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A worldwide diversity chat application pilot on interactions and social practices (2021 - 2nd Wave)

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A worldwide diversity chat application pilot on interactions and social practices (2021 - 2nd Wave)

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Abstract

This technical report describes a dataset collected in 2021 as part of the WeNet project, a Horizon 2020 funded project that aims at developing a diversity-aware, machine-mediated paradigm for social interactions. The aim of the study was to measure aspects of diversity based on social practices and related daily behaviours. The data collection was linked to a previous pilot and was organized in three phases. The first involved a sample of university students from five universities, located in Denmark, Italy, Mongolia, Paraguay, and the United Kingdom. The respondents had to interact in a chat application called Ask4Help exchanging request and information about their daily life. While interacting a smartphone application, called iLog, was collecting data from nine smartphone sensors, twenty-four hours a day. In the second phase, the respondents answered to the chat application evaluation questionnaire, while in the third phase they participated in a focus group to provide their feedback on the overall User Experience and explore specific research questions relevant for the project. This dataset allows to investigate the diversity and interactions of university students in a multi-layered perspective, both within and across countries, in a synchronic and diachronic way.

1 Background & Summary

The large-scale survey described in this document has been produced as part of a large international and multidisciplinary project called *WeNet - The Internet of us*, which aims at harnessing the diversity of people. The WeNet main aim is to bootstrap an online virtual community where the diversity of its members is leveraged to improve their "well-being" and quality of interactions. In this framework diversity is assumed to be a key distinguishing feature of life, and it is defined as the variability that exists across humans and social relations, e.g., in terms of geographical locations or mobility constraints; personal or interpersonal skills; cultural, religious, economic, or social statuses; beliefs, attitudes, desires, or intentions.

The notion of diversity has been extensively used, and this term has been given a variety of meanings, often quite different from each other. In this work we use this term leveraging on a distinction between what we call *objectual* and *functional* diversity. The chosen terminology follows the distinction, made in [1], where anything in the real world is called *Object* when it is described in terms of how it appears, i.e., of how it is perceived through senses, and is called a *Function* when it is described in terms of how it behaves, i.e., of how it impacts the world. By objectual diversity, called "observable diversity" or "surface level diversity" in the Social Sciences [2–10], we mean here the kind of diversity that applies to "observable" demographic characteristics such as sex, culture (race, ethnicity, national origin), age, membership in formal organisations (religious or political), or physical features. On the other hand, by functional diversity, called "less observable diversity" or "deep level diversity" in the Social Sciences [2–10], we mean here diversity as it applies to less "observable" characteristics. Examples of deep level diversity involve technical abilities, tenure in the organisation, socio-economic and cultural background, personality traits, cognitive abilities, and values.

These two types of diversity, in the Web, but not only, play a fundamentally independent and in many ways antithetic role. Thus, while objectual diversity can be in many ways associated with *bias* [11], and is taken as a negative phenomenon which is becoming more and more pervasive in the Web [12], essential diversity can be taken as a positive phenomenon which should be capitalized as much as possible. Functional diversity is actually the main focus of WeNet, whose main goal is to capitalize on it towards more inclusive, more extensive and better social relations. [11] In the dataset described in this paper, diversity is modeled based on earlier work in the social sciences [2–10]. Along this line of thought, *surface* (i.e., objectual) and *deep* (i.e., functional) diversity fall under the broader area of theory of *social practices*, when studied at the group level, and of *behavioural routines* when studied at the individual level [13–23].

[11] https://www.internetofus.eu/2020/02/10/a-diversity-aware-internet-when-technology-works-for-people/.

Additional information on how diversity has been operationalized can be found in the technical report [24], of which this data collection presents a subsequent phase.

The WeNet Ask4Help - chat application's aim is to demonstrate and test different diversity-aware technology being developed within the WeNet project, and to enable the communities at the different WeNet pilot locations to mutually benefit from the diversity of their members. In this context, we ended up designing a community question-answering (Q&A) chat application, where the users interact with their peers through a chat application, that connects them based on their diversity.

This study was conducted involving students from the following universities: Aalborg University (AAU) (DK), London School of Economics and Political Science (LSE) (UK), the National University of Mongolia (NUM) (MN), the Universidad Católica "Nuestra Señora de la Asunción" (UC) (PY), and the University of Trento (UNITN) (IT).

This chat application pilot 2.0 is an implementation of the Chat Application Pilot 1.0 [], also based on participants' feedback from the first pilot study. The pilot 2.0 ran on a common scenario – getting strangers to help each other – with a total of over 200 student participants posing and answering questions to each other via a chat application, supported by Telegram. As a result of the previous pilot, the current data collection implemented the interaction components, both from the point of view of the social information that might be represented and of the norms that should guide the interactions. Considering the social information, the chat application was implemented following three different directions:

1. The social relationships component, which is responsible for constructing each user's social network based on their interactions within WeNet;
2. The social preferences component, which is responsible for eliciting each user's preferences in terms of ranking potential answer givers and their responses;
3. The social explanations component, which is responsible for providing explanations about any suggestions presented to a user within WeNet.

Furthermore, the structure of the profile included the recording of the social relationships between the users. Accordingly, the norms adopted by the chat application allowed users to invoke social distance as a desired property when stating their choice for potential answer givers. Ranking based on the social preferences of the users was also finalised, and a ranking diversification process was also developed to allow a list of answer givers and responses to be presented to the user in a manner that would introduce a desired level of diversity (in chosen attributes) in its presentation.

Therefore, in the 2.0 pilots, student volunteers tested a more sophisticated version of the app, which uses diversity-aware AI to capitalise on the diversity of student communities for the mutual benefit of all. As part of the study, participants completed a short questionnaire covering their interests and skills, values and personality which came together as their personal profile, used by the WeNet

technology to match questions to the most appropriate respondent(s). Therefore, the pilot 2.0 integrates new features and components and it is the result of close coordination between the ethics, social science, machine learning and technical working groups. These groups developed a location proximity feature (to help participants selecting people nearby), social distance algorithms (to send messages to diverse participants), incentive system with badges and messages, norms (i.e., question parameters), and the ethical dimensions, with the sensitive and anonymous options, and contact information for support services.

In a nutshell, the main features of this data collection can be summarised as follows:

- It is both cross-cultural and multi-country;
- It covers different aspects of students' interactions. The data collected allow for the study of similarities and differences in how students ask for helps and advice to their colleague but also to develop sophisticated spatial/time use/predictive models of analysis;
- It includes three forms of collected data: self-reported data collected from an online survey, interaction data collected via chat application, and behavioural data collected by iLog, an app that gathers data from smartphone's sensors.

2 Methods

This study has developed indicators and tools which allow to measure diversity across the three dimensions underlying social practices (competence, material and meaning) and, also, to measure how they are organised and performed in interaction while, at the same time, maintaining a level of comparability across university students from different country and cultural communities. The process was articulated as a four-stage data collection, as follows:

1. The first stage is called Profile and it is composed of a close-ended questionnaire, that allowed to collect observation on social practices and students' daily routines;
2. The second stage, called Ask4Help Pilot, is administered via two main channels:
   - A chat application that allow participants exchange questions and answers;
   - A smartphone application that collected data from 9 smartphone sensors.
3. The third stage is a close-ended questionnaire to evaluate the chat application features;
4. Finally, a cycle of two focus groups to discuss the characteristics of the app and future implementations with the participants.

As described in Figure 1, the first stage was dedicated to the Profile questionnaire, that the participants had to fill in immediately before starting to use the chat application. Furthermore, the selection and interaction rules among the

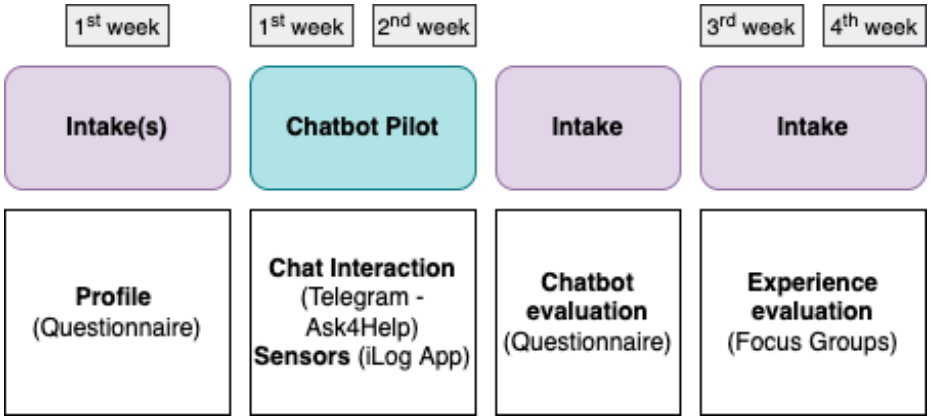

Fig. 1: Study Protocol

participants were based on the Profile questionnaire. After filling-in the questionnaire, participants were invited to download the chat application and iLog app participate in the two weeks data collection. An evaluation questionnaire was sent right at the end of the data collection and two focus groups were held within the two weeks after the end of the data collection. During all the data collection a help-desk was active, and ready to support students in all the problems which were arising.

2.1 Data collection tools

The questionnaires were managed with the Tally[12] platform to which participants were redirected to during the study registration process.

The chat data were collected through a Telegram chat application called Ask4Help designed by Service Design Lab and developed by U-Hopper Srl, together with coordinating partner University of Trento and Ben-Gurion University of the Negev. This chat application was assessed by the JRC's Market Creation Potential indicator framework as having a "Noteworthy" level of Market Creation Potential.[13]

The sensor data were collected via `iLog app`. [25][14] which collected the information remaining active in background, without interfering with the use of the phone and chat application.

As mentioned before, the interaction components were elaborated from the previous chat application pilot 1.0, both from the point of view of the social

[12] https://tally.so/
[13] https://www.innoradar.eu/innovation/37259
[14] [26–29] is a list of publications which describe the use of iLog and of iLog collected data in various experiments. Currently, iLog runs on Android devices; the iOS version is under development.

information that might be represented and of the norms that should guide the interactions.

Social Information Concerning the social information, within the user-user interaction model, community members could ask questions by triggering the chat application's question command. After a user has asked a question, they followed a six-steps procedure. For each step, the requester had to:

1. *Step 1*: specify the domain of their inquiry (Music, local things, arts, career, studies, cultural interest etc.)
2. *Step 2*: specify the domain interest of the respondent, i.e. if they have same or different interests compared to the requester.
3. *Step 3*: specify if the responded has to have similar, different, or indifferent beliefs.
4. *Step 4*: specify if the question is sensitive (the chat app will let the answer givers know). The community members can answer anonymously or with their names.
5. *Step 5*: specify if the respondents should be socially closer or further from the requester. For closer we mean known people or people with whom the requester have interacted with within the chat application.
6. *Step 6*: specify if the person should be in their proximity.

Once the requester received 5 the answers or the question has expired, the question flow closes, and a rating flow is triggered. The requester had to choose the best answer and to rate how helpful it was.

As additional features, multiple users can be answer givers at the same a time. In addition, respondet can postpone the answer with a reminder. Finally, if the requester didn't receive replies within 24 hours, she could ask again the question again.

Norms The main platform component that is responsible for mediating interactions is the interaction protocol engine (IPE). The basic idea is that norms dictate what behaviour is permitted, prohibited, etc. Every time an action or event takes place (say a user performs an action in the WeNet chat application, a message is forwarded from one mobile to another, a timer goes off, etc.), the decision engine is triggered to check whether the action is permitted and to analyse and execute its consequences, if applicable. Therefore, the user profiles were enriched to contain socio-demographic characteristics, information about the user's competences and social values, amongst others. Together with the social information described above (i.e., location, social relations, etc.) the norms were implemented in such a way to mediate all the possible combination within the participants profile, e.g., send the message to everyone in the community, notify the user of incoming messages unconditionally, etc.

2.2 Sample design

The sample strategy was to involve 50 students from each pilot site, who had possibly already participated in the first wave. People in possession of smart-

phones with iOS or other systems were also involved, even if they were unable to install the iLog app during the chat application pilot.

The second wave of the chat application pilot was advertised on the WeNet website (e.g., for UK https://www.internetofus.eu/lse-pilot/) with promotional texts and videos translated and localised to suit each pilot location. Numerous communication avenues were considered to reach the highest possible number of students, such as emails and a leaflet containing a QR code to the web page, was distributed on strategic points on campus. The experiment was also advertised on the Student Hub, on department newsletters and through face-to-face canvassing. In UK presentation on WeNet was also featured in the Research Showcase at LSE during Welcome Week and the data collection was advertised on the student newspaper 'The Beaver' in UK. Interested students were invited to register their interest by completing and submitting a Google Form accessible via the dedicated page. Numerous reminders were sent to interested students, including a list of 'special features' that set we@ apart from mainstream social networking apps and Q&A platforms.

2.3 Incentives strategy

The strategy of involving the participants concerned tangible and intangible incentives. Regarding the material incentives, a fixed payment has been defined for all those who have installed the chat application. Table 1 reports the fees for each site. In addition, AAU has made available 7 prizes of 500kr to be drawn by lot among the active participants.

Table 1: Incentives per pilot site

	Compensation
AAU	150 kr
LSE	10 £
NUM	20.000 MNT
UC	35.000 Gs
UNITN	.

Two different types of intangible incentives were provided. First, a set of badges with the following characteristics have been produced:

1. Quantity badges, or based on the number of contributions in order to:
   - Incentivise asking questions
   - Incentivise answering questions
2. Quality badges, in order to reflect the participant's judgment on the contribution. The badges where given when the answer was accepted by the requester.
3. Reputation, in order to showcasing users achievements

The complete set of badges can be found in Table 8 in Appendix 8

Secondly, a set of messages was sent in order to:

1. overcome "question posting anxiety";
2. incentives a better performance - asking or answering more questions.

The complete set of messages can be found in Table 9 in Appendix 8

Chat application 2.0 pilot was used also to implement some of the takeaways from the 1.0 pilot, as specified in the following table:

Table 2: Badge and Messages implementation according to takeaways from the 1.0 pilot

Pilot 1.0 issues	**Deatails**	**Pilot 2.0 corrections**
Badge Awareness	Users demonstrated low awareness to badges	An explanation message upon first login to application was added
Message Fatigue	Users expressed a feeling of being overwhelmed by too many messages	Message load was decreased by 60%
Badge Levels	In multiple locations users reached the top badge level very quickly (within a few days). Some users mentioned absence of more challenging badge levels	Badge thresholds were increased for the middle and top levels (factor of 2).
New Badge Type	Users requested additional quality-based badges which reward them for good work	"Long Message" badge was added. Users are rewarded for messages with more than 100 characters.

3 Data Records

The final dataset contains data about *only* 156 participants. Table 3 shows the selection and participation of students in the various stages of the survey. As can be seen, participants from the previous survey were invited (only those who completed more than 75% of the survey, where possible).

Although more than 50 people have agreed to participate, in all pilot sites except LSE, many have not installed the app. The highest number of defections occurred in UC, with only 22 participants, while at AAU 46 participants filled in the profile questionnaire before downloading the app, the highest number in the survey. Regarding the exit survey, 28 participants in NUM and 21 in LSE completed it, while in the other pilots, less than 15 participants provide feedback on the survey.

Table 3: Sample selection and participation

Focus Group	Profile	Exit survey
AAU	46	13
LSE	26	21
NUM	31	28
UC	22	1
UNITN	33	4
Total	156	67

The following paragraphs are aimed at describing the data from the three different sources, namely (i) questionnaires; (ii) chat application; (iii) sensors. Data from focus groups will not be distributed and, for this reason, will not be described in this section.

3.1 The questionnaires

Tables 4 describes the main characteristics of the sample. In almost all the pilots most of the participants were women, with a peak at LSE where they were 58.3%. The only exception was UNITN in which female participants were 21.2%. In AAU and LSE most of the participants were enrolled in a Master's (more than 70% in both cases), while, in the remaining pilots, the majority were Bachelor's students (at UC they were the only participants). In addition, most were enrolled in a hard sciences degree program. In particular at NUM where 71.4% were enrolled in one of these courses.

Table 4: Sample descriptive statistics

	AAU	LSE	NUM	UC	UNITN
Gender					
Female	41.3	58.3	51.5	40.9	21.2
Male	41.3	25.0	27.3	50.0	69.7
Other/Not say	17.4	16.7	21.2	9.1	9.1
Degree					
BSc	23.1	26.3	92.9	90.9	63.6
MSc	71.8	73.7	0.0	9.1	36.4
Other	5.1	0.0	7.1	0.0	0.0
Department					
Hard Sciences	26.5	25.0	46.4	100.0	78.9
Social Sciences	73.5	70.0	35.7	100.0	15.1
Humanities	0.0	5.0	17.9	0.0	6.0
Total	100 (N=46)	100 (N=26)	100 (N=31)	100 (N=22)	100 (N=33)

In addition to the students' socio-demographic characteristics, the profile questionnaire gathered information related to material, competence, and meaning. In particular two standard scales were used as proxy for meaning and one as proxy for competence. Regarding meaning, the following scales were used:

- a scale about personality, namely the Big Five Inventory [30];
- a scale about values, namely the human values survey [31, 32].

Concerning competence, the multiple intelligence scale [33] was administered.

In addition to the profile questionnaires, an evaluation questionnaire was conducted on the chat application and its elements. The questionnaire therefore contains quantitative assessments and textual comments regarding:

1. the user experience
2. experience with badges and messages used as incentives
3. the general experience with the chat application and its features.

This questionnaire can be used to support the analyzes and observations deriving from the analysis of the chat application data.

3.2 The chat application data

The chat application was based on a question and answer mechanism on any topic of interest to the participating student community. Tables 5 and 6 describe the average and total of the questions and answers that were asked at each of the sites. From the tables it can be seen that there were very active participants. In particular, at UC where one participant asked up to 51 questions and while at AAU another participant gave 138 answers. NUM was the site with the greatest interactions, ie 229 questions and 988 answers.

Table 5: Number of questions per user and total number of questions

	AAU	LSE	NUM	UC	UNITN
mean	5.8	3.6	8.0	8.6	2.5
median	2	3	7	5	2
sd	8.1	2.3	5.3	10.9	2.5
max	37	8	22	51	12
min	1	1	2	1	1
Total	220	47	229	180	63

Figures 2 and 3 present the most common words for each pilot used during the study. As for the questions, the common terms was "can", "like", and "good in AAU, "lse" and "think" for LSE, "going", "know" and "can", respectively for NUM, UC and UNITN. As for the answers, the most common word was "best" for AAU, "lse" for LSE, "feel" for NUM, "favorite" for UC, and "study" for UNITN.

(a) AAU

(b) LSE

(c) NUM

(d) UC

(e) UNITN

Fig. 2: Most frequent words in questions per pilot site

(a) AAU

(b) LSE

(c) NUM

(d) UC

(e) UNITN

Fig. 3: Most frequent words in answers per pilot site

Table 6: Number of answers per user and total number of answers

	AAU	LSE	NUM	UC	UNITN
mean	17.3	5.4	31.9	30.2	7.0
median	10	5	28	29	5
sd	22.1	2.0	25.8	22.0	5.3
max	138	13	116	93	23
min	1	1	1	3	1
Total	797	102	988	694	216

The dataset of the chat application also contains different parameters regarding the timing and the types of questions that have been asked. In addition, the participant was able to define who to ask the question and the reason for accepting one answer above the others.

3.3 The sensor data

The sensor data collected are rather rich and diversified. We are not aware of any other dataset with similar properties. Furthermore some of the sensor selected are somewhat unusual. The data from the sensors can be divided into:

- Hardware (HW) sensors, that in our case corresponded to the two version of the location, namely GPS(rounded down) and Point Of Interest (POI) reported in Table 7;
- Software (SW) sensors, by which we mean all the SW events that can be collected from the Operating system and SW, for instance the Notifications the HW received and so on. The complete list of SW sensors is reported in Table 7.

Table 7: Sensors data

id	Sensor Name	N. Obs.	Estimated Frequency
1	Location	50.892	Once every minute
2	Bluetooth Devices	38.521	Once every minute
3	Bluetooth LE(Low Energy) Devices	59.762	Once every minute
4	Running Applications	347.741	Once every 5 seconds
5	Notifications received	384.066	On change
6	Movement Activity (per Time)	18.393	Once every 30 seconds
7	Movement Activity (per Label)	18.396	Once every 30 seconds
8	Step Counter	47.186	up to 20 times per second
9	Step Detection	42.731	On change

The frequency by which the sensors are captured is reported, according to the following conventions: *on change* means that the value of the sensor is recorded

only when the current value is changed (along with a timestamp of when it happened), *up to X samples per second* means that for each second the value of the sensor will be stored up to maximum of X times (these values are estimated), and *once every Y* means that the values of a sensor is recorded once the time Y has passed (these values are estimated). The meaning of the sensors is described in the codebook that can be downloaded from the dataset Catalog.

4 Technical Validation

The data preparation consisted of anonymization and data cleaning, aiming at removing any type of personal information from the dataset and make it available to third parties. Notice however that this is not enough, in the sense that this dataset, like any other dataset of the same kind, would lead to re-identification if cross-checked with other datasets. Because of this, this dataset is not published open in the Web. This dataset can only be used in isolation and under certain precise conditions.

For what regards the *Personal Data Anonymization*, all personal information, i.e., *e-mail address*, *home address*, *name and surname*, has been removed from each of the three types of datasets (online questionnaire, time diaries and sensors), still making sure that the same unique identifier would be assigned to the same person across all three datasets.
In addition to Personal Data Anonymization, further measures were taken for each type of dataset.

The anonymization and data cleaning of the online questionnaire consisted of the normalization of all the value labels.

Concerning the preparation of the chat application data, all personal names have been replaced by unique identifiers, in such a way as to facilitate the recognition of the exchange of messages between the same people. Furthermore, in case the names of places or of external people make the participant recognizable, these have been removed.

The sensor anonymization procedure dealt with *GPS Anonymization*. The main problem is that the position of a person, in particular if joined with the specific time and day, leads very easily to re-identification, in particular when a person is in places which are not too crowded (e.g., outside cities) or when collected for a long period of time. The only solution is to make the spatio-temporal information more ambiguous. There are many ways of doing this, all having different consequences of the usability of the dataset for research. The GPS information of this data set has been anonymized in two different ways

1. *Round Down* Here the idea it that precision is deliberately truncated from the location sensor so that it becomes anonymous but in a way to be still useful for certain scientific purposes. Furthermore, the dates associated to each GPS point are truncated;
2. *Point of Interest (POI).* Here the idea is to collect *only* those points where the user has spent more than a certain amount of time. In this dataset, if

latitude and longitude do not change for one minute then a POI tag is added to the stream. For each POI the elapsed time in seconds is also added. GPS longitude and latitude readings are removed. The POI is selected to identify a general location (suburb, city, region) and the closest relevant places (bar, restaurant, lake, etc).

These procedures have produced two sets of datasets, that we call *RoundDown* and *POI*, each containing all the other sensors. For privacy reasons, only one of the two datasets can be downloaded by the same research institution (the union of the two would easily lead to re-identification).

5 Usage Notes

This data collection is intended as a continuation of the studies conducted within the WeNet project and in particular of the study on diversity described in [24]. Most of the participants in this study also participated in the Diversity Pilot 1 and the profiles and observations (on social practices, daily routines and chat interactions) can be linked upon request.

The dataset is available in different formats, depending on the type of data:

- Questionnaire and chat data: they are available in .csv;
- Sensors data: they are available in .csv format and in PARQUET.

The main entry point documentation for this dataset is the Catalog:

https://ds.datascientia.eu/

The website contains links for further information regarding the tools used, including the link to the questionnaire, the chat application and the iLog documentation; codebooks describing both variable labels and value labels and providing descriptive statistics.

Additionally, the website contains a sample of the dataset and links to all articles that have been published through the dataset. Further documentation and metadata will be provided in the project catalog.

Because of the type of data, to be fully compliant with `GDPR`, in order to have access to any of the datasets described in this paper, a licence must be signed. The details of how to enable this are provided in the Catalog. Some relevant licensing conditions are: (i) the datasets may only be used for research purposes; (ii) redistribution of the datasets is forbidden; (iii) the datasets cannot be made public (e.g., on a website) or given to a third part.

6 Code availability

No code is made available.

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7 Author contributions statement

The order of names is by contribution of the Institution and, inside each Institution, by contribution of the individuals. As such, the order of names does not necessarily reflect the importance of the contribution of the single individuals. The roles of the authors, presented by by their initials, is as follows:

- *Study management*: F.G., I.B., A.D.G.;
- *Study design*: F.G., I.B., A.D.G., M.B., R.C.A., G.G., M.B., D.G.P., L.M.; N.O.; C.S.;
- *Technical support*: M.R., M.Z., C.G., M.B., C.C.;
- *Data Collection*: M.B., R.C.A., M.R., A.D.G, P.K.,A.G., A.C., G.G., M.B., L.C., A.H.;
- *Data Preparation and correction*: R.C.A., C.G., M.B., C.C., P.K.

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9 Competing Interest

All authors declare no competing interests during the data collection, preparation and analysis of this dataset.

10 Appendix

Table 8: Intangible incentives: Badges

Name	Type	Description	Message
First question	Quantity: counting first question asked by user	After first question asked	Congratulations! You just earned the First Question badge! Way to go!
Curious level 1	Quantity: counting sum of questions asked by user	After 5 questions asked, user gets the badge	Congratulations! You are Level 1 Curious! Stay hungry and keep asking questions!
Curious level 2	Quantity: counting sum of questions asked by user	After 10 questions asked, user gets badge	Congratulations! You are now Level 2 Curious! Amazing interest in the world, keep asking questions!
First answer	Quantity: counting first answer given by user	After first answer given	Congratulations! You just earned the First Answer badge! Way to go!
Helper level 1	Quantity: counting sum of answers given by user	After 5 answers, user gets badge	Congratulations! You are now Level 1 Helper! Keep sharing your knowledge!
Helper level 2	Quantity: counting sum of answers given by user	After 10 answers given, user gets badge	Congratulations! You are now Level 2 Helper! Keep sharing!
First Good Answer	Quality: counting first accepted answer by user	After first accepted answer	Congratulations! You just earned your First Good Answer badge! Well done!
Good Answers level 1	Quality: counting first accepted answer by user	After 3 accepted answers	Congratulations, your answers are appreciated! You just earned your Good Answers Level 1 badge!

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Table 8 – continued from previous page

Name	Type	Description	Message
Good Answers level 2	Quality: counting sum of accepted answers by user	After 5 accepted answers	You keep giving great answers! You just got Good Answers Level 2! Congratulations!

Table 9: Intangible incentives: Messages

Message	When?
You are x question/s away from a new badge! Type: question to ask the community!	User is messaged when no questions after a certain time frame, and x question is missing for levelling up.
You are x answer/s away from a new badge!	User is messaged when the user needs x answer to level up and has been inactive for a period.
You haven't asked a question yet. You can get help from the community with your questions. Type: question to ask the community!	User is messaged when they have not asked any question yet.
You haven't asked a question recently. Anything you are wondering about that the community may know?	User is messaged when no questions have been asked after a certain time frame.
There are open questions to answer. Type: answer for the list! (by querying getTasks in the task manager)	User is messaged when there are open questions to answer and the user hasn't answered a question for a while.
Help the community by answering open questions or by asking new questions!	User is encouraged to contribute to the community
Any question is a good question! Type: question to ask the community.	User is encouraged to overcome "question posting anxiety"