When participants were more confident with a set of tasks, for instance some batch tasks, they would use the option to auto-accept the next task as the previous one is completed. However, when our participants encountered other task types that may vary considerably (e.g. surveys), or when workers were less confident in their ability, they often checked out each instance before accepting. An example of this was when one of our participants was trying out some new (to him) mapping tasks. This 'try before you buy' tactic is part of the hidden preparatory work of turking.

[10] The operation of blocks and suspensions is a common topic of discussion in Turk forums and our material, here, is supplemented from our reading of forums.

It is worth taking a moment to examine the issue of HIT difficulty and turkers confidence (or lack thereof) in their ability to complete a HIT, as it was a theme that ran through many of our encounters. The difficulty of a HIT to any turker is of course an individual thing, predicated in part on English language fluency and general comprehension. However, it is often deeper than that, for example, we saw cases where turkers rejected surveys because they did not understand what the questions were actually asking. Answering a question or more generally completing a HIT successfully requires an understanding of the meaning of the question or the 'intention' behind the HIT[11], which goes beyond a simple understanding of the words in English [35]. Deciding whether they understand a task or not necessarily falls under the judgement of the individual turkers. However it is not necessarily a simple decision as the overlap between, what [15] call different 'social worlds' - those of the requester and the turker - may mean the turker thinks they understand the task when in reality they don't. This is similar to how the different 'social worlds' of the participants working on the same task in different countries impact practically on the understanding of and ability to complete tasks correctly [15]. The tendency of many of the turkers we saw was to err on the side of caution, however they did not always do so, with potentially disastrous results e.g. the suspension of Nagen's account.

Such defensive practices evidence the real fear of suspension: nearly all our participants knew someone who had their account suspended by AMT. As with blocks, Turkers have almost no useful information on why they have been suspended. This ambiguity and opaqueness cultivates a climate of concern amongst the communities of Turkers that they too might run into problems. To illustrate the problem of this lack of information, we discuss the Internet café owner's case.

Vignette 13

The Internet café-cum-DTP shop owner, Nagen, explains his way of doing things, *"I only do tasks that I have done before so that I am familiar with the instructions.* […] *But I think one of past few times, something I did went wrong as I got some warning emails from Amazon and finally got blocked. I was pretty sure I had done the task correctly and had seen the instructions before but perhaps I misunderstood something and now I might get suspended. We keep trying to contact them (AMT) via emails. I still have around $50 in my account. They are an American company, they are pukka (genuine/honest/honourable) in their procedures, I trust they'll be fair to me and give me my money back…"* (translated from interview in Tamil)

Given this Turker's low level of English literacy, it would not be surprising if he had made enough errors to merit a block (from the requester) and even a suspension from Amazon. We would argue however, that the lack of information available to him and Amazon's subsequent treatment of him are problematic. In Figure 2, you can find the response from Amazon to his request to review the suspension, or at the very least to have the funds in his account returned to him. There is little here, or in the original notice of suspension, which indicates which task 'failure' had caused the suspension, or even if it came from doing a task. The only information provided to him was 'for Violation of the Participation Agreement' which could cover a multitude of infractions.

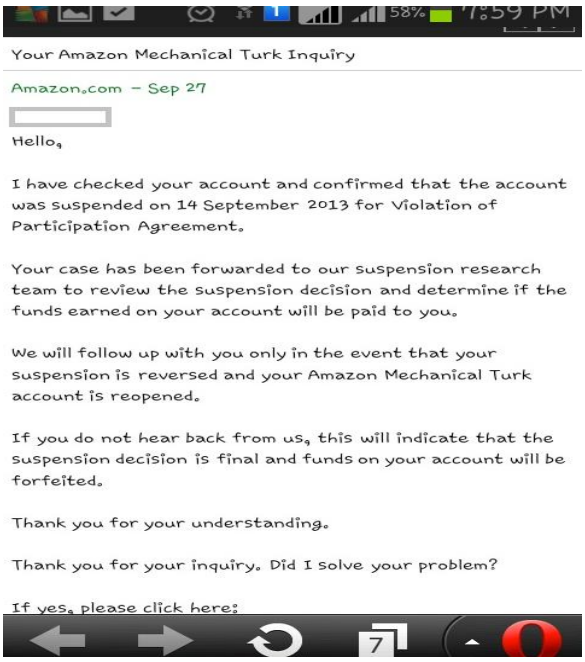

Figure 2. AMT's email to Nagen about his suspended turk account, as viewed on his friend's phone (Vignette 13)

One thing to note is that this *is* a genuine worker, even if his output can be flawed at times. He puts in a lot of effort to try to do tasks well; he is not trying to cheat. However, AMT does not seem to distinguish between scammers – people who are 'gaming' the system, making no attempt at genuine work - and genuine but poor workers. All are treated the same, with a suspension and forfeiting of funds, which genuine workers legitimately earned through crowdwork. By highlighting this case, we hope to speak to both requesters and researchers. There seems to be a tendency to assume that poor work is just scamming or that poor workers can be treated equivalently to scammers. However, it seems very likely that some proportion (we do not know how large) are genuine workers trying their best but who are not really up to the task at hand. As such, they are mislabelled as scammers. Our internet café owner reveals the human face behind the scammer label. Whilst we would not deny requesters the right to weed out workers who produce bad work, we suggest that some distinction needs to be made, between genuine workers and scammers, even if it is only to ensure they get paid the funds owed when their account is suspended. We hope that this point is an illustration of the need, pointed out by other researchers e.g. [17,19,28,34] for requesters, especially those from global corporations to think how to make their tasks more accessible to wider audiences.

5. DISCUSSION

Turking in India is naturally coloured by the circumstances of life in India, a country of startling diversity. Access to AMT is restricted by the requirement to have a computer or smartphone, internet access, and some amount of English and computer literacy. While these restrictions mean that none of our participants came from populations in India with the lowest levels of income and literacy, the participants in our study were a relatively diverse group.

[11] Or at least an understanding of what the instructions are actually asking you to do.

Infrastructure had a large impact on turking. Clear differences in both speed and reliability were seen between the different configurations of infrastructure, access modes, technologies and places of access, from internet cafes with weak, intermittent Wi-Fi to homes with reliable, fast broadband connections. These impacted the types of jobs our participants could do, the time taken to do those jobs and also the likelihood of failing at the last hurdle and losing money. Whilst some of our participants expressed frustration, for many these features were un-noteworthy - just part of the normal working conditions, and normal, natural troubles [7]. This is not to say that Turkers did not attend to bandwidth and so on, as seen in 1) day-to-day activities when they juggle between devices, or between activities like emailing, or 2) longer term decisions when upgrading their internet connection or acquiring in better devices is judged to be a worthwhile investment. These strategies should come as no surprise since normal troubles have normal, known about solutions both in day-to-day dealings and in the longer term. There were also marked differences in English and techno-literacy amongst our participants, and this clearly impacted their earning potential. In comparison with the US, where the other large population of Turkers reside, there are two additional differences which impact on turking: the time difference – meaning most of the work is available at night for the Indian Turkers - and the cost of living, which is lower in India, making turking a better paid activity.

5.1 Spare Cycles

We have examined the concept of crowdwork as an activity to make 'spare cycles' profitable and found that whilst on the surface it might seem to fit, when we dig deeper it seems less appropriate. Leaving aside for now fundamental questions on the appropriateness of even applying this term to human activity, it is clear that for our participants turking is rarely something to do in snatched minutes. *To turk is to work* and it occupies substantial hours in a week and competes with others activities they would prefer to do. Furthermore, whether turking full-time or just for an hour here or there flexibility of working hours is limited by the availability of good work. It is not so much that turking fills spare cycles, as the turkers have to make 'spare cycles' themselves in which to fit work (cf. [2]). That to turk is to work might seem unsurprising to many, but it is important to reiterate this given the picture that much of the early research created of turking as a leisure activity [13,16,30]. Perhaps, if crowdwork was seen as work from the outset the policies for blocking and suspending would have taken a different form. The fun and enjoyment that turkers speak of would seem to be better respecified as 'job satisfaction.' We hope this also provides a more nuanced perspective on the sometimes overly negative picture of crowdworkers as exploited, which is the counter argument to crowdwork as fun.

5.2 Reputation Management, Feedback and Training

The work of reputation management falls fairly decidedly on the Turkers' shoulders, wherever the challenge to their reputation lies. Whilst the asymmetry in ratings and therefore transparency of reputation *within AMT* [32] has been remarked elsewhere, our paper shows clearly for the first time the hidden work that Turkers do to maintain their ratings and reputations. Reputation management tactics are often defensive and the Turker shoulders the potential cost of the practice. These practices include ensuring they can do the work before accepting it, specialising in known tasks for specific requesters, getting training on tasks from co-workers, ensuring the completion code would load and so on. Our Turkers typically took considerable care over their work to ensure they completed the task correctly so as to not harm their reputations and where they did not they took the consequences (e.g. Vignette 13). It is telling that Turkers would rather lose HITs than damage their reputation. There is of course a simple solution to this, returning work uncompleted should not be counted against workers and certainly should not result in a block. If a Requester has a *genuine reason* for not wanting work to be returned uncompleted they should make it clear in the HIT – whilst at the same time being aware that they are penalising genuine workers who are trying their best, especially those with lower bandwidth connections or lesser skills. One reputation maintenance strategy of many Turkers was to stick with tasks they are really sure they can do. Whilst specialisation can be good – improving speed and quality – this tactic does reduce the opportunity for learning and advancement. It does not offer much of a 'career' or skills development path. We therefore join the voices asking requestors to make training material available and give useful feedback [21]. Even if the training is unpaid, it is likely there would be an uptake among genuine workers, as evidenced by our Turkers' participation in real or virtual learning communities. Turkers specifically talk about devoting time (for no pay) to this learning and the pursuit of qualifications and furthermore some are willing to do zero dollar HITs in the belief they will get some sort of payoff later[12].

Feedback and training are interrelated, with feedback on performance being a good aid for learning, however, feedback could also help Turkers handle some of the opaqueness of AMT and the uncertainness that comes with this opacity. Turkers rarely know why work is rejected (their error or some other reason), what would lead to a block/suspension or why they have been blocked/suspended. Whilst AMT normally sends warning emails before suspending someone, they seem to be directed at scammers – people who deliberately do bad work or game the system. They do not give any reasons, which would help genuine workers understand and change their behaviour. Since AMT is an uncertain environment with little clear information, then Turkers' community 'experience' is almost the only source of information about how AMT works. Whilst this can provide a variety of benefits, and help the Turkers work better, it is not necessarily particularly accurate and can contribute to the climate of concern.

Although ours was a self-selecting sample and we do not deny the existence of scammers (wherever there is a system, there will

[12] We would like to say a few words on zero dollar hits: where these HITs are not part of any development or career trajectory, or even where they are so-called small prize HITs (i.e. only the top worker gets paid), they can easily be exploitative. People might do them, however requesters cannot make the assumption workers are doing them with their eyes open. AMT is surrounded by myths, some of them akin to tales of 'golden tickets.' The Turkers who did these HITs honestly believed they would get some benefit or pay out down the line. Even if unknowingly, these HITs play on myth and misunderstanding to exploit the workers.

surely be people to game it), our research leads us to ask: Is it fair to treat scammers and workers who produce poor output as the same? It is perhaps convenient for lazy requestors and AMT – however it is a heavy-handed approach to error. We would hope that our paper will give both requestors and researchers pause for thought. There have been strong arguments for relationship-based crowdsourcing and we believe our findings here provide further support for it [1,25,31]. Requesters, your workers are still *your* workers even if they are an anonymous, non-contracted and shifting crowd. You have an obligation to treat them well and you will get benefit from doing so. Indeed, we can see some requesters already engaging in ad-hoc relationship-based crowdsourcing – maintaining a group of known good workers and emailing them when batches of work are ready or moving the relationship wholly off AMT.

6. CONCLUSION

In this article we have presented findings from our qualitative, largely ethnographic studies of Indian Turkers. We have particularly focused on how they organize and schedule their Turking work given their life circumstances, work and family commitments, access to and expertise with technologies and infrastructure, location and learning. This not only serves as a means to better understand these hitherto invisible workers but also to aid in considerations of how best to work with them and utilize their abilities – all of which points to the promise that going forward, relationship-based crowdsourcing can be more fruitful than many current modes of operation.

7. REFERENCES

[1] Bederson, B. B. and Quinn, A. J. 2011. Web workers unite! addressing challenges of online laborers. *In Proceedings of CHI EA '11*. ACM (2011), 97-106.

[2] Bourne, K. A., and Forman, P. J. (2013). Living in a Culture of Overwork: An Ethnographic Study of Flexibility. *Journal of Management Inquiry, 25 March 2013, DOI: 10.1177/1056492613481245*

[3] Crabtree, A. 2003. Designing Collaborative Systems: A Practical Guide to Ethnography, Springer.

[4] Crabtree, A., Nichols, D. M., O'Brien, J., Rouncefield, M., & Twidale, M. B. 2000. Ethnomethodologically informed ethnography and information system design. *Journal of the American Society for Information Science*, *51*(7), 666-682.

[5] Felsteiner, A. 2011. Working the crowd: employment and labor law in the crowdsourcing industry. *Berkeley Journal of Employment & Labor Law 32(1)*, 143-204.

[6] Felstiner, A. 2013. The weakness of crowds. Limn, Crowds and Clouds (2), Retrieved from *http://limn.it/the-weakness-ofcrowds/*.

[7] Garfinkel, H., 1967. Studies in ethnomethodology. Englewood Cliffs, N.J.: Prentice-Hall.

[8] Gawade, M., Vaish, R., Waihumbu, M, N., Davis, J., 2012. Exploring Employment Opportunities through Microtasks via Cybercafes. *In Proceedings of IEEE GHTC'12 77-82.*

[9] Howe, J., 2006. The rise of crowdsourcing. *Wired Magazine Issue 14.06. Available at http://www.wired.com/wired/archive/14.06/crowds.html*

[10] Hughes: Hughes, J. A., Randall, D., & Shapiro, D. (1992, December). Faltering from ethnography to design. In *Proceedings of the 1992 ACM conference on Computer-supported cooperative work*, 115-122.

[11] Hughes, J., King, V., Rodden, T., Andersen, H. (1994) Moving Out from the Control Room: Ethnography in System Design. *In Proceedings of ACM CSCW'94 Conference on Computer-Supported Cooperative Work* , 429-439.

[12] Ipeirotis, P. 2010. Analyzing the Amazon Mechanical Turk marketplace. *CeDER Working Papers No. CeDER-10-04. Available at http://hdl.handle.net/2451/29801*

[13] Ipeirotis, P. 2010. Demographics of Mechanical Turk. CeDER Working Papers No. CeDER-10-01. *http://hdl.handle.net/2451/29585*

[14] Irani, L. and Silberman, M. S. 2013. Turkopticon: Interrupting Worker Invisibility in Amazon Mechanical Turk. *In Proceedings of CHI 2013, ACM Press.*

[15] Jensen, R. E., & Bjørn, P. (2012). Divergence and Convergence in Global Software Development: Cultural Complexities as Social Worlds. *From research to practice in the design of cooperative systems*. pp. 123-136

[16] Kaufmann, N., Schulze, T., and Veit, D. 2011. More than fun and money. Worker Motivation in Crowdsourcing – A Study on Mechanical Turk. *In Proceedings of AMCIS 2011.*

[17] Khanna, S., Ratan, A., Davis, J., Thies, W. 2010. Evaluating and Improving the Usability of Mechanical Turk for Low-Income Workers in India. *In Proceedings of ACM DEV 2010*.

[18] Kittur,A., Chi, E. H., and Suh, B. 2008. Crowdsourcing user studies with Mechanical Turk. *In Proceedings of the CHI '08. ACM*, 453-456.

[19] Kittur, A., Nickerson, J. V., Bernstein, M., Gerber, E., Shaw, A., Zimmerman, J., Lease, M. and Horton, J. 2013. The future of crowd work. *In Proceedings of CSCW '13, ACM press*, 1301–1318.

[20] Kochhar, S., Mazzochi, S., Paritosh, P. 2010. The Anatomy of a Large-Scale Human Computation Engine. *HCOMP'10. ACM press.* 10-17.

[21] Le, J., Edmonds, A., Hester, V., Biewald, L. 2010. Ensuring quality in crowdsourced search relevance evaluation: The effects of training question distribution. *SIGIR'10*. 17-20.

[22] Little, G., Chilton, L. B., Goldman, M. and Miller, R. C. 2009. Turkit: tools for iterative tasks on mechanical turk. *In Proceedings of KDD-HCOMP '09, 2009.*

[23] Martin, D., Hanrahan, B. J., O'Neill, J., Gupta, N., 2014. Being a Turker. *In Proceedings of ACM CSCW '14*, 224-235.

[24] O'Neill, J., Roy, S., Grasso, A., Martin, D., 2013. Form Digitization in BPO: From outsourcing to crowdsourcing? *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI'13).*

[25] O'Neill J., Martin D. 2013. Relationship-based Business Process Crowdsourcing? *In Proceedings of IFIP Conference on Human-Computer Interaction'13*. 429-446.

[26] Pontin, J., 2007. Artificial Intelligence, With Help From the Humans. The New York Times. *Available at http://www.nytimes.com/2007/03/25/business/yourmoney/25Stream.html*

[27] Randall, D., Harper, R. & Rouncefield, M. (2007). Fieldwork for Design: Theory and Practice. Springer Verlag, New York.

[28] Ratan, A. L., Satpathy, S., Zia, L., Toyama, K., Blagsvedt, S., Pawar, U. S., Subramaniam, T., 2009. Kelsa+: digital literacy for low-income office workers. *Proceedings of the 3rd International Conference on Information and Communication Technologies and Development*, 2009.

[29] Ross, J., Irani, L., Silberman, M. S., Zaldivar, A., and Tomlinson, B. 2010. Who are the crowdworkers?: shifting demographics in mechanical turk. *In Proceedings of CHI EA '10, ACM (2010), 2863–2872.*

[30] Shaw, A., 2010. For love or for money? A list experiment on the motivations behind crowdsourcing work. *Available at https://crowdflower.com/blog/2010/08/for-love-or-for-money-a-list-experiment-on-the-motivations-behind-crowdsourcing-work/*

[31] Silberman, M. S. 2010. What's fair? Rational action and its residuals in an electronic market. *Unpublished manuscript. http://www.scribd.com/doc/86592724/Whats-Fair*

[32] Silberman, M. S., Irani, L., and Ross, J. 2010. Ethics and Tactics of Professional Crowdwork. *ACM XRDS, 17, 2.*

[33] Sommerville, I., Rodden, T., Sawyer, P. & Bentley, R. 1992. Sociologists can be surprisingly useful in interactive systems design. In proceedings of HCI '92, CUP. *People and computers*, 341-341.

[34] Star, S.L. and Strauss, A.L. 1998. Layers of silence, arenas of voice: The ecology of visible and invisible work'. *CSCW Journal, 8: 9-30.*

[35] Tanney, J. (2013) *Rules, Reason and Self-knowledge*. Harvard University Press

[36] Thies, W., Ratan, A., Davis, J.: 2011. Paid crowdsourcing as a vehicle for global development. *In: CHI '11 Workshop on Crowdsourcing and Human Computation*