Development and Validation of Acceptability of Mental-Health Mobile App Survey (AMMS) for Android-based Online Counseling Service Assessment

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Abstract. The development of internet brings significant changes in human life, including its influence on mental health conditions. As one of the countries with the largest increase in internet users in the world, Indonesia has important potential in utilizing this technology for psychological services. However, various studies show that the use of internet intervention in mental health services, especially by utilizing mobile-based technology, is still limited. This also relates to the conditions for receiving this intervention which are still not clearly known. This study aims to develop a measuring tool to explore the conditions of acceptance of internet interventions with mobile-app-based counseling services. This study involved 174 respondents spread across Indonesia with diverse demographics. Research results show that in general, measuring instruments meet good assessment requirements.

1. Introduction
Mental health and subjective well-being are important aspects which are generally missed by the public and professional staff, including in Indonesia. The results of the World Health Organization (WHO) data show that 5% of the Indonesian population experiences anxiety disorders that interfere with daily activities, especially in Indonesian adolescents who reported that more than 20% experienced victims of bullying from elementary to high school. However, these conditions are not followed by optimal mental health services from professionals both in terms of quality and quantity, so there appears to be a gap between the number of individuals served and professional mental health servants [1], [2].

Along with technological developments, especially internet technology, which has entered various types of service provision in the world, mental health services also enters a new phase of service[3]. The imbalance of mental health services with the availability of professional staff allows mental health services by utilizing mobile applications on Smartphone [4]–[7]. This condition is evidenced by the development of post-modern counseling approaches that are combined with long-distance services, such as psychological intervention with the Cognitive Behavior Therapy (CBT) approach to treat Post Traumatic Disorder [8], [9]. Some interventions using the internet are reported to have significant results. In addition, the opportunity for mental health services in Indonesia is also very high, with a significant increase in internet users in the range of 2001 to 2015 of 500%, and 95% of them are active Smartphone users [10]. This condition can be used for mental health services in Indonesia [11].

To answer these opportunities, it is necessary to have a preliminary study to determine the level of acceptance of respondents to counseling services through distance media. The use of this application is also a challenge for counselors as professionals who serve individual mental health conditions [10], [12]–[14]. Therefore, it is necessary to have initial support data that indicates individual acceptance of
this service, where the picture of the data cannot be comprehensively obtained and known [15], [16]. It is important to know the condition of Indonesia's population acceptance of mental health interventions by using a mobile app or platform on Smartphone that are connected via the internet, therefore at the initial stage, it is necessary to develop instruments that reveal the conditions of client acceptance of interventions through the application [17], [18]. Answering the challenges of mental health services through the mobile app, the main purpose of this article is to reveal the development and validation of measuring instruments to reveal the conditions of respondents' acceptance of the mobile-based counseling service application [19]. In addition, the findings of this research will also reveal a general map of the conditions of respondents' acceptance of mental health services using the mobile app[12].

2. Method

2.1. Participants
The sample on the development of this instrument involved 174 respondents with diverse demographics in Indonesia, which consisted of 25.85% men 74.14% women.

2.2. Measuring
This article reveals the development and validation of measurement tools for respondents' acceptance of mobile app-based mental health services. The measurement of the condition of respondents' acceptance of mental health services using a mobile app was measured using inventory sourced from Usage Health Mobile and has been modified and developed with an approach to mental health, resulting in an inventory of Acceptability of Mental Health Survey Apps (AMMS) with a value of Cronbach Alpha-KR20 of 0.89.

2.3. Data Analysis
Analysis of research data using Rasch analysis was assisted by Winstep Version 3.72 software [20]. Data sets and raw data apply the Open Science principle, so that it will be accessible to other researchers who will conduct other analyzes, namely using the Open Science Framework [21].

3. Result and Discussion
Analysis with the Rasch model was conducted to determine the mental health conditions of respondents and acceptability of mental health services by using the mobile app in general. On the rescaling value of mental health logit shows a value of 48.63 from a scale of 100, this indicates that the respondent's mental health condition is close to the middle scale and is at moderate level. While the logit acceptability of respondents to mental health services using the mobile app is at point .09 logit with rescaling of 49.49 logit, it can be said that there is a strong tendency for respondents to receive mental health services using the mobile app. Continuing the variability of the data can be seen from the SD of each aspect, where the value of variability from acceptability is higher, so that traceability and use of results are needed in subsequent analyzes.

| Estimation                  | Logit Value | Rescaling Logit Value (0-100) |
|-----------------------------|-------------|-------------------------------|
| AMMS                        | AMMS        |
| Mean Person                 | .09         | 49.49                         |
| SD Person                   | 1.61        | 12.34                         |
| Max Measure                 | 5.36        | 90.03                         |
| Min Measure                 | -4.27       | 15.99                         |
| Separation Index Person     | 2.50        | -                             |
| Person Reliability (Cronbach Alpha-KR20) | .89       |
3.1. Construct Validity

Construct validity can be interpreted by whether there is sufficient correlation between items of measurement with theoretical constructs that underlie the preparation of the measuring instrument [22]. In other words, construct validity will measure whether the scores obtained support the theoretical concepts desired by the measurement objectives when the gauges/tests are formulated. To support these basic assumptions, it is necessary to analyze the integration of items in the same construct, where the integration will explain the variables appropriately.

In the Rasch perspective, an analysis of the integration was carried out through uni-dimensionality analysis. Based on the results of the analysis, it is known that the raw variance value that can be explained by AMMS is 50.7%, this finding is well above the acceptance threshold of the uni-dimensionality value of 40%. In addition, the unexplained variance value in all contrasts is below the minimum limit of 15%. These findings mean that constructively AMMS measuring instruments meet the requirements of construct validity.

Table 2. The uni-dimensionality of Acceptability of Mental-Health Mobile-App Survey (AMMS) using standardized residual variance

| Category Structure                  | Empirical | Modeled |
|------------------------------------|-----------|---------|
| Total raw variance in observations | 22.29     | 100.0%  |
| Raw variance explained by measures | 11.29     | 50.7%   |
| Raw variance explained by persons  | 6.95      | 31.2%   |
| Raw Variance explained by items    | 4.33      | 19.4%   |
| Raw unexplained variance (total)   | 11.00     | 49.3%   |
| Unexplained variance in 1st contrast | 1.98     | 8.9%    |
| Unexplained variance in 2nd contrast | 1.78     | 8.0%    |
| Unexplained variance in 3rd contrast | 1.47     | 6.6%    |
| Unexplained variance in 4th contrast | 1.08     | 4.9%    |
| Unexplained variance in 5th contrast | .98      | 4.4%    |

3.2. Analysis of Rating Scale

Rating scale analysis is used to see whether the respondent can correctly distinguish the answer choices. In AMMS, there are four answer choices, which are Very Appropriate, Appropriate, Fairly Appropriate and Not Appropriate. Based on Andrich Treshold's data exposure in Table 3, it is known that Andrich Treshold's value is above the minimum acceptance limit, even though the answer option 3 (Fairly Fit) is slightly below the acceptance limit. This means that in some questions the respondents were hesitant in distinguishing the answer choices with other answer choices.

Table 3. Summary of Acceptability of Mental-Health Mobile-App Survey (AMMS) Category Structure

| Label | Score | Observed % | Sample Expected | Infit MNSQ | Outfit MNSQ | Andrich Threshold | Category Measure |
|-------|-------|------------|-----------------|-----------|------------|------------------|------------------|
| 1     | 1     | 216        | 11              | -2.26     | -2.25      | -69              | NONE             | (-3.73)          |
| 2     | 2     | 632        | 33              | -.69      | .67        | 2.39             | 1.03             | -2.56            | -1.45            |
| 3     | 3     | 851        | 44              | .69       | .99        | 1.03             | .96              | -3.0             | 1.30             |
| 4     | 4     | 215        | 11              | 2.35      | .89        | 1.07             | 1.04             | 2.86             | (3.99)           |

However, if analyzed based on the findings in Graph 1, the fact is that all answer choices are at their own peak. This means that there is no overlapping range of answer choices. The graph also implies that respondents can clearly distinguish the four answer choices in answering the questionnaire.
3.3. Fit Items and Item Difficulties

The difficulty index of the question is in principle determined by how much the respondent is working on the problem correctly in principle; the difficulty value will be indicated by the proportion of the truth of the respondent answering the question in the form of a percentage. But in the Rasch perspective, the proportion of respondents in answering is transformed in the form of a logit scale. In Table 4, it is explained that the higher the acquisition of logit value, the item will be categorized as an easy item to answer, and vice versa. In Table 4 it is also known that item 3 is the item with the highest ease of answer, which is related to "I feel comfortable telling personal problems through an application on a Smartphone", the item obtains the highest logit value, while on item "I am an easy to adjust person with the application on the Smartphone " get the lowest logit scale value.

If analyzed based on fit items, items that are declared outliers or cannot be categorized as items that can represent variables in the measuring instrument are if the MNSQ Outfit logit values are in the range of 0.5 to 1.5. Based on the findings in Table 4, it is known that no item is outside the range, so it can be stated that all the right items represent variables.

**Table 4. Constructing Examinations from Calibrated Item, Item Difficulty, and Item Fit of the of Social Media Fear of Missing Out Indonesian Version**

| Item | Measure | Infit MNSQ | Outfit MNSQ | S.E.M. | Perceived Difficulties |
|------|---------|------------|-------------|--------|------------------------|
| 3    | 1.06    | 1.17       | 1.15        | .13    | Most easy item         |
| 4    | .99     | 1.03       | 1.03        | .13    |
| 6    | .53     | .97        | .88         | .13    |
| 8    | .48     | .83        | .83         | .13    |
| 5    | .18     | .89        | .88         | .13    |
| 2    | -.01    | 1.05       | 1.05        | .13    |
| 10   | -.25    | 1.39       | 1.44        | .13    |
| 7    | -.51    | .79        | .76         | .13    |
| 9    | -.54    | .61        | .58         | .13    |
| 1    | -.94    | 1.24       | 1.29        | .13    |
| 11   | -.99    | 1.03       | 1.19        | .13    | Most difficult item    |

**Figure 1. Category Probabilities: Modes - Structure Measures at Intersections**
3.4. Item Discrimination Test

The power of discrimination in principle is a parameter that will distinguish between individuals/groups of individuals who have and do not have attributes (variables) that are being measured [23]. This means that the power of discrimination will be able to determine which individual is in accordance with what is expected by the measuring instrument. In the Rasch perspective, the discrimination index when the measurement is not found is meaningful Error Measurement. In other words, items that are not careful (SEM > 1.0 logit) indicate items that do not have good discrimination. The AMMS measuring instrument was not found in the SEM value at 1.0 logit, so it can be interpreted that the measuring instrument has a good level of discrimination.

3.5. Item Analysis

The findings of the study indicate that respondents tend to feel comfortable and safe when divorcing the conditions of the problems experienced through online, this is evidenced by the achievement of logit item A3 (I feel more comfortable to tell my problem through an Smartphone) for 1.06 logit with rescaling of 56.97 logit.

| Items                                                                 | Construct       | Logit Value | Rescaling Logit Value (0-100) | Outfit MNSQ | Code |
|----------------------------------------------------------------------|-----------------|-------------|--------------------------------|-------------|------|
| I want to access mental health services through the internet if I feel uncomfortable | Behavioral Intervention | -0.94       | 41.63                          | 1.2941      | A1   |
| If there is a Smartphone app about mental health, I want to use it | Behavioral Intervention | -0.01       | 48.76                          | 1.0501      | A2   |
| I feel more comfortable to tell my problem through an app on a Smartphone | Substitutive     | 1.06        | 56.97                          | 1.155       | A3   |
| By using the app on my Smartphone, I feel my secrets will be more assured | Substitutive     | 0.99        | 56.46                          | 1.0286      | A4   |
| I want to consult via online first before meet my counselor         | Complementary   | 0.18        | 50.19                          | 0.876       | A5   |
| I want my psychological condition monitored by counselor through online | Complementary   | 0.53        | 52.9                           | 0.8756      | A6   |
| I want to find mental health information that I experience through the internet | Complementary   | -0.51       | 44.91                          | 0.7573      | A7   |
| Some of my problems can be consulted only through online with my counselor | Substitutive     | 0.48        | 52.51                          | 0.8297      | A8   |
| If there is a way to contact an online counselor, I would like to do so | Personal Innovativeness | -0.54       | 44.64                          | 0.5824      | A9   |
| I tend to try the latest apps on Smartphone                          | Personal Innovativeness | -0.25       | 46.92                          | 1.4401      | A10  |
| I am a person who is adaptable to the development of the app         | Personal Innovativeness | -0.99       | 41.21                          | 1.1858      | A11  |

Respondents felt that using mobile-apps could be substitutive with mental health services that are usually (conventional) in the form of face-to-face. This supports the explanation from the findings of previous research that mental health services using online media can increase user confidence, coupled with anonymous abilities that can be done in the session. The assumption of this condition is based on the tendency of clients who feel more comfortable if the initial meeting can be done online. However, this certainly does not reduce the importance of mental health services through face-to-face, which is indeed more effective in alleviating mental health problems.
4. Conclusion
In general, the development of the Acceptability of Mental Health Survey Apps (AMMS) instrument has met good measurement requirements, both in terms of validity and reliability. As one measure to see the level of acceptance of respondents, AMMS has been quite strong in predicting whether respondents do need internet-based counseling services and how high the level of acceptance is. This will certainly be able to answer the challenges and opportunities of counseling professionals such as counselors in developing approaches and mental health interventions using remote media. The presence of the development of internet-based media will also bring a positive impact to overcome the gap between individuals who need mental health services and professionals who are ready to provide their services.

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