MINIMIZING CONFORMITY IN FOCUS GROUP FOR SOFTWARE DEVELOPMENT

Research-in-Progress

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ABSTRACT

In order to create successful software or systems, user involvement is one of the essential activities in software development process. In the user involvement, participant attitudes and their knowledge level about the software are substantially related to the quality of participant feedback. Particularly, in focus group test, which is one of the most widely used methods for attaining user feedbacks, if a participant is extremely passive or has no experience to share, he or she cannot provide productive feedback and, more importantly, can be subject to conformity. This tendency can be problematic in the focus group method because it decreases the likelihood that participants' feedback stands for their true belief and further amplifies the strength of dominant voice in the group. In this research, conformity and its relationship with the knowledge level and assertiveness level of participants of focus group will be investigated in the context of focus group test.

Keywords

Software development, agile development, focus group, conformity, knowledge level, assertiveness

INTRODUCTION

In order to create successful software or systems, user involvement is one of the essential activities in software development process. Prior studies have presented that user involvement in development can make a significant contribution to the production of successful software (Harris and Weistroffer 2009). However, although those studies have illustrated the importance of the user involvement in various software development contexts, they omitted an important discussion on how to acquire reliable feedback from participants, which can substantially influence to the success.

In order to attain a valuable feedback from the participants of user involvement activities, it is important to understand potential factors that determine the feedback quality. Participant attitudes toward involvement are one of the key determinants of feedback quality (Lin and Shao 2000; Pries-Heje 2008). This attitude is influenced by the interaction in participant groups and knowledge concerning the software tested (Pries-Heje 2008). Consequently, the dynamic in participant groups and the level of technical and socio-technical knowledge about the software are directly related to the quality of participant feedback.

In this research, the influential factors will be investigated in the context of focus group method. The focus group is one of the most widely used methods for evaluating software or information system in the development process because it can be conducted at low cost and allows researchers to attain prompt user feedback (Nielsen 1997). This method has gained huge popularity in the agile software development process, in which iteration and prompt user feedback is the core of the process (Highsmith and Cockburn 2001). In agile development, for example, when the design of prototype software is completed, developers usually conduct a focus group test to decide whether or not they continue development or modify the design of software (Highsmith and Cockburn 2001; Paetsch et al. 2003). Therefore, findings and conclusion from focus group test are substantial in developers' decision making for software.

The underlying idea of the focus group method is that active interaction can allow participants to develop and clarify their ideas more efficiently than a one on one interview (Kitzinger 1995). In the design of focus group research, therefore, it is essential to recruit subjects who have the proper level of knowledge and experience concerning discussion themes and have a positive attitude toward communication with other participants. If a participant is extremely passive or has no experience to share, he or she cannot provide productive feedback and, more importantly, can be subject to "conformity".

Conformity generally refers to one's propensity to abide by group expectation or the majority of the group (Campbell et al. 1986). This tendency can be particularly problematic in the focus group method because it decreases the likelihood that participants' feedback stands for their true belief and further amplifies the strength of dominant voice in the group (Hollander 2004). Because the research results are determined only by the observed behaviors of participants in focus group, the

conformity can produce seriously biased research outcomes. In turn, if software developers make or revise their software on the basis of the biased research knowledge, the software may be unsuccessful. Otherwise, they would waste a huge amount of resources in the development.

> *Research Problem:* If serious conformity has occurred in focus group research for software development, the outcome can be highly biased. These biased findings can lead developers to waste a huge amount of resources or create a product that cannot satisfy final consumers.

The purpose of this research is to investigate conformity in focus group and its relationship with the knowledge level and assertiveness level of participants of focus group tests for software development. The findings of this research will enhance academic knowledge concerning conformity and will provide software developers useful information in designing their research for attaining user feedbacks.

LITERATURE REVIEW

User Involvement and Software Success

The relationship between user involvement and software success has been investigated in many studies. Although a few articles argued that user involvement has no significant impact on the success of software, most studies generally concluded that user involvement is highly influential to software success (Harris and Weistroffer 2009). This is because active user involvement can provide various benefits for developing successful software, such as more accurate user requirements, knowledge for optimizing software features, and information for improving the level of software acceptance (Damodaran 1996).

McKeen and Guimaraes (1997) investigated the relationship between user involvement in software development and user satisfaction and system success by using the data attained from 151 system development projects in eight companies. They conclude that the user involvement is positively associated with user satisfaction and system success in 15 out of 31 participative user activities. Foster and Franz (1999) conducted research to clarify the differences in the perception of user involvement between the users and software analysts. They analyzed the data collected from 150 users and software analysts. In the conclusion, they demonstrated that the perception is different in the two groups and, more importantly, that the perception of users toward involvement is highly correlated to the acceptance of the software tested by users. Doll and Deng (2001) studied the importance of user involvement to the success of collaborative and non-collaborative applications. The definition of collaborative applications is any software or system that is designed to help users coordinate their work with others. In order to address the relationship, they surveyed 402 users in 18 organizations. They found that user involvement is significantly important in both types of systems. Ji-Tsung and Marakas (2006) investigated the impact of user involvement in the analysis and design stages on system success by conducting a laboratory experiments with 210 students. They found that active participation in both stages is more closely related to the system success than less active participation. In addition, they illustrated that high degree of the participation in analysis stage actually can decrease the need for additional participation in the design stage.

As discussed, it seems apparent that user involvement is highly related to software or system success in a variety of contexts. However, few papers have considered how user involvement should be designed and, more importantly, the types of participants who can contribute to the success of software.

Importance of Participant Attitude in User Involvement

Lin and Shao (2000) evaluated several factors in user involvement that are potentially related to the success of software. The factors include system impact, system complexity, development methodology, and participant attitudes. They found that user participation is positively related to software success. Specifically, they illustrated that the impact is more substantial when participants have positive attitude toward the software. Pries-Heje (2008) investigated the impact of relationship between different stakeholder groups in user involvement activities on the implementation of ERP. They collected data through interview of 18 managers, users, and consultants during an ERP implementation. In the conclusion, they demonstrated that the user attitudes toward software or system can vary according to users' perceived influence with consultants. For example, if they feel their opinions and influences are limited by consultants, they tend to have negative attitude toward the software. In addition, they found that the attitude becomes more satisfactory as the level of their knowledge about the software increases.

These studies commonly indicated that positive user attitude toward software and the degree of knowledge about it are highly related to user satisfaction and success of software. However, they omitted another critical factor in their discussion that can

have substantial influence: interaction among users. This is important because their attitude and the level of knowledge can be changed not only by interaction with consultants or managers but also by other participants.

Focus Group in Software Development

In software development, the term focus group generally refers to an informal discussion that four to nine users talk on issues and concerns about features of software prototype (Paetsch, Eberlein et al. 2003). The focus group has been one of the most popularly adopted test methods in software development process because it provides useful information with relatively small efforts in a secure way, compared to a formal, large research methods (Nielsen 1997). This method can be adopted for a variety of purposes from software concept test to user interface test (Paetsch, Eberlein et al. 2003). As agile software development has become widely used in the industry, the popularity of focus group methods has increased (Boyle, Cook et al. 2006). The uniqueness of agile development is the short iteration in idea and concept development phase. When an iteration cycle ends, the validity of software design is decided normally with user focus group review (Highsmith and Cockburn 2001; Paetsch, Eberlein et al. 2003). Therefore, it can be said that the results of the focus group is highly influential in deciding the direction of software development.

Conformity in Focus Group

Since the basic idea of the focus group is that vigorous discussion can generate better outcomes than interview with individuals, it is critical to recruit participants with proper knowledge and assertiveness (Kitzinger 1995). This is because the levels of intelligence and assertiveness are highly associated with conformity (Dana-Nicoleta and Zinkhan 1999).

Conformity generally refers to the propensity to follow group expectation or the major opinion in the group (Campbell, Tesser et al. 1986). This can be divided into two categories: public compliance and private acceptance. Public compliance means conformity occurred in face-to-face situations for attaining rewards or avoiding punishment. Private conformity refers to individual tendency concerning the voluntary acceptance of the moral beliefs and expectations (Dana-Nicoleta and Zinkhan 1999). The causes of conformity are informational influence and normative influence. Informational influence can be caused by the acceptance of information from others. Normative influence can be occurred by the acceptance of expectation from group or another person (Dana-Nicoleta and Zinkhan 1999).

This effect should be controlled in the focus group because it can substantially reduce the possibility that participants' suggested opinions represent their belief and even can enhance the strength of dominant ideas (Hollander 2004). In the focus group, the only source for evaluation is participants' ideas and opinions presented. Therefore, if serious conformity occurs in focus group, the research outcome can be biased and, consequently, the software developed on the basis of the biased knowledge is less likely to be successful.

Impact of Assertiveness and Knowledge Level on Conformity

Lascu and Zinkhan (1999) discussed a variety of influential factors to conformity in the context of product purchase decision on the basis of previous research findings. They argued that personal characteristics including intelligence and assertiveness are one of the critical criteria that can influence the level of conformity. Rhodes and Wood (1992) implemented a meta-analytic review on previous papers with key words such as persuasion, attitude change, conformity, and intelligence to investigate the impact of intelligence to influenceability. They found that less intelligent persons are more likely to be influenced by external stimulus than highly intelligent ones. Nakamura (1959) carried out a survey test with 141 introductory psychology students to investigate the possibility that conformity contributes to the variability in achievement in problem solving. The results demonstrated a negative relationship between intellectual level and tendency to conform to the suggestion of others. Williams (1984) conducted a survey to investigate the relationship between conformity and assertiveness. He surveyed 80 college students who have high and low assertiveness. He concluded that the 40 highly assertive students conformed significantly less often than the 40 low in assertiveness. Williams and Warchal (1981) examined the relationship between the assertiveness and conformity. They conducted an experiment, in which 30 university students participated who were exposed to a series of 10 conformity tasks based on Asch's classic paradigm. They revealed that high-conformity students were less assertive than low-conformity students.

As discussed, there is a significant relationship between assertiveness and conformity in various situations. In the design of focus groups, similarly, it is expected that conformity can be ruled out by controlling the assertiveness level of participants. In the case of focus groups, intelligence can be regarded as the degree of participants' knowledge concerning the theme of focus group. This is because participants with higher level of the knowledge would show better understanding on the theme and, in turn, will be seen as intelligent. Therefore, it is expected that conformity in focus group can be prevented by manipulating participants' knowledge level. However, these relationships have not been investigated in the context of focus groups for software development.

> ***Research Question:*** In focus group for software development, is conformity associated with the degree of assertiveness and the level of participants' knowledge? If so, which characteristic is more strongly related to the conformity?

Research Hypothesis

In order to address the research question, four hypotheses are established on the basis of literature discussed. In the hypotheses, if participants have strength in one of the two characteristics, it is assumed that they are less likely to conform to other participants in focus group. This is because both knowledge level and assertiveness level seem to be related to level of conformity, but the relative strength of the two factors has not been clarified. Overall research model is illustrated in the Fig. 1.
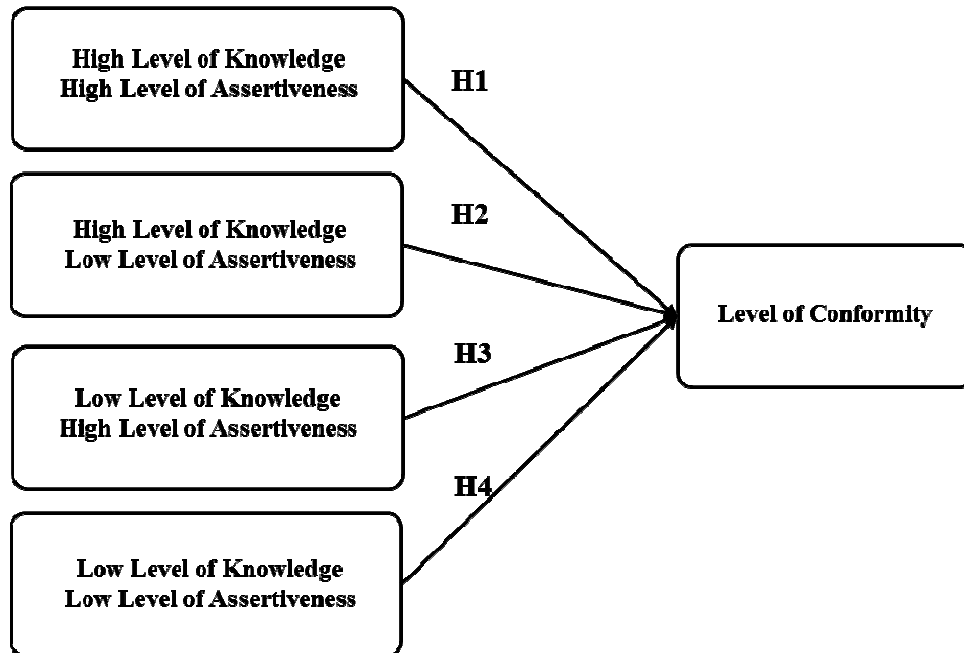

Fig.1 Research Model

> **H1:** Participants with high level of knowledge and high level of assertiveness are least likely to conform to other participants.

> **H2:** Participants with high level of knowledge and low level of assertiveness are second least likely to conform to other participants (more likely than high-high group but less likely than low-low group).

> **H3:** Participants with low level of knowledge and high level of assertiveness are second least likely to conform to other participants (more likely than high-high group but less likely than low-low group).

> **H4:** Participants with low level of knowledge and low level of assertiveness are most likely to conform to other participants.

METHODOLOGY

Subject Groups

The overall research design adopted is the two by two factorial design. This research design is appropriate for estimating conformity in focus group according to the level of participants' knowledge and assertiveness. This is because it allows assessment of which features or combinations of features of the treatment have an effect through different groups (Trochim

2001). Four different types of groups are designed according to the level of knowledge (high – low) and assertiveness (high-low).

Fig.3 Two by Two Factorial Design

Subject Recruitment

In terms of level of knowledge, there are two types of participants: high and low level of knowledge groups. High level of knowledge group will be mainly collected from Computer Science, Computer Engineering, and MIS departments of a university in Texas.   Low level of knowledge group will be primarily collected from other departments irrelevant to technology and engineering.   In screening test, the potential participants who agree to participate in the experiment will be examined in terms of their assertiveness and knowledge levels.
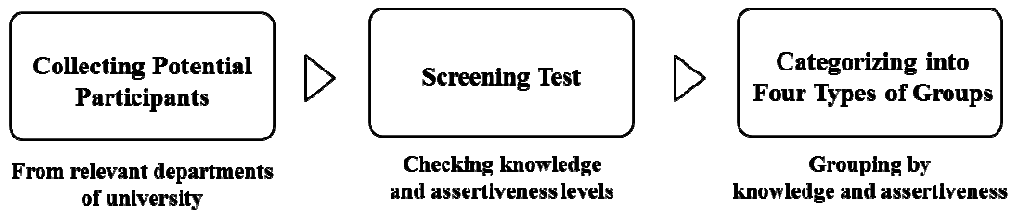

Fig.4 Subject Recruitment Process

In order to exclude possible influential factors, gender, age, and education level of participants are controlled. Although the relationship between gender and the degree of assertiveness is highly controversial (Stokes, Childs et al. 1981; Eagly and Steffen 1986), the possibility cannot be completely ruled out. In addition, because computer technology oriented subjects are mainly dominated by male users, it will be difficult to find female users for high knowledge groups. Age and education level also should be controlled to ensure active and balanced discussion, because communication skills are highly related to it. Therefore, because the participants of this experiment should have same education level, graduate level and doctoral level students will be excluded in the participant recruitment.   Consequently, all the potential subjects in the pool are male undergraduate students.

Software for Study

MS Windows 8 will be adopted as software for examining the hypotheses. There are two reasons that the operating system software is appropriate for this research. First, although focus group tests in real situations are conducted with proto types, it is almost impossible to attain such proto type software for this research. Although MS Windows 8 is commercialized software, it is currently released and not widely used yet. Therefore, it will be relatively convenient to find the participants who have not used MS Windows 8 and who can provide their fresh opinions. Second, the focus group has been widely exploited in the operating system software development process for the purpose of understating how users feel about various aspects of the software (Paetsch et al. 2003). In the concept development stage, particularly, focus group methodology is frequently employed (Highsmith and Cockburn 2001).

Screening Test

Based on the selected user groups, a screening test will be conducted for confirming their knowledge level and willingness to participate in this test. In the screening test, they are informed that this is a usual software test rather than an experiment, in order to invoke natural behaviors through the tests. The recruited participants are asked to take part in the test for evaluating level of assertiveness and level of knowledge through email survey. The assertiveness test is designed on the basis of Rathus Assertiveness Schedule, one of the most popularly used assertiveness test methods across various areas (Furnham and Henderson 1981). Specific items are illustrated in Appendix.1. Level of knowledge will be evaluated by the exam questions adopted from Microsoft 70-680 which is a part of Microsoft certification test.   In order to verify content validity, two or three IT specialists will involve in the design of specific items for testing level of knowledge. Participants are allocated into the four different user groups, by the results from the knowledge level test and the assertiveness test. In each group, five subjects are assigned, which is a general group size for focus groups (Folch-Lyon and Trost 1981).

Research Design

The main research framework of this research is a quasi-experiment, which consists of pretest and posttest. In the pretest, participants individually try MS Windows 8 and are asked about it by both individual interview and survey. In the posttest, the participants take part in focus group discussion by their level of knowledge and assertiveness. One pseudo participant who is an expert user takes part in the discussion. The role of the expert user is to try to make other participants conform to him. After the discussion, the participants are asked to fill out same survey, which is composed in a different way from the pretest survey.
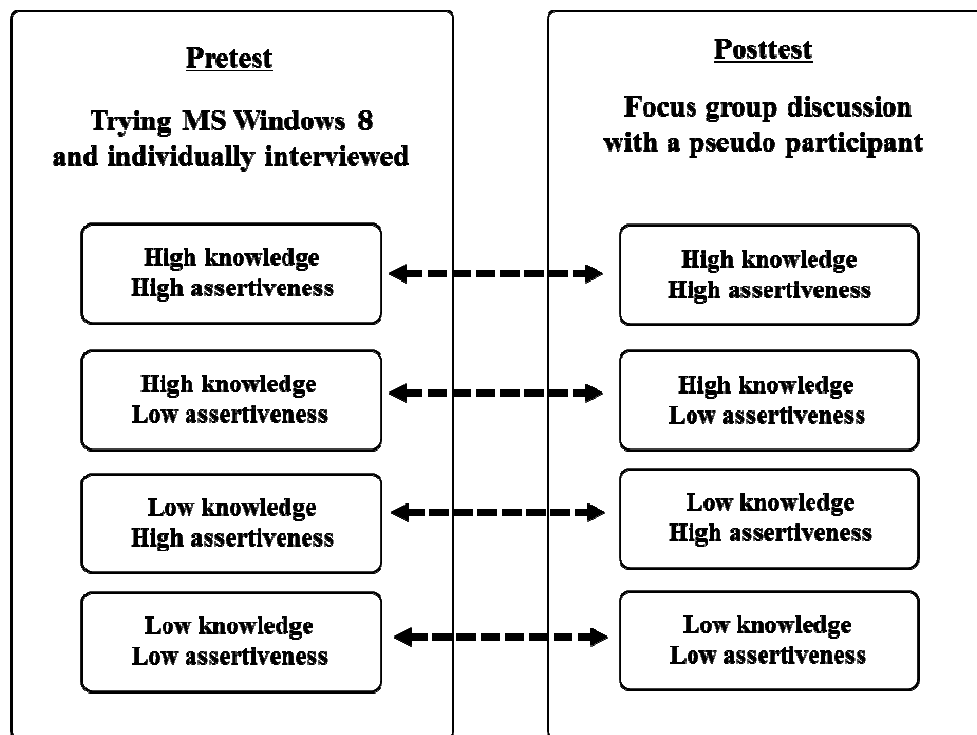

Fig.2 Overall Research Design

Pretest

Participants will try MS Windows 8 in the pretest. They will explore various aspects of the software such as usability and functionality. Estimated testing time is 30 minutes. After exploring the various aspects, they will be asked to fill in questionnaires covering various perspective of the software such as first impression, usability, and difficulty level.

Posttest

The posttest is a focus group discussion. Participants who will try the software discuss the same topics as they are asked in the pretest. A pseudo participant is included in each participant group, sorted by their level of knowledge and assertiveness. Besides a moderator in each session, the pseudo participant will play a role in presenting his ideas in highly assertive attitude to provoke conformity effect in the session. The pseudo participant shows only very positive (representing 7 in Likert's scale) or very negative (1 in Likert's scale) responses in the discussion. This is because the extreme responses provide a more apparent reference point for deciding whether the participants are conformed.
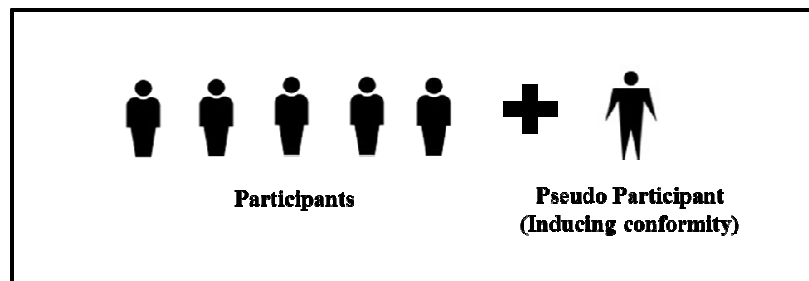

Fig.3 Member Composition of Focus Group Discussion

Data Collection

Data will be collected mainly by surveys in the pretest and posttest. The survey results from each test will be compared to examine how their responses change after the focus group discussion. The changes will be calculated on the basis of reference points that represent opinions of the pseudo participant in each discussion group. Positive values in change illustrate that participants have been exposed to conformity during the discussion. An example of expected result is below.

Questions	group1 (high knowledge-high assertiveness)							
	subject1				subject2			
	pretest	posttest	reference	change	pretest	posttest	reference	change
Q1	3	4	7	1	3	6	7	3
Q2	3	2	1	1	3	2	1	1
Q3	5	2	1	3	2	4	1	-2
Q4	2	3	1	-1	2	2	1	0

Table.1 Example of Experiment Result

EXPECTED CONTRIBUTION

This study will contribute to both theory and practice. It will enrich literature concerning conformity by illustrating influential factors to creation of conformity.   In the context of focus group, particularly, it will provide how knowledge level and assertiveness level are associated with level of conformity of participants of focus group. The outcomes of this research will be helpful for practitioners. If knowledge level and assertiveness level are significantly related to conformity level in focus group tests for software development, practitioners will have to consider these factors in the design of focus group. For example, they will have to allocate participants into different groups according to their knowledge level and assertiveness level.

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APPENDIX.1: RATHUS ASSERTIVENESS TEST

<u>ASSERTION INVENTORY</u>

Please indicate your degree of discomfort or anxiety in the space provided *before* each situation listed below. Utilize the following scale to indicate degree of discomfort.

1 = none	3 = a fair amount	5 = very much
2 = a little	4 = much	

Then, go over the list a second time and indicate *after* each item the probability or likelihood of you displaying the behavior if actually presented with the situation. For example, if you rarely apologize when you are at fault, you would mark a "2" after that item. Utilize the following scale to indicate response probability.

1 = never do it	3 = do it about half the time	5 = always do it
2 = rarely do it	4 = usually do it	

Degree of   *Response*

Discomfort   *Situation*   *probability*

_____ 1. Turn down a request to borrow your car

_____ 2. Compliment a friend

_____ 3. Ask a favor of someone

_____ 4. Resist sales pressure

_____ 5. Apologize when you are at fault

_____ 6. Turn down a request for a meeting or date

_____ 7. Admit fear and request consideration

_____ 8. Tell a person you are intimately involved with

when they says or does something that bothers you

_____ 9. Ask for a raise

_____10. Admit ignorance in some area

_____ 11. Turn down a request to borrow money

_____ 12. Ask personal questions

_____ 13. Turn off a talkative friend

_____ 14. Ask for constructive criticism

_____ 15. Initiate a conversation with a stranger

_____ 16. Compliment a person you are romantically

involved with or interested in

_____ 17. Request a meeting or date with a person

_____ 18. Your initial request for a meeting is turned down and

you ask the person again at a later time

____ 19. Admit confusion about a point under discussion

      and ask for clarification   _____

____ 20. Apply for a job   _____

____ 21. Ask whether you have offended someone   _____

____ 22. Tell someone that you like them   _____

____ 23. Request expected service when such is not forthcoming   _____

____ 24. Discuss openly with the person his/her criticism of your behavior   _____

____ 25. Return defective items, e.g. store or restaurant   _____

____ 26. Express an opinion that differs from the person you are talking to   _____

____ 27. Resist sexual overtures when you are not interested   _____

____ 28. Tell the person when you feel they has done something that is unfair   _____

____ 29. Accept a date   _____

____ 30. Tell someone good news about yourself   _____

____ 31. Resist pressure to drink   _____

____ 32. Resist a significant person's unfair demand   _____

____ 33. Quit a job   _____

____ 34. Resist pressure to use drugs   _____

____ 35. Discuss openly with the person his/her criticism of your work   _____

____ 36. Request the return of borrowed items   _____

____ 37. Receive compliments   _____

____ 38. Continue to converse with someone who disagrees with you   _____

____ 39. Tell a friend or someone with whom you work, when they

      says or does something that bothers you   _____

____ 40. Ask a person who is annoying you in a public situation to stop _____

APPENDIX.2: SAMPLE EXAM QUESTIONS OF MICROSOFT CERTIFICATE RELATED TO WINDOWS 7

1. You have a computer that runs Windows 7. The computer has System Protection enabled. You need to retain only the last System Protection snapshot of the computer. All other snapshots must be deleted. What should you do?

A. Run Disk Cleanup for Programs and Features.

B. Run Disk Cleanup for System Restore and Shadow Copies.

C. From the System Protection Restore settings, select Turn off System Restore.

D. From the System Protection Restore settings, select Only restore previous versions of files.

2. You have a computer that runs Windows 7. You have a system image of the computer. You need to restore a single file from the system image. You must achieve this goal in the minimum amount of time. What should you do first?

A. From Disk Management, select Attach VHD.

B. From Backup and Restore, select Restore my files.

C. Restart the computer and run System Restore.

D. Restart the computer and run System Image Recovery.

3. You have a computer that runs Windows 7. You need to identify how much disk space is occupied by previous versions. What should you do?

A. At a command prompt, run Diskpart.

B. At a command prompt, run Vaultcmd.

C. From System, view the System Protection settings.

D. From the properties of drive C, view the previous versions settings.

4. You have a computer that runs Windows 7. You manually create a system restore point. You need to restore a copy of a file stored on drive C from two days ago. You must achieve this goal in the minimum amount of time. What should you do?

A. From Recovery, select System Restore.

B. From Backup and Restore, select Restore my files.

C. From the command prompt, run Wbadmin get items.

D. From the properties of the file, select Previous Versions.

5. You have a computer that runs Windows 7. You add a new hard disk drive to the computer and create a new NTFS partition. You need to ensure that you can use the Previous Versions feature on the new drive. What should you do?

A. From Disk Management, convert the new disk to a dynamic disk.

B. From System Properties, configure the System Protection settings.

C. From System and Security, enable BitLocker Drive Encryption (BitLocker).

D. From the properties of the new drive, create a share and modify the caching settings.