Community-based Game Design:
Experiments on Social Games for Commonsense Data Collection

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ABSTRACT

Games with A Purpose have successfully harvested information from web users. However, designing games that encourage sustainable and quality data contribution remains a great challenge. Given that many online communities have enjoyed active participation from a loyal following, this research explores how human computation games may benefit from rich *interactions* inherent in a community. We experimented by implementing two games for commonsense data collection on the leading social community platforms: the *Rapport Game* on Facebook and the *Virtual Pet Game* on PTT. In this paper, we present the choices of interaction mode and goal-oriented user model for building a community-based game. The data quality, collection efficiency, player retention, concept diversity, and game stability of both games are analyzed quantitatively from data collected since August/November 2008. Our findings should provide useful suggestions for designing community-based games in the future.

Categories and Subject Descriptors

I.2.6 [Learning]: Knowledge acquisition. H.3.4 [Systems and Software]: Question-answering (fact retrieval) systems.

General Terms

Performance, Design, Experimentation, and Human Factors.

Keywords

human computation, games with a purpose, online community, social interaction

1. INTRODUCTION

Commonsense knowledge is critical in building human-like AI systems [9]. While techniques for mining knowledge from published documents have been demonstrated, it is difficult to discover commonsense knowledge hidden in texts [3].

Human computation exploits the productivity of online users to solve problems that are simple to humans yet extremely difficult to computers. Commonsense knowledge collection proves to be a natural fit [10, 13]. With an increasing demand for commonsense knowledgebase in Chinese, it is worthwhile to design a human computation game for the task.

Meanwhile, the emergence of online community presents further opportunity to enrich human computation games, e.g. GWAP[1] and Collabio[2] on Facebook. However, both have failed to attract followers, with only 45 and 98 monthly active users in GWAP and Collabio respectively. We argue that *the interaction among users* is the key to successful data collection from a social community. How to design a game that supports user interaction and provides incentives for players to stay/return for sustained contribution, therefore, becomes a major challenge.

We tackle this challenge by investigating modes of interaction among users and goals of their participation in communities. This paper introduces two interaction modes and their corresponding games to collect commonsense knowledge in Chinese deployed on two leading online social platforms. In the Rapport Game on Facebook, players expect to establish good vibes with friends by asking/answering questions with matching answers. In the Virtual Pet Game on PTT, the leading bulletin board system in Taiwan of over 800,000 users, pet owners strive to raise smart pets by teaching them simple facts, also in a question-answering fashion.

Preliminary evaluation showed that useful data collected by both games exceeds 80%. Nevertheless, significant variation in player retention highlights the differences between the communities. After reviewing the related work, we first present the interaction models and both game designs for commonsense data collection. Experimental data are analyzed quantitatively in terms of data quality, collection efficiency, player retention, concept diversity, and game stability in order to provide valuable insights into future design of community-based games.

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[1] http://apps.new.facebook.com/fb_gwap/

[2] http://apps.new.facebook.com/collabio/

2. RELATED WORK

In this section, we briefly review related work in the following three research areas.

2.1 Expert-Developed Knowledge Base

The Cyc Projects [5] collects commonsense data from experts. A team of knowledge engineers encode commonsense into the knowledge base. Rigorous data formats are imposed to create data that are logical and correct. This approach ensures the highest quality of data. However, it is expensive, time-consuming, and difficult to scale up. The quantity of data is limited by the number of experts, so the commonsense collected grows too slowly.

WordNet [4] is a highly structured database of words, which are carefully crafted by expert linguists. WordNet defines a lexicon dictionary using a network representation of words and their relations. It has been successfully used in a variety of applications. Similarly, HowNet (知網) defines the relationships between objects and concepts in Chinese using a formal linguistic approach [2].

2.2 Web-based Data Collection

With the growing number of users online, the Internet has become the platform of choice for data collection. The MIT Open Mind Common Sense (OMCS) project harvests commonsense via direct contribution of sentences in pre-defined templates from voluntary web users [10]. Over eighty hundred thousand commonsense data entries have been successfully collected through the contribution of some 20,000 people in five years. GlobalMind, launched in 2005, is an extension to bring Open Mind to multiple languages and cultures including Japanese, Korean, Mandarin Chinese, French and Spanish [1]. Unfortunately, it failed to attract meaningful contribution in Chinese.

Verbosity is a two-player game in which the Describer gives clues to help the Guesser figure out a secret word [13]. The clues are collected as commonsense knowledge about the corresponding secret word. No information on the quality or quantity of the data collected has been released.

In contrast, Yahoo! Answers is a platform for collecting expert knowledge or solutions from its online community. Users post questions to be answered by peer users, e.g. “How do I fix my fax machine?” or “Where can I get cheap carpets?” A system of points and levels is adopted. Users are awarded with points by answering questions, voting for a best answer, or choosing the best answers for their questions. The levels keep track of how active the users have been. There is no restriction on the forms of Q&A. Similar question-answering services via the mobile phones, e.g. ChaCha, or via instant messages, e.g. Aardvark, have gained popularity in recent months.

2.3 Commonsense Semantic Network

The ConceptNet [6] from the MIT Media Lab represents commonsense knowledge as a semantic network, which works by spreading activation rather than logical reasoning as in Cyc. Operations in ConceptNet are intuitive and flexible, making it a good choice for encoding commonsense knowledge. For example, knowing that there exists some relationship between the words may be good enough for many applications. A ConceptNet in Chinese is the model we aim to build from the social games.

3. COMMUNITY-BASED GAME MODEL

A Web community attracts users based on two important factors. Firstly, how do users interact with each other? Secondly, what do users expect to get in return for their participation?

3.1 Interaction Modes

In Verbosity, each player is matched with another player (or bot) randomly on the website to play in a given game episode. Figure 1 shows the standard one-to-one interaction mode in online games.

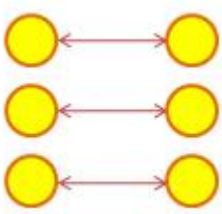


Figure 1. One-to-one interaction mode of Verbosity.

Unlike the typical user interactions in human computation games above, users in a community can interact freely with others. Different webs of interactions may be formed among users. Figure 2 shows two major modes.

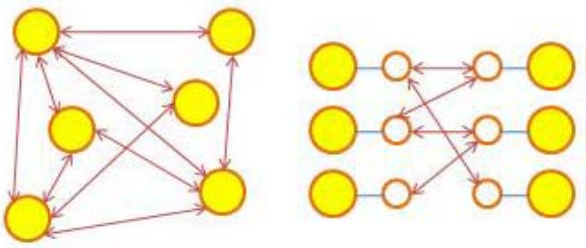


Figure 2. Webs of interactions in an online community:

Direct interaction mode (left) vs.

Indirect interaction via web agent mode (right)

1. Direct interaction mode:
   Appear in social network websites where users have access to the name and photos of users with whom they interact.
2. Indirect iteraction via web agent mode:
   Appear in most of the extensions a community provided, e.g. pet feeding or role playing. In these extensions, there exists a web agent that represents user to interact with others.

In designing the community-based games, either mode may be used to participate in the community.

3.2 Goal-oriented User Model

When users join a community, they usually have some goals they want to achieve in that community. For example, a user in a forum about restaurants may be interested in finding good restaurants. According toMaslow [8], needs of people are organized in a hierarchical structure. Therefore, users in a community may have different needs and perform actions in accordance to their needs. A simplified three-layered goal-oriented user model is shown in Figure 3.

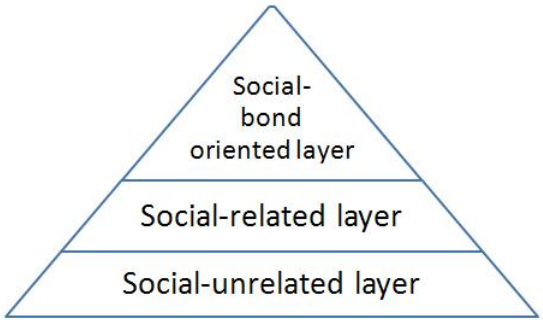


Figure 3. Goal-oriented user model.

In our restaurant forum example, users in social-unrelated layer may just want to find a restaurant for his birthday party; users in social-related layer may browse all the post and find it interesting to comment on others' post; users in social-bond oriented layer may like to share his/her feelings and be proud of his/her popular post on the forum.

This goal-oriented user model of users' action is found in today's web communities. When building the community-based game, we may need to make sure which users' goal the game satisfied.

4. GAME DESIGN

In this section, we present detailed descriptions of the Rapport Game and the Virtual Pet Game. The former works on Facebook using the direct interaction mode, while the latter works on PTT using the indirect interaction via web agent mode. Both are actively deployed community-based games for commonsense data collection.

4.1 Q&A Templates

To build a Chinese ConceptNet, we adapted the templates from OMCS in both games. Instead of asking for complete sentences from each contributor, each template is filled out in two steps. Specifically, a question includes three parts, namely a subject input by the player, a predetermined relation (usually a verb), and an object to be answered by other players. Below we list the interaction examples, followed by the detailed introduction of our two games:

1. Question Asking: In the template "A likes B", a player can input "students" or "little boys" as A, which turns the question for others to answer "Students like ___?" or "Little boy likes ___?"
2. Question Answering: If a question is like "Students like ___?", and the player can fill in the blank "having holidays", "no homework", etc.

4.2 The Rapport Game

The Rapport Game is a game for players to meet others, enjoy the excitement within the serendipitous encounter, and furthermore, to get a strong connection with each other. We choose Facebook, the most-populated social network website in the world with 35 languages, as our platform to deploy the Rapport Game. The main reason is that many users on Facebook are actively trying to maintain/enhance their social connection. The screen shot of the homepage is shown in Figure 4.

Figure 4. Homepage of Rapport Game

1. **Action List**
2. **Player List**

Every time the player enters the homepage, he/she can choose someone he/she is interested in from the player list which is generated randomly and then choose a method to interact with that player from action list. The flow of the Rapport Game is shown in Figure 5 and the following is its brief description.

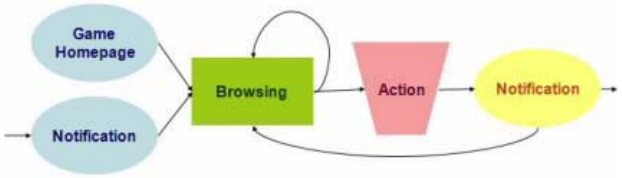


Figure 5. Flow of the Rapport Game.

1. Action: There are four actions players can perform to interact with others, including vote other's answers, ask questions, answer other's answers, and be other's fan. As the game's name states, the Rapport Game is a cooperative game. The players' *rapport score* increase once their answers are vote as "agree" by other players or their answers are matched with others' answers as shown in Figure 6. Therefore, the players are motivated to input the answers most users agree with and which is also the commonsense we'd like to collect.
2. Notification: While a player do an action to other player, the Rapport Game will represent the player to send a notification to notify other player to respond. It is one of the most common mechanisms that bring players into the Rapport Game or other games on Facebook.

3. Browsing: To discover potential players with whom to interact, players may browse the profile and question history of the other players as defined by their privacy settings.

Figure 6. Question answering interface.

1. Question 2. Matched answers

4.3 The Virtual Pet Game

The Virtual Pet Game is a game for players to raise virtual pets in a web community environment. Players can take care of their pets at the Pet's Home, in which their major interaction with their pets takes place.

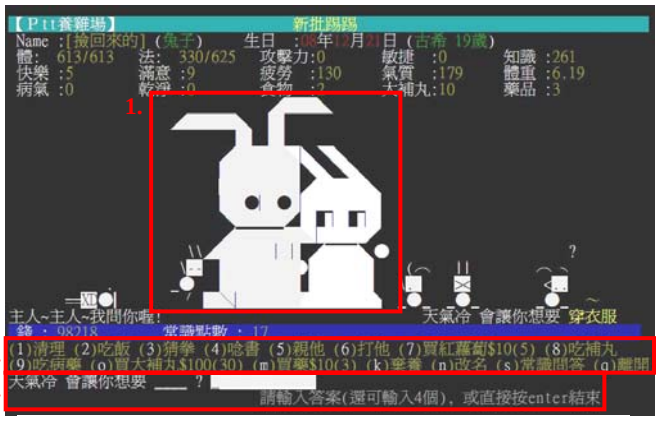


Figure 7. The PTT Farm House

1. **Picture of the pet**
2. **Choices of player actions**
3. **Commonsense question w/ input field**

PTT is the chosen platform of our Virtual Pets Game. It is a BBS (Bulletin Board System) that is accessible via a text-only terminal interface in Chinese. The primary purpose of PTT is to provide users an environment for information-sharing, yet it also provides games for entertainment. The main reasons why we developed our pet game on PTT is that it has the largest social network in Taiwan (over 800,000 log-ins per day on average). In addition, there was already a simpler version of the Virtual Pet Game in PTT previously. It allows us to simply add the "Common Sense Q&A" functionality to the Pet's Home, instead of redesigning the whole game from scratch. The screen shot of Pet's Home is shown in Figure 7.

When players in the Pet's Home, they can choose to feed, play, bath, kiss, and etc to their pet. The pets feel satisfied and happy if the players take good care of them. If the players, on the contrary, forget to take care of their pets for a long while, they will feel unsatisfied, sad, or they will even starve to death. In our game design, players can teach their pets commonsense in "Commonsense Q&A" to help them get the *commonsense point* and become more intelligent. The flow of the Virtual Pet Game is shown in Figure 8 and the following is its brief description.

1. Action: When the players use "Commonsense Q&A", they may ask/answer their pets questions or use their pets' *commonsense point* to exchange food for their pets. These interactions in fact are asking and answering other players' questions through their pets. While they answer questions, their pets' *commonsense point* increased as a reward for them to interact more with their pets.
2. PTT Mail: After players answer question, the system will send a PTT mail to the player who ask the question. This PTT mail is shown as if the players' pet finds the answers in a pet school and want to show what it learns to its owner.
3. Pet's school: There is a link to a pet's school web page in the PTT mail. Once the players get the answer from their pets, they can go to the pet's school to reflect the teaching quality, i.e. whether the answer is good or not. If an answer is voted as a bad answer, the system will send a PTT mail to the player to warn him/her not to teach his/her pet this kind of bad knowledge.

In addition, PTT also provides a discussion board for this Virtual Pet Game. Players can share their pets' statuses, their raising diary, and the received answers or questions on the board if they like.

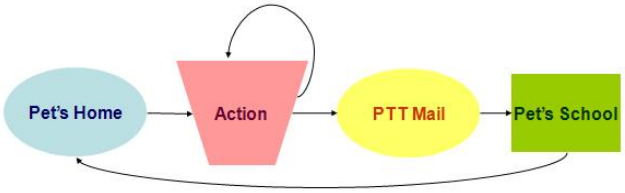


Figure 8. Flow of the Virtual Pet Game.

4.4 Comparison of Game Design

The Rapport Game on Facebook uses the direct interaction mode, whereas the Virtual Pet Game on PTT is designed as indirect interaction via web agents (aka the pets). The two designs of community-based game can be compared in terms of their goal-oriented user model as summarized in Table 1.

Table 1. Goal-oriented user model

	Rapport Game	**Virtual Pet Game**
Users in social-unrelated layer	***Answer*** questions from friends simply to show goodwill	***Answer*** questions to get *commonsense point*, which can be traded for pet food later when needed

Users in social-related layer	***Vote*** answers from friends as they are curious to find out what their friends think	***Ask*** questions to solicit answers as they are curious to find out what other people are teaching their pets
Users in social-bond oriented layer	***Ask*** questions as they are interested in building a stronger relationship with their friends or a specific player in the game. ***Answer*** questions as a fan as they want to match the answers of their target	***Participate*** in the pet's discussion board to show off their smart pets in the Q&A process. ***Rank*** answers in the pet's school webpage frequently as they are eager to establish the best learning environment for their pets.

5. ANALYSIS & DISCUSSION

This section presents the analysis of our games conducted in several aspects, in order to provide reference for future community-based game design. The statistics is from the data collected by both games over the first six months since their launch (Rapport Game: August, 2008; Virtual Pet Game: November, 2008).

5.1 Quantitative Analysis

5.1.1 Data Quality

We measure the amount and quality of the collected answers opposed to the questions for both games, viewing that sole questions without answers are merely unusable fragments, and that if the quality of an answer is assured, the whole composed statement is assured. For quality measurement, answers entered repetitively to a same question by different players are regarded valid, since the consensus among players may be used as a kind of verification [11]. We call this time of repetition the match count. The higher an answer's match count is, the better its quality is.

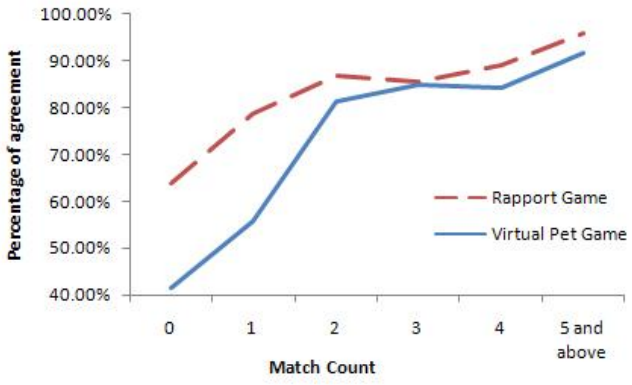


Figure 9. Percentage of agreement.

Figure 9 shows, for both games, the relationship between match counts and the statistical agreement from the voting activity where the players were asked to vote "agree" or "disagree" online to the collected fact. From the curves drawn based on over 10,000 votes for each game, one can find that answers whose match count equal to or exceed 2 are agreed to by at least 80% of the players, and that match count is virtually proportional to the percentage of agreement. Compared to other approaches collecting data from the general public (OMCS: 75% rated 4 and higher in scale from 1 to 5 [10], Verbosity: 85% [13]), we think this result shows that our approach is practical, and also flexible with adaptation of the match count.

In addition, Figure 9 also shows that the percentage of agreement in Rapport Game exceeds to Virtual Pet Game in average. From our observation on user behavior, we think this phenomenon is related to the interaction mode. In Rapport Game, the players interact directly and their photos are attached in all the questions/answers they make. As a result, players are more cautious about what they do so that they can leave a good impression on others. However, the players in Virtual Pet Game interact with others through their pets and don't know the name of players who make the questions/answers. Therefore, even with the voting mechanism, the players in Virtual Pet Game are more likely to make bad questions/answers than players in Rapport Game.

5.1.2 Collection Efficiency

There are 4,636 Chinese-speaking users on Facebook who registered Rapport Game in six months, in which 1,700 users (about 36.7%) really took actions and contributed 17,075 answers and 14,458 votes. We think this is because a big portion of the Facebook users add applications simply because their friends invite them, but they may not necessarily want to play this game. The Virtual Pets Game, on the other hand, was participated by 6,899 users, and about 606,170 answers and 23,178 votes have been collected in our databases.

Table 2. Efficiency comparison with OMCS

	OMCS-1	**Rapport**	**Pet**
Time	2 years	6 months	
# of contributors	9,296	1,700	6,899
# of unique statements	456,195	14,001	511,734

Table 2 shows the efficiency comparison between the Pet Game, the Rapport Game, and OMCS-1 [10], where we use the amount of unique answers to represent the commonsense pieces. As the readers can see, the Virtual Pets Game outperforms OMCS-1 in commonsense collection, with less time/contributor needed and more commonsense collected. The Rapport Game, however, does not perform as ideally. There are several potential reasons. First, there is only a small portion of users use Chinese in Facebook (about 1% Facebook users). Therefore, the number of users in all Chinese games are far less than the English ones. Second, as the readers will see in the number of answers and votes, players in Rapport game seem to prefer simple mouse-clicking over typing characters, suggesting interface design may strongly affect the collection result. These issues, in our perspectives, are more interface-related, which may be improved potentially and lead to better results.

5.1.3 *Player Retention*

With the data quality and efficiency assured, it is still insufficient to know how community features affect a game. In what follows, we compare the existing human computation games on Facebook and then discuss about the player retention in both games.

Table 3. Comparison of Facebook human computation games

	Rapport Game	GWAP	Collabio
Language	Chinese	English	English
# of monthly active users	605	45	98

Table 3 shows that the popularity of Rapport game is superior to other human computation games on the Facebook even though there are only 1% Chinese-speaking users on Facebook. The result may imply that the interaction and user model are useful for building a community-based game. The most different part in Rapport game from GWAP and Collabio is the friend-invitation mechanism (i.e. question asking) for the players in social-bond oriented layer. The question asking action brings the most active players' friends into the Rapport game, which in turn, increases their interaction through the Q&A. In the statistics of Rapport Game, players with higher *rapport scores* play with a higher percentage of friends and players playing with a higher percentage of friends have a higher average answer count. In particular, players with *rapport scores* over 30 play with 100% friends. The friend-invitation in GWAP and Collabio, on the other hand, is more like an isolated part in the game and not highly related to players' goal.

When it comes to the comparison between the Rapport game and Virtual Pet game, the behavior of players seems different in some ways. Figure 10 (a, b) shows the distribution of how many players had x number of interactions, where the interactions involve both answer and vote. We use this curve as the player retention curve and re-plot the comparison of both games in Figure 10 (c).

The slope of the player retention curve is a way to compare the popularity of both games in their platform. A steep slope means that many people tried the game few times and not many people returned to it again; whereas, a flatter slope means that many players played the game many times.

The comparison in Figure 10 (c) shows that the popularity of both games are nearly the same but there are more players for the Virtual Pet Game, for any given number of interactions x. We concluded the reasons of this phenomenon as follows:

1. Influence of goals

   It is surprising that the slopes of retention curve for both games are similar even if they are in two totally different communities. From our goal-oriented user model, it seems that the players in both games with the similar distribution of players in different layers.

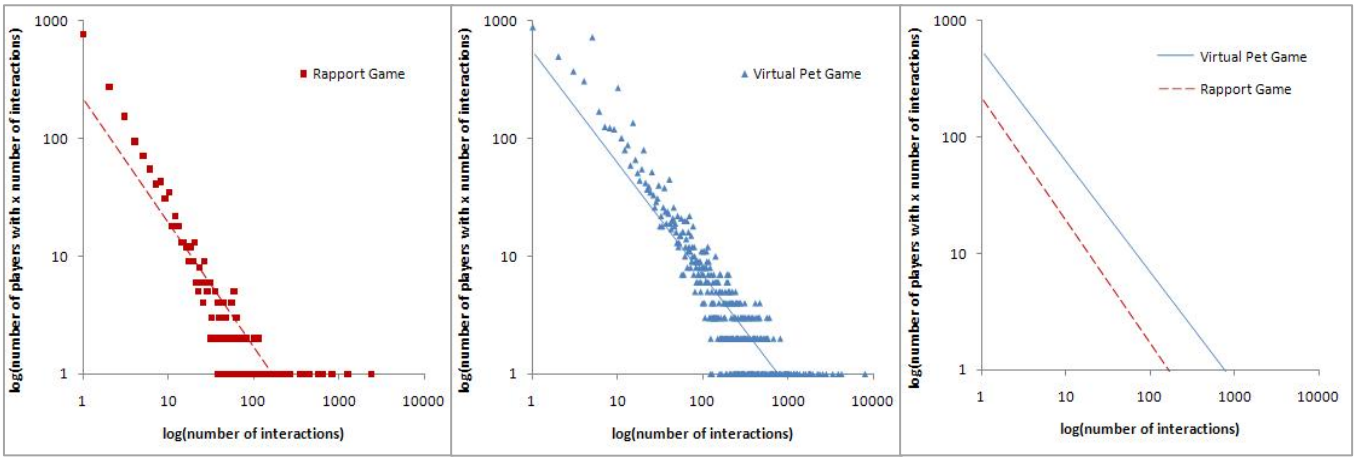
   However, given that food is the most important thing in raising a pet, the incentive to get *commonsense point* to exchange for food in Virtual Pet Game is stronger than to meet friends in Rapport Game so that the retention curve of Virtual Pet Game is flatter than Rapport Game.

2. Stand-alone-game vs. Game-within-a-game

   The Rapport Game is just one of the application in Facebook, whereas, the Virtual Pet Game is the build-in function in PPT. Therefore, the Rapport Game started with no players and need to compete with other applications on Facebook. The Virtual Pet Game, on the other hand, has some players with high loyalty at first. Every time a new function release, it will be a big topic on the Pet discussion board and the players will be eager to try it and influence others to play. To sum up, a game-within-a-game is easier to gather the user on the community to play through the original players than a stand-alone-game.

5.1.4 *Concept Diversity*

From Table 2, we can find that 10,147 commonsense collected by Rapport Game are not appear in the data from Virtual Pet Game. This tells us that the feature of data from different community may vary with community features.



(a) **(b)** **(c)**

Figure 10. Number of players who had x number of interactions.

Table 4. Top 10 concepts in both games

Rapport Game		Virtual Pet Game	
Concept	**Degree**	**Concept**	**Degree**
I	202	Sleep	5035
You	161	I	4473
Happy	137	You	4299
Laugh	118	Eat	4083
Sleep	117	Happy	2594
Love	113	Joy	2484
Bored	89	Stool	2447
Joy	85	Boring	2297
Boring	79	Money	2008
People	78	Angry	1991

We use the collected facts to create two Chinese-version ConceptNets, where the entered subjects and objects in the templates are the nodes, and the relations are the links. Examples include, "Taking off clothes before you take a shower" or "Candies are sweet".

The top 10 nodes of both games are listed in Table 4. From Table 4, it is clearly that the data w e collected are highly related to our daily life. Compared the top 10 concept list of the games, it shows that most concepts in Rapport Game are about the feelings of people and in Virtual Pet Game are about the necessity of life. This observation corresponds to the goals we set for users in Game Design section where players in Rapport Game care about the people and others' feelings and players in Virtual Pet Game teach their pets to how to live their lives.

5.1.5 Game Stability

To predict the sustainability of both games in a long-term scale, we made a logarithmic regressive estimation using the collected data for each game. Figure 11 shows the weekly estimation of the Virtual Pet Game, where the interactions include both answers and votes. Figure 12 on the other hand, shows the estimation of the Rapport Game. Both graphs choose the first 18 weeks of games, since we wish to predict the decay of games. The estimated logarithmic equations are shown by the drawn curves.

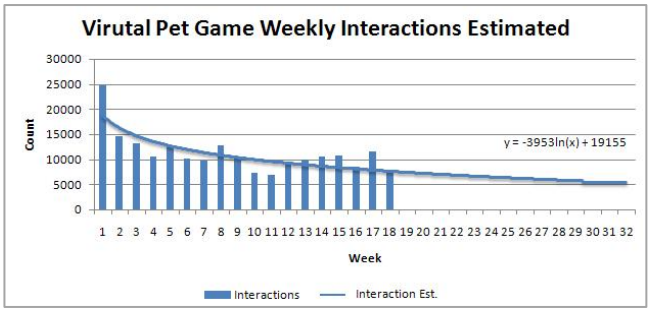


Figure 11. Virtual Pet Game weekly interactions estimation.

As the readers can see, the prediction of the Virtual Pets Game seems promising. Using the prediction equations, i.e. y = -3953ln(x) + 19155 for the interactions, the weekly interactions will be 3690.8 counts per week on the 50th week.

The result of the interaction in Rapport Game seems similar to Virtual Pet Game. Using the prediction equations, i.e. y = -82.23ln(x) + 990.22 for the interactions, the weekly interactions will be 668.53 counts per week on the 50th week.

The stability estimation of both games shows that the community-based games may be a feasible method for sustainable data collection. Moreover, in our experience in the interaction with the players in both games, they are responsive to the change of games. Once the data collection rate decrease, it is easy for developer to come up new functions to retain its popularity.

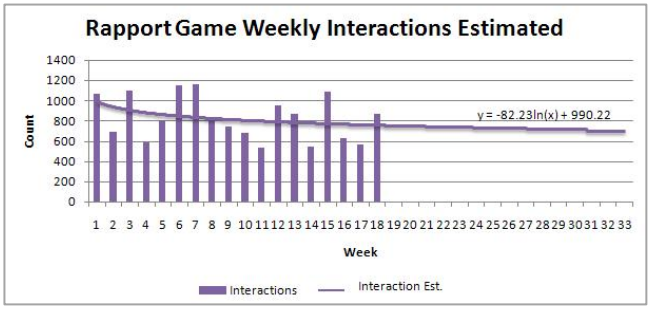


Figure 12. Rapport Game weekly interactions estimation.

5.2 Qualitative Analysis

Qualitative data has also been collected from our face-to-face discussion with several players of the Rapport Game, and the posts on the discussion board of the Virtual Pets Game on PTT. We now introduce them in this subsection.

First, the players of the Virtual Pet Game found this new functionality themselves by interacting with each other on the discussion board. For example, user "Katlinbubu" asked in a post series, "So you're the one who answered my question, right?", which user "Qpie" then replied, "Yup. It's me XD", which we view as an evidence of the virtuous circle that our game shares with the sense of fellowship that existed already in the community. That is, they feel excited about this game by interacting with each other, and interact more because of this new game.

A large number of players posted how they felt and their interaction details on the board. A player said, "The new function is so fun! I got crazy about it after getting to know it today…and stayed up late unconsciously…Oh! But my pet even said it's too tired that it doesn't want to answer me anymore : (" while another said, "A lot of its answers are so funny…like 'you practice drum playing when it is raining' and 'tails like to shake'…and it even asked me, 'I am so smart, right?' Ha ha". Lastly, the most extreme case that we found was, "…it makes me like it even more every day. I'm gonna feed it till the end of the world…" All these examples show that the pet raisers have strong affection with their pets and enjoy playing the game, even being aware of how the system actually works – they are really interacting with other players, not the pets.

On the other hand, players of the Rapport Game are concerned more about "other people reading my answers" since their profiles – at least personal icons and identities – are open to public. Some people feel more comfortable to play with those they are already familiar with, e.g. "I'd like to play but all these people are

strangers", while others feel less embarrassed to allow other players to see their answers, such as "I'm afraid people will see my idiotic answers, but it's okay since I don't know most people ". Showing that people tend to consider more when entering answers than simply teaching little, adorable "lives".

Nonetheless, the players are fairly consistent in enjoying reading other people's answers. One player said, "I'd like to see what other people answered", and the other said, "When I see my friends posting same answers as my own, it feels great". A player even expressed, "Sometimes I feel inspired by reading other people's answers", which is an unexpected statement to us. We found, after further investigation, that indeed some of our players" input could be insightful to others, such as "You would persist and live strongly when you fail", a kind of statement typical to the Rapport Game yet hardly found in the Virtual Pets Game, because the Rapport Game is more tuned to be a place where one is allowed to share her philosophy toward everyday situations.

5.3 Summary

In summary, we argue that developing a human computation game in communities is more than creating a typical web-based game. Existing constraints or features of the communities should be taken into consideration. The interaction mode and goal-oriented user model offer a direction with great potential. The Virtual Pets Game performs well in efficiency and the number of data collected, since it has a loyal community that has existed for years, and the game demands players to be responsible in frequent engagement. On the other hand, the Rapport Game, despite the relatively small number of users, excels in data quality. It has a considerable popularity among Chinese applications on Facebook. Direct interactions between players encourage most people to show the best of themselves to others. In summary, we have observed the following important elements of community-based games for effective data collection:

a) strong affective bonds between members in the communities, e.g. friend-invitation on Facebook, and the discussion board on PPT,

b) quality-verification mechanism by taking advantage of the communities

c) behavior of players affected by their goals

d) interaction with the responsive players in communities

e) community-selection according to the features of data we'd like to collect

which we believe are vital to successful, sustainable community-based game for data collection.

6. CONCLUSION

We present the interaction mode and goal-oriented user model for the design of community-based game for data collection and demonstrated the preliminary results from the Rapport Game and the Virtual Pet Game. Utilizing the power of the emerging social network and the traditional web community, the proposed method successfully attracted users to play by fulfilling their respective needs in different communities (e.g. users are eager to meet friends on Facebook and users want to see their pets grow on PTT). To further improve community-based games for data collection, we plan to develop strategies to increase the data quality with match count 0 or 1 (e.g. introduce of punishment in Virtual Pet Game), to analyze in depth the behavior of players to gain insights in building a community-based game, and to combine the elements of different communities with different games to enrich the diversity of data. The commonsense data collected can enable us to build up the Chinese ConceptNet.

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