Advantages and disadvantages of four interview techniques in qualitative research

Citation for published version (APA):

Document status and date:
Published: 01/01/2006

Document Version:
Publisher’s PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:
• A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher’s website.
• The final author version and the galley proof are versions of the publication after peer review.
• The final published version features the final layout of the paper including the volume, issue and page numbers.

Link to publication

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the “Taverne” license above, please follow below link for the End User Agreement:
www.tue.nl/taverne

Take down policy
If you believe that this document breaches copyright please contact us at:
openaccess@tue.nl
providing details and we will investigate your claim.

Download date: 04. Sep. 2019
Advantages and Disadvantages of Four Interview Techniques in Qualitative Research

Raymond Opdenakker

Abstract: Face-to-face interviews have long been the dominant interview technique in the field of qualitative research. In the last two decades, telephone interviewing became more and more common. Due to the explosive growth of new communication forms, such as computer mediated communication (for example e-mail and chat boxes), other interview techniques can be introduced and used within the field of qualitative research.

For a study in the domain of virtual teams, I used various communication possibilities to interview informants as well as face-to-face interviews. In this article a comparison will be made concerning the advantages and disadvantages of face-to-face, telephone, e-mail and MSN messenger interviews. By including telephone and MSN messenger interviews in the comparison, the scope of this article is broader than the article of BAMPTON and COWTON (2002).

Table of Contents

1. Introduction

2. Advantages and Disadvantages of the Four Interview Techniques
   2.1 Face-to-face interviews: Synchronous communication of time and place
   2.2 Telephone interviews: Synchronous communication of time, asynchronous communication of place
   2.3 MSN messenger interviews: Synchronous communication of time, asynchronous communication of place

3. Summary

4. Conclusions

Acknowledgement

References

Author

Citation

1. Introduction

KVÄLE (1983, p.174) defines the qualitative research interview as "an interview, whose purpose is to gather descriptions of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena". Collecting these descriptions can be done in several ways, of which face-to-face interviews are the most common. Besides Face-to-Face (FtF) interviews, interviewing by telephone is popular too. But also interviewing using the Internet is rising. Due to developments in computer technology, all kinds of computer mediated communication (CMC) tools have been developed. With CMC is meant: a process where messages are electronically transferred from a sender to one or more recipient(s), both in synchronous (in real time) and in asynchronous (independent
from time and place) setting. Examples of tools used for CMC are e-mail and chat boxes (as MSN messenger), which also can be used for interviews. [1]

The experiences with the four mentioned interview techniques were gained during my research of EU funded virtual teams, from which team members were dispersed all over Europe. I tried to conduct as much FtF interviews as possible in the first place, but due to time and financial constraints this was not always possible. Also doing research on virtual teams, where FtF communication has decreased in favour of other forms of communication, paved the way for me to use other interview techniques. Although it would have been likely to establish telephone interviews, not all interviewees were in favour of it. As one interviewee remarked "We can do it (the interview) by an Instant Messaging tool as well. If it takes an hour, I think it will be better and less disturbing for my colleagues". The focus of this research was semi-structured interviews. [2]

In this article four types of interview techniques will be compared: FtF interviews, telephone interviews, MSN messenger interviews, and e-mail interviews. The focus of this article is concentrated on the ways in which the four interview techniques differ from each other, thus highlighting the advantages and disadvantages. Whenever possible, the experiences from my own interviews are mentioned. [3]

### 2. Advantages and Disadvantages of the Four Interview Techniques

When comparing the four interview techniques, the differences in advantages and disadvantages are on one hand related to their differences on the dimensions synchronous communication in time and/or space and asynchronous communication in time and/or space. Table 1 presents the four interview techniques related to these dimensions.

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronous</td>
<td>FtF</td>
<td>FtF</td>
</tr>
<tr>
<td>communication</td>
<td>MSN messenger</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Telephone</td>
<td></td>
</tr>
<tr>
<td>Asynchronous</td>
<td>E-mail</td>
<td>E-mail</td>
</tr>
<tr>
<td>communication</td>
<td></td>
<td>MSN messenger</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephone</td>
</tr>
</tbody>
</table>

Table 1: The four interview techniques divided by synchronous/asynchronous communication in time and/or space [4]

FtF interviews are characterised by synchronous communication in time and place. MSN messenger and telephone interviews are characterised by synchronous communication in time, but asynchronous communication in place. E-mail interviews are characterised as asynchronous communication in time and
place. One could argue that MSN messenger and telephone interviews are characterised by synchronous communication in cyberspace. As cyberspace is defined as "the noplace" (MORSE, 1998), communication in a virtual place brings with it other advantages and disadvantages than communication in a real place, as in FtF interviews. Therefore with synchronous communication of place is meant a real place, and not a virtual place. [5]

On the other hand advantages and disadvantages of the four interview techniques are related to the technology used. [6]

2.1 Face-to-face interviews: Synchronous communication of time and place

As already mentioned, FtF interviews are characterised by synchronous communication in time and place. Due to this synchronous communication, as no other interview method FtF interviews can take its advantage of social cues. Social cues, such as voice, intonation, body language etc. of the interviewee can give the interviewer a lot of extra information that can be added to the verbal answer of the interviewee on a question. Of course the value of social cues also depends on what the interviewer wants to know from the interviewee. If the interviewer is seen as a subject, and as an irreplaceable person, from whom the interviewer wants to know the attitude towards for example the labour union, then social cues are very important. When the interviewer interviews an expert about things or persons that have nothing to do with the expert as a subject, then social cues become less important (EMANS, 1986). On the other hand this visibility can lead to disturbing interviewer effects, when the interviewer guides with his or her behaviour the interviewee in a special direction. This disadvantage can be diminished by using an interview protocol and by the awareness of the interviewer of this effect. [7]

In FtF interviews there is no significant time delay between question and answer; the interviewer and interviewee can directly react on what the other says or does. An advantage of this synchronous communication is that the answer of the interviewee is more spontaneous, without an extended reflection. But due to this synchronous character of the medium, the interviewer must concentrate much more on the questions to be asked and the answers given. Especially when an unstructured or semi structured interview list is used, and the interviewer has to formulate questions as a result of the interactive nature of communication. WENGRAF (2001, p.194) even speaks of "double attention", which means

"that you must be both listening to the informant's responses to understand what he or she is trying to get at and, at the same time, you must be bearing in mind your needs to ensure that all your questions are liable to get answered within the fixed time at the level of depth and detail that you need". [8]

FtF interviews can be tape recorded, of course with the permission of the interviewee. Using a tape recorder has the advantage that the interview report is more accurate than writing out notes. But tape recording also brings with it the danger of not taking any notes during the interview. Taking notes during the
Interview is important for the interviewer, even if the interview is tape recorded: (1) to check if all the questions have been answered, (2) in case of malfunctioning of the tape recorder, and (3) in case of "malfunctioning of the interviewer". In one interview I conducted I should have taken notes because I had forgotten to push the "record" button. Another disadvantage of tape recording the interview is the time a transcription of the tape recording consumes. BRYMAN (2001) suggests that one hour of tape takes five to six hours to transcribe. [9]

The synchronous communication of time and place in a FtF interview also has the advantage that the interviewer has a lot of possibilities to create a good interview ambience. In other words the interviewer can make more use of a standardisation of the situation. On the other hand this synchronous communication of time and place can bring with it a lot of time and costs. Interviewing an interviewee in a place some 200 kilometres away will take a whole day, including travelling and interviewing. It can even take more days, when the interviewee is ill and didn't or couldn't reach the interviewer in time to cancel the interview. Also the costs, i.e. travelling costs, can become very high in this way. Doing research by using FtF interviews, which have to be held all over the globe, as for example is the case when doing research in the domain of virtual teams, takes a lot of effort, time and costs, and is therefore almost impossible for one researcher. [10]

The last advantage of this interview method is that termination of a FtF interview is easy, compared to other interview methods. In the interaction between interviewer and interviewee enough clues can be given that the end of the interview is near, for example by shuffling the papers and turning off the tape recorder. An explicit way to terminate the interview is by thanking the interviewee for cooperation and asking him or her if there are further remarks that might be relevant to the topic or the interview process. This can lead to an emergent of a whole new area of information (WENGRAF, 2001). [11]

2.2 Telephone interviews: Synchronous communication of time, asynchronous communication of place

Due to the asynchronous communication of place, one of the advantages of telephone interviewing is the extended access to participants, compared to FtF interviews. MANN and STEWART (2000) make a distinction in the following categories:

- Wide geographical access. People from all over the globe can be interviewed —of course if they have access to telephone or computer. FtF interviewing can be very expensive and takes too much time.
- Hard to reach populations. It enables researchers to contact populations that might be difficult to work with on an FtF basis for example mothers at home with small children, shift workers, computer addicts and people with disabilities.
• Closed site access. It is a possible means of access to people on sites, which have closed or limited access (such as hospitals religious communities, prisons, the military, and cults).
• Sensitive accounts. Some personal issues are so sensitive that participants might be reluctant to discuss them FtF with an interviewer.
• Access to dangerous or politically sensitive sites. With telephone, interviewers can interview people living or working in war zones, or sites where diseases are rife, without needing to grapple with the danger—and the bureaucracy—of visiting the area. [12]

Although the interviewer can interview people that are not easy to access, one of the disadvantages of asynchronous communication of place by telephone is the reduction of social cues. The interviewer does not see the interviewee, so body language etc. can not be used as a source of extra information. But social cues as voice and intonation are still available. Although social cues are reduced, enough social cues remain for terminating a telephone interview without a problem. [13]

Another disadvantage of asynchronous communication of place is that the interviewer has no view on the situation in which the interviewee is situated. Because of this the interviewer has lesser possibilities to create a good interview ambience. FtF interviews can make more use of a standardisation of the situation. Due to this lessened possibility to create a standardisation of the situation with telephone an extra disadvantage is that the interviewee can stay "visible" for other employees and managers in the organisation. As I experienced for example the interviewee was called away by his manager, so the interview had to be stopped abruptly. [14]

As in FtF interviews synchronous communication of time implies that interviewer and interviewee can directly react to what the other says. This also leads to the advantage that the interviewee is more spontaneous in his response and does not deliberate too long. But on the other hand, the interviewer has to concentrate much more on the questions that need to be asked and the answers given. [15]

Another advantage of synchronous communication of time concerning telephone interviews is, as in FtF interviews, the interview can be tape recorded. Tape recording a telephone interview depends on the equipment. A speakerphone is recommended (BURKE & MILLER, 2001). As with FtF interview the telephone interview is also time consuming due to the fact that the tape has to be transcribed. [16]

2.3 MSN messenger interviews: Synchronous communication of time, asynchronous communication of place

As with telephone interviews, due to the asynchronous communication of place, one of the advantages of MSN messenger interviewing is the extended access to participants, compared to FtF interviews (COOMBER, 1997). Although the
interviewer can interview people that are not easy to access, one of the
disadvantages of asynchronous communication of place by MSN messenger is
the absence of social cues. The lack of some elements, as intonation, can be
filled up with the use of emoticons. Before the users were able to create simple
emoticons with a normal keyboard, for example a "smiley" could be made as ": )".
Nowadays the keyboard gives the opportunity to create more advanced
emoticons ":o". This is also the case with MSN messenger, where professionally
developed emoticons can be put straight into a message.

Diagram 1: Examples of emoticons [17]

The emoticons have been culturally stipulated however, and reflect culturally
specific meanings. MORRIS (1994) has shown that the same gestures in
different cultures have several different meanings. Or also: for the same
meanings in different cultures several different gestures can exist. Thus, when
the interviewer conducts a MSN messenger interview with an interviewee with
another cultural communication style, then the interviewer must pay careful
attention to the use of emoticons. It cannot be assumed that these emoticons will
be interpreted in a manner as meant by the interviewer. Diagram 2 shows clearly,
that emoticons are not universal (AOKI, 1995).

Diagram 2: Comparison between Western and Japanese emoticons. It is notable that
strong feelings, like anger, are reflected directly in the USA and Western European
culture, whereas the Japanese emoticons reflect more subtle alternatives for these
feelings. [18]
It depends of course on the topic of the research, and the questions asked, whether or not the lack of social cues are an advantage (or at least neutral) or a disadvantage. However, when interviewing interviewees from another culture, according to SHACHAF (2005, p.52) "the lack of nonverbal and social cues reduces miscommunication due to cultural diversity". [19]

Asynchronous communication of place has, according to BAMPTON and COWTON (2002, paragraph 18), also the advantage that they "can protect the researcher by offering a degree of anonymity, perhaps through the adoption of an (e-mail) pseudonym. A classic example of the positive effects of anonymity is a study by GERGEN, GERGEN, and BARTON (1973). In this study individuals who met and conversed in a situation where they could not see one another, sitting in the dark, disclosed much more intimate details of their lives and of the self than did those who met and conversed in a lighted room. Indeed, those who were in the darkened condition left the encounter feeling more positively about the other person, compared to a control condition in which people interacted with the lights on. This important phenomenon is called self-disclosure, or "the act of revealing personal information to others" (ARCHER, 1980, p.183). CMC discussions proved to have higher levels of spontaneous self-disclosure than FtF discussions (JOINSON, 2001). And visually anonymous participants disclosed significantly more information about themselves than non-Visually anonymous participants did (JOINSON, 2001). According to SPEARS and LEA (1994, p.435), "under the protective cloak of anonymity users can express the way they truly feel and think". When the topic of research asks for information concerning attitudes etc. from the interviewee, the preference for interviews conducted by MSN messenger is obvious. The chance that the interviewee will give a richer and a socially undesirable answer is higher. [20]

The next advantage of asynchronous communication of place is saving costs and time, because the interviewer does not have to travel to the interviewee. On the other hand, when comparing the different interview techniques concerning the amount of time the interview itself actually costs, MSN messenger is less favoured. To have a good and in-depth interview by MSN messenger takes about double the time of a FtF interview (MARKHAM, 2004). Meanwhile the concentration of the interviewer and the interviewee can decrease, with negative consequences for the quality of the interview. A possible solution is to have several MSN messengers sessions with the interviewee. The advantages of several sessions are that both the interviewer and the interviewee stay concentrated, and that the interviewer has had the time to overlook the other interviews and come up with additional questions. [21]

Another advantage of asynchronous communication of place by MSN messenger is that disturbing background noises (e.g. when people are working with machinery outside the building) are not recorded. [22]

Asynchronous communication of place can be a disadvantage, because the interviewer has no view on the situation in which the interviewee is situated. Because of this the interviewer has lesser possibilities to create a good interview
ambience. Due to this lessened possibility to create a standardisation of the situation, with MSN messenger an extra disadvantage is that the interviewee can stay "visible" for other employees and managers in the organisation. [23]

Beside advantages and disadvantages due to the synchronous communication of time and the asynchronous communication of place, there are also some advantages and disadvantages that find their roots in the technology used. In the first place interviewing with MSN messenger has the advantage that the outcome can directly be downloaded on the computer, so there is no transcription time. But direct recording also brings with it the danger of not taking any notes during the interview. Taking notes during the interview is important for the interviewer, even if the interview is tape recorded, to overlook if all the questions have been answered. This danger is even bigger when interviewing with MSN messenger, because writing in a chat box and taking notes at the same time is more difficult, when one has only two hands. Although not taking notes also has advantages, because "the immediacy of the exchange excites me. I will not have to break my train of thought by having to jot down notes, so the flow of dialogue should be smooth" (POLLOCK, 2004, p.4). [24]

In the second place although miscommunication is not uncommon for all the interview techniques used, which can have its roots in different operationalisations of words, or cultural differences, MSN messenger interviews can have a specific form of miscommunication, when both type at the same time. On the other hand, when one is writing, the other can read this at the bottom of the screen. This reduces the possibility that both are writing at the same time, which could lead to this miscommunication. [25]

In the third place MSN messenger is "dependent on willing and competent access to reliable technology on the part of both researcher and subject" (BAMPTON & COWTON, 2002). Especially when organising an interview with people from other cultures, for example the Arabian culture, this can be a disadvantage. The new technological possibilities and from that resulting communication media are a typically Western (and also oriental: think of Japan) product. Some cultures, like for example Arab cultures have much resistance against the setting-up of such communicative media. Because of this also the use of MSN messenger etc. in this culture is less used. Also there will be differences in cultures with regard to the media preference. One culture swears by e-mail, thus another culture gives the preference to video conferencing and another to FTF communication. [26]

In the fourth place as online interviewing involves at the most basic level the exchange of texts, this way of interviewing may be more suitable for people who type fast, and, depending on the research question, whose personalities come through in the text as clearly as they would in FTF (MARKHAM, 2004). [27]

In the fifth place terminating an interview in MSN messenger can be more difficult, because it can seem very abrupt. [28]
2.4. E-mail interviews: Asynchronous communication of time and place

As with telephone and MSN messenger interviews, one of the advantages of e-mail interviewing, due to asynchronous communication of place, is the extended access to participants, compared to FTF interviews (COOMBER, 1997). And as with using MSN messenger, a disadvantage of using e-mail is the complete lack of social cues. Therefore e-mail interviewing "provides a limited register for communication" (BAMPTON & COWTON, 2002, paragraph 25). Using emoticons, as already discussed in the former paragraph, can diminish the effects of this disadvantage. But the interviewer must always be aware that the use of emoticons is not always appropriate according to the interviewee. As each interviewee has his or her own communication style, the interviewer has to adapt the personal communication style online accordingly (KIVITS, 2005). There are also researchers that warn for an overestimation of the use of emoticons, as "e-mail messages containing emoticons did not generate different interpretations than did messages without emoticons" (WALTHER & D'ADDARIO, 2001, p.342). [29]

Another advantage of asynchronous communication of place is that disturbing background noises are not recorded. E-mail interviewing has of course the extra advantage that the interviewer can formulate the questions, and the interviewee can answer the questions at his or her own convenience without noise disturbance due to independence of place and time. [30]

Asynchronous communication of place also has the advantage that an e-mail interview can be much cheaper than e.g. a FtF interview, because there are no travelling costs. On the other hand this technique can cost a lot of time. Due to the asynchronous communication of time, the interviewee might have to wait sometimes for days or weeks before he/she answers the questions. This does not only lead to the risk that the interviewee will lose interest in the research, but also to the risk that the interviewee may forget to reply to questions (KIVITS, 2005). Sending reminders at an appropriate time to the interviewee can reduce this problem. [31]

With an e-mail interview, synchronous communication of time is impossible. Although the advantage can be that the interviewee does not hesitate in giving a socially undesirable answer but the chance of a spontaneous answer to a question is smaller, because the interviewee has more time to reflect on the question. And spontaneity can be the basis for the richness of data collected in some interviews. It depends of course on the research questions if this reflective behaviour is a disadvantage or not. On the other hand an e-mail interview has the advantage that the interviewer can take time to respond to the developing dialogue (BAMPTON & COWTON, 2002; KIVITS, 2005). [32]

According to BAMPTON and COWTON (2002, paragraph 7) asynchronous communication of time, as is the nature of an e-mail interview, also has obvious advantages as "busy interviewees do not have to identify a mutually convenient time to talk to each other". Also
"in permitting a lengthy delay between communications, an e-interview gives the interviewee time to construct a response to a particular question. It provides for example the opportunity to find information which might be required, although the researcher then does not know what resources the interviewee has drawn upon" (paragraph 8). [33]

They also remark that "it is possible to interview in a foreign language even if the interviewer is insufficiently fluent for a face-to-face interview" (paragraph 19). A translating tool that can be very useful for conducting these interviews is http://babelfish.altavista.com. Although ELRON and VIGODA (2003, p.330) warn that "(...) the lack of face-to-face social cues results in greater cultural and language barriers". [34]

As with MSN messenger, beside advantages and disadvantages due to the asynchronous communication of time and place, there are also some advantages and disadvantages due to the technology used. In the first place the outcome of an e-mail interview can directly be downloaded on the computer, so there is no transcription time. As BAMPTON and COWTON (2002, paragraph 25) state concerning e-mail interviews: "it offers significant savings in terms of time and financial resources, particularly in relation to the elimination of the need to travel or to transcribe tapes". [35]

In the second place in an e-mail interview it is not necessary to take notes, because the interviewer can always overlook the questions and answers that already have passed before sending new questions to the interviewee (MARKHAM, 2004). [36]

In the third place there is the possibility of continuing to collect data simply because the interviewer can and not because he or she should (MARKHAM, 2004). This could go beyond the research aim. [37]

In the fourth place terminating an interview in e-mail can seem very abrupt. Some e-mail interaction will simply die away. Others will be terminated with good wishes. But according to MANN and STEWART (2000, p.157) "if the interaction is deep and extended there may be difficulties of closure". [38]

3. Summary

Beside face-to-face interview and telephone interview the use of new communication forms such as e-mail and MSN messenger opens new ways for qualitative research workers for data collection. The type of interview technique chosen by the researcher can depend upon the advantages and disadvantages, which are linked to every interview technique. [39]
Using face-to-face interviews for collecting information are preferred, when:

- social cues of the interviewee are very important information sources for the interviewer (of course dependent on the research problem);
- the interviewer has enough budget and time for travelling, or the interviewees live near the interviewer;
- standardisation of the interview situation is important. [40]

Using telephone interviews for collecting information are preferred, when:

- social cues of the interviewee are less or not important information sources for the interviewer (of course dependent on the research problem);
- the interviewer has a small budget and less time for travelling;
- looking for access to people on sites, which have closed or limited access (such as hospitals religious communities, prisons, the military, and cults);
- standardisation of the interview situation is not important;
- some anonymity is requested. [41]

Using MSN messenger interviews for collecting information are preferred, when:

- social cues of the interviewee are not important information sources for the interviewer (of course dependent on the research problem);
- the interviewer has a small budget and less time for travelling;
- looking for access to people on sites, which have closed or limited access (such as hospitals religious communities, prisons, the military, and cults);
- standardisation of the interview situation is not important;
- anonymity is requested;
- both the interviewer and the interviewee are competent enough in type writing and using (and have access to) computers. [42]

Using e-mail interviews for collecting information is preferred, when:

- social cues of the interviewee are not important information sources for the interviewer (of course dependent on the research problem);
- the interviewer has a small budget and less time for travelling;
- looking for access to people on sites, which have closed or limited access (such as hospitals religious communities, prisons, the military, and cults);
- standardisation of the interview situation is not important;
- anonymity is requested;
- both the interviewer and the interviewee are both competent enough in type writing and using (and have access to) computers;
- there is a huge time difference, because interviewer and interviewee live in different parts of the world separated by several time zones, and synchronous
interviewing means for one party (interviewer or interviewee) interviewing at night;

• It is necessary that the interviewee takes time to respond to the developing dialogue. [43]

4. Conclusions

In summary, all four interview techniques share common principles/basics and can be equally used for conducting interviews in research. Important distinctive criterion is however the nature of the information one wants to obtain, especially the importance of social cues. As already mentioned, if the interviewee is seen as a subject, and as an irreplaceable person, from whom the interviewer wants to have his or her opinion for example about the labour union, then social cues are very important. Interviewing by F2F or by telephone will be more preferred. When the interviewer interviews an expert about things or persons that have nothing to do with the expert, then social cues become less important. For such situations all four interview techniques are appropriate for use. [44]

Acknowledgement

I would like to thank Carin CUYPERS (Bureau Lara, the Netherlands) for the German translation of the abstract, and Natalia Martin CRUZ (University of Valladolid, Spain) for the Spanish translation of the abstract.

References


Author

Raymond OPDENAKKER studied labour- and organisation psychology. He is an external PhD candidate at the Eindhoven University of Technology. The title of his PhD research is "The strategic momentum in virtual teams".

Contact:

Raymond Opdenakker

Eindhoven University of Technology

Faculty Technology Management

Pav.R.0.22

PO Box 513

5600 MB Eindhoven

Netherlands

E-mail: R.J.G.Opdenakker@tm.tue.nl

Citation