Situation Complexity: Delineating Situational Factors Affecting Individual Communicative Action in Problem Solving

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ABSTRACT

The rapid development of new social media technologies has provided today's individual with a variety of communicative tools that enable the dissemination of information to large groups of people in a very short amount of time. Individuals who converge into collectives are viewed as influential forces in the creation of problem perception, and have the potential to influence society and pressure the organisations within it. For this reason, understanding audiences and managing information is of interest to communications practitioners and scholars alike. Of late, the study of the individual problem solving process has become an important focus; more specifically, the communicative behaviour of individuals and the factors that influence these communicative behaviours. Previous studies have examined three key antecedent factors that determine an individual's participation in communicative action: problem recognition, involvement recognition, and constraint recognition. This study proposes that the problem solving process is also influenced by contextual factors that may limit or encourage communicative behaviour. The purpose of this study was to delineate the "situation" in the individual problem solving process and construct a quantitative measure of perceived situation complexity. A synthesis of extant literature produced preliminary dimensions and items that were tested through a survey distributed among 152 university students. Exploratory factor analysis yielded six main dimensions: solution complexity, referent criterion, negative feelings toward the problem, environmental salience, problem familiarity, and uncertainty of a solution. These results provide initial guidance into exploring the concept of context in individual problem solving and the consequences on communicative action.

Keywords: *Communication behaviour, problem solving, problem conceptualisation, situation complexity, exploratory factor analysis*

INTRODUCTION

Individuals as communicants are important components in the process of information dissemination. The term "communicant", as proposed by Kim (2006), is thought to accurately describe the individual's ability to both receive and produce information. For decades, communication research has focused on the individual as a member of the audience, one who passively receives and processes information. The individual as a producer of information, an entity that actively shares and spreads information, is a relatively recent notion that is just beginning to gain traction in the area of communication research. Active communicants have an essential role in the exercise of democratic and developmental processes in society, and have the potential to form collectives, or publics, to push for change. Naturally,

the formation of publics can present challenges for parties that may be negatively impacted by this process. While the expression of one's opinions and the formation of collective voices may have positive outcomes, it may also result in the spread of misinformation, encourage negativity, and raise tensions within society.

In today's changing media landscape, the active communicant has the access to vast, new spaces to instantaneously share news and opinions with large audiences. These new avenues for self-expression also allow individuals to speak anonymously or behind different guises, where answerability to one's words and actions may go unchecked. An interesting example of an issue that caught the attention of the Malaysian public and created much controversy was the "I Want to Touch a Dog" campaign (see Muammar Ghaddafi Hanafiah & Mohd Yuszaidy Mohd Yusoff, 2015). It is therefore important, now more than ever, to understand why and when individuals are likely to become active about particular issues and to study the motivations behind one's need to acquire, select, and transmit information.

Kim, Grunig, and Ni (2010) explored information acquisition, selection, and transmission as part of a larger concept called "communicative action". The authors proposed that communicative action, or communicative behaviour, is produced as a by-product of the individual problem solving process. In other words, when a person perceives a problem, he/ she will partake in communicative behaviour while attempting to solve said problem. Based on this notion, Kim and Grunig (2011) developed a situational theory of problem solving to explain when, why, and how communicants become active in their communicative behaviour. In their study, Kim and Grunig (2011) propose that the antecedent factors of problem recognition, involvement recognition, and constraint recognition influence a person's communicative behaviour. Additionally, referent criterion and situational motivation to solve the problem further refine our understanding of the relationship between problem solving and communicative behaviour.

In examining the antecedents to communicative behaviour in problem solving, the context within which the communicant stands is commonly overlooked. In fact, researchers in the social sciences tend to treat contextual factors as contaminants to their research data. Even so, in the area of communication research, communication behaviour especially, a closer examination of context may be beneficial in order to identify and understand factors that may constrain or motivate communicants to be either proactive or passive in their communicative behaviour.

This study is part of a larger research project exploring the role of contextual factors in the problem solving process. More specifically, this study focuses on defining the problem-solving context; what factors constitute a "context" and how these factors influence one's communicative behaviour. In other words, what factors in a problem situation may influence the way a person communicates about said problem?

Extant literature shows that the individual holds the key to the many questions we ask about information needs and communicative behaviour. Much of the recent focus has been on situational factors of the individual, their attitudes and their cognitions in satisfying information needs. Much less attention has been paid to situational structures that make up the "situation" or the context within which the

problem or issue arises. Communicative behaviour does not occur outside of context. What factors in the situation influence one's communicative behaviour? More specifically, the objective of the study is to construct a quantitative measure of perceived situation complexity.

LITERATURE REVIEW
The Situational Theory of Problem Solving
In the situational theory of problem solving (STOPS), Kim and Grunig (2011) posit that communicative behaviour is a result of the problem solving process. The authors expanded Grunig's (1997) situational theory of publics to a generalised theory of problem solving that, in addition to information acquisition and selection, also takes into consideration the information transmission behaviours of communicants. In STOPS, three key antecedents precede communicative behaviour: problem recognition, involvement recognition, and constraint recognition. Another variable, situational motivation to problem solving, mediates the relationship between the key antecedents and communicative activeness. Referent criterion, on the other hand, directly influences communicative activeness. This is demonstrated in Figure 1 below.

STOPS is able to predict a wide range of communicative behaviours and has been proven to enhance our understanding of when and why people become active communicants. The theory has been used to improve the classification of publics (Ni & Kim 2009), study hot-issue publics (Kim, Ni, Kim, & Kim, 2012), and examine communicative behaviours in a range of issues (Norliana Hashim, Chang Peng Kee & Mat Pauzi Abd Rahman, 2016; J.-N. Kim & Rhee, 2011; J.-N. Kim, Shen, & Morgan, 2011; Lee, Oshita, Oh, & Hove, 2014).

Although STOPS was constructed with the intention to be a more generalised theory of problem solving, its current use very much remains in the field of public relations where it originated. By exploring relationships between the variables in the STOPS model and contextual variables, it is hoped that the avenues for research may be expanded.

THE PROBLEM AS CONTEXT
A person will encounter many types of problems in his/ her lifetime; the problem solving process is one that an individual will partake in, consciously or unconsciously, on many occasions in everyday life. The perceived problems that one encounters may or may not require effortful solution. A problem occurs when one perceives that something is missing or irregular about a particular situation - when one's needs or expectations are not being met. An information need or information problem, on the other hand, occurs when an individual perceives a gap, an inconsistency or lack of knowledge. A perceived problem can therefore lead to a perceived information problem, that in turn compels one to pursue more information through communicative action in order to solve the problem at hand (Kim & Grunig, 2011).

It is important to note that not all problems encountered by a person can or will become issues of public concern. The range of problems one may experience vary from personal issues with personal solutions to public issues with solutions that involve higher level solutions and multiple stakeholders.

When dealing with public issues, the difference between an issue and the related underlying problem must be recognized (Patton & Blaine, 2001). According to Dale and Hahn (1994), a public issue is defined as a "matter of widespread [public] concern." Patton and Blaine (2001) state that public issues reflect recognition by the public that something is not the way it should be and that a public remedy must be taken. They add that these concerns are usually related to identifiable problems, but sometimes are based on perceptions that are either accurate or inaccurate.
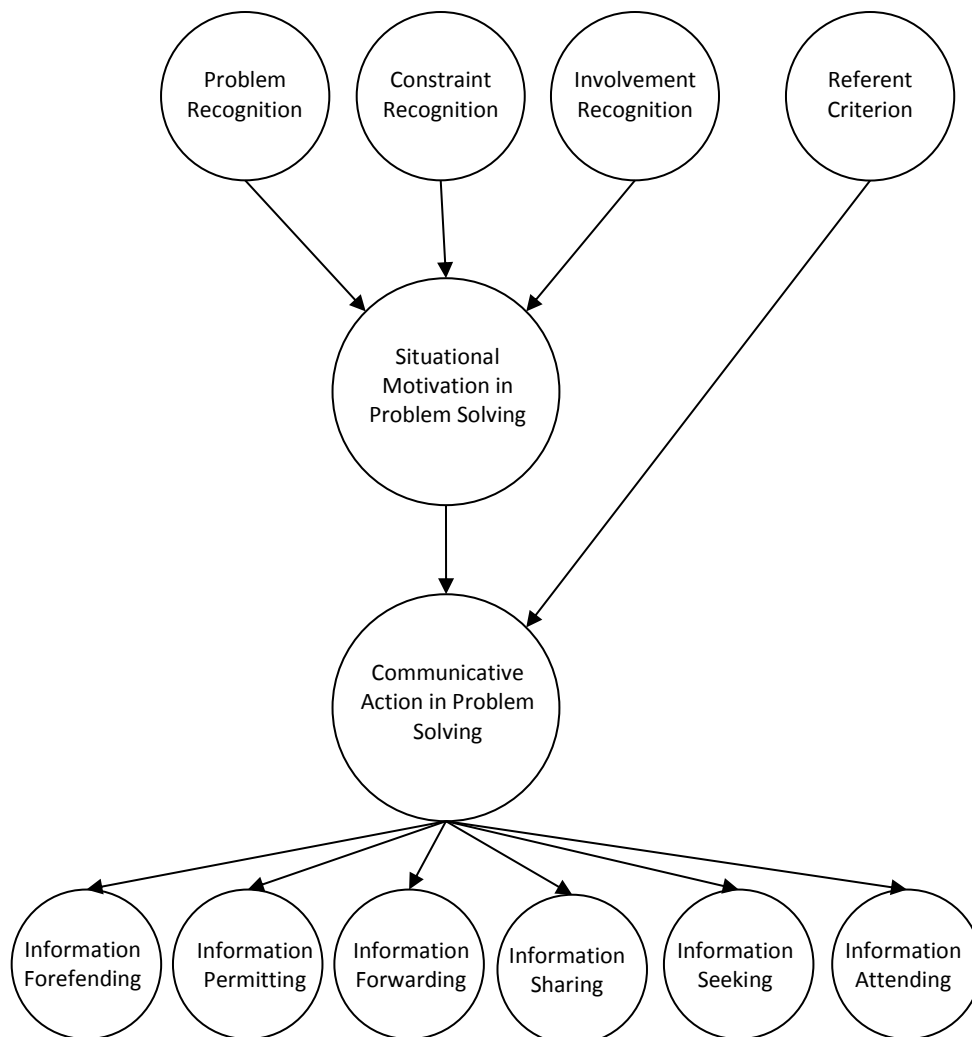

Figure 1: The situational theory of problem solving

According to contingency theories, the assumption is that the 'correct' response to a situation is determined by a correct analysis of the situation. Therefore, with this in mind, in order to determine appropriate remedy or appropriate actions to be taken to resolve the issues, it is first important to know the types of issues that exist. Several studies have been conducted in developing typologies of issues.

Types of Issues/ Problems
The need for a typological segmentation of issues has been suggested as early as 1959 by Barth and Johnson (1959) in examining the structure of community

decision-making. However, a review of literature has revealed that prominent work on the topic remains quite dated and has been somewhat neglected in the field of communication research. This could be due to research traditions that cultivate perceptions that external or contextual factors are too broad or too disconnected from the individual to significantly contribute to the prediction of behaviour in general. Much of the current literature on categorisation of issues or problems are based in the field of organisational management and focus on leadership and problem resolution.

Barth and Johnson (1959) proposed a typology of issues in their study on community power. Based on previous findings, the assumption was that the structure of the influence system and the kinds of participants in decision-making processes vary with the types of issues facing a community at any given time. It was based on this assumption that they needed to research and develop a typology of issues. The authors made two important suggestions for the typology: the first is that the categories of issues be general enough to apply to a wide range of issues and second, that the categories could be theoretically linked back to patterns of influencing behaviour. It should be noted that Barth and Johnson's (1959) dimensions are treated from the point of view of community leaders. However, their suggestions for the typology of issues can be translated for use in the present study.

According to Barth and Johnson's (1959) typology, issues can be observed through five different dimensions. The first of which is the unique - recurrent dimension. The authors state that a given issue is either a one time issue or an issue that reoccurs. The second dimension in the typology is salient - nonsalient to leadership. This dimension is about the continuum on the saliency of an issue to the interests of community leaders. Some issues are central to their interests and important to the leaders of a community, while others are peripheral to their interests and of little concern to them. The third dimension is salient - nonsalient to community publics. This dimension refers to the extent of prominence or importance which leaders feel the various community publics attach to specific issues. The fourth dimension is effective action possible - effective action impossible. This dimension refers to whether an issue is possible to be solved or not or whether there are resources available to solve the issue or not. The fifth and last dimension is the local - cosmopolitan dimension. This dimension refers to whether the issue only concerns the local community or larger organisations in the state or nation.

Barth and Johnson's (1959) typology was proposed, but not tested nor translated into an instrument to form a valid typology. Their five dimensions, although plausible, could be perceived as dichotomous and limiting.

Another sort of typology was proposed by Herzik (1983) in the author's analysis of speeches presented by state governors. He identified three different types of issues, which he named cyclical issues, perennial issues, and temporal issues. Cyclical issues are "those in which interest grows, peaks, then declines – perhaps to return again". Most political themes and themes that often frame state politics are included in this category. These types of issues appear to flow from interests that get activated and must be resolved in some manner. Perennial issues are discussed recurrently (Herzik, 1983). These types of issues need continual attention, but are essentially of administrative nature. Herzik (1983) describes

temporal issues as those of immediate, pressing, but time-limited nature. These issues are highly salient, but only for short periods of time.

Herzik's (1983) typology was used by DiLeo and Lech (1998) in their study in order to "examine the typology by applying it to the gubernatorial agendas of the 1990's and by testing his claim of a relationship between types of variation over time in the occurrence of agenda items across the states and their centrality as political backgrounds" (1998:9). Needless to say, the types of issues discussed by Herzik (1983) are somewhat constrained by the political scenario of the time however, provide a basic distinction of different types of issues based on when and how an issue occurs.

Similarly, Neuman (1990) in his study titled 'The Threshold of Public Attention' examined ten political issues and developed his own typology of issues based on the four relatively distinct types of issues he found based on his analysis of public media coverage and corresponding public attention. The types of issues he discovered were crises, symbolic crises, problems, and nonproblems. The crises category is described as issues with 'fairly clear-cut beginnings, middles, and ends. Crises have real-world life cycle and are not simply enduring social problems. The issues classified under this category were the war in Vietnam, urban unrest, and the energy crisis. The next category found was termed symbolic crises. These include problems that have been occurring over quite some time and are not likely to be fundamentally resolved in the near future. This type of issue is can also be publically perceived as a problem of crisis proportions for a limited period of time. Issues related with drugs, pollution, and poverty were classified under this category. The next is the problems category. Issues that are periodic and sometimes dramatic crises of sudden change fall under this category. Inflation and unemployment are example issues in this category. Lastly, a nonproblem is an issue that has not appeared to move from the status of an enduring social problem to a symbolic crisis. Neuman (2009) characterized crime as a nonproblem issue.

Another typology of problems that is of relevance to problem categorisation is one created by Patton and Blaine (2001), adapted from a typology developed by Heifetz and Sinder (1988). Patton and Blaine's (2001) study aimed to find the role of their organisation in educating communities about public issues. According to Patton and Blaine (2001), there are three types of problems, which the authors named Type I, Type II, and Type III. Each type of problem category involves different types of information needs and requires different management approaches. For Type I problems, the underlying problem and the best solution to the problem is clear. Solution to this type of problem is left to public officials; the public will not be required to be involved in the problem solving process. For Type II problems, the problem is clear, however, there are several possible solutions to the problem. For this type of problem, it is best that government officials allow citizens to play a major role in determining the solution in order to get public acceptance. For a Type III issue, the issue exists, but there is no consensus on what the underlying problem really is, hence, no consensus on what the solution should be either. However, there are many proposed solutions to the problem by various groups of people in which each group thinks their own proposed solution will address the problem. According

to Mathews (1999), although public officials realize that they cannot solve Type III problems on their own, effective ways to involve the public have yet to be devised.

Perhaps one of the more comprehensive typologies of issues (or problems) is provided by Rittel and Webber (1973) who elaborate on the nature of social problems. The authors categorise problems into three types: tame problems, complex problems, and wicked problems. Other researchers such as Grint (2005) have also used this typology in their own studies. Grint (2005) uses the categories of tame problems and wicked problems from Rittel and Webber's (1973) typology in his study to help distinguish between management and leadership, and adds on an additional category known as critical problems to his study.

The first category of problems as discovered by Rittel and Webber (1973) is tame problems. Tame problems are well-defined and the solution to a tame problem is clear. It can be solved in a linear fashion with the use of straightforward, reductionist, repeatable, sequential techniques. According to Grint (2005), tame problems may be complicated, but they are resolvable through unilinear acts because there is a point where the problem is resolved and that it is likely to have happened before. Grint (2005) points out that this means that there is only a limited degree of uncertainty in dealing with tame problems and therefore it is associated with management in which the manager's role is to 'provide appropriate processes to solve the problem' (pp. 1473). According to Rittell and Webber (1973), the problems found in fields such as science and engineering are usually tame problems. This is because in these areas, the mission and the answer as to whether or not the problem has been solved is clear. Next, is the complex problems category. Complex problems are usually non-linear in nature. Unlike tame problems, complex problems are difficult to understand. Furthermore, complex problems' solutions can lead to other problems and unintended consequences. The use of traditional analytic and project management techniques are not able to solve complex problems, either are reductionist or sequential approaches. Although the characteristics of complex problems may be well understood, the problems themselves are very difficult.

Another category of problems identified by Rittell and Webber (1973) is wicked problems. Wicked problems are the hardest problems to solve. They tend to overlap with complex problems. The goals of wicked problems are either unknown or ambiguous and the means-ends relationships are poorly understood. According to Grint (2005) a wicked problem " is complex, rather than just complicated, it is often intractable, there is no unilinear solution, moreover, there is no 'stopping' point, it is novel, any apparent 'solution' often generates other 'problems', and there is no 'right' or 'wrong' answer, but there are better or worse alternatives" (2005:1473). Simply put, a huge degree of uncertainty is involved and therefore it is associated with leadership (Grint 2005). In dealing with wicked problems, a leader's role is to ask the right questions rather than provide the right answers because, as Grint (2005) notes, the answers may not be self-evident and will require a collaborative process to make any kind of progress. A detailed description on wicked problems can be found in Rittell and Webber's (1973) study. The third category of problems described by Grint (2005) is the critical problem. As defined by Grint (2005), a critical problem is presented as self-evident in nature, as encapsulating very little time for decision-making and action, and it is often associated with authoritarianism. For this

type of problem, there is no uncertainty whatsoever in what needs to be done, at least from the actions of the commander, whose role is to take decisive action which is required, in other words, to provide the answer to the problem.

In a different approach to defining problems, Witteman (1988) suggests that a dimensional interpretation of the problem situation may be more useful. The author explored interpersonal problems and communication styles, and reviewed dimensions of problem situation conceptualisation to understand the individual's mental representation of a problem situation. It was found that five dimensions were relevant to interpersonal problem solving; 1) comparison of the problem to others, 2) the problem-related goal, 3) uncertainty about the situation, 4) attribution of cause for the problem, and 5) affect for the other party. These dimensions consist of more detailed subdimensions.

While the study focuses specifically on interpersonal problems, Witteman (1988) had explored various areas of problem-related literature to conceptualise "the problem". Some of the dimensions mentioned above also overlap with the conceptualisations of issues or problems by Barth and Johnson (1959), Herzik (1983), and Patton and Blaine (2001). A significant difference between Witteman's (1988) work and the others discussed above is that the author includes two affective dimensions: attribution of cause for the problem, and affect for the other party. Perhaps this is because his research focuses on interpersonal problems that may be directly influenced by how an individual feels toward another. Even so, it is an interesting facet of the problem situation that is relevant to the individual's corresponding communicative behaviour.

SITUATION COMPLEXITY

In reviewing the issue or problem typologies above, five major themes of issue segmentation were encountered. Keeping with the suggestion of Barth and Johnson (1959) for liberal dimensions that could be applied to a broad range of issues and that could be theoretically related to the behaviour under study, five potential dimensions for the categorization of issues were identified. Together, the dimensions form the concept of "situation complexity". These dimensions are issue occurrence, solution complexity, issue saliency, causal attribution onto others, and feelings toward the problem.

Issue occurrence

The typologies by Barth and Johnson (1959), Herzik (1983) and Neuman (1990) discuss the factor of issue occurrence. Frequency, uniqueness and occurrence were also mentioned in Witteman's (1988) conceptualisation of a problem. In Barth and Johnson's (1959) typology, a somewhat dichotomous concept of occurrence was discussed in that problems were proposed to be evaluated based on uniqueness. It was suggested that a unique issue - one that had not previously occurred - required more effortful deliberation but ultimately gave the freedom to explore solutions as there are no pre-existing remedies learned from a previous experience. On the other end of their continuum, Barth and Johnson (1959) discussed recurrent issues that people were more familiar with; issues that already have an established solution and allocated resources for their resolution.

Similarly, Herzik's (1983) typology mentions the occurrence of an issue in terms of how often it happens. The author describes issues as cyclical, perennial or temporal; indicating issues that are evaluated based on how they occur. Although the main focus of Herzik's typology is the patterns of issue salience, it is also observed that some issues tend to occur suddenly and may require immediate attention whereas others tend to be continuous, or occurring more often.

Neuman (1990) also differentiates between issues with a focus on the manner of occurrence. The author's work examines thresholds of public attention given to particular issues and observes patterns of saliency between different issues. His observations on a typology of issues were for the practical organisation of the 10 issues pre-selected for his study. The typology was therefore not empirically tested, but was a result of the categorisation of his ten issues. Neuman (1990) specifically segments his issues based on how the issue emerges, its rise and decline. He touches on enduring issues that happen over a continuous period of time to issues that are short-lived. Neuman's (1990) categorisation however, was made in retrospective observation of issues that had already occurred and may not be of relevance to the anticipatory planning of information management.

Witteman (1988) discusses issue occurrence in terms of a problem's uniqueness and frequency and how it relates to the individual's existing repertoire of problem-related knowledge. The author defines problem uniqueness as the perceived novelty of the problem. When a problem is unique, it means that the individual is not familiar with the type of problem and cannot rely on existing knowledge or experience to solve it; the individual must search for more information about the problem. Frequency, on the other hand, is defined as the perceived recurrence of the problem. If an individual perceives that a problem has occurred many times, they are inclined to have a preferred strategy or way of solution to the problem.

Complexity of solution
The works of Barth and Johnson (1959), Rittel and Webber (1973), Neuman (1990), Patton and Blaine (2001), and Witteman (1988) acknowledge the importance of issue/ problem solution as components in their respective definitions of issues. Rittel and Webber (1973) consider a majority of public issues, policy and planning issues in particular, to be wicked problems. Most of the principles the authors used to describe wicked problems involve the complexity of issue resolution. Whereas solutions to tame problems are relatively clear-cut, wicked problems are much harder to solve. The authors outline that solutions to wicked problems often cannot be objectively defined nor are there criteria or formulas for their resolution. Most of the time solutions to these types of issues are unique; no two situations can share the exact same solution. Additionally, solutions to wicked issues cannot typically be tested and once a solution is applied, it is essentially a "one-shot operation" as any sort of tried solution can leave lasting (sometimes negative) effects on the

populations involved. In contrast, tame problems are mostly administrative with ready or tested solutions available when needed.

Neuman's (1990) typology does not explicitly address the importance of distinctions in issue solution but do imply that issues of different types will differ in their possibility of resolution. He suggests that some issues cannot be fundamentally resolved, these typically fall under his concept of symbolic crises. Other issues - his concept of problem - may require complex solutions depending on what the public perceive the actual problem to be.

Barth and Johnson (1959) take on a dichotomous perspective of issue solution. The authors make the distinction between issues with possible effective solutions and issues that are "impossible" to effectively solve due to unattainable decisions or unavailable resources. However, the possible/ impossible dimension only elaborates on whether a solution is available or not but gives no indication toward the complexity of the solution. Barth and Johnson (1959) go on to propose that sometimes a "tension-reducing mechanism" is used in issues with impossible effective solutions in order to neutralise the issue without having to implement an actual solution.

Patton and Blaine (2001) also use the complexity of issue solution to distinguish between their types of issues. This particular research was conducted to explore the role of their organisation in educating people about public issues and emphasises the difference between a public issue and its underlying problems. The authors propose three types of issues based on the clarity of the underlying problem and the availability of solutions to those underlying problems. When an underlying problem is clear and the solution to the problem is clear, the issue is defined as a Type I issue that is relatively simple to understand. Type II issues may have clear underlying problems but increases in complexity because there are multiple solutions to these problems. Type III issues are those where the underlying problems are not clear; there may not be a consensus on what the problem is or if there is a problem at all. Thus solutions to these types of issues tend to be unknown and may require public inquiry to help remedy them.

Although Patton and Blaine's (2001) typology may seem rather simplistic, it makes an important argument that the information needs of the public may differ between levels of issue complexity and solution complexity. As an issue increases in complexity, the complexity of solution also increases. This in turn also affects the complexity of the information publics require to comprehend the issue.

The complexity of solution is also discussed by Witteman (1988) as part of the conceptualisation of a problem. More specifically, the complexity of a problem is discussed in relation to the perceived problem-related experience an individual may have and the uncertainty surrounding the issue. Complexity is defined by asking questions such as: do other parties involved in the problem share the same need to find a solution? Can they be trusted? Are they equally committed to solving the problem? Witteman (1988) focuses on the perceived connection (or disconnect) with the other parties involved.

Issue saliency

Issue saliency is generally regarded as the prominence of a particular issue be it through media visibility or its level of importance to publics. The concept of issue saliency is likely to have been made more difficult to define in today's information landscape. If an issue was once deemed salient through observation of its coverage in traditional media, the fragmentation of available sources of information today makes this measurement slightly more complex. Even so, the prominence of a particular issue is likely to affect the amount and types of information needed to aid in publics' comprehension on the issue. The typologies of Barth and Johnson (1959) and Neuman (1990) specifically touch on the saliency of issues. Barth and Johnson (1990) consider differences in issue importance to the way it is resolved and if the resolution needs to be made public in response to public pressures. In their article, it is suggested that community leaders may sometimes be forced to act on issues that are of high salience to publics.

Neuman (1990) examines the effect of agenda-setting on publics by observing the media coverage of issues and measuring levels of public opinion on the issue. He finds that media coverage and peaks in public opinion can vary by issue type and concludes that a thorough examination of public responsiveness to different issue types could provide a less rigid picture of the dynamics of issue salience.

Causal attribution onto others

Causal attribution onto others is one out of two affective dimensions to the conceptualisation of problem or situation complexity suggested by Witteman (1988). It is defined by perceived blame attributed to the self, the other parties involved, and the environment. Witteman (1988) argues that communicative styles will differ with the attribution of blame.

Feelings toward the problem

Feelings toward the problem is the second affective dimension suggested by Witteman (1988). It is suggested that both negative and positive feelings, toward the problem or the offending party, will affect the way a problem is perceived. Witteman (1988) does not elaborate very much on this dimension. Even so, the link between emotions and their impact on human action – from social judgment and decision-making to communication and social behaviour – is an established topic of interest to social scientists (see (Lerner, Li, Valdesolo, & Kassam, 2015).

The dimensions above are by no means extensive but meet the criteria of Barth and Johnson (1959) for a plausible typology of issues in that it is general enough to encompass a wide range of issues, yet can be linked to difference in information needs and communicative action. A typology that considers the five dimensions may provide an effective and comprehensive way of categorising issues in a way that emphasises its relevance to corresponding information needs and communicative action.

METHODOLOGY

A quantitative approach was deemed best suited to meet the goals of this study. The survey method was utilised to gather research data specifically, a cross-sectional survey via group administered questionnaire. Creswell describes survey research as a means of collecting "quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (2009:10). Furthermore, Babbie (2010) emphasises the strength of surveys for the measurement of attitudes or the like in large populations. According to the author, the survey method is the best option for researchers seeking to gather primary data in a population that may be too complex to observe directly.

Sample

The sample consists of 152 students at Universiti Kebangsaan Malaysia, aged between 18 and 33 years old. 78.3% of the sample were female while the remaining 21.7% were male. The sample's ethnic composition are as follows: 76.3% Malay, 11.8% Chinese, 2% Indian, 5.9% Bumiputera of Sabah and Sarawak, and 3.9% were of ethnicities not specified. A majority of the respondents were undertaking undergraduate studies (76.3%) and postgraduate studies (21.7%) while others were pursuing other qualifications (2%).

Data collection

Respondents were recruited through convenience sampling and questionnaires were distributed to students in select classes at Universiti Kebangsaan Malaysia during the month of March in the year 2014.

Non-probability sampling, although not ideal, are common and useful for early theorising and hypothesis testing in developing theory (Caplan, 2005). The scope of the research is limited to "theoretical generalisability" as opposed to statistical generalisability (Kim, 2006:174). Mohammad Rezal Hamzah, Emma Mohamad, & Mohd Yusof Abdullah (2016) utilised university students in their study to model health information seeking behaviour.

Measures

Measures for the concept of situational complexity were developed based on extant literature. The questionnaire consisted of 30 items under the six dimensions of referent criterion, problem occurrence, complexity of solution, issue salience, causal attribution onto others, and negative feelings toward the problem. Five of these items were adapted from items used to measure referent criterion in Kim & Grunig's Situational Theory of Problem Solving (2011). Respondents were asked to indicate their perceptions and behaviour on the issue of ethnic disunity – an issue that surfaces regularly in a multicultural society such as Malaysia's. A 7-point Likert scale was utilised with 1 representing strong disagreement and 7 representing strong agreement with the statements.

Data analysis
Exploratory factor analysis was conducted on the data, utilising a principle axis factoring method with oblique rotation (promax). The anti-image correlation matrix was examined to check for individual variable sampling adequacy, in which all values were above .5 (Field 2013). And the Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .79 (a "middling" value according to Hutcheson & Sofroniou, 1999). The data met all prerequisites for the analysis.

FINDINGS

The purpose of this study was to test the 30 items constructed for the measurement of situation complexity. When an exploratory factory analysis was conducted on the data, it was found that only 19 items should be retained. Factor loadings above .5 were kept as suggested by (Chinna, Karuthan, & Choo, 2012). The items fell into six different factor groups. All six of the factors had eigenvalues over .7, a criterion deemed suitable by Joliffe (1972). Table 1 shows the eigenvalues and variance explained.

Table 1: Eigenvalues and variance explained for the construct of situation complexity (N=152)

Factor	Extraction Sums of Squared Loadings		
	Eigenvalues	**% of variance**	**Cumulative %**
1	4.484	23.602	23.602
2	2.304	12.127	35.729
3	1.908	10.043	45.772
4	1.090	5.734	51.507
5	0.771	4.056	55.563
6	0.745	3.921	59.484

The results show that the 19 items can be broken down into 6 different dimensions, all of which when combined, explain 59.5% of the variation in situation complexity. Factors 5 and 6 both contained only two variables but were retained as they showed eigenvalues of above .7 (Jolliffe 1972). A summary of the factors and their respective items are presented in the tables below. The factor loadings and Cronbach's alpha values are also reported.

Factor 1: Solution complexity
Four items clustered together for the first factor extracted. Most of these items originated from the initial theme of "complexity of solution" and pertained to the perceived difficulty of a solution. More specifically, the items were related to complexity of a solution in terms of how many groups are involved in solving the problem, the importance of a solution, the urgency of a solution and the consequences of the problem if a solution is not found. This set of items showed high reliability with a Cronbach's alpha value of .84. Factor 1 was relabeled as "solution complexity". A summary of the results is provided in Table 2.

Table 2: Items and factor loadings for solution complexity (N=152)

Item	Rotated Factor Loading	Cronbach's Alpha
• There are many parties that must work together in solving this problem	.526	
• It is very important that this problem is solved	.803	
• This is a problem that must be solved urgently	.921	
• This problem has severe consequences to those involved if not solved	.848	.844

Factor 2: Referent criterion

Table 3: Items and factor loadings for referent criterion (N=152)

Item	Rotated Factor Loading	Cronbach's Alpha
• I am confident about my knowledge on this problem	-.563	
• I strongly support a certain way of resolving this problem	-.683	
• I have a preference for how the problem should be settled	-.812	
• I am pretty sure I know how to solve this problem	-.614	
• Past experience has provided me with guidelines for solving this problem	-.624	.790

Five items load onto a second factor related to the experience an individual has with the problem at hand. The items in this factor were originally from the set of items used to measure referent criterion, and showed consistency in their grouping. This set of items measures the perceived confidence, existing knowledge and skills that an individual possesses about the problem situation. These items also showed a relatively high level of reliability with a Cronbach's alpha of .79. Table 3 summarises the items, factor loadings and reliability of the set of items. The label "referent criterion" was retained for this factor. Items show negative factor loadings because this factor contributes negatively to the concept of solution complexity; as referent criterion increases, situation complexity decreases.

Factor 3: Negative feelings toward the problem
Factor 3 consists of three items pertaining to how the respondents feel about the problem. To be more specific, the items represent feelings of anger, discomfort and dissatisfaction toward the problem situation – negative emotions that the respondent experiences when thinking about the problem. Accordingly, Factor 3 is labeled as "negative feelings toward the problem". The items showed high reliability with a Cronbach's alpha value of .84. Table 4 presents the items and their respective factor loadings in more detail.

Table 4: Items and factor loadings for negative feelings toward the problem (N=152)

Item	Rotated Factor Loading	Cronbach's Alpha
• I am angry that this problem exists	.578	
• This problem makes me feel uneasy	.992	
• I am highly dissatisfied with the current problem situation	.824	.841

Factor 4: Environmental salience
The fourth factor extracted contained three items. These items are related to the salience of the problem; if the issue is commonly experienced by the people closest to them, if it is something that is being talked about by their friends and family, and if they have seen the issue being discussed or shared on the Internet. Table 5 displays the results of the factor analysis. A satisfactory reliability score was achieved with a Cronbach's alpha value of .74. Factor 4 was labeled as "environmental salience".

Table 5: Items and factor loadings for environmental salience (N=152)

Item	Rotated Factor Loading	Cronbach's Alpha
• My family and/ or friends have experienced this problem	.671	
• My family and/ or friends talk about this problem	.845	
• I have seen other people share news/ opinions about this problem online	.494	.742

Factor 5: Problem familiarity

Table 6: Items and factor loadings for problem familiarity (N=152)

Item	Rotated Factor Loading	Cronbach's Alpha
• This problem occurs quite often	.834	
• I have experienced problems similar to this before	.805	.803

Two items were found to group together for Factor 5. These items relate to perceived problem occurrence and how familiar respondents are to the type of problem and/ or problems similar to the issue utilised in the questionnaire. As can be viewed in Table 6, the group of items achieved high reliability with a Cronbach's alpha of .80. With reference to the gist of the items, Factor 5 was labeled "problem familiarity".

Factor 6: Uncertainty of a solution

Table 7: Items and factor loadings for uncertainty (N=152)

Item	Rotated Factor Loading	Cronbach's Alpha
• I don't know how to solve this problem	.734	
• I am not sure if there is a solution to this problem	.713	.662

Factor 6, the last factor to be extracted, consists of two items. These items identify the element of uncertainty in thinking about a problem situation. Accordingly, Factor 6 was named "uncertainty of a solution". As can be seen in Table 7, the item factor loadings were acceptable but the Cronbach's alpha value was relatively low at .66. Even so, it was decided that this factor be retained as the eigenvalues meet the minimum of .7.

DISCUSSION AND CONCLUSION

This paper aimed to address three main objectives. The first was to review the literature for definitions of the problem situation. The second objective was to observe the definitions and construct dimensions for a conceptualisation of the problem situation, namely "situation complexity". The third objective was to empirically test the items for the measurement of perceived situation complexity.

The conceptualisation of situation complexity was based on literature in the fields of communication, public relations, public policy and information management that explicitly addressed problem characteristics, problem typologies or problem dimensions. The synthesis of literature provided initial guidance toward forming the dimensions that would define the concept of situation complexity in problem solving. Items were constructed based on the review of literature and adapted from existing measures. The initial dimensions constructed from the literature review were dismantled and redefined based on the results of the exploratory factor analysis (EFA). The EFA identified the underlying structure of the concept: six dimensions, made up of 19 items. The six dimensions were labeled solution complexity, referent criterion, negative feelings toward the problem, environmental salience, problem familiarity, and uncertainty of a solution.

The results of this research provide a starting point for the study of situation complexity in a problem situation. With the introduction of this variable, the relative importance of the problem situation is expanded and can be examined in more detail. From a practical perspective, it enables practitioners of communication campaigns to monitor their audiences and subsequently plan their objectives around the six dimensions of situation complexity.

For example, if a group of people perceives a problem in their community and they perceive the solution to be complex, perhaps they may be convinced (via communication campaigns) that the solution is not as complex as it appears. This in turn, may alter their communicative behaviour – how they search, select and spread information about the problem. Further studies would be needed to examine the relationship between situation complexity and the communicative behaviour of

publics. Does situation complexity change the way people communicate? If so, in what ways might it change people's communicative behaviour?

Future avenues for research include 1) conducting further studies to test and validate the construct in different situations or with different respondents; 2) Qualitative investigation of the concept to enhance our understanding of situation complexity and improve its measures.

In conclusion, this study is only a first step in the exploration of situation complexity and its role in the problem solving process. The examination of its relationships with other variables in the situational theory of problem solving (STOPS) is needed to further understand this concept and its effects on individual problem solving.

BIODATA

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