An Original Information Systems Research Method: The Discount Focus Subgroup Method

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Abstract: The aim of this paper is to present a new original qualitative research method called the Discount Focus Subgroup (DFSG) method, which originated in and was developed from information systems research. This paper synthesizes previous work on DFSG method to provide a more coherent picture of the method's applications, procedures, and strengths. It discusses why the DFSG is an innovative method and how it is distinct from the existing traditional qualitative group-based methods (e.g. focus group, brainstorming, and joint application development). The paper also provides a critical evaluation of the method by highlighting the limitations and dilemmas that a researcher might encounter when applying it and demonstrating how these pitfalls can be avoided or lessened. It finally offers directions for future research to further develop this method. This paper presents useful methodological guidelines to researchers who intend to use this method in their research projects.

Keywords: Information systems, qualitative research, Discount Focus Subgroup (DFSG) method, focus group

1. Introduction

Most empirical qualitative information systems (IS) research uses traditional research methods, such as case studies, grounded theory, ethnography, and actions research, including techniques like interviews, focus groups, and observations. These methods originated in the social science fields (Myers, 1997). This trend could also refer to the nature of IS, which is a multidisciplinary field where human activities, actions, and perceptions are an integral part of most IS research. Hence, IS researchers agree that social science methods are appropriate for investigating IS research questions. However, IS qualitative researchers should focus not only on social and behavioral issues but also on technology, which should figure prominently in investigations within the IS field (Sarker, Xiao, and Beaulieu, 2013). Sarker et al. (2013) reviewed 98 articles published in top IS journals from 2001–2011 and reported that many qualitative research papers merely focused on social issues, while technology was no more than the context of the research or received little attention in the surveyed research articles.

Indeed, qualitative IS researchers need to concentrate on sociotechnical interactions (Lee, 2001); a failure to do so can rob IS researchers of their comparative advantage compared to other social science researchers (Markus, 1997). Surprisingly, the IS literature only rarely contains research methods that originated in the IS field itself; some researchers used minor adaptations of existing methods to show their applicability and relevance to IS research, while others attempted to integrate several of them to produce more rigorous research (Baskerville and Pries-Heje, 1999; Carroll and Swatman, 2000; Fernández, Lehmann, and Underwood, 2002; Pan and Tan, 2011; Walsh, 2015; Wolfswinkel, Furtmueller, and Wilderom, 2013). The current paper demonstrates an original qualitative research method called the Discount Focus Subgroup (DFSG), which originated in the IS research field. We initially designed the DFSG method for a study that aimed to identify the ethical concerns that could arise due to the use of a new and emerging technology (i.e. near field communication). The method evolved through several stages, as not all aspects and dimensions of the method were clear or completely specified at the beginning. First, observations from prior research indicated the need and justification for a new non-traditional method to tackle new challenges; next, the traditional method (i.e., focus group) was adapted and altered to address these challenges. As a result, new abstract and generalizable methodological steps emerged. Later, researchers raised further reflections and feedback regarding application of the DFSG. Finally, the need for robust criteria to evaluate its applicability was recognized. Many theorists supported this viewpoint for building a new theory or method using a stages-based model and an iterative process of improvement (Carlile and Christensen, 2005; Christensen, 2006; Jones and Gregor, 2006). As a natural result, the method development occurred in cycles and produced several papers for top IS conferences, and others (Halaweh, 2013, 2014, 2015, 2016). However, this paper synthesizes a complete picture of all issues and dimensions related to the method as it continues to gain a higher degree of maturity. This maturity increases the dependability of the method and its applicability to the IS field so researchers in IS

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and other close fields, such as management and software engineering, who find the method appropriate for their research context can apply it confidently.

This paper contributes to IS qualitative research methods by providing a more cohesive picture of the method's applications, procedures, strengths and limitations through synthesizing all previous work. It also shows how the DFSG is innovative and original compared with other traditional group-based methods.

The next section presents literature review on group-based methods. Section three details the development and application of the DFSG method. Section four discusses the originality and innovativeness of the method, limitations and dilemmas that might arise when applying the method, quality criteria for evaluating the DFSG research, and its applicability in other IS related fields. Finally, the conclusion section offers some directions for future research that will lead to further development and applications of the DSFG method.

2. Literature Review

This section reviews literature on existing similar group-based methods (traditional focus group, brainstorming and joint application development (JAD)) used in IS research, which are used for gathering qualitative data (e.g., ideas or requirements) from a group of participants. The literature is reviewed in order to show in subsequent section how the DFGS is different from these methods.

The focus group (i.e., traditional) method emerged from the social research of the 1950s (Templeton, 1994). Powell et al. (1996) defined a focus group as "a group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research" (p. 499). Focus groups allow researchers to obtain insight and rich data from a group discussion in a short amount of time (Morgan and Scannell, 1998). The data collected from focus groups provide profound insight into people's beliefs, opinions, and experiences. The focus group method is the most appropriate for exploratory research, but it can also be used for confirmatory research (Stewart and Shamdasani, 1990). According to the literature, more than one focus group meeting is needed within a study (Krueger, 2000; Morgan and Scannell, 1998). The literature also suggests that the number of focus group participants should be in the range of 4–12 (Jankowicz, 1995), 6–10 (Morgan and Scannell, 1998), 7–10 (Krueger, 2000), or 6–12 (Kelley, 1999). Participants are selected using purposive sampling on the basis of their relevance to the research topic under investigation. Typically, a moderator conducts focus group sessions; this moderator should possess the necessary oral and written skills to conduct the session successfully, such as the ability to allow all participants to express their views, to communicate, to listen, and to involve all participants in the conversation (Krueger and Casey, 2000). Researchers typically record the sessions with audio and/or video devices (Krueger and Casey, 2000) and then transcribe them for analysis using different methods and techniques. Key factors in the success of group work are the harmony of the participants (Homogeneity within the group) to capitalize on people's shared experiences (Kitzinger, 1995; Morgan (1997).

Researchers in the IS field have advocated the use of the focus group method (Burgess, 2010; O'hEocha et al., 2012; Sobreperez, 2008). However, despite its suitability for researching IS phenomena, only a few researchers have used this method in the IS field (O'hEocha et al., 2010; Sobreperez, 2008). This lack of extensive use was confirmed by Belanger (2012), who reviewed 58 articles published in top IS journals that employed the focus group method. Her literature review indicated that many published articles had adopted this research method in general, but they were recent publications; 49 out of the 58 studies were published between 2003 and 2011. Furthermore, Belanger (2012) pointed out that this method is gaining acceptance for its appropriateness in IS research. Another important finding was that most of the reviewed papers used the focus group method to study the new exploratory nature of IS phenomena. The focus group research method has been used to study IS phenomena, such as IT/IS adoption, acceptance, impact, and evaluation (Klaus and Blanton, 2010; Otondo et al., 2009; Weidong and Lee, 2005). However, some IS studies that used this method did not specify the number of focus groups (Smith et al., 1996), while others did not include the number of participants in each group (Smith and McKeen 2007; Weidong and Lee, 2005). In fact, some articles specified neither the number of focus groups in the study nor the number of participants in the focus groups (Wang et al., 2004). In some investigations, the focus group was the sole research method (Campbell et al., 2005; Lee and Kwon, 2008); in others, it was used in conjunction with other methods, such as survey or/and or interviews (Dickinger et al., 2008; Krasnova et al., 2010; Smith et al., 1996; Weidong and Lee 2005). The focus group was also used as the method for requirement elicitation and IS development (Farinha and da Silva, 2009; O'hEocha et al., 2010).

Stahl et al. (2011) suggested using focus groups in IS research as a critical method that can facilitate emancipation. Tremblay et al. (2010) used the focus group method as an evaluation technique for design research. Despite its advantages for gathering rich data in a short time, Turban and Aronson (1998) cited the drawbacks of group work, such as inappropriate representation in the group, a tendency to repeat what has already been said, inappropriate influences (such as domination of time, opinions, or topics by one or a few individuals, or a fear of speaking), and the fact that activities are time consuming to plan. Zowghi and Coulin (2005) cited the limitations of this method, including dominant participants, biased opinions, high logistic costs, and gathering participants. Furthermore, when the method has been used for requirements elicitation, it was difficult to organize due to the large number of different stakeholders that may be involved in a project (Dheepa et al., 2013; Zowghi and Coulin, 2005).

Brainstorming was originally developed by Alex Osborn in 1939 as a method for creative problem solving. He subsequently published his book, *Applied Imagination* (1953), in which he provided systemic guidelines for applying brainstorming. Brainstorming is a process where participants engage in informal discussion to rapidly generate as many ideas as possible without focusing on any one in particular (Zowghi and Coulin, 2005). Leffingwell and Widrig (2000) divided brainstorming sessions into two phases: idea generation and idea reduction. The primary goal during idea generation is to produce as many ideas as possible. The principal aim during idea reduction is to analyze all the generated ideas. The idea reduction phase includes refining, ranking, and grouping. With the participants' consent, the most usable ideas become decisions that will be implemented or will become requirements for the product (Robertson and Robertson, 1999). One of the advantages of using brainstorming is that it promotes freethinking, expression, and so-called "out-of-the-box" thinking and also allows for the discovery of new and innovative solutions to existing problems (Leffingwell and Widrig, 2003; Zowghi and Coulin, 2005). During brainstorming sessions, people are told that all ideas are acceptable no matter how crazy they may seem and that they must not slow the process down by criticizing or debating the merits of various ideas (Leffingwell and Widrig, 2000). In fact, the main principle of brainstorming is to defer any judgment about the quality of the ideas (Osborn, 1953), which is sometimes referred to as "no criticism" of ideas.

According to Osborn (1953), another main principle of brainstorming is to focus on quantity rather than quality. This "imagination of ideas" might be seen as a challenge or a criticism of the method because it is difficult to keep focused and stay within the boundaries of the problem that should be solved (Jonasson, 2012). However, the intended purpose of brainstorming sessions is not usually to resolve major issues or make key decisions (Zowghi and Coulin, 2005). The disadvantage of this method is that participants are not yet permitted to criticize or judge the ideas because the sole focus in on generating ideas. Liikkanen et al. (2011) recommended that a large number of participants is not advisable in brainstorming sessions. Studies have revealed that when there were more than three participants around a table, they were more likely to distract each other and block the production of ideas by the person speaking or prevent others from thinking (Stroebe et al., 1992; Wilson, 2006). These impediments increased the risk that ideas would be forgotten as well as the likelihood of free riding and an increased pressure for social conformity. Diehl and Stroebe (1991, 1987) confirmed this view in a review of 22 studies, demonstrating that group brainstorming produces fewer ideas than individual brainstorming, when the individual works alone.

JAD was originally developed by International Business Machines (IBM) in the late 1970s (Jonasson, 2012). It is an organized and structured group-based technique used for requirement elicitation (Maiden and Rugg, 1996) where all key stakeholders, including sponsors, project managers, business users, and IT professionals (system analysts/software engineers), as well as the JAD session facilitator and scribe, discuss the requirements, analyze these requirements, and design user interfaces. The main aim of JAD is to build consensus and agreement among stakeholders about the system requirements (Jonasson, 2012). Jonasson (2012) pointed out that the optimal number of participants in a JAD session is between 5 and 10. Jonasson (2012) pointed out that, the facilitator is most important to the success of the JAD sessions. He also added that while the facilitator is the key to the success of the JAD session, the scribe is the key to accurate documentation of everything of value. Hence, JAD is highly dependent on a facilitator and a scribe. Christel and Kang (1992) recognized that all participants funnel their ideas through a facilitator or a recorder. Thus, the recorder may inadvertently impose an interpretation on the collected data not shared by the group. Liou and Chen (1993) also noted some problems with JAD, such as the unequal involvement of JAD participants (only the comments

of the most vocal are captured) and the limited ability of analysts to judge the group consensus in real time. In addition, there is also the inability to involve a large number of participants.

Obviously, the use of group techniques for gathering data demands more planning and follow-up, and translating and transcribing the data are more time consuming and can also be costly if the existing traditional methods are used. Moreover, these existing methods (JAD, brainstorming sessions, and focus groups) lack the means to manage the data and information gathered from large numbers of people. These approaches also fail to scale up to big projects with a large number of participants; in these cases, many stakeholders are omitted, and their viewpoints are overlooked (Lim and Finkelstein, 2012). The methods do not include large number of participants in a single group session, as the maximum number of participants should not exceed 12, which is also not recommended in other methods like brainstorming. A large number of participants (more than three) is often considered a problem as it may block the process of idea generation. Other methods aim to build a consensus among the participants, such as JAD, which is not necessarily the case in a research context where participants are free to express different viewpoints on a particular topic. In all traditional group-based methods, there is high dependency on the moderator/facilitator (who might also be the primary researcher), who could be biased in documenting and transcribing notes or misunderstand/misinterpret the issues. In addition, some participants or topics could also dominate the discussion.

3. DFSG Method Development and Application

DFSG can be defined as a qualitative research method that aims to gather and analyze qualitative data on emerging technologies and/or phenomena in an effective, efficient and economical manner. This section addresses the context of the research where the DFSG method was devised, the motivations and justification for developing the DFSG method, and how it was developed.

3.1 Research Context

The DFSG method was developed in research intended to investigate the future ethical concerns that could arise from using a new and emerging technology called near field communication (NFC), which allows users to make mobile payments on smart phones. At the time of this study, experts considered NFC to be an emerging technology (Thomas et al., 2009), as it was still not widely used or applied for mobile payments in retail stores. Since the technology was new, no one had conducted investigations into the ethical issues surrounding this technology, as it was unclear what future concerns this technology might bring. While some might say that it is too early to investigate this issue, IT ethics researchers would object to that idea. For example, Sandler (2009) indicated that some people harbor misconceptions about ethics and emerging technology. One of these misconceptions is the belief that "It is too soon to tell what the social and ethical issues are" (Sandler, 2009, p. 6), which is due to the narrow focus on the technology itself and a neglect of the broader contextual factors. However, Stahl et al. (2007) disagreed when he stated that "The best way of creating IT policy that is sensitive to ethical issues pertains to being proactive in addressing such issues at an early stage of the technology life cycle" (p. 1). Therefore, now (the time of this study) is both timely and reasonable to consider the possible impact of this emerging technology, even if it is yet not widely used by customers and merchants for mobile payments.

The literature review on NFC technology also confirms that there is a need to highlight the social and ethical concerns that might arise by adopting NFC-enabled technologies (Özdenizci et al. 2010). Thus, this subject is an interesting area for investigation, as no previous study has highlighted it, and we should not wait until the technology impacts us negatively.

3.2 Motivation and rationale for developing DFSG

Both general and specific challenges arose during this research study (i.e., the ethical impacts of NFC technology), which gave rise to the DFSG method. General challenges pertained to the limited funds available for conducting research; there were no funds to hire research assistants to help with gathering and analyzing the qualitative data. Therefore, only one researcher conducted this entire investigation. More importantly, other challenges involved the difficulty in finding research participants, particularly those who could provide insight and relevant information, due to the nature of this new and emerging research topic. When it comes to new technologies that are not widely known or accepted, it is difficult to find participants who are familiar with them. This limitation produces difficulty in gaining insight from one-on-one interviews or even focus groups that contain small numbers of participants, as some of them could be unfamiliar with the research topic (e.g., NFC technology) or have little knowledge about it. A third challenge concerned the analysis phase.

As there is no existing research in this area, qualitative research is appropriate for gathering data, obtaining insight, and building concepts and hypotheses. However, in qualitative research, the researcher typically spends considerable time gathering data and then transcribing every single recorded word—a process that may result in hundreds of pages that are not entirely insightful or useful.

The existing group-based methods did not clearly address the aforementioned challenges. Obviously, these challenges justify the need for the DFSG, which answers the question of when it can be applied. Therefore, this method can be used in three situations: when limited funds (monetary and human resources) are available for conducting research; to investigate emerging technology or related phenomena where it may be difficult to recruit research participants to provide insight and relevant information on pertinent topics and that could not be gained from one on-one interviews or even focus groups with small numbers of participants; and when the researcher wants to overcome challenges concerning the analysis of qualitative data. Moreover, it addresses some of the problems and pitfalls of the existing group-based methods discussed in the previous section

3.3 DFSG application

Because NFC technology is relatively new and not widely known, the researcher chose a qualitative research approach for this study as it provides insight about ethical concerns through focus group discussion. The first group session included four participants, as suggested by the literature, which recommended a range of between 4–10 participants. However, this group did not produce relevant or important insights or rich discussions of issues due to the nature of the research topic, which concerns a new technology that they had not experienced. Furthermore, it was also difficult to find participants who knew about it or had already used it. As a result, the researcher decided to invite more participants in a large group with the hope that it would produce more ideas and a richer discussion; two additional focus group sessions lasted about 75 minutes. The second group included 16 participants, and 10 of them had NFC-enabled mobile phones. The third group consisted of 17 participants, but only 5 of them had NFC technology on their mobile phones. In addition, some of the participants only discovered during the course of the meeting that they had this technology available on their mobile phones. They were neither previously aware that they had it, nor did they know its function.

The number of participants involved in Groups 2 and 3 was larger than the group sizes suggested in the literature. This greater number was due to the nature of the research topic, which involved discussions and debates about an emerging technology that is not yet widely accepted by individuals or merchants. Thus, it was expected that some of the participants would be unfamiliar with this technology or have little knowledge about it. However, their contributions could still be considered effective in raising questions and enquiring into the topic, while others who were more familiar could provide answers on the basis of their opinions and experience. Due to the limited resources, the researcher selected the participants from the university, which is the researcher's work environment and therefore was easy to access. The researcher worked as a facilitator to motivate and encourage the participants to share their opinions and beliefs freely. The researcher led the discussion by introducing the objectives of this research and providing a briefing about NFC technology. The discussions revolved around the main question: What are the ethical implications of using NFC technology for mobile payment?

Because of the limited human resources (research assistants) available to manage and moderate the session, the researcher divided Groups 2 and 3 into subgroups, which are easily managed. The researcher asked the participants to spend a few minutes writing their answers in note form, and then they discussed their ideas first with the members of each subgroup and then in an open discussion among the whole group. The discussion between the members of each subgroup involved debating, joking, and sometimes reaching an agreement about their opinions. The participants documented the session results on paper themselves (Appendices A.1 and A.2), and the researcher also took notes during the open discussion. These results were combined into a document for analysis that focused on identifying the issues and themes. The researcher did not attempt to transcribe each word spoken in the discussion; instead, the focus was to identify the significant issues discussed by the groups. In addition, the researcher took no audio or video recordings of the session to avoid too much formality and the possible concern that each participant would be assessed on the basis of his or her speech. The participants themselves led the discussions, as each of the subgroups had a leader who wrote notes down on paper. Some members of the subgroups posed the questions, while others provided their answers and opinions. This approach enabled each participant to think, speak out, and express his or her opinion freely. To ensure that no issues/ideas were missed, each subgroup wrote its ideas on paper, and the researcher focused on writing notes during the open discussion between subgroups. When the discussion

between all subgroups was open, all ideas were heard in a circular manner. For example, most of the subgroups listed privacy as an issue. However, when the issue was raised for the first time by one subgroup, other subgroups stated their viewpoint in relation to the same issue, even when it was listed as point #4 on the sheet for another subgroup. This procedure was done to avoid repetitions of the same issues during another round of the open discussion.

After collecting the papers, the researcher applied a constant comparative analysis to the collected data by constantly comparing the issues and then grouping similar ones together under one category. In this scenario, the data collection and a partial analysis occurred simultaneously; therefore, the researcher did not have to devote time later to transcribing each word and coding the keywords. Instead, the listed ideas or issues from all the subgroups are usually ready for clustering and categorizing (analysis). The researcher applied the clustering process (grouping a set of issues/ideas that are similar or that have similar properties) before categorization (classify issue/idea according to predefined concepts / categories), which was very important to ensure the emergence of concepts. Table 1 shows some chunks of data taken from written notes by different subgroups, which were then compared. Since they are similar, they were combined and refined under the "privacy" category. Samples of handwritten notes are shown in Appendices A.1 and A.2.

Table 1: Codes and a category that emerged from a constant comparison analysis

(Equivalent handwritten chunks of data are attached in Appendix A.1.)

Category: Privacy
Chunks (codes underlined)
Personal information privacy will be violated.
They can watch my personal information.
Privacy can be violated. Not anyone can access the information.
Companies could track the person-details used.
Access to our information. Banks will easily know our location and our payment process; we can easily be tracked.
The dilemma-easy access to others. Can be easily violated-especially if the mobile phone is stolen.
Hackers may access the information stored in the chip, and can be used in fraud transactions or purchases.

On the basis of the demonstrated application of the altered focus group method, five methodological steps/principles were generalized for applying the DFSG method (shown in Figure 1).

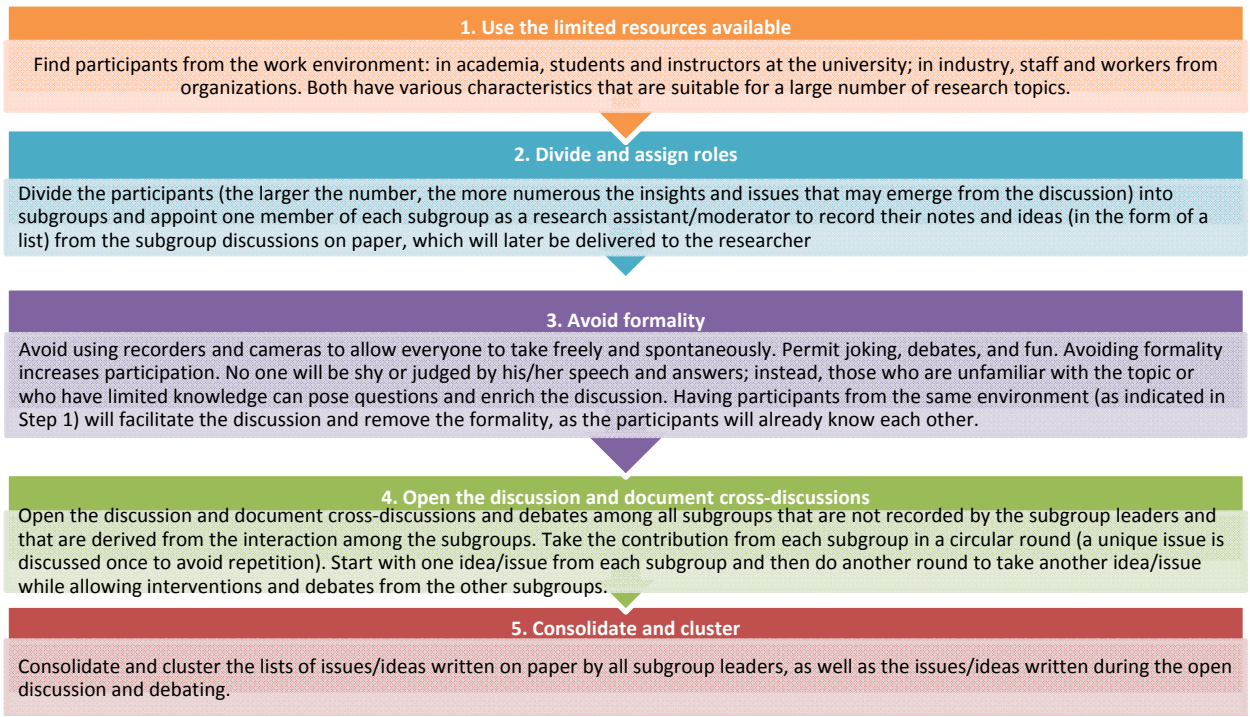

Figure 1: DFSG methodological steps/principles

The following figure depicts a typical DFSG meeting in which the method steps are applied. As shown in Figure 2, the participants in a big group (assuming 21 participants) are divided into 3 subgroups with 7 participants each. The number of participants in each subgroup might be slightly different depending on the number of participants in the big group. In each subgroup, one person should lead the subgroup's discussion and record the members' viewpoints. Each subgroup should produce one document to be delivered to the principal researcher at the end of the session. Figure 2 also shows the principal researcher, who coordinates and moderates the entire session. He or she also writes notes or memos during the open discussion among all subgroups and when observing the subgroup members' discussions. Figure 2's arrows indicate the circular direction in which issues are discussed (a unique issue is discussed once) to avoid repetition of the same issues when the open discussion takes place among all subgroups.

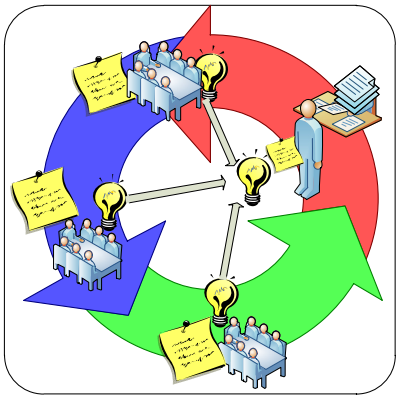

Figure 2: Typical DFSG meeting

4. Discussion

This section discusses the originality of the method including its strengths, limitations, ways to evaluate the quality of research applied the DFSG method, and its applicability in other fields.

4.1 Originality and innovativeness

This paper argues that the DFSG method is original and innovative. To support this argument, the proposed method is compared with the traditional focus group method and other group-based methods. Table 2 displays the differences between the DFSG method and the traditional focus group method. These also show the advantages (strengths) of the method over the others.

The DFSG is considered innovative for the following three reasons. First, when more than 12 participants (the maximum number suggested in the literature) are involved, the method still remains effective as the participants are divided into subgroups. Although the literature indicates otherwise, more participants actually provide more insight and discussion than a smaller number of people. Using subgroups within one big group is a new way of addressing a large number of participants. This is also a need for certain research topics that are new and emerging, as researchers expect some of the participants to be unfamiliar with the topic under investigation, and their role is to raise questions. This, again, does not cause problems, as the participants are divided into subgroups, and each is led by a leader who plays the role of moderator or acts as a research assistant so the session can be managed and organized.

Second, the DFSG eliminates the costs of employing research assistants, using voice/video recorders, and transcribing each recorded word; instead of transcribing intensive and often irrelevant speech, the research can focus on the issues and themes and make use of the participants to write down the ideas. Therefore, the answers to the research questions are focused and organized, as they are written in the form of a list on paper. In addition, the cost of finding participants is reduced, as the participants are selected from the researcher's environment or from one that can be easily accessed (a school, university, hospital, company, etc.). Due to these economic factors, the term "discount" was added to the name of the method, which is also a new perspective that was not clearly considered by previous researchers in the context of qualitative IS research.

Table 2: A comparison between the traditional focus group/group-based methods and the DFSG method

	Traditional focus group/group-based method	The DFSG method
Number of participants	Limited. A small number is recommended. (Krueger, 2000), (Morgan & Scannell, 1998), (Jankowicz, 1995), (Krueger, 2000), (Kelley, 1999), Liikkanen et al. (2011), Jonasson (2012), (Dheepa et al., 2013), Zowghi & Coulin (2005).	Large number. A greater number of participants means more ideas, thoughts, opinions, and insights will be shared and obtained.
Key research participants	The primary researcher, hired research assistants, moderators/facilitators who might be biased or misunderstand or misinterpret the data (i.e., ideas/issues/ requirements) (Krueger & Casey, 2000), (Christel & Kang,1992), (Lim & Finkelstein, 2012), Jonasson (2012),	The primary researcher and the participants themselves, who help in managing and conducting the session; they document their own viewpoints, so bias, misunderstanding, and misinterpretations are rare.
Cost and time	Logistical factors, planning, finding participants, and the need for recording and transcribing the group session data are both costly and time-consuming. Krueger (2000), Morgan (1997), Turban and Aronson (1998), Zowghi and Coulin (2005) Krueger (1994) and Morgan (1988).	Not costly (economic) and more efficient for data collection and analysis by removing the need to transcribe and document the discussion and by selecting research participants who are easily accessible.
Studying emerging technology/ phenomena	Does not provide the means to study emerging topics that are unknown or limited knowledge/experience known about them. Experience and homogeneity "participants have similar characteristics or levels of understanding about a given topic" within the group is required to success the group meeting. (Kitzinger, 1995), (Morgan, 1997). (Dheepa et al., 2013), (Zowghi & Coulin, 2005).	Very suitable for investigating emerging technologies and phenomena by involving a (heterogeneous) large number of participants, even those with limited knowledge, as they raise questions that enrich the discussion and thought.
Learning	Does not focus on learning and instead aims only to gather data. Previous literature did not refer to using group-based method for this purpose	DFSG involves some participants who have no knowledge or little knowledge of a particular topic, so they might learn about a new thing or gain knowledge from the discussion.

Third, the application of the DFSG aids in promoting awareness and learning new things (e.g., new technology and its impact). For emerging issues that are not common or widely known, it is acceptable for some participants to be unfamiliar with the topic under investigation. In the example, the participants learned about NFC from the discussion, and some even discovered that they had this technology on their mobile phones. The traditional focus group method does not move beyond the objective of data collection and therefore does not assist in learning and spreading awareness among participants during group meetings. The DFSG is an IS research method because one of its applications, which justified its development, is investigating new emerging technologies. The DFSG method is designed to research both (emerging) technology and social organizational factors, which is not addressed by the traditional research methods. The nature of the IS discipline is that rapidly develops with new features and advancements in technology on a continual basis (Moor's Law implication). Indeed, the IS community needs an innovative method (i.e., the DFSG) to aid in researching innovative technology as well as the issues and phenomena that surround the technology, which develops and changes rapidly and continuously.

4.2 Limitations and pitfalls /dilemmas

Although the DFSG method has many advantages, as indicated in a previous section, some limitations must also be highlighted along with dilemmas and concerns that might emerge when applying the DFSG method. Scholars raised some of these issues at several conferences or workshops where this method was presented, while readers who want to apply the method might point out other issues or questions which are also discussed in this section. This section provides a reflection on the application of the DFSG method and offers some guidelines to avoid any pitfalls. It also presents clarifications on its application and addresses some misconceptions about the DFSG.

4.2.1 Quality of the data

One of the main criticisms of using the DFSG is the lack of any medium to record the meeting session; the quality of data can be questioned, as only some of the data can be gathered and important issues could be lost. The purpose of obtaining a recording is to remind the researcher of the issues discussed during the meeting that he or she might overlook. It also provides an audit trail of the raised issues. However, these purposes can be achieved by the DFSG. During the group session, the participants record their thoughts on paper, so important issues will not be missed. Instead, the credibility of the information actually increases as any misinterpretation or misunderstanding that could occur during transcription is eliminated. The researcher can also ask the participants to write about all issues that were raised even though some issues may not be agreed upon. The main point here is that all issues raised and discussed at the table were written on the paper and given to the researcher.

Researchers collect less data when applying the DFSG compared to traditional focus groups, which is expected, since the data are already organized by the participants themselves and prepared for cross-group/subgroup analysis and clustering. Here, it is important to differentiate between the value and the amount of gathered data; one may glean insight from a small amount of data, as was the case in the current research project, since the collected data were summarized and organized. In traditional focus groups, where audio/video is used to record every single moment of the session, a large amount of data is collected and then transcribed into tens or hundreds of pages, but not necessarily each sentence or transcribed speech will be significant and insightful. By applying the DFSG, the data collection and analysis processes will be shortened due to the focus on issues, ideas, and themes, as opposed to the transcription of detailed speech and manifold sentences in focus group settings.

If the amount of written data is limited or very short, then the researcher might request additional explanations from the participants during the session. The researcher could also exclude a number of the participants from the overall group number. For example, if the researcher selected 20 participants but one subgroup of 5 did not produce anything useful (no unique issues raised), then that subgroup's participants will not be counted and the actual considered number is 15 participants. This practice is similar to how researchers analyze survey data and exclude some questionnaires from the analysis because they are not filled in completely or because they contain suspicious answers.

4.2.2 Selecting subgroup leaders

Another concern that might arise is that the person who leads the subgroup could dominate the discussion, write down ideas that he or she likes or dislikes, or ignore some ideas. To avoid such issues, the researcher should first ask the subgroups to select a leader, who will have two main tasks: to document the discussed issues and to verbalize the group's ideas when discussing them with other subgroups (in the open discussion). The second practice is to ask each member to double check the written issues/ideas and then sign the paper before giving it to the primary researcher. Here, the participant agrees that his/her viewpoint is documented on the paper but not necessarily that he or she agrees with everything written on the paper. In other words, the written ideas/notes do not necessarily represent a consensus among the subgroup participants. If the leader feels that some points are missing, he or she may still write them down her/himself. The third practice is that the principal researcher should observe the participants and their discussion to document those issues that are hidden or ignored by the subgroup leaders and then raise them when the discussion is opened up to all subgroups. It is also important to note that one of the subgroup members might spontaneously volunteer to write the notes of the subgroup discussion and present them. These people often have oral, written, and leadership skills and can be identified in the meeting or when the subgroups are formed. Obviously, failing to identify those active volunteers might result in missing important ideas that are not documented. The above three strategies can help in minimizing this risk.

4.2.3 The method of selecting the participants

The method's first step/principle is to select its participants from the researcher's environment/workplace; therefore, the DFSG is more compatible with a case study, as the participants are chosen from a specific boundary. Although it can be said the method fits with the case study methodology, multiple case studies might be difficult to arrange because the researcher usually only works in one company at a time. The method is group-based, and the group must be selected easily and economically (first principle); this situation can therefore only exist in one organization, and it is more suitable for the researcher to use his/her workplace.

For example, an instructor might want to examine the use of smart phones by his or her colleagues and students at the university where he or she teaches. An IT specialist could study the implementation of a health enterprise information system at a hospital where he or she works. A data specialist might investigate the opportunities and challenges of implementing Big Data at his or her organization. The DFSG method is more applicable when the researchers are IS professionals and practitioners who can easily use their workplace for the research's purpose.

4.2.4 Misunderstanding of the term "discount"

The term "discount" does not mean producing low-quality or discounted research results, as this does not fit with the scientific and academic world. Instead, "discount" refers to using innovative tools/means in a smart way to gather and analyze qualitative data economically. The DFSG method is economical compared to other methods because it eliminates the costs of employing research assistants, using voice/video recorders, and transcribing the recordings. A discount reduces the research costs in a smart way while maintaining the quality of the research. In fact, the term "discount" was used by Nielsen (1989), who developed "discount usability engineering", in the human computer interface (HCI) field; his method was a formative technique and is used by many HCI professionals. However, Nielsen's method is distinct from the DFSG in terms of their purposes and applications. The term "discount" within the DFSG method can be used in the context of qualitative research as a formative and/or summative data collection and analysis technique that involves unique and different procedures: sampling people who are easily available, dividing the participants into subgroups (and using larger groups than are typically recommended, which differs drastically from Nielsen's (1989) method, which suggests testing interface designs using only five participants), asking participants to take notes (removing the need for transcription), discussing unique items from each subgroup with the full group, consolidating a list of ideas from all subgroup lists and the full group discussion, and avoiding formality and recorders.

4.3 Quality evaluation of IS research applied DFSG

Another important issue is related to the quality of the research that has applied this method: how the IS community (including journals, conference editors and reviewers, thesis supervisors, and examiners) will evaluate the soundness of any research that used the DFSG method. The quality can be ensured through three main approaches. First, the quality of the justification: the three conditions for applying the method were discussed in a previous section. These conditions need to apply to any IS research that employs the method. However, some might apply the method when only one condition out of the three is relevant and applicable. In this situation, the method is still valid, but details about the context should be provided to determine if the method perfectly fits with all or some of these conditions. Second, the quality of the process of application: quality can be assured by providing details about the context of conducting the subgroup meetings, the steps of the application (Figure 1), and the notes and observations taken by the researcher while the subgroups discussed the issues, and also by documenting any odd observations or actions that took place during the discussion. Third, the quality of output (research outcomes): one of the main elements that should be provided by any study that applies DFSG is a sample of the ideas and notes written by the subgroup leaders, which should be attached as an appendix. It is important to emphasize that these should not be transferred or typed into a computer; instead, they should be handwritten (they might be provided beside computer typed version for text clarity) by the participants themselves. This criterion is an advantage over the traditional methods where interviews are transcribed and typed into a computer by the researcher. In this traditional case, there is no evidence that the information is original, accurate or complete or raised by the participants themselves. Attaching handwritten samples will increase the credibility and auditability of the research results.

4.4 Applicability of the DFSG method in other fields

Other IT/IS-related fields, such as software engineering and knowledge management, might apply the DFSG method for knowledge and requirement elicitation and analysis. For example, in certain large projects, such as enterprise systems (ERP), large numbers of stakeholders are required to determine the system requirements and functions. There might be a need for several people from each department or functional area within the organization to be involved. Organizations might need to involve more people in the development process of the system. As existing methods do not involve large numbers of stakeholders, there is no guarantee that one or two people from each department are representative. Some people are not included on the assumption that they are not sufficiently knowledgeable or not suitable for political reasons, a process that might give rise to bias in the outcomes. In addition, some people simply may not be involved due to the limited number of permitted participants (at most 12). In fact, meeting people from cross-functional areas and allowing

interactions between them is also important for such systems because system components and business processes are interdependent. In some cases, conducting separate meetings with people from each department is not appropriate when the organization's business processes are interdependent and when understanding how work is done requires collaboration between individuals from cross-functional areas. Moreover, conducing separate meetings with several groups of people from different divisions increases costs. Therefore, DFSG method can be more appropriate in this case by having large number of people in one group.

Similarly, in knowledge management field, organizations might need to acquire and document employees' experience on particular subject. By using DFSG, they can involve large number of employees from same environment who will share and document their experience (tacit knowledge). When there are employees who have little knowledge involved in the meeting, they might learn from more knowledgeable people through subgroups discussion. Moreover, tacit knowledge might be transformed from experts' minds into explicit knowledge documented by both senior (expert) and junior (novice) employees, which will be an asset for the organization.

5. Conclusion

This paper demonstrated a new qualitative research method called DFSG. It shows the contexts in which the method can be applied. The method is effective and efficient for investigating new emerging IT research phenomena. Also, it is appropriate for collecting data from large groups, and addressing challenges that researchers encounter when conducting qualitative research such as availability of resources (human and financial) to gather and analyze data. This paper also argued that the DFSG method is original and innovative, and has advantages over other existing group-based methods such as traditional focus group, JAD, brainstorming (as shown in Table 2). Nevertheless, researchers who adopt this method might encounter some pitfalls and problems. Therefore, this paper provided methodological guidance on how to apply the method and avoid the potential pitfalls.

PhD students might be advised to explore the applicability of the DFSG method for their research, particularly those who are already working in organizations, so their workplace (if applicable) can be the case study where the environment can be used and qualitative data can be collected economically. The DFSG method might also be explored and applied in other IT/IS-related fields as shown in the previous section.

The DFSG method fits with one single case study strategy, as the researcher typically works in one place where he or she can select the participants. Future research might discuss whether this is an advantage or a disadvantage and comment on whether there is a need for multiple case studies or if one unique case is sufficient. Multiple researchers might also collaborate on a joint research project to create multiple collective cases where each researcher can use his or her own working environment.

The method can stand alone and be used throughout an entire research project, but it can also be used as a formative research technique during the research project life cycle to gather some needed data at particular stages. Future research should examine this distinction to determine if the method can be used for a pilot study to rapidly gather data, which helps to design survey questions or build case study protocol, including initial questions that can be investigated later using one-to-one interviews.

The DFSG is considered a qualitative research method. Some might argue that it is not a research method but instead is a data collection technique. However, a literature review on research methods in the IS and other fields has produced mixed interpretations and uses of these terms. In the IS field, there could be some level of agreement among a large number of IS scholars that grounded theory, case study, action research and ethnography are research methods, but the IS field should not be limited by this classification (each should be considered a "method" and not a "methodology"). For example, some consider grounded theory to be research "methodology" instead of "research method", while others used it only as a technique for data analysis. On his current website (the Grounded Theory Institute: www.groundedtheory.com), Barney Glaser, the co-founding father of grounded theory, points out that many people call grounded theory a qualitative method, although it is not. He considers grounded theory as an inductive methodology. Therefore, further research and arguments about this issue might be conducted in the future with regards classifying DFSG as methodology, method or technique.

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Appendix A: Samples of Notes Written by the Participants

A.1 Samples of discussion notes (chunks of data) written by subgroup leaders and compared with each other

1	* personal information privacy it will be violated.
2	4) They can watch my personal information The policy :- 1) storing private information is out of our responsibility.
3	Companies could track the person - details used
4	① Privacy can be violated. ↳ Not anyone can access the information, and if information were accessed, for example to only have prices listed, how much you paid and the date and time (without listing venue) ↳ And upon activation users must be well-informed of what information will be accessed and by who.
5	access to our information → bank will easily know our location and our payment processes, we can easily be tracked
6	The Dilemma - easy access to others, can be easily violated - especially if mobile is stolen
7	hackers may access the information stored in the chip and can be used in fraud transactions or purchases.

A.2 A sample of some notes written by one subgroup

What are the negative impacts that can come with NFC?

① Privacy can be violated.
↳ Not anyone can access the information, and if information were accessed, for example to only have prices listed, how much you paid and the date and time (without listing venue)
↳ And upon activation users must be well-informed of what information will be accessed and by who.

② Losing your device can be risky as it can lead to ~~theft, and~~ loss of time and high costs to replace.
↳ One lost, users must be informed of the procedures they have to take (for example informing the server)
↳ There can be a way to make replacement easier, for example online activation in order to duplicate the serial number for example

③ Not all stores may be able to afford this technology?
↳ They can learn from how long it took some stores to be able to get a machine to take credit cards, so to make this technology (NFC) more convenient for users and to encourage more people to use it, they should make it relatively cheaper and easier for stores/institutes to get it

④ Not all phones have it (NOKIA, Blackberry, iPhone)
↳ They should work on making it available to all phone companies and encourage all to manufacture it within their phones for the sake of convenience.