



A tale behind Mum Effect

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Abstract:

Mum effect is a situation when one or more project stakeholders decide to withhold critical information for particular reasons. In software project where most of the production is intangible, the seriousness of this challenge increases exponentially. There have been reports indicating that mum effect can surface during any phase of development and ultimately lead to disaster in software projects. Mum effect can be influenced by several factors such as organizational and national cultures. This research investigates potential mum effect scenarios and reveals specific reasons which induce this challenge among information technology practitioners.

Keywords:

project management; outsourcing risk management; culture; mum effect; interview.

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1. Introduction

Software projects are indeed different from projects of other engineering disciplines. The entire development cycle of software projects highly involves design. Moreover, the products, especially during development, are mostly intangible. This makes project monitoring particularly difficult. The development of software projects highly depends on human generated ideas. This leads to unique risks and different degree of challenges, especially those which are related to human factors.

“Mum effect” or “code of silence” is defined as a phenomenon when one or more persons decide to hide the problems [1]. Hiding problems in general engineering projects is not easy and may not result in extreme situations. For example, in a construction project, a delay of works-in-progress can be almost immediately noticed due to the visibility of the product. Additionally, overall progress of physical products such as a house or a car can be inspected with minimal technical knowledge. In the same way, customer satisfaction can also be assessed early. Thus, any delays or misconception can be promptly detected and managed. However, this could be vastly different in software projects. It is rather impossible to inspect software product during the development, especially for those who have little technical knowledge. Ironically, even for a software engineer, it is difficult enough to understand a code written by others. Problems from misunderstanding of requirements could surface at the later phase of development, such as the acceptance testing or, even worse, the deployment. The problem could be worsened if the staff encounter problems but decide not to report or attempt to hide them. In this way, such problems would be extremely difficult to detect and subsequently tackle. This suggests that the abstract nature of software development matches perfectly with the subtleness of mum effect. People with different background may have different perception towards mum effect. Some might claim that keeping silence would have minimal effect to certain software projects, especially the ones with agile development environments. In contrast, others might argue that code of silence can surface even from staffs who have the most experiences and responsibilities. As for evidences, this risk caused substantial damages to software projects in the past [2],[3],[4]. Mum effect shares several similar traits to another risk called “deaf effect” which surfaces when at least one stakeholder decides not to acknowledge problems.

Several factors are hypothesized as mum effect factors. These include fear of consequences, information asymmetry, fault responsibility, time urgency and culture [5],[6],[7]. Firstly, fear of consequence directly depicts situations which an individual choose silence rather than uncertain consequences if the information is revealed. Secondly, information asymmetry indicates a project environment where stakeholders hold different information. This factor can be extended to communication gap which involve lack of sufficient information channel or other communication barriers. Both factors encourage mum effect. In contrast, the third and fourth factors, fault responsibility and time urgency, are negative factors of this risk. Fault responsibility, the third hypothesized factor, describes scenarios when there is a sophisticate chain of responsibilities. This encourages stakeholders to report problems if they could blame others. Fourthly, time urgency indicates that the closer the deadline is, the more likely the negative issues are reported. The final mum effect factor, culture, is arguably the most sophisticate aspect. Culture is a sensitive issue and cannot be easily controlled. Studies report that effects of these factors vary. Some factors appear to have strong connection to the risk while no significant proof is yet found for other factors.

This research does not attempt to investigate the factors of mum effect, however. On the contrary, it explores reasons of being silence on certain situation from a group of samples. Yet, the findings can be used as guidelines for practitioners to mitigate this risk.

The second section of this paper describes literature reviews on mum effect. The third section depicts interesting case studies on mum effect. This includes several business and educational cases. Then, the fourth section defines research methodology, the participants and other research settings. Findings are discussed in the fifth section. Finally, the sixth section concludes this paper.

2. Literature review

Mum effect is an interesting risk. It surfaces when at least one stakeholder determine to withhold critical information, generally to avoid negative consequences. This risk could become a serious issue in software projects where progresses are generally intangible. The lack of product visibility makes project tracking difficult. The situation could get worse with inaccurate information or concealed negative issues. Different levels of mum effect could lead to minor delay, significant conflicts, or project breakdown.

Researchers have suggested that there are several potential factors which influence mum effect. One of these factors is culture [6]. Based on Hofstede's landmark research, culture can be classified into five major dimensions [8]. Certain cultural dimensions such as power distance index and individualism are expected to have influence on mum effect. People with higher power distance index, which indicates a perception of large gap in societal equity, is expected to be more vulnerable to mum effect. An example scenario of this case is when young engineers feel reluctant to communicate with their superiors. This obviously facilitates mum effect. Individualism, on the other hand, designates different values between personal and group objectives. People with low individualism tend to prioritize group benefits over their own goals. They are likely to cover their colleagues' mistakes in order to keep positive relationship. Although this could strengthen the team, it could also result in irrational defensive culture. Mum effect can indeed surface from such situation. Interestingly, cultural scores from a number of countries, especially those in Asia, seem to be suitable for facilitating this risk.

Studies report that collective behavior is one of the most dominant traits of Asian culture [9]. The characteristic of the collectivist society is shared among Asian countries such as China, Vietnam, Singapore, Korea and Japan. The collectivist nature of Asian people reflects one of the key Confucius principles, which perceives that a person is not a mere individual but an important member of a family [10]. An example to illustrate this principle in practice is the case that students are keener to express their ideas as a group rather than an individual [11]. If their opinions are wrong, the blame is shared between team members. In this way, no matter the group decision makes sense or not, students who have different opinion than the majority of the group would usually keep mum. This may not be the case in Western culture where the individualism is high. As a result, every individual are more likely to oppose the group consensus if they think the majority are wrong.

With these hypotheses, researchers attempt to study relationships between this risk and cultural dimensions based on local and multinational recipients [12],[13]. International graduate students are reported to share a similar obligation to report critical issues to their immediate supervisor. Yet, they are not likely to pursue the result if their report is ignored. No significant differences are found between students from different cultural background [12]. Another study finds that there are strong connection between cultural dimensions and mum effect scenarios. For examples, IT professionals who have high power distance index tend to be reluctant to make a straightforward estimation. Additionally, collective respondents are unlikely to decline customer's requests, even unnecessary ones. However, surprisingly, their relationships are found to be not as significant as expected [13].

Fear of consequences and information asymmetry are other proposed factors for mum effect [1]. Indeed, in order to avoid immediate bad consequences, a person might choose withholding of negative information. This is especially true in an organization which has a record of staff punishment. Information asymmetry also facilitates mum effect. This factor arises from several issues such as a large gap of communication, language barriers, lack of communication channel, inadequate information circulation and inefficient communication. In an organization with serious information asymmetry, the staff might feel that reporting bad news is complicate and ultimately determine to keep mum. This mum effect factor is extended to communication gap in order to cope with other issues regarding inefficiency of communication [5]. The influence of these factors could be lessened by improving the quality of communication and building a strong organizational culture.

Team solidarity is another potential source of mum effect [5]. Generally, team solidarity is beneficial for a project. However, if such bond is too strong, it is possible that team members become protective. As a result, they might fail to

report information which could negatively affect their colleagues or team relationship. This factor is sensitive and needs to be managed carefully.

Other factors of mum effect are defined as fault responsibility and time urgency [7]. Fault responsibility occurs when at least two stakeholders take part in a project. It is not unusual for an organization to blame external vendor if problems arise from the project development. It is found that if the fault responsibility can be placed on the external vendor, mum effect is less likely to happen. Another factor, time urgency, involves with the project life cycle and time-to-market. It is reported that high urgency negatively influences mum effect. In other words, a higher urgency increases a person's willingness to tell the bad news.

3. Case Studies of Mum Effect

There have been reports that a number of software projects were affected by mum effect. In most case, this risk created delay and many undesirable problems to the project. However, there were several cases which mum effect ultimately led to major disasters.

3.1 CONFIRM

One of the most devastating cases involving mum effect was the CONFIRM system development. Major international organizations such as Budget Rent-A-Car, Marriot Corporation and Hilton Hotels invested in this project [2]. All stakeholders expected that CONFIRM will be a very successful project. However, instead of a new and complete global reservation system, \$165 million was lost. A report indicated that this project suffered from extreme technical complexity. Serious scope creep and sophisticated system integration were also accounted for the problems.

Although technical difficulties were blamed as the main reasons of this disaster, the mitigation was actually likely to be possible if an immediate action was taken. However, the project staffs decided not to report this critical problem at an early stage of development in order to prevent the team from punishment against high expectation from stakeholders. While the project kept going, the problem continually intensified. It was already late before the stakeholder realized the situation and acted correspondingly. Resources were pushed in attempt to solve the problems. Unfortunately, all effort was wasted and CONFIRM was never completed.

3.2 LAMP

The License Application Mitigation Project (LAMP) project is another excellent example of IT projects failure which stemmed from mum effect. The project was planned to offer an automated process for renewal of vehicle license and registration for the state of Washington, USA [4]. Unfortunately, this five year promising project of \$16 million turned out to be a seven year mediocre project of \$67 million [CIO Staff, 1998]. The main problems of LAMP project were identified as poor scope management, poor project coordination and poor project management.

In this case, several problems were actually found in an early stage of development. However, the problems fell into deaf ears. The LAMP management team fails to admit their seriousness. Instead of reporting to the stakeholders, the project staffs reluctantly continued their work. For some reasons, the technical staffs also did not attempt to report these problems to external parties. This later resulted in more serious problems and a major increase of budget. It is arguable that if the team halted their production and reported the difficulties to the stakeholders, even though the project might still fail, it would cost much less budget and resources.

3.3 ADMIN

Another interesting case study on mum effect is the ADMIN project. This project was to develop an information system for administrative tasks for a mid-sized company [3]. The project manager was freshly promoted and immediately assigned to this project. This one-year project progressed smoothly in the perspective of the stakeholders until the testing phase. Then, major problems regrettably surfaced during the testing. After the first mistake was encountered,

numerous other defects appeared. The project consequently suffered from a major delay and was ultimately scrapped after two years of implementation.

It was later revealed that these problems were actually earlier acknowledged by the project manager. One major problem stemmed from miscommunication between the manager and a project member. However, the project manager was confident that the problem would be mitigated and therefore chose not to report to higher stakeholders. Unfortunately, the problem turned out to be serious. Not only he was unable to solve the cases, it also grew to the scale that affected the entire project.

3.4 Mum effect in education

Mum effect often surface in education. It is normal to find that at least a few students fail to feedback or participate in in-class activities. This leads to inefficiency of the classrooms. Culture and language capability are usually blamed for this behavior [14]. However, as aforementioned, a study amongst international IT students found that the connection between cultural dimensions and mum effect are not as significant as expected [12]. Also, mum effect can be generally found in local East Asian universities where the students' first languages are used. Thus, it is not entirely logical to accuse that language barrier is the main source of mum effect either.

There have been reports on mum effect as one of the most dominant the in-class behavior of Asian students [14]. They are reported as quiet and inactive in opposed to Australian, American and European students [15]. The silence of Asian students is known to be a sign of respect for their teachers [14],[11]. This behavior is found to be common among Asian students, for example in China [11]. The silence is considered to be the better alternative than speaking in front of their seniors that is perceived as showing off in Asian tradition. This mindset shapes up the students' public behaviors, and, therefore, provides challenges to faculties and the education system.

Another common issue that contributes as one of the factors is the fear of "losing face", which can lead to a loss of self-esteem and reputation in community [16]. Asking questions during class can be perceived as lacking of understanding, and thus shows a sign of disgracefulness in some cultures. In even more serious cases, students would say "yes" in response to a teacher's question if asked whether they understood what explained in class, even though they did not. This is because answering "no" would be seen as an insult to the teacher.

The first three business cases suggest that mum effect, although subtle, can be extremely dangerous to projects. This is especially critical in software projects where the actual progresses are not entirely visible for stakeholders. It can be seen that several aforementioned factors influenced mum effect in those case studies. Mum effect in the CONFIRM and LAMP projects was clearly caused by fear of punishment and pressure from high expectation. On the other hand, mum effect in the ADMIN project was slightly different since it involved over self-confidence and expectation of achievement. Then, the final case indicates that mum effect exist from the level of undergraduates. Students from certain regions appear to be more vulnerable from others. Culture, although perceived as the main source of this case, was found to have no significant correlation to this risk. Indeed, there could be many more elements which influence mum effect. Additional empirical studies which focus on identifying its source could help improving the overall knowledge for tackling this challenge.

4. Research Methodology

This research performed a short but insightful survey to the participants in July 2013. The sample group involved 38 senior computer engineering undergraduate students from Chiang Mai University, Thailand who attended the software engineering class. Two questions as follows were asked to the students:

- Have you ever keep silence in certain situations?
- If yes, what were your most frequent reasons on that action?

After that, the students wrote their answer in their card and submitted them anonymously. The participation was entirely voluntarily. This simple setting reflects a viewpoint towards mum effect from a perspective of fresh graduates, before being affected by organizational culture.

The first question was a probe question to investigate whether the students are vulnerable to mum effect. The students are given a 7-scale Likert of answers, i.e., never, very rarely, rarely, occasionally, very frequently, and always [17]. On the other hand, the main interest of this research focuses on the second question. Although simple, this second question was an open end question which directly inquires for the reasons behind mum effect scenarios. The students were allowed to give more than one reasons if they want. Their anonymity encouraged them to provide sincere answers.

After the participant submitted their answers, the data was then analyzed. Basic descriptive statistical analysis is performed on the results of the first questions in order to investigate general trend of this phenomenon. Then, the answers of the second questions are normalized, grouped and interpret.

5. Results and Discussions

Fig. 1 summarizes information gathered from the first question. Although most of the students experienced mum effect, the majority of them (33 out of 38) stated that this risk only happened rarely or occasionally. Almost 10% of the students even stated that they very rarely or never keep mum in any situations. This can be a positive sign for the industry that these future workers, in spite of their young ages, do not have a nature of silence. They can keep mum at times, but not always. An appropriate environment could encourage these young talents to speak and participate.

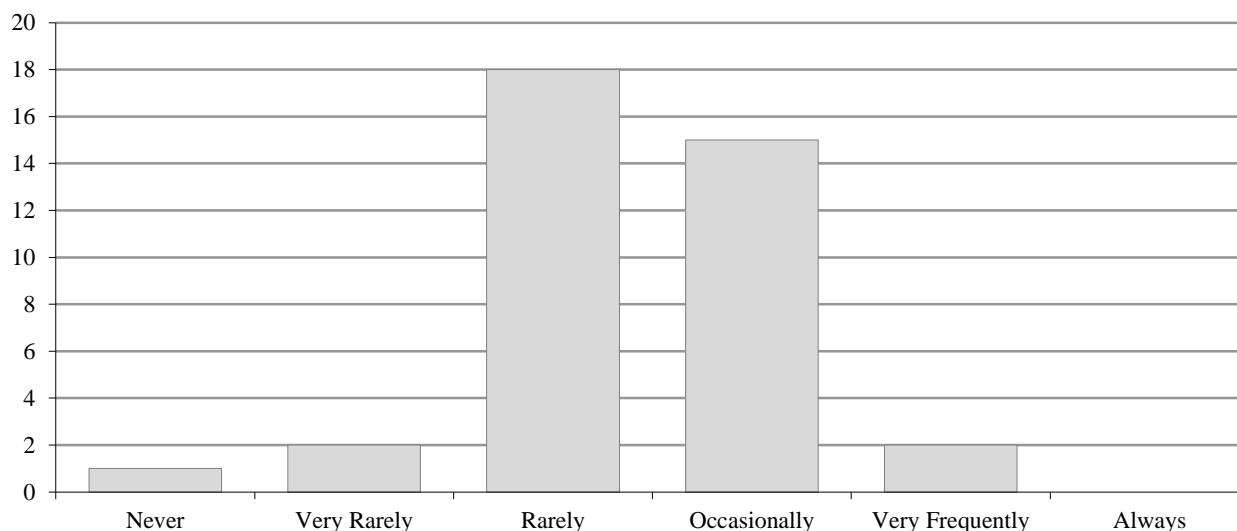


Fig. 1. Ratio of students who kept silence in certain situations

Fifty five various responses were retrieved from the second question. Samples of these answers are listed as follows:

- I keep mum when I think my idea could exacerbate the scenario;
- I keep mum when I do not have any idea on that issue;
- I keep mum when I am not confident;
- I keep mum when I am uncertain that what will be the result of my idea;
- I keep mum when I do not understand the question;

- I keep mum when my adversary is present in the group;
- I keep mum when I need to use English;
- I keep mum because I never refuse my boss/lecturer's command;
- I keep mum because I am shy;
- I keep mum because I want to give other people a chance to speak;
- I keep mum because I prefer a private discussion over public speaking.

These answers were then moderated and organized. Similar responses such as having conflict with the interlocutor, having conflict with another stakeholder, or avoiding conflicts amongst team members were grouped together. Table 1 exhibits the result of these responses.

Table 1. Reasons behind mum effect

Group	Subtotal	Frequency
<i>Team solidarity</i>	15	
Relationship maintaining		7
Avoiding conflict		5
Command from superior		3
<i>Fear and uncertainty</i>	14	
Fear of consequences		6
Uncertainty of ideas		8
<i>Characteristics of the participant</i>	8	
Shyness		3
Preferred communication style		3
Courtesy		1
Selfishness		1
<i>Miscellaneous</i>	18	
Complication in communication		10
Culture		1
Language barriers		1
Other		6

Major reasons behind mum effect found in this research can be divided into five categories, i.e., fear and uncertainty, team perception, characteristics of the participant and miscellaneous. Several interesting feedbacks were discovered.

5.1 Team solidarity

Team solidarity involves situations when the participants attempt to maintain team relationship by any means. This includes keeping mum if the idea can offend other team members. Several students admit that they rather keep silence if their expression can cause problems within the team. This displays a strong collectivism culture of the students. Yet, perception towards team relationship can be dangerous. It has been reports on several occasions that a strong team can become overprotective and lead to deceptive vision [18]. Therefore, it is important to keep the balance of the team

relationship. Additionally, based on Hofstede's cultural research, it appears that many countries in Asia and South America such as China, Indonesia, Malaysia, Thailand, Colombia, Venezuela and Peru are collectivists [8]. General population in these countries is likely to prioritize team relationship over individual objectives. This is different from most North America and European countries where people tend to sacrifice team relationship if it conflicts with their personal goals. As a result, different approaches might be needed for these different cultures.

Conflict amongst stakeholders also facilitates mum effect. Students reveal that they are unwilling to talk if their adversary is presented in the conversation. This is regardless whether he or she represents as a moderator, superior or another team member. This is actually a rather serious scenario since it is not always easy to allocate conflicts amongst team members. In order to tackle this problem, an organization should establish a conflict management system as well as a mechanism which can help identifying conflicts between both internal and external stakeholders.

Another mum effect scenario surfaces when the participants receive orders from their superiors. In this case, superiors could mean their lecturers, advisors, bosses or even group leaders. A few students indicate that they always accept their orders or assignments, regardless of they are confident they can finish it or not. This is actually not a positive sign since it could lead to major problems as described in previous case studies. Indeed, in order to overcome this case, the superiors need to understand the capability of their subordinates as well as encourage them to sincerely feedback on their orders. Likewise, there should be certain mechanisms which encourage the subordinates to negotiate without any potential punishment. Frequent tracking of work-in-progress, such as in agile software development, would be another efficient strategy for this setting.

5.2 *Fear and uncertainty*

As hypothesized as a major factor for mum effect, fear of consequences is reported to be one of the top reasons of the students' silence. Students indicate that if they feel fear that their talk can result in bad consequences they are obliged to keep mum. This is especially true when the students predict that the outcome would be undesirable and would directly affect them. The bad consequences distinctively noted by this sample group involve fear of punishment and fear of causing conflict. Fear of punishment is found to be the dominant reason behind mum effect in this study.

Uncertainty is another main reason of silence. Several students reveal that whenever they are uncertain of the outcomes, they are not likely to speak. This situation could be worsened if they are not familiar with their immediate supervisor. Uncertainties could be a complex situation since removing them from a working environment is not a simple task.

Arguably the best strategy to tackle mum effect from fear and uncertainty for the industry is building a sincere working environment and culture where the staff can at least feel that they will be safe even if their idea are different from others. Records of previous decisions based on certain action could help reducing the uncertainties. For example, if the staffs recognize that their current boss is open to public discussion and never keep grudge against the critics, they would be more likely to create an open argument on such basis. Improving relationship between staffs in the same line of command is also another promising mitigation strategy. It is obvious that if the staffs feel that they will be protected by their supervisors, they would feel more obliged to report negative issues.

5.3 *Characteristics of the participants*

Shyness is one main reason behind mum effect. The students who admit that they have a shy nature are likely to be nervous talking in public. In some cases, shy students could have problems even when they need to communicate in person, either with their colleagues or supervisors. Shyness usually reduces when the people get more confident or are more familiarize with their counterparts. Indeed, practicing and experiences could gradually help easing this matter. Furthermore, the supervisors should attempt to encourage their staff to speak, especially the ones who usually keep silence. The stronger the bond between the team grows, the less the shyness is likely to emerge.

Several students indicate that they are likely to keep mum whenever they are in public. However, they are more than willing to converse in person. This suggests that an organization needs to have more than one channel of communication. Apart from public and personal options, an anonymous channel would be an efficient solution to this problem. Also, similar to the strategy to tackle shyness, building up relationship between staffs could help lessening this situation.

Courtesy is reported as a source of mum effect from one student. An interesting scenario emerges when this student attempts to keep mum in order to encourage other members to speak. Although this could be perceived as a mere excuse from another shy student, it is not entirely illogical. Again, improving communication channel could be an excellent strategy to tackle this unfortunate case. With increased options of communication, ideas could be expressed more easily.

One response from the students states that he or she keep mum when having a decent idea. Instead of telling the idea to others, he or she choose to keep this for own sake. This indeed sounds selfish and would be undesirable for any level of organizations. Tacking mum effect emerged from this situation could be sophisticated. The best strategy to handle this case could be a building of strong professionalism within the organization and improve the attitude towards the good of the organization.

5.4 Miscellaneous

Complication in communication is an extension of a previously proposed factor, the communication gap. This source of mum effect involves a number of complex situations in communication. The survey results reveal that mum effect can happen when the participant could not clearly understand the question. It also occurs when they has no idea how to answer the questions. It could even happen when the staffs think that there are a sufficient amount of enough ideas expressed. A few students indicate that they are not likely to speak if they think other people's ideas are good enough to concur. Other feedbacks involve when the idea is extremely difficult to do or the idea is difficult to express. In fact, all of these reasons are not necessarily true. Certain ideas which one person perceive as difficult might be easy in the viewpoint of others. Moreover, everyone should be given at least an opportunity to express their idea, no matter how similar they are. Indeed, the staffs should be advised that more number of similar ideas can actually highlight their importance. A strong organizational culture which encourages information exchanges could dampen this mum effect setting.

Culture and language are also regarded as sources of mum effect from one student. The student signifies that he or she cannot express ideas sincerely in front of seniors or superiors since it is considered not polite. Although similar to the aforementioned scenario described in previous case studies, this might be another misinterpretation towards cultural politeness. Yet, it is undeniable that culture is usually a sensitive issue. The best method to mitigate this could be to set an example in an organization level. An organizational culture which subordinates are encouraged to discuss with their supervisors should help minimizing this mum effect scenario.

Other feedbacks describe random situation which encourage mum effect. For example, a few students indicate that if they are depressed or they feel not in the mood, they would not participate in any kind of discussion. One student even note that he or she personally hates meetings and believes that keeping silence could help the conversations to end as soon as possible.

6. Conclusion

Mum effect involves a scenario when one or more person decides to withhold certain information for some reasons. This risk might be considered as a trivial one in many engineering projects. However, it can lead to serious problems in software projects. This is due to the high dependency on human resource and abstract nature of software products. Reports indicate that mum effect led to a number of software project failure in the past.

Fear of consequences, information asymmetry, culture, language barriers, fault responsibility and time urgency are proposed as factors which influence mum effect. Several experimental studies report that some of these hypothesized factors have connections to the risk. This study attempts to explore other potential source of mum effect. The anonymous survey was conducted to a group of senior undergraduate students to investigate on this matter.

Several reasons of mum effect are identified. Unsurprisingly, team solidarity, fear of consequences and complication in communication are the most frequently stated factors. The students choose to keep mum if they think that it can help avoid conflicts with their associates. The result also revealed that several participants would never refuse or negotiate when they receive assignments from superiors. Also, they are likely to withhold their information when they feel that the result of the idea is uncertain or will lead them to undesirable consequences. Complication in communication also facilitates mum effect. The participants indicate that various settings cause mum effect. This includes when they do not clearly understand their interlocutors, or they are not sure how to properly express their ideas. Some additional interesting elements are also found in this study. Several characteristics of participants such as shyness and preferred communication styles are reported to be potential sources of mum effect.

Based on the findings, two major implications can be applied in any organization in order to mitigate mum effect. Firstly, at least three options of communication channels need to be represented and accessible. This includes not only public and personal, but also anonymous communication. In this way, the staffs are allowed to choose their most preferable channels, thus the mum effect could be reduced. The second implication involves building a strong organizational culture. A working environment which the team encourages discussion and treats each ideas equally is highly likely to help lessening mum effect.

Other strategies based on implications from this study include promoting of professionalism within the team. Every staff should prioritize the benefits of the organization over their personal interests. Problems and concerns should be discussed constructively. The person who raises issues should be rewarded, not punished or blamed. Relationship between staffs should be built up to a high level. This is to encourage frequent and sincere information exchange, either officially or informally.

The major limitation of this study is the monotonous background of the participants. Since they are all Thai undergraduate students from the same class, they are likely to experience similar environment. Yet, from another perspective, this limitation is a genuine reflection from fresh workforces who have been minimally influenced by actual organizational cultures. As a result, the findings are especially beneficial for tackling mum effect in such bodies.

This research could be extended in the future by collecting the data from experienced IT professionals. To maximize the profit from the study, the participants should have various ethnographical backgrounds, educational levels, positions and professional experiences. The data collection could be performed in a form of interview in order to thoroughly investigate the phenomenon as well as their solutions.

Another potential research based on this study is the evaluation of the proposed mitigation strategies. Results of a controlled experimental research which investigates the effectiveness of organizational culture, increased communication channel, and other strategies on mum effect would definitely benefit software project management community.

As there are a number of potential source for mum effect, the management team needs to carefully monitor the status of their human resources. Mitigating mum effect is not difficult. However, it needs to be performed as early as possible.

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