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An Investigation of the Utility of Microblogging in a Virtual Organisation

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AN INVESTIGATION OF THE UTILITY OF MICROBLOGGING IN A VIRTUAL ORGANISATION

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ABSTRACT

Virtualisation is one possible business strategy of an organisation. The nature of virtual organisations is that individuals or teams are distributed over different work sites. This leads to barriers in communication, coordination and collaboration between these entities due to dispersed expertise, time zones, languages, cultures, etc. To address these issues, virtual organisations have invested in ICT for supporting collaboration between cross-site colleagues.

One very new collaborative technology is microblogging. Microblogging supports asynchronous communication between multiple persons. Microblogging is based upon transmission of short messages that can be sent from Web-based microblogging systems, instant messaging tools, email or mobile phones. Microblogging has some relevant features like simplicity, immediacy, accessibility and presence.

This paper describes our investigation of the utility of microblogging, particularly the Twitter tool, for collaboration support in a virtual organisation. Since microblogging is very new and was introduced only recently, no work has been done on this exact topic. The investigation involved conducting an online survey to collect participants' opinions about the utility of Twitter in the workplace after using Twitter over a three-week period. The study yielded quantitative and qualitative results regarding participants' experience of Twitter. It was found that microblogging could be adapted to virtual organisations quickly due to ease of use in terms of taking less time and effort for creating microblogs. Twitter could be used in virtual organisations for collaboration support because it is believed that the use of Twitter could somewhat improve communication between cross-site co-workers. However, to be well accepted by virtual organisations, Twitter needs improvement and addition to its existing functionality.

Keywords: *Microblogging, employee survey, virtual organisation*

1. INTRODUCTION

A virtual organisation is an entity that has dispersed departments or composite organisations operating in different places and different time zones in order to achieve shared goals [1]. Virtual organisations have natural advantages such as linking resources together, sharing workload, increasing operating time and productivity, reducing costs, etc. However, employees in virtual organisations also face challenges for coordinating project activities, such as communicating about and collaborating over activities because of distance and possibly time zones. For example, travelling time is a problem for geographically distributed co-workers when they want to communicate with each other for work activities.

Thus, researchers have studied the use of communication technology (for instance, email, instant messaging, audio/video conferencing, discussion forums, e-meeting systems, blogging, etc.) for reducing the barriers to distant communication and enhancing the effectiveness of communication in such situations. Some communication technologies are desktop-based applications and others are web-based applications. Recently, there is an increasing trend in studying a new generation of web-based applications for Web 2.0 for collaboration support in virtual organisations.

One of the newest web applications is *microblogging*. Microblogging allows multiple, distributed persons to communicate asynchronously. Microblogging is a social networking tool that allows users to communicate using different methods including the web user interface, instant messaging, email and mobile phones. Microblogging has evolved from blogging, instant messaging, text messaging, and social networking [2]. Some features of microblogging, such as accessibility, simplicity, presence and immediacy, have made this web application popular [3].

Twitter [3] is one of the most popular microblogging tools and is considered as one of the fastest growing applications in the history of the Internet [2]. In fact, Twitter has received great attention from online communities, media companies, business companies, bloggers, researchers, etc. For example, an official study has been conducted on Twitter about user intentions in using microblogging, geographical distribution of users and the relationships between different user networks [3]. There are also very useful ideas about the use of Twitter in the workplace, such as notification of current progress of work, task assignment done outside the workplace, notification of change of meeting schedules, etc. [4]. In addition, some famous technology bloggers like Robert Scoble have discussed the use of Twitter for business (for example, notification of business events) and marketing strategy (for example, informing others of a new product) [2]. Furthermore, some giant media companies (e.g. BBC, ABC, CNN, The New York Times, etc.) have used Twitter as a way of spreading news to a network of Twitter users.

Microblogging has the potential for supporting collaboration between cross-site colleagues in a virtual organisation due to its features. For instance, microblogging's immediacy means that colleagues can communicate quickly, and its accessibility means that there are several ways for colleagues to communicate effectively to one another. Our interest lies in how microblogging could be used in the workplace for collaboration support and to what extent microblogging could be used in the workplace for such a purpose. Therefore, this paper describes our investigation of the utility of microblogging, using the Twitter service, for collaboration support in a virtual organisation. Work has not been reported in the literature on this topic because of the recent inception of this technology. We have aimed to determine findings with regard to use of microblogging in a virtual organisation, for instance, participants' views about:

- particular features of microblogging like direct message

- the relevance of microblogging in communication

- using microblogging to notify colleagues of changes in meeting schedules, etc.

In order to achieve these aims, we have conducted a survey at a virtual organisation: Western & Central Melbourne Integrated Cancer Service (WCMICS) in Melbourne, Australia. An online survey was used to collect data about various aspects of using Twitter in such a virtual organisation, such as the usefulness of Twitter functions and potential uses of Twitter in the workplace. WCMICS staff members trialled Twitter for three weeks carrying out various activities, such as posting updates to Twitter, sending direct messages to a "follower" (a user who follows the messages of the person posting messages) or tracking other users' updates. Staff filled in the online survey after trialling Twitter to provide us with data for analysis; the analysis reveals our findings about the use of microblogging in a virtual organisation.

Section 2 covers the Twitter system. Section 3 discusses work related to the topic of this paper. Section 4 explains WCMICS so that the reader has a better understanding of this virtual organisation. The design of the trial is covered in Section 5. Following this, the major results and findings of the survey are presented in Section 6. We conclude with our conclusions in Section 7.

2. TWITTER MICROBLOGGING SERVICE

Twitter allows posting and receiving of updates with regard to both private and public networks. The updates are called *tweets* and are text messages of up to 140 characters (including hyperlinks), much like Short Message Service (SMS) messages of mobile phones. The most recently posted tweet will be found at the top of a Twitter page. Twitter allows posting and receiving of tweets flexibly in the following ways:

- The web: Twitter.com or third-party web applications like Twittervision, Facebook, etc.
- Desktop applications: twhirl for Windows and Apple Macintosh platforms, Twitteroo for the Windows

platform, etc.

- Instant messaging tools: GTalk, AIM, etc.
- Mobile phones: SMS, the mobile Twitter website, etc.
- Email: only for posting tweets
- Really Simple Syndication (RSS): only for receiving tweets

Twitter supports both one-to-many communication or one-to-one communication amongst users.

Due to lack of absolute certainty as to whether the Twitter user interface is permissible for inclusion in this paper (for copyright reasons), we have not included any screen captures of Twitter. However, the user interface can be viewed at Twitter.com.

A Twitter user's homepage consists of various sections. The major sections of the homepage are:

- post area, where users enter tweet content and post them
- display area, which supports display of recent tweets, replies from followers, all updates posted by the Twitter homepage owner and all public updates posted from Twitter users, and
- friend search area, where Twitter users can search for another user.

3. LITERATURE REVIEW

Due to the novelty and very recent introduction of microblogging, there is a tremendous lack of research on the specific topic behind this paper. Hence, this paper undeniably reports an original contribution to knowledge about microblogging and virtual organisations. This section discusses some other work on microblogging that also happens to be related to Twitter.

Java et al [3] discuss the usage and user community of Twitter. These researchers studied the growth of Twitter usage, user intentions and geographical distribution of users based on data collected over April and May 2007. It was found that there was rapid growth in the number of users of Twitter: for the first half of April, the number of users worldwide increased from about 3.4 million to about 5.1 million. In the same period, the number of tweets posted in total increased from about 18 million to about 31 million.

Based on examining the content of the updates, there was found four main uses of Twitter, such as discussion of daily activities and current status, and communication with friends.It was also found that there are three main groups of users based upon the relationship between Twitter users: (1) Information providers, (2) Information seekers, and (3) Friends.

Initial research has been conducted on exploring why people use microblogging and its possible effects on work-based informal communication [5]. Zhao and Rosson found that microblogging was used for such aspects as "frequent small updates of personal life events", "people-based RSS feed", etc. [5]. These researchers also present a conceptual framework for understanding the benefits of informal communication.

Microblogging has been used in a variety of areas such as libraries (for announcements, news about library events, etc.) [6], branding using word of mouth [7], higher education (e.g., for students' continual connection to a teaching blog [8] or potential use in nursing education [9]) and addressing social isolation [10].

Bocaneanu's research [4] is the closest in theme to our work. Bocaneanu discusses potential uses of Twitter in the workplace. Potential uses include:

- A user notifying their current progress in their work to other colleagues. The other colleagues are able to provide resources to that user relevant to their work (e.g. articles, guidelines, etc.).

- Updating status messages associated with instant messaging services (e.g., GTalk).

- Logging work activities of employees.

- Assigning tasks from outside of the workplace.

- Where a team uses a wiki for collaboration, announcements of wiki updates can be made with Twitter.

- Notifiying colleagues of any changes in meeting schedules.

4. WESTERN & CENTRAL MELBOURNE INTEGRATED CANCER SERVICE

WCMICS is one of three metropolitan Integrated Cancer Service organisations in Melbourne, Australia. Like the other two organisations, WCMICS follows principles such as providing high quality care to cancer patients, multidisciplinary

care, assuredness of access to full service for patients, and so forth. WCMICS aims to provide the right treatment and better support to cancer patients. To achieve this aim, WCMICS has four priorities including:

1. Multidisciplinary cancer care

2. Care coordination

3. Supportive care

4. Quality monitoring and support

Employees of WCMICS conduct various activities. Some employees are assigned to a tumour group (e.g., lung, skin, etc.) and are responsible to run and support projects in each tumour group. Other employees are responsible for information management associated with WCMICS activities. Finally, other tasks employees carry out in projects include stakeholder management, meeting arrangement, writing reports, information provision, workshops, etc.

WCMICS is highly relevant for surveying with regard to our project because it is a real virtual organisation and already has a need for collaboration support using computing technology. In fact, WCMICS communicates with six health organisations distributed across Melbourne and collaboration technology is considered as one of the major means for communication amongst clinicians, health professionals and other such staff. Particularly, the Victorian government (Victoria is the state of which Melbourne is the capital city) has invested in videoconferencing for supporting meetings and work groups in this virtual organisation.

Some employees of WCMICS are located in the abovementioned six organisations. Those employees not located in the six organisations form the WCMICS Directorate. The organisations are: Peter MacCallum Cancer Centre, Melbourne Health, Royal Women's Hospital, Western Health, Werribee Mercy Hospital and St Vincent's Health Melbourne. The WCMICS Directorate is the "glue" for assisting employees to work with one another given they are located in different organisations. Since these employees are spread across these different organisations, there is no doubt that the employees have to interact in a virtual manner. As supported by one of the results shown later in the paper, when employees communicate in a dispersed fashion they principally use email, telephone, and audio and video conferencing to achieve this.

5. DESIGN OF TRIAL

A. Overview

Seven WCMICS employees made up the final set of participants in our trial who participated in the survey. Twelve employees—the maximum number who could be approached from this very small organisation—were initially invited to participate in the survey. From this number, nine employees agreed to try out Twitter in the trial period of three weeks. Finally, when the survey was placed online for collecting responses, only seven employees answered the survey. Hence, the results reported in the next section will convey an initial idea about microblogging in a virtual organisation.

The participants had never used microblogging at all. The technology of microblogging was absolutely new to participants; hence, our results reflect what highly computer literate workers believe about microblogging having never used it before.

The participants trialled Twitter over a three-week period. Participants were provided with guidelines (shown only as an overview in Appendix A) explaining how to use the functionality and features of Twitter. Participants were then able to log into Twitter and use the functionality and features in their own time knowing that they will fill in a survey after the three-week period. They followed the instructions in these guidelines to learn how to use Twitter in its various ways. The major areas covered by the guidelines are shown in Appendix A since the guidelines are over thirty pages long. Some of the types of functionality the guidelines describe include:

- Users following each other on the Twitter network

- Posting and receiving tweets in different ways

- Replying to tweets from other users

- Sending direct messages to other users

- Tracking other users' tweets

Participants would take about half-an-hour or more to trial their use of Twitter. It was certainly not expected that each participant know fully how to carry out every aspect of available functionality in order to complete the survey. Once a participant has an understanding of how a microblogging tool works and what is possible with the tool, they are in a position to provide us with their view of the microblogging in the organisation.

At the end of the trial, the participants were requested to fill in the online survey. The third

author emailed the URL of the online survey to participants at WCMICS so that they could access the survey and fill in their responses.

B. Participant Profile

Table 1 shows the profile of each of the participants. The participants are identified with a simple code: P*X*, where *X* represents the number of the participant. The Table shows the position of each participant within WCMICS and also the tasks they carry out in that position. It can be seen that there are two information managers and two project staff members as reflected in their codes. Note that "ICS" refers to the entire metropolitan Integrated Cancer Service in Melbourne.

C. Survey

The survey of WCMICS employees was created in online form by the first author. The software used to create the online survey was Infopoll Designer (Infopoll Inc., 2008). Infopoll is a Canadian company providing online survey services for anyone who requires feedback from people. The Infopoll software is a desktop application used to create surveys locally that can then be published online (that is, as a Web site) by placement on the Infopoll server.

The design of the trial involves WCMICS employees filling in the online survey in their own time in a three-week period. There are different types of questions asked in the survey that provide us with relevant data. We have analysed this data to provide us with results from which we can learn about the utility of microblogging in a virtual organisation.

Raw data is stored at a remote Infopoll server. The Infopoll software automatically creates for us customised charts depending on our needs for graphical representation. Alternatively, the raw data can be downloaded in CSV format for our own analysis using other tools such as Microsoft Excel. In fact, this is what we did: we saved the data in its raw form and performed analysis in the form of histograms that is a feature of Excel. The histograms we have generated from the data, representing the results of this work, are shown in the next section.

The questionnaire is designed using both closed-ended and open-ended questions. Most questions in the survey are closed-ended questions that have a pre-defined list of answers from which participants can select their answers. The number of points for the scale of a question is either five points (for instance, question 3.16 in Appendix B) or seven points (for instance, question 3.1 in Appendix B).

TABLE I
PARTICIPANT PROFILE

Partici-pant	Position	Tasks performed
P2	Manager	Overall management responsibility for the WCMICS Directorate including: • Human resource management • Project management • Financial management • Performance management of directorate and ICS Stakeholder management, including CEOs of their organisations and the Department of Human Services, in conjunction with the ICS Director.
P3, P6	Information manager	Overall management responsibility for all information related activities in the ICS within the framework of the WCMICS information strategy in particular. Human resource and line management of an analyst programmer. Stakeholder management, including all relevant internal and external stakeholders.
P1, P4	Project staff	Management and support of tumour or work stream. Stakeholder management including all relevant internal and external stakeholders.
P7	WCMICS hospital administrative coordinator	Administrative and project support: • Leading the clinicians who participate in WCMICS local collaborating tumour groups. Includes follow-up of actions arising, managing site video-conferencing and call participation. • Meeting organisation, management and administration for any tumour group • Hospital tumour stream development including multidisciplinary care and continuity of care
P5	Analyst programmer	Web site maintenance. Data warehouse construction. General systems analysis and programming roles. Provision of data reports as required. Obtaining access to external data sources.

Also, some questions in the survey are open-ended questions to allow participants to provide their own opinions, comments or suggestions about a particular issue mentioned in those questions.

Questions in the survey are categorised as follows:

- Participant profile, involving aspects such as age, gender, educational background, etc. For example,

  Please indicate your years of experience of using collaboration technology (e.g. email, instant messaging, blogging, wikis, etc.).

- General communication. For example,

  How important do you think the immediacy (in terms of speed) of communication tools is (e.g. instant messaging, email, etc.)?

- Utility of Twitter. These types of questions include:

  - ❑ Usefulness of functions provided by Twitter, including RSS, direct message, reply, tracking, etc. For example,

    How useful do you think the tracking function supported by Twitter is?

  - ❑ Possible uses of Twitter in the workplace including notification of current task status, task assignments outside the workplace, etc. For example,

    What do you think about the possible uses of Twitter in the workplace?

  - ❑ Suggestions for improving and enhancing Twitter's abilities for supporting collaboration. For example,

    Based on your usage, how would Twitter needs to be different in order to better support communication in your virtual organisation?

The survey is attached to Appendix B of this paper.

6. RESULTS OF TRIAL

This section presents various results arising from analysis of the survey. Analysis was a straightforward process:

1. responses to closed-ended questions in section 1 of the survey ("Participant Profile") are mutually exclusive and proportions for each response are calculated (the results for these are in section 6.1)
2. responses to checkbox-based questions (for instance, question 2.1 in Appendix B) are used to calculate proportions for each response
3. responses to point scale closed-ended questions are analysed to draw distributions of responses
4. responses to open-ended questions are used to learn about participants' views, and in some cases responses (or portions of them) are cited as evidence of their views

The histograms in sections 6.B and onwards are distributions of responses from the closed-ended questions in 2. and 3. above.

A. Background of participants

From the seven participants, 86% are female and 14% participants are male. Their educational backgrounds include high school as highest achievement (14%), undergraduate as highest achievement (43%) and postgraduate as highest achievement (43%).

More than half of participants have worked for less than one year in the WCMICS (57%). The remaining participants have worked more than one year but less than two years (29%) and more than two years (14%). Most of participants are working in a non-management position (Information Managers are not considered as part of management) and only one participant is working as a manager at the WCMICS. Interestingly, 100% of participants have knowledge of IT for more than ten years. Some of them have six to ten years of experience using collaboration technology (43%) compared to 57% of participants who have more than ten years of such experience.

B. Methods of communication

Fig. 1 shows for different methods of communication amongst employees, the proportions of the total set of participants that use certain methods. For instance, 100% of employees use face-to-face meetings and email to communicate with each other. It can be seen that these employees do not use instant messaging, blogging or other forms of groupware to
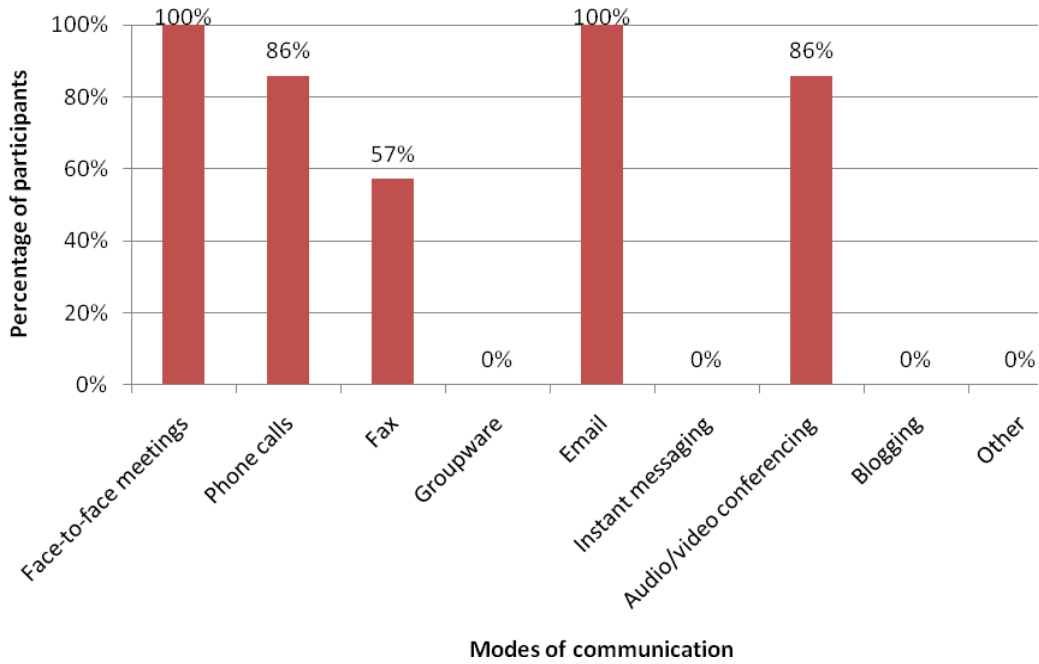
Fig 1. Methods by which employees communicate

communicate with one another. However, these employees do make good use of audio and video conferencing for communication.

C. Utility of Twitter in the workplace

1) Flexible ways for posting and receiving tweets
    Question 3.1 asks participants if they believe Twitter will be more useful in their workplace given the flexibility in using the tool for posting tweets and receiving them. The responses to this
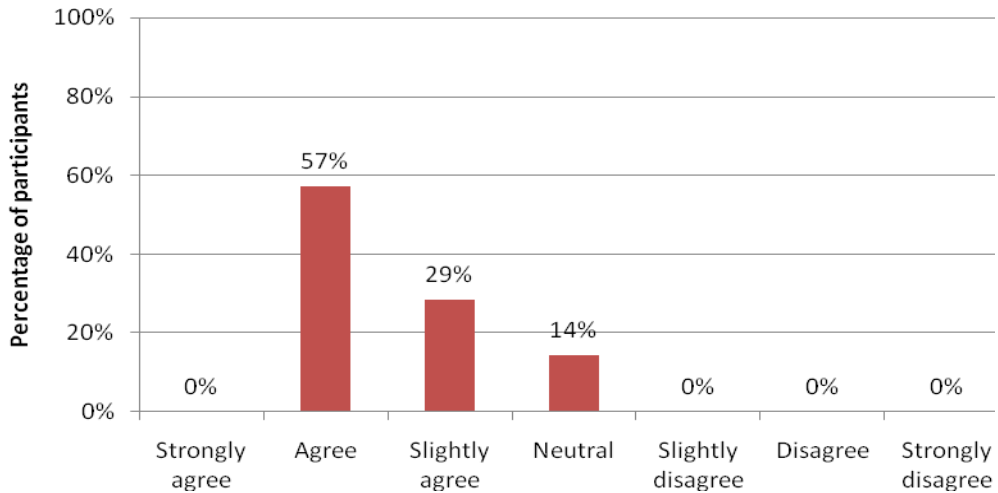
Fig 2. Responses to flexible ways to post and receive updates and increasing the utility of Twitter
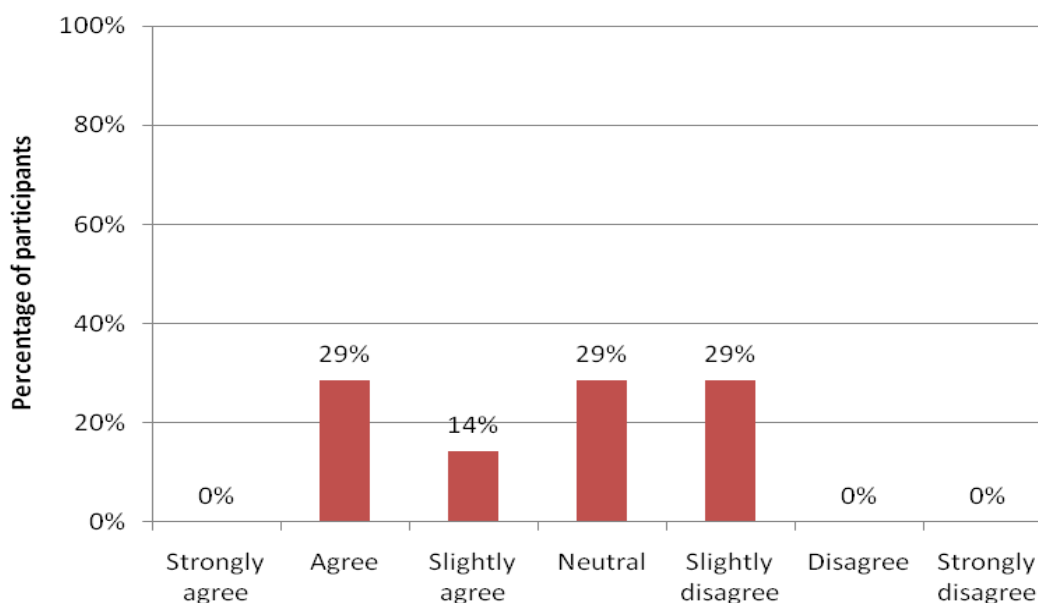
Fig. 3. Responses to direct message as an alternative to email

question are shown in Fig. 2.

Fig. 2 suggests there is potential in applying microblogging in a virtual organisation from the majority of responses being in the positive region of the Figure. Given the ubiquity of mobile phones, the commonness of email and the familiarity of the web, our results show that using these technologies with microblogging can possibly be a helpful way to communicate with other users. A highly negative result for this question would have made us wonder if microblogging would be of any use to employees in a virtual organisation.

2) Direct message

Direct message operates similarly to email. Using this functionality, a user sends private messages directly to other users who are followers of the first user. If a user does not have any followers, the user cannot send direct messages to anybody.

Question 3.12 asks participants about use of direct messages as an alternative to using email to send short messages privately to colleagues. Fig. 3 represents the distribution of responses to this question.

43% of participants believe to some extent that direct message could be used instead of email. One participant stated that "*This would be a key function for me*" and another stated "*Because it was easy*" (these responses reflect the 43% agreeing with the

question). The one participant who responded in slight agreement stated:

> *I feel email is sufficient at the moment. Only application for me would be to receive messages to my phone when not at my desk and at one of the hospitals*

These three favourable responses suggest that microblogging is worthwhile to provide for the sake of some employees in a virtual organisation.

The two participants who slightly disagreed with using direct messages as an alternative to email claimed:

> *Why log into a webpage when I am generally on email all the time*

and

> *I would like to have all of my formal correspondence (irrespective of size) stored in one place for easy reference. However I would prefer sending informal (non work related) short messages via Twitter*

Although this last participant slightly disagreed, they still indicated they would use microblogging for one particular task.

Our conclusion from these results is as follows. The direct message functionality of Twitter cannot replace email, but can be used in conjunction with email. Particularly, this functionality will be used as an extra way to communicate to colleagues in an informal way and in case they are out of office.
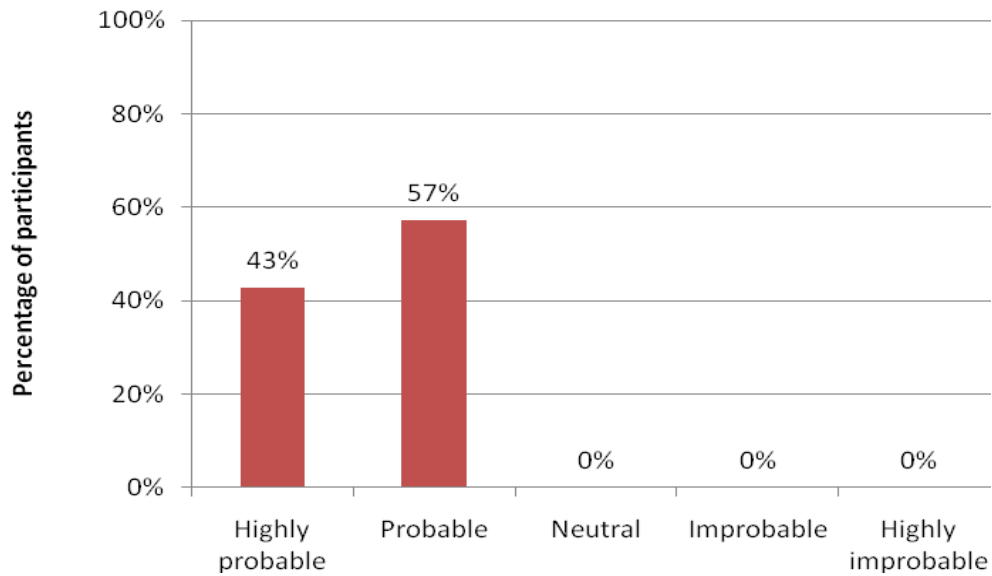
Fig. 4. Responses to use of Twitter for notifying about change of meeting schedules

Direct message could be used in the case when user wants to send a message privately to a certain follower and not all followers.

3) Notification of change of meeting schedules
   Question 3.16 is an overall question dealing with possible uses of microblogging in the virtual organisation. One of the sub-questions under this question asks for participants' views about use of microblogging for notifying colleagues of changes in meeting schedules. Refer to Fig. 4 for responses to this question.
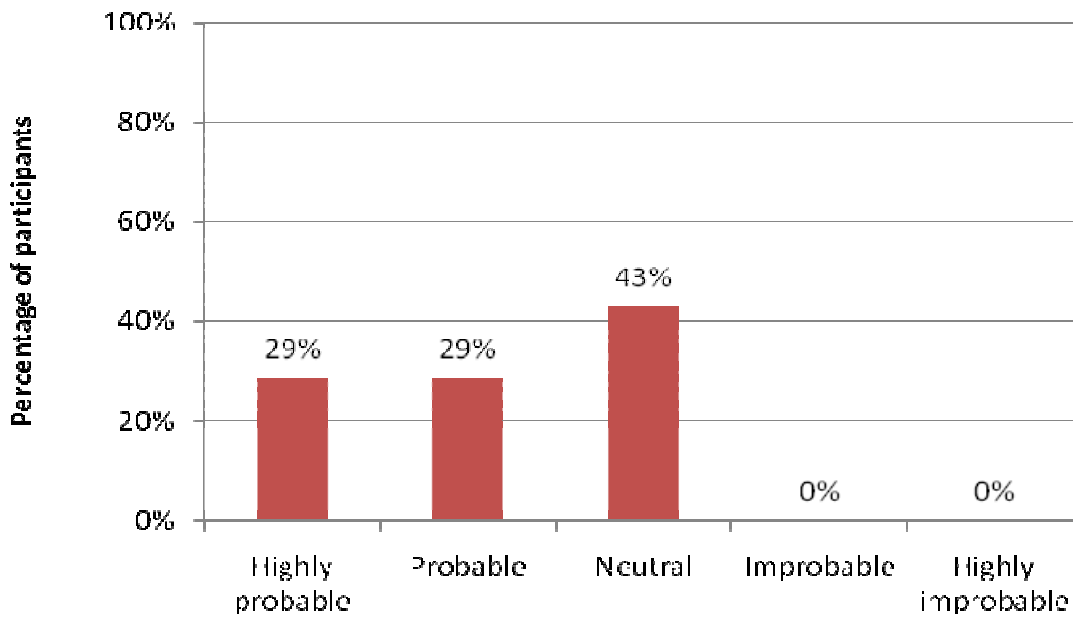

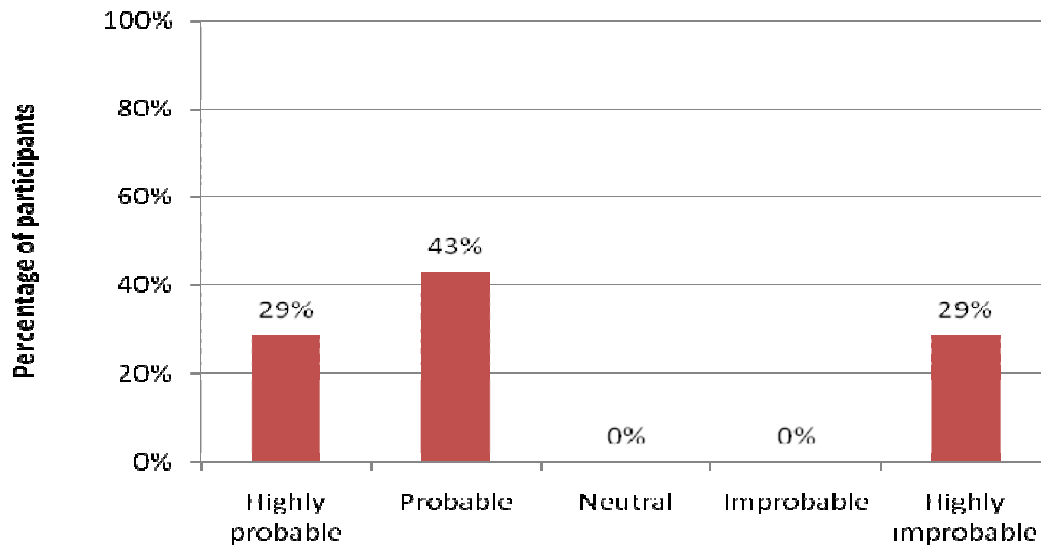Fig. 5. Responses to using Twitter to pose questions for work-related problems

Fig. 6. Responses to use of Twitter for sharing work-related information

It is clear that there is a very positive view about using microblogging to deal with changes to meeting colleagues. When employees are out of the office and have no access to their computer, they can use Twitter via SMS to notify others that they need to change meeting times. Three participants found it highly plausible that they would use microblogging for this purpose; two responses from them include: "*Particularly if out of the office*" and "*if a meeting is cancelled at last minute, sending a message by both email and SMS is convenient*". One of the participants responding as "probable" claimed Twitter "*Could be useful to those who are out of the office*".

4) Asking about specific work-related problems

Another sub-question under question 3.16 requests responses to "Posing questions for specific work-related problems". This means that an employee uses the microblogging tool to ask a question specifically related to work to which they need to find a solution. Fig. 5 illustrates that some proportion of participants are favourable to this idea.

Like the provision of direct message as an alternative to email, Twitter could be provided as one alternative to allow workers in a virtual organisation to ask work-related questions. The disadvantage that microblogging has over other communication technologies is that message length is limited to 140 characters (also considering that SMS messages are no longer limited to 160

characters). This limited length can make it difficult to write out an entire question and provide its context.

5) Sharing work-related information

Still another sub-question under question 3.16 was one that asked, "Sharing work-related information (e.g., URL, events, not including news)". This question aimed to determine what participants thought about using microblogging to provide each other with work-related information without using the technology to provide news (that would be best provided using in other ways such as at the organisation's intranet). The interesting result from this question is shown in Figure 6.

Of all the distributions presented so far in this paper, this one is the first containing a reasonable proportion of negative responses. However, the majority of participants (72%) are in favour of using microblogging to share work-related details. To get a better picture of what employees of a virtual organisation think about this issue, more participants are required for the sample (this also applies to the other questions described above). Again, there is support for use of microblogging (in this case, for sharing work-related information) as one of several means for achieving an aim. In other words, microblogging is not seen as the new technology to replace other technologies for sharing information, but as one useful technology to achieve this aim.

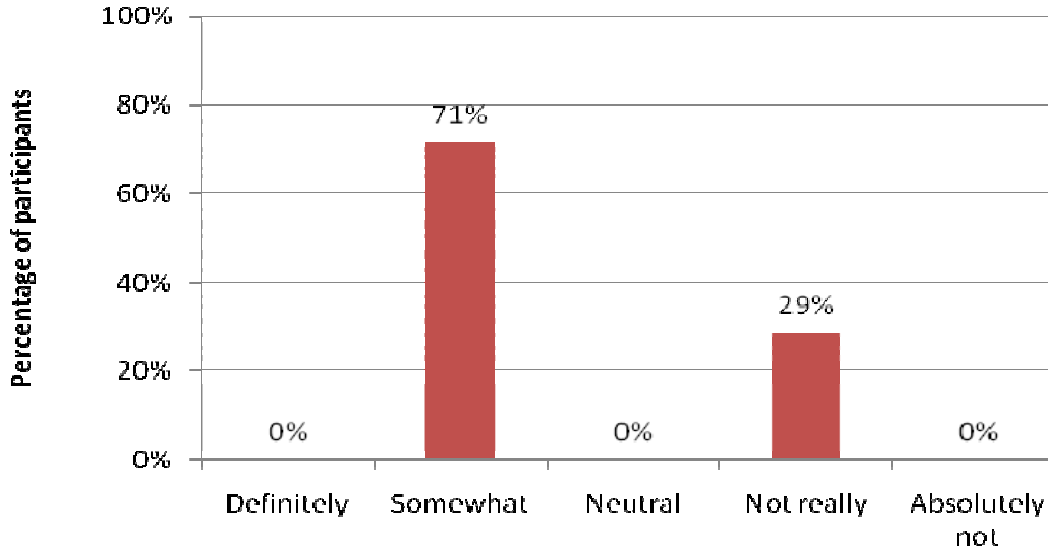*6) Improving communication in WCMICS*

Fig. 7. Responses to use of Twitter to improve communication in WCMICS

Question 3.17 and 3.18 asked if Twitter could ameliorate communication in the virtual organisation. The result shown in Fig. 7 is a useful result and correlates to the result in Fig. 8 that is discussed in the next sub-section.

Fig. 7 shows that most participants believe microblogging is able to enhance communication in the virtual organisation; however, it cannot do this in its current form. That is, microblogging is a relevant tool having the potential to improve communication, but to do this, it needs further adjustment. Of course, a larger sample size would give a better result with regard to this issue. Nevertheless, in the main, employees of WCMICS welcome microblogging as an extra technology for supporting communication in their work.

First, we can address the negative side of the result. There are two participants who form the "Not really" view. Their qualitative responses to question 3.18 include:

> *Unless the functionality changes and the service is easier to use then no. Also*
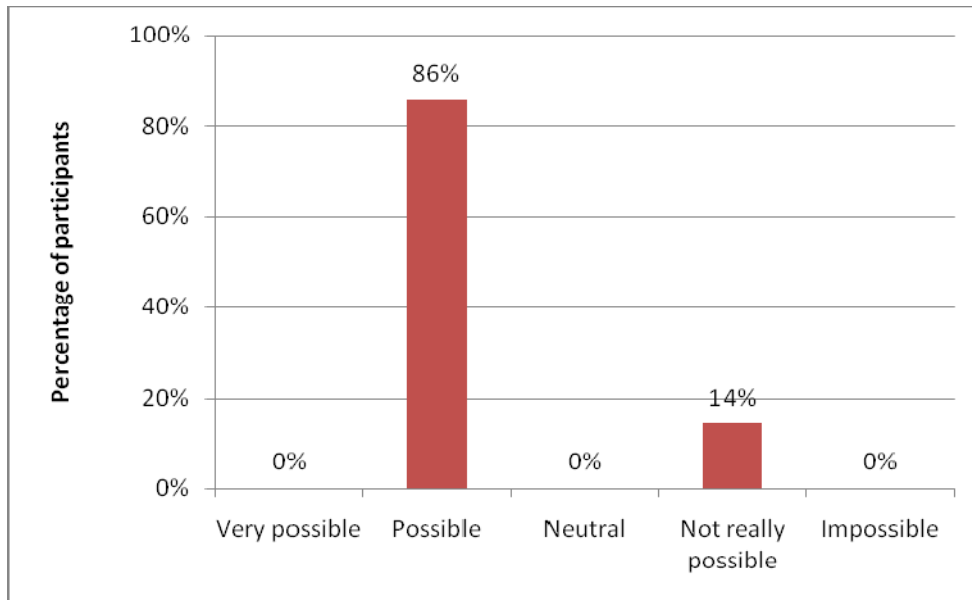

Fig. 8. Responses to possibility of use of Twitter in the workplace

need a group distribution to send same message to a group of contacts

and

Doesn't really do anything better than email

Now, the positive perspective behind use of microblogging involves the following comments. The first comment is:

I think it has possibilities but there are limitations due to: people perceiving logging in as another thing to do; few people have company phones therefore concern about cost of receiving SMS; can't use it for longer messages

We are unsure why this participant states "cost of receiving SMS" as a problem since receivers of SMS in Australia normally do not pay the cost of a message as this cost is borne by the sender. One participant's view was that:

Some member of the staff may be working out of office and may not have access to email. Twitter could help (limited) communication via SMS

Another participant stated:

It would provide a place for communication and feedback where most communication is a one way process

The last comment of the "Somewhat" category is: "Just needs to be integrated into daily use which would take time".

7) Possibility of using Twitter in the workplace

Question 3.22 asks generally about whether Twitter as a technology could be used at WCMICS. We consider that Fig. 8 conveys an important result: it is a key, overall finding of this research.

The Figure shows that, like in case of the previous question, participants principally believe that the technology has potential, but needs further improvement to be well accepted in the organisation. Like the previous case, no participant overwhelmingly agrees with Twitter's use (which is why it needs improvement), the majority are positive about Twitter, and very few are negative about Twitter, and even these few are not grossly negative in their view of Twitter.

First, the only negative view consisted of the following comment (there was no further expansion by the participant on the reason behind this comment): "*Doesn't meet organisational needs*". We can only conclude that from this participant's experience with microblogging that they believe

that with all it has to offer, the technology is not relevant to their work in the virtual organisation.

The remaining comments, of participants who viewed that it is possible to use microblogging in WCMICS, included the following: "*Contacting staff working out of office*", "*Dependant on participation*", "*I think I need more education about it*", "*Would need some modifications ...*" and

I think it would be useful to link those not at our 'head office' or those who are out of the office

It is re-stated here that certain changes need to be made for Twitter to be far better accepted as a technology that would be widely used at WCMICS. These changes are covered in the following sub-section.

D. Suggestions for improving Twitter

Various suggestions for ameliorating the functionality of Twitter have been provided via questions 3.19 and 3.24 in the questionnaire in Appendix B. From the feedback of one participant, it was found that improvements include receipts sent to the sender of a message to indicate the receiver has read the message, increasing the length of the message and support for sharing documents:

I would like to be able to obtain read receipts; text message length is too short. I am old and don't like shortened text talk i.e. U 2 2morow; As sender would like option not to send to mobile; Document sharing section would make it more useful

A mechanism whereby an email message is sent to a follower to indicate that a tweet has been placed at Twitter would be useful:

Perhaps links to email to let you know when someone has left a message. Sometimes I forgot to check and didn't want my mobile beeping all the time so switched the phone message off.

A setting in Twitter that allowed only urgent messages to be sent as SMS rather than all messages sent as SMS was also suggested:

the option to send SMS updates was good but it got annoying after a while as you only want to get these for urgent messages rather than general chat although I consider myself reasonably computer literate, I found the website a little difficult to use

Another suggestion from a participant was that Twitter should have a feature of archiving

messages. Actually, Twitter has this feature, but it only archives messages with date and time stamp in reverse-chronological order without grouping messages by week, month or year.

A final major suggestion is that there should be group distribution of messages so that a sub-group of followers receive these messages.

7. CONCLUSION

This research has involved use of an online survey of employees of a virtual organisation: the Western & Central Melbourne Integrated Cancer Service (WCMICS). In our study of microblogging, using the representative Twitter system, in a virtual organisation, we have gained various findings. Although our study has not involved a large number of participants, we have a preliminary idea about this particular topic.

The immediate uptake of microblogging is quite possible in a virtual organisation given our results. Given flexible ways to post messages (i.e., SMS, Web interface, email, etc.), most of our participants were positive that this would encourage use of microblogging to communicate with one another. The direct message functionality of microblogging would be useful to a proportion of employees as an alternative to email. That is, some employees would be satisfied in using email as they already have in the past, but some would be open to using microblogging to communicate in this way.

Of course the logistics of meetings will change in an organisation, and a virtual organisation is no exception in this regard. The response to using microblogging to address this issue was positive overall. Hence, we would recommend organisations investigate the application of microblogging for this purpose to determine if it would be successful in their situation.

Just over half of the respondents believed that microblogging would be highly useful or somewhat useful for placing questions that seek answers to work-related problems. However, users have to contend with the character limit of messages in posing questions. The majority of the respondents also believed microblogging would be useful to differing extents in sharing work-related information. Our results do not suggest replacement of other technologies that also carry out this task, but that microblogging could be one relevant way to carry it out.

Generally, participants felt that microblogging could improve communication in the virtual organisation, but more has to be done with a tool like Twitter to achieve this. Whether microblogging be made easier to use or that it supports group distribution or that it allows longer messages or that it "*be integrated into daily use which would take time*", microblogging needs to be altered or used more so that it is a highly relevant tool to a virtual organisation. Investigating the possibility of generally using Twitter in a virtual organisation also lead to a similar result to that question, and the conclusion is also the same: adjust Twitter and expose it further to employees to make it more useful to the organisation.

Some comments that were provided in response to a few of our questions included the notion of being out of office. These employees naturally spend some time externally to their offices in the workplace and this recurring theme in their responses suggests that microblogging, with its flexibility of access (e.g., via mobile phones) is relevant technology to support them in this way of working.

Finally, various improvements were found for the case of Twitter (of course, other microblogging tools may not need these requirements as they may also have the following types of functionality). These improvements include those such as the provision of read receipts, longer message length, document sharing and setting the system so that only urgent messages are sent via SMS.

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APPENDIX

Appendix A – Guidelines for Using Twitter (partial)

1. How to create a Twitter account
2. How to protect your updates from being viewed by unknown people
3. How to set time zone to Melbourne time
4. How to go back to my Twitter homepage
5. How to sign in Twitter
6. How to sign out from Twitter
7. How to post an update to Twitter
8. How to delete an update from Twitter
9. How to view your all updates
10. How to put an update to your collection of favourite updates
11. How to take out an update from your collection of favourite updates
12. How to view all your favourite updates
13. How to view a single update
14. How to add a tiny URL (web page address) to content of an update
15. How to follow a user on Twitter
16. How to not follow a user on Twitter
17. How to block a follower
18. How to unblock a user
19. How to create a group of users for private communication via Twitter network
20. How to accept an invitation when your updates are protected
21. How to turn on/off notifications for a user in your list of people who you are following
22. How to set up your mobile phone to send updates to Twitter and receive updates from other people who you are following on Twitter
23. How to send an update to Twitter using SMS
24. How to not receive updates from other Twitter users using SMS
25. How to not receive updates via SMS and IM from other users by the web
26. How to send a direct message using SMS

48. How to get all latest updates from your Twitter account using Twitteroo application
49. How to track a word in all updates that you get from other people who you are following via SMS/IM
50. How to untrack a word in all updates that you get from other people who you are following via SMS/IM

Appendix B – Online Survey

Utility of Microblogging Services in Virtual Organisations Survey

Twitter.com - A Microblogging Service

Twitter is considered as a new online social technology that allows users to post and trace other users' microblogs (short updates and having 140 characters). The number of Twitter users has increased rapidly because of its useful functionality such as quick communication, and Twitter also supports various ways to post and receive the updates such as the web, desktop application, IM, SMS and email (post only). A question posed is "Could Twitter be highly useful in the workplace for supporting collaboration between geographically distributed colleagues?". Therefore, this survey is aimed to find out the answer to that question. The survey data will be used to write up a thesis and possibly publish a paper. All participants' information will be kept confidential.

Some questions require you to use the Twitter's functions in order to know what they are and how they works before you can answer them in a correct way.

Participant Profile

1.1. **Which range of age are you in? ***

○ 15 - 25 years old

○ 26 - 35 years old

○ 36 - 45 years old

○ 46 - 55 years old

○ 56 - 65 years old

1.2. **Which gender group are you in? ***

○ Male ○ Female

1.3. **Please indicate your educational background. ***

○ High school

○ TAFE

○ University *please indicate "undergraduate" or "postgraduate"* [   ]

1.4. How long have you worked for the WCMICS? *

○ Less than 1 year

○ 1 - 2 years

○ More than 2
years

1.5. Please indicate your position in the WCMICS. *

○ Management   ○ Non-management

1.6. How long have you used information technology (e.g. word processor, email, etc.) ? *

○ Less than 1 year

○ 1 - 5 years

○ 6 - 10 years

○ More than 10
years

1.7. Please indicate your years of experience of using collaboration technology (e.g. email, instant messaging, blogging, wiki, etc.). *

○ Less than 1 year

○ 1 - 5 years

○ 6 - 10 years

○ More than 10
years

General commmunication tools

2.1. Which mode(s) of communication do you use in the workplace?

Please choose all that apply

☐ Face-to-face meetings   ☐ Email (e.g. Microsoft Outlook, Yahoo Mail, Gmail)

☐ Phone calls   ☐ Instant messaging (e.g. Skype, Yahoo Messenger, GTalk)

☐ Fax   ☐ Audio/video conferencing

☐ Groupware (e.g. Lotus Notes, Microsoft Netmeeting) ☐ Blogging (e.g. blogger.com, wordpress.org)

☐ Other *Please indicate* [_____]

2.2. How important do you think the immediacy (in terms of speed) of commmunication tools is (e.g. instant messaging, email, etc.)? *

Very important	Important	Neutral	Not really important	Unimportant
○	○	○	○	○

2.3. The use of communication tools taking less time and effort is important to me. *

Strongly agree	Agree	Slightly agree	Neutral	Slightly disagree	Disagree	Strongly disagree
○	○	○	○	○	○	○

Utility of Twitter in the workplace

3.1. Twitter has different ways to post and receive updates such as the web (e.g. Twitter.com), desktop applications (e.g. Twitteroo), instant messaging (e.g. GTalk), SMS or email (*post only*). This will increase the utility of Twitter in the workplace. *

Strongly agree	Agree	Slightly agree	Neutral	Slightly disagree	Disagree	Strongly disagree
○	○	○	○	○	○	○

3.2. Which way(s) did you use to post updates to Twitter?

Please choose all that apply

- ☐ The web
- ☐ Desktop application
- ☐ Instant messaging
- ☐ SMS
- ☐ Email

3.3. Which way(s) do you feel are more convenient?

Please choose all that apply and indicate your reasons

- ☐ The web _____
- ☐ Desktop application _____
- ☐ Instant messaging _____
- ☐ SMS _____
- ☐ Email _____

3.4. Which way(s) did you use to receive updates from Twitter?

Please choose all that apply

☐ The web

☐ Desktop
application

☐ Instant messaging

☐ SMS

3.5. Which way(s) do you feel are more convenient?

Please choose all that apply and indicate your reasons

☐ The web [_____]

☐ Desktop application [_____]

☐ Instant messaging [_____]

☐ SMS [_____]

3.6. Did you use RSS supported by Twitter? *

RSS (Really Simple Syndication) is used with a RSS reader (e.g. Google Reader, My Yahoo!, NewsGator) to get new updates of your interest without going to Twitter website.

○ Yes ○ No

3.7. How useful do you think RSS supported by Twitter is?

You don't need to answer this question if you answer "No" for question 3.6.

Very useful	Useful	Slightly useful	Neutral	Very little usefulness	Not useful	Absolutely not useful
○	○	○	○	○	○	○

3.8. Did you use the reply function supported by Twitter? *

Reply is a way to give your feedbacks or comments on a particular update from other users.

○ Yes ○ No

3.9. How useful do you think the reply function supported by Twitter is?

You don't need to answer this question if you answer "No" for question 3.8.

Very useful	Useful	Slightly useful	Neutral	Very little usefulness	Not useful	Absolutely not useful
○	○	○	○	○	○	○

3.10. Did you use the tracking function supported by Twitter? *

Tracking means you are looking for updates having a word of your interest (e.g. a name, a place, etc.). Thus, when any update that matches your word of interest, you will receive a notification from Twitter via SMS or IM.

○ Yes ○ No

3.11. How useful do you think the tracking function supported by Twitter is?

You don't need to answer this question if you answer "No" for question 3.10.

Very useful	Useful	Slightly useful	Neutral	Very little usefulness	Not useful	Absolutely not useful
○	○	○	○	○	○	○

3.12. Twitter has direct message function to send messages privately to other Twitter users so I will consider it as an alternative way to send brief messages to my colleagues instead of email. *

Strongly agree	Agree	Slightly agree	Neutral	Slightly disagree	Disagree	Strongly disagree
○	○	○	○	○	○	○

3.13. Please indicate your reasons for your answer to question 3.12.

3.14. Twitter doesn't group updates in archive by year, month, week or day. This is difficult for me to view a particular update later by date. *

Strongly agree	Agree	Slightly agree	Neutral	Slightly disagree	Disagree	Strongly disagree
○	○	○	○	○	○	○

3.15. Twitter doesn't have a built-in search engine for updates. However, a search engine is essential for finding your updates. *

Strongly agree	Agree	Slightly agree	Neutral	Slightly disagree	Disagree	Strongly disagree
○	○	○	○	○	○	○

3.16. What do you think about the possible uses of Twitter in the workplace?

	Please indicate the level of possibility *					Please comment
	Highly probable	Probable	Neutral	Improbable	Highly improbable	
Notification of current task status	○	○	○	○	○	
Notification of change of meeting shedules	○	○	○	○	○	
Notification of wiki work-related updates (wiki is a website that is edited by its visitors such as Wikipedia)	○	○	○	○	○	
Task assignments outside the workplace	○	○	○	○	○	
Logging work activities	○	○	○	○	○	
Posing questions for specific work-related problems	○	○	○	○	○	

Apart from posing questions, seeking answers for specific work-related problems in other ways	○	○	○	○	○	
Sharing work-related information (e.g. URL, events, **not including news**)	○	○	○	○	○	
Reporting work-related news	○	○	○	○	○	

3.17. Do you believe your use of Twitter could improve communication in your organisation given its nature as a virtual organisation? *

Definitely	Somewhat	Neutral	Not really	Absolutely not
○	○	○	○	○

3.18. Please indicate your reasons for your answer to question 3.17.

3.19. Based on your usage, how would Twitter need to be different in order to better support communication in your virtual organisation? *

Please give your suggestions

www.jatit.org

3.20. **Twitter would be well accepted by other key members of your virtual organisation.** *

Strongly agree	Agree	Slightly agree	Neutral	Slightly disagree	Disagree	Strongly disagree
○	○	○	○	○	○	○

3.21. **Please indicate your reasons for your answer to question 3.20.**

3.22. **To what extent do you think Twitter could be used in the workplace?** *

Very possible	Possible	Neutral	Not really possible	Impossible
○	○	○	○	○

3.23. **Please indicate your reasons for your answer to question 3.22.**

3.24. **What *new* capabilities or *new* functionality supporting your work do you want to recommend for adding to Twitter?** *

3.25. **Do you have any further comments on Twitter?**

Your comments and feedbacks will be essential for the completeness of research project about the utility

of microblogging services in virtual organisations.

Submit form   Clear form

This form was built with Infopoll Designer.