

# Identifying Mental Health Elements among Technical University Students Using Fuzzy Delphi Method

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**Abstract-**Mental health is a part of our daily life that is often experienced. As a student, mental health issue often encounters a variety of difficult challenges at the higher education institution. A student with good mental health can handle and cope the normal stress of life, capable work productivity, enhance academic performance and able to make contribute to the community. However, rapidly transformation and changing of society have been impacted on students' mental health, and it will be deteriorated and negatively impact on students if it absence of preventive controlled. This study aimed to identify the element of mental health among the technical university students. A total of 11 experts were selected to analyze the fuzziness consensus of experts. All collected data was analyzed by using the fuzzy Delphi method and the result shows that there are 4 elements of 8 elements that fulfill the requirement consensus of experts, which threshold value is equal and less than 0.2, the percentage of the expert group is more than 75%.The four elements were depression, anxiety, stress, and fear are often experienced by technical university students. In conclusion, precocious actions have to be taken by university and counseling center, parents and non-government organization in order to mitigate the mental health problem faced by students to improve the quality lifestyle students at the university.

## 1. Introduction

Mental health is one of the fundamental elements to the overall health and well-being of an individual. According to the Malaysian Mental Health Policy, mental health is defined as an individual's ability to interact with people and the environment to promote subjective well being and optimal functioning, and the use of cognitive/intellectual, affective/emotional and



relational abilities, toward the achievement of individual goals consistent with justice. (Abd Kadir, 2014). In the light of the definition provided by Malaysian Mental Health Policy, mental health in terms of emotional, psychological, and social depend largely on how a person thinks, feels, and acts. In addition, mental health is also associated with depression, anxiety and stress and it is a common psychological problem (Ratanasiripong, Kaewboonchoo, Hanklang, & Chumchai, 2015; Dyrbye, Thomas, & Shanafelt, 2006). If an individual is not able to control his/her mental health in an appropriate manner, then a variety of symptoms and effects will appear, and thereby disturbing not only his/her mode of living, but also affecting other people around him/her.

In Malaysia, the National Health and Morbidity Survey, which was conducted in 2015 by the Ministry of Health (MOH), found out that the prevalence of mental health problems among people aged 16 years and above was 29.2%, with approximately 4.2 million. This figure means that one in three Malaysians has experienced mental health problems. The current situation is very worrying because the findings have also indicated twofold increase for the reported cases related to the mental health problems over the past 10 years of 10.6% in 1996 and 11.2% in 2006. Mental health problem may bring about devastating impacts to the sufferers if assistance and guidance are not provided to them. For instance, an individual with mental disorder especially depression, tends to develop suicidal behaviour (Rotenstein, Ramos, Torre, Segal, Peluso & Guille, 2016).

According to the report National Health and Morbidity Survey 2011 by Ministry of Health Malaysia, the results indicated that 1.7% of the respondents had the ideas of committing suicide, 0.9% had planned to commit suicide, and 0.5% had attempted suicide. The percentages are relatively small, however, if pragmatic action is not taken at the beginning, the problem will be progressing gradually to an alarming level. Many factors might cause mental health problem, such as physical and biological, environment and social, interpersonal relationship and academic performance (Cheng and Cheng, 2015; Ali, Rao, Ali, Ahmed, Safi, Malik & Husan, 2014; Kumar and Bhukar, 2013). However, within university context, the factors that influence the mental health of a student might be different on the ground that the living environment, commitments and the challenges faced by university students differ significantly compared with working adults (Thuraiselvam & Thang, 2015; Harnois, & Gabriel, 2000).

For university students, the main factors that induce mental health problems are mainly related to academic commitment, financial support / income, lack of skills and time management techniques (Rafidah, et al., 2009). In addition, requirement of education system and high expectation from his/herself and parents are also the major contributors to the mental health problems. On top of that, the challenges of the changing environment also bring about negative impact on mental health of students, especially for the first-year students who are still struggling to settle down in an unfamiliar environment and the final-year students who are still unclear about their career plans and goals (Cheng, & Cheng, 2015). Due to the aforementioned factors, many students undergo stressful university life and subsequently their mental health is jeopardised. Therefore, it is necessary for students to maintain vigorous mental health and, furthermore, university should provide additional supports and guidance for students with mental health problems.

The main purpose of this study was to explore the elements of mental health problems experienced by the technical university students. This purpose can be achieved by answering the “How many elements mental health was experienced by technical university student based on expert consensus?”.

## 2. Methodology

Fuzzy Delphi Technique was used to explore the elements of mental health among technical university students in which a set of questionnaire was developed by the researchers based on the existing literature and findings from the expert interviews. The interviews were conducted with 14 experts specialised in the field of psychology and counselling. In the second phase, a total of 11 experts were selected to answer the questionnaire. According to Jones and Twist (1978), the number of respondents for Delphi technique is usually from 10 to 50, therefore, 11 experts were sufficient for this research. Each selected expert has more than 10 years working experiences pertaining to psychology and counselling in university. The elements of mental health were identified by obtaining the consensus from the participating experts. Table 1 shows the simple Fuzzy Delphi procedures used in determining the elements of mental health.

Table 1: Fuzzy Delphi Technique

Step	Total Expert	Instrument Design
First Step (Establish Survey Instrument)	14	Structured Interview
Second Step (Distribute Survey Instrument )	11	Survey Instrument

### 2.1 Fuzzy Delphi Technique

According to Mohd Jamil, Siraj, Hussin, Mat Nor, and Sapar (2014), the Fuzzy Delphi procedures are composed of six basic steps as follows:

#### *Step 1: Determination of Expert*

A total of 11 experts were involved in answering the questionnaires. The experts were chosen based on their working experiences in the related field of expertise.

#### *Step 2: Linguistic Scale Selection*

In this research, the linguistic scale comprised seven-point scale, ranging from (1) very strongly disagree, (2) strongly disagree, (3) disagree, (4) not sure, (5) agree, (6) strongly agree to (7) very strongly agree. The triangular fuzzy numbers (TFNs) are more proper to utilize as compare to the crisp numbers in the sense that it can represent the information more rigid in the real situation (Tarmudi, Muhiddin, Rosdy D.Tamsin, 2016). Table 2 shows the linguistic seven-point scale:

Table 2: Seven-point linguistic scale

Seven-Point Linguistic Scale				
	Linguistic Variable	Triangular Fuzzy Number (TFNs)		
1	Very strongly disagree	0.0	0.0	0.1
2	Strongly disagree	0.0	0.1	0.3
3	Disagree	0.1	0.3	0.5

4	Not sure	0.3	0.5	0.7
5	Agree	0.5	0.7	0.9
6	Strongly agree	0.7	0.9	1.0
7	Very strongly agree	0.9	1.0	1.0

### ***Step 3: Calculate the Average Value***

The average value was calculated based on the total of linguistic scale number of each item and then divided by the number of experts.

### ***Step 4: Determine the Threshold Value (d)***

If the value of threshold ( $d$ ) is equivalent to or smaller than 0.2, it indicates that the consensus and agreement from all experts are achieved. When threshold value is larger than 0.2, second round of data collection has to be conducted in order to fulfil the requirement for Fuzzy Delphi.

### ***Step 5: Consensus of Expert***

In this stage, the percentages of consensus of each item and overall item have to be determined. If the consensus of experts is equal to or more than 75%, it indicates that the group has reached an agreement. The procedures have to be repeated to ensure the participating group has come to agreement provided the consensus percentage is less than 75%.

### ***Step 6: Defuzzification Process***

The main function of defuzzification process is to determine the ranking and score of item by using one of the three formulas as follows:

- i.  $A_{\max} = 1/3 * (m1 + m2 + m3)$
- ii.  $A_{\max} = 1/4 * (m1 + m2 + m3)$
- iii.  $A_{\max} = 1/6 * (m1 + m2 + m3)$

For the case of this research, the researchers have chosen formula (i) to obtain the defuzzified values as well as to determine the ranking and score according to the consensus of experts.

## **3. Data Analysis and Discussion**

The analysis outputs that based on the consensus from the participating experts indicated that there were four major elements of mental health experienced by the technical university students. The four elements were depression, anxiety, stress, and fear are state in Table 3. Specifically, the results of analysis showed that the percentages of agreement for the four elements were larger than 75%, in which depression and fear yielded 91% of agreement, whereas anxiety and stress yielded 100% of agreement. On the contrary, another four elements of mental health were rejected due to low level of agreement (<75%) from the experts. These four elements were phobia, trusty, crisis, and spiritual. This data consists of the threshold value of each element, overall item percentage, average of response, fuzzy evaluation and item ranking.

Table 3: Data Analysis

EXPERTS	ELEMENTS OF MENTAL HEALTH							
	Depressio n	Anxiet y	Stres s	Fear	Phobia	Trusty	Crisis	Spiritua l
<b>1</b>	0.1	0.1	0.2	0.2	0.4	0.5	0.8	0.7
<b>2</b>	0.1	0.1	0.2	0.2	0.4	0.3	0.7	0.1
<b>3</b>	0.1	0.2	0.2	0.2	0.4	0.0	0.3	0.4
<b>4</b>	0.1	0.0	0.0	0.2	0.1	0.3	0.6	0.8
<b>5</b>	0.1	0.0	0.0	0.1	0.3	0.3	0.6	0.4
<b>6</b>	0.1	0.0	0.0	0.2	0.1	0.3	0.3	0.4
<b>7</b>	0.1	0.1	0.2	0.2	1.1	0.5	0.8	0.7
<b>8</b>	0.1	0.1	0.2	0.2	0.1	0.3	0.3	0.1
<b>9</b>	0.1	0.2	0.2	0.5	0.6	0.5	0.6	0.5
<b>10</b>	0.3	0.2	0.2	0.2	0.1	0.0	0.1	0.2
<b>11</b>	0.1	0.1	0.0	0.2	0.3	0.0	0.6	0.2
Threshold Value (d)	0.1	0.1	0.1	0.2	0.3	0.3	0.5	0.4
Overall Item percentage d <0.2	91%	100%	100%	91%	36%	27%	9%	18%
Defuzzificatio n (Average of Response)	0.906	0.867	0.858	0.818	0.706	0.318	0.512	0.442
Defuzzificatio n (Fazzy Evaluation)	9.967	9.533	9.433	9.000	7.767	3.500	5.633	4.867
Ranking of Element	1	2	3	4	REJEC T	REJEC T	REJEC T	REJECT

#### 4. Conclusion

In general, Fuzzy Delphi Technique consists of six basic steps, namely, selection of experts, linguistic scale selection, compute the average value, calculate the threshold value, determine the consensus of experts and lastly defuzzification process. Fuzzy Delphi Technique can be considered as an effective method to determine the attributes or constructs of a variable that based on the level of consensus among the experts. During the interview, which is part of the Fuzzy Delphi process, the participating experts are allowed to express their opinion without restrictions to ensure completeness, coherency as well as consistency of opinion. More importantly, the use Fuzzy Delphi Technique may significantly reduce time consumption on the questionnaire and save cost. In the other aspect, this article has also reported that depression, anxiety, stress, and fear are often experienced by technical university students. The findings appear to suggest that precocious actions have to be taken by university and counselling centre in order to mitigate the mental health problem faced by students. Apart

from that, cooperation from all quarters, such as university, parents, and non-governmental organisations (NGO) should be strengthened to combat the problems pertaining to mental health among technical university students and to improve the quality of students' life at university.

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