

DEVELOPING EMOTIONAL INTELLIGENCE SCALE FOR STUDENT TEACHERS

Phyo Thaw Tar Aung¹ and Aye Aye Aung²

Abstract

The main purpose of this study was to develop the new Emotional Intelligence Scale (EIS) for student teachers by applying one-parameter logistic model of item response theory (IRT). A total of 1200 student teachers from Yangon University of Education and Sagaing University of Education were selected by equal-sized stratified random sampling technique. The emotional intelligence scale was used as a research instrument. Descriptive research design and quantitative survey method were used in this study. According to confirmatory factor analysis, 59 items: 16 items in Empathy Social Awareness, 17 items in Self-Regulation, 18 items in Self-Awareness/Optimism and 8 items in Managing Emotions were left in the Emotional Intelligence Scale. Moreover, it was found that this scale would be most suitable for the examinees whose ability ranges from -3.5 to +1.5 and it would provide the maximum information at ability (θ) is -1.4. Finally, the new Emotional Intelligence Scale (EIS) for student teachers was developed with 33 items under four dimensions such as Empathy Social Awareness, Self-Regulation, Self-Awareness/Optimism and Managing Emotions.

Keywords: Emotional Intelligence, Item Response Theory

Introduction

Importance of the Study

Teachers play a pivotal role in developing education system that generates all round development and good citizens. In 1998, Kennedy has pointed out that outcomes of education are affected by the quality of the teaching work force. So, teachers are considered to be the major transmitter of accumulated knowledge and experience of human race, from generation to generation. Not only in-service teachers but also prospective teachers have to possess good qualities and qualifications as much as possible.

To be qualified teachers, they need to be not only academically sound in each respective subject but also known thoroughly classroom management, teaching methodology, and educational psychology such as human behavior, emotion, feeling, etc. It is important that the quality of teachers, the attitudes towards their teaching, their feelings and emotions towards others as well as their jobs require being good and positive. As they would deal with students, parents, colleagues and others, it is important to control their feelings and emotions to be successful in their jobs. They are also role models of their students. They need to control their emotions, feelings and behaviors as well as of their pupils.

Teaching is an emotional practice that involves emotional relationships, emotional understanding and emotional labor. Therefore, it requires teachers to become more efficient role models in terms of emotional intelligence. Emotional intelligence may be more important than conventional IQ. The belief that success of people at work is mainly due to professional knowledge and skills related to IQ has become less prominent since the concept of emotional intelligence became popular and increasingly prevalent as the best predictor of people's success.

Therefore, it is important to investigate the emotional intelligence of student teachers. However, there has been no study investigating the emotional intelligence of student teachers in Myanmar. Moreover, there has been no Emotional Intelligence Scale free from any biased items

¹ Tutor, Department of Educational Psychology, Hlegu Education College

² Assistant Lecturer, Department of Educational Psychology, Yangon University of Education

to assess the emotional intelligence of student teachers. On account of these reasons mentioned above, it needs to develop the new Emotional Intelligence Scale (EIS) that free from any biased items for student teachers.

Purpose of the Study

The primary purpose of this study was to develop new Emotional Intelligence Scale (EIS) which will accurately represent the emotional intelligence of student teachers in Myanmar regardless of gender and region groups.

Definitions of Key Terms

The following definitions of the key terms were used in this study.

Emotional intelligence refers to the capacity of recognizing one's own feelings and those of others, for motivating ourselves and for managing emotions well in us and in our relationships (Goleman, 1998).

Item response theory (IRT) is a general statistical theory about examinee item and test performance and how test performance relates to the abilities that are measured by the item in the test (Hambleton & Jones, 1993).

Review of Related Literature

Emerging Emotional Intelligence

Over the past century, psychologists studying intelligence remained focused on its cognitive aspect. Intelligence quotients (IQs) were developed and used during the initial part of the 20th century as measures of intelligence. French psychologist Alfred Binet pioneered the modern intelligence testing movement in developing a measure of mental age in children, a chronological age that typically corresponds to a given level of performance (Myers, 1998). More modern studies linked a person's IQ with their potential for success in general as well as with elements such as leadership success (Lord, DeVader & Alliger, 1986). However, the validity of the general academic measure of IQ was soon challenged on the grounds that it did not consider situational factors such as environment or cultural setting when predicting achievement (Riggio, Murphy & Pirozzolo, 2002). Theorists began to hypothesize that perhaps cognitive intelligence as measured by IQ tests did not encompass intelligence in its entirety, but that perhaps several types of intelligences could coincide within one person.

Since the last two decades a new dimension of intelligence, termed as emotional intelligence, has received much attention as being more responsible for success than IQ (Goleman, 1995). Goleman (1998) has asserted that the old yardstick of judgment, that is training and expertise, has been substituted by the new yardstick that judges how well the people handle themselves and how well they handle others. The new rules of the world of work focus on personal qualities such as empathy, initiative, adaptability and persuasiveness, taking intellectual ability and technical expertise for granted. Moreover, recent research has revealed that the cognitive ability is not the only predictor of performance rather affective development is an equally important predictor of success (Nasir & Masrur, 2010).

Specifically, a broadened notion of intelligence considers abilities in domains beyond cognition such as competencies and skills in social and emotional domains. In this connection, emotional intelligence or EQ (emotional quotient) has gained popularity among the lay public, highlighting the importance of an individual's development in managing self-relevant and others' emotions.

Popular Models of Emotional Intelligence

Early theorists such as Thorndike and Gardner paved the way for the current experts in the field of emotional intelligence. Each theoretical paradigm conceptualizes emotional intelligence from one of two perspectives: ability or mixed model.

Ability models define emotional intelligence as a set of mental abilities and makes claims about the importance of emotional information and the potential uses of reasoning well with that information. *Mixed models* of emotional intelligence combine mental ability with personality characteristics such as optimism and well-being.

In 1990, Peter Salovey and John Mayer first coined the term “emotional intelligence” and continued to conduct research on the significance of the construct. Mayer and Salovey’s conception of emotional intelligence is based within a model of intelligence, that is, it strives to define emotional intelligence within the confines of the standard criteria for a new intelligence (Mayer, Salovey, Caruso & Sitarenios, 2003). It proposes that emotional intelligence is comprised of two areas: experiential and strategic. Each area is further divided into two branches that range from basic psychological processes to more complex processes integrating emotion and cognition. Experiential emotional intelligence can be divided into emotional perception and emotional assimilation and strategic emotional intelligence can be differentiated into emotional understanding and emotional management.

Bar-On developed one of the first measures of emotional intelligence that used the term “Emotion Quotient”. Bar-On’s model of emotional intelligence relates to the *potential* for performance and success, rather than performance or success itself, and is considered process-oriented rather than outcome-oriented (Bar-On, 2002). In his model, Bar-On outlines five components of emotional intelligence: intrapersonal, interpersonal, adaptability, stress management, and general mood.

Goleman discovered the work of Salovey and Mayer in the 1990’s. Inspired by their findings, he began to conduct his own research in the area and eventually wrote *Emotional Intelligence* (1995), the landmark book which familiarized both the public and private sectors with the idea of emotional intelligence. Goleman’s model outlines four main emotional intelligence constructs such as self-awareness, self-management, social awareness and relationship management.

Item Response Theory (IRT)

Item Response Theory (IRT) is a system of models that defines one way of establishing the correspondence between latent variables and their manifestations. Item Response Theory (IRT) is a collection of models that provide information about the properties of items and the scales they comprise through the analysis of individual item responses. The goal of item response theory is to provide both invariant item statistics and ability estimates. This feature will be obtained when there is a reasonable fit between the chosen model and the data set (Hambleton & Swaminathan, 1990). Item Response Theory (IRT) is used for the design of test, test assembly, test scaling and calibration, construction of test item banks, investigation of test item bias and other common procedures in the test development process. The central feature of IRT is the mathematical model on relating of how examinees at different ability levels on the trait should respond to an item.

There are three popular models of item response theory (IRT). They are

1. One-parameter logistic model (1-PLM) or Rasch Model
2. Two-parameter logistic model (2-PLM) and
3. Three-parameter logistic model (3-PLM).

In the Rasch or one-parameter model (1-PLM), the probability of a student answering a question correctly is defined as a function of the student's ability and the difficulty of the items employed in a test, without taking into consideration either the item discrimination parameter or a guessing factor associated with each item. In the two-parameter logistic model (2-PLM), a student's probability of answering a question correctly is a function of the student's ability and item difficulty after taking into consideration the item discrimination, but not the chance or guessing factor associated with each item. Item discrimination describes how well an item can differentiate between examinees having abilities below the item location and those having abilities above the item location.

In the three-parameter logistic model (3-PLM), the probability of a correct response is a function on the two parameters described for the one- and two-parameter logistic models, as well as a chance of scoring or guessing factor associated with each item. This parameter provides a (possibly) nonzero lower asymptote for the item characteristic curve and represents the probability of examinees with low ability answering the item correctly (Hambleton et al., 1991).

Moreover, the item and test information functions of IRT have applications in test construction, item selection, assessment of precision of measurement, comparison of tests, determination of scoring weights, and comparison of scoring methods (Hambleton & Swaminathan, 1990). The item information function depends on the slope of the item response function and the conditional variance at each ability level, θ . The greater the slope and the smaller the variance, the greater the information, and, hence, the smaller the standard error measurement.

One of the useful features of item information functions is that the contribution of each item to the test information function can be determined independently of the other items in the test. One of the most features of the test information function is that the contribution of each item to the test information function is additive. Thus, the effect of each item and its impact on the total test can be readily determined. Such a feature is highly desirable in test development work.

Method

Sample of the Study

In order to obtain the required data, the sample of student teachers to be tested was selected from Yangon University of Education (YUOE) and Sagaing University of Education (SUOE). The participants were 600 from YUOE and 600 from SUOE. A total of 1200 student teachers from first year, second year, third year, fourth year and fifth year participated in this study. Out of 1200 student teachers, 600 (50%) were males and 600 (50%) were females. The student teachers participated in this study were selected by using equal-sized stratified sampling method.

Instrumentation

In this study, the emotional intelligence questionnaire from leadership toolkit, the emotional intelligence questionnaire modified by Suzanne Farmer et al. (2013), the emotional intelligence rating scale developed by Sumita Rao (n.d.) and the emotional intelligence scale

developed by Aye Aye Aung (2015) were adapted and applied to measure the emotional intelligence ability of student teachers. The Emotional Intelligence Scale consists of 110 items: self-awareness/optimism (36 items), self-regulation (43 items), empathy social awareness (12 items) and managing emotions (19 items) with Four-point Likert Scale ranging from 1 (strongly disagree) to 4 (strongly agree).

Procedure

Before conducting data collection, preliminary test administration was done. As research instrument, the Emotional Intelligence Scale was used in this study. The whole scale of Emotional Intelligence Scale (EIS) indicated satisfactory internal consistency with Cronbach's alpha of **0.92**. For each subscale of EIS such as Self-Awareness/Optimism, Self-Regulation, Empathy Social Awareness, and Managing Emotions, the internal consistency values are **0.84**, **0.84**, **0.80** and **0.72** respectively. So, it was evident that Emotional Intelligence Scale (EIS) has high reliability to measure the student teachers' emotional intelligence. The field test study was carried out with 110 items of Emotional Intelligence Scale to 1200 student teachers from first year, second year, third year, fourth year and fifth year of YUOE and SUOE.

Data Analysis and Findings

The Confirmatory Factor Analysis for Emotional Intelligence Scale

In order to establish the four factors structure of the Emotional Intelligence Scale such as Empathy Social Awareness, Self-Regulation, Self-Awareness/Optimism and Managing Emotions, confirmatory factor analysis was used. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.94. It was above the recommended value of 0.7 that is indicating that there were enough items for each factor. And Bartlett's Test of Sphericity was significant ($p < .000$); this means that the variables are correlated highly enough to provide a reasonable basis for factor analysis. The four factors also have eigenvalues (a measure of explained variance) greater than 1.0, which is a common criterion for a factor to be useful. Finally, factor analysis was conducted with 59 items: empathy social awareness (16 items), self-regulation (17 items), self-awareness/optimism (18 items) and managing emotions (8 items).

Checking the Assumption of Unidimensionality

After collecting the required data, a set of test items is checked whether there is a reasonable fit between the chosen model and the data set to develop the Emotional Intelligence Scale by applying the one-parameter logistic IRT model. A common assumption of IRT models is to hold unidimensionality. In order to investigate this assumption, a principal factor analysis was conducted with SPSS software package. Figure 1 clearly shows the dominance of the first factor. The largest eigenvalue of the 59 items is over three times larger than the second largest eigenvalue, and the second largest eigenvalue is not much more than the smaller ones. Therefore, it can be concluded that this test hold the assumption of unidimensionality. Thus, it can be said that the test data satisfy the assumption of unidimensionality. When the assumption of unidimensionality is true, local independence is obtained: in this sense, the two concepts are equivalent (Lord, 1980).

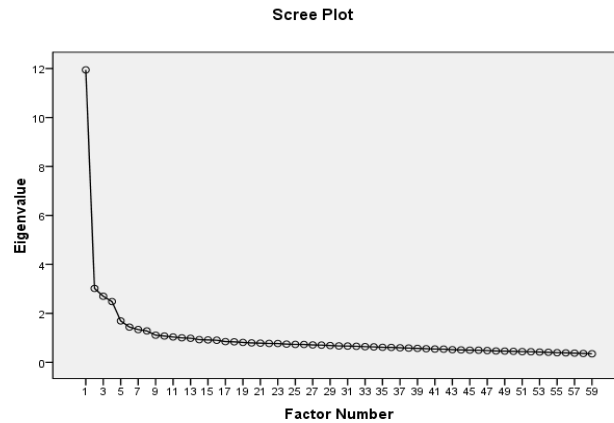


Figure 1 A Scree Plot of Eigenvalues for 59 Items of Emotional Intelligence Scale

Item Parameter Estimation for Developing New Emotional Intelligence Scale

After exploring the DIF items based on gender and region groups, new Emotional Intelligence Scale (EIS) was developed by using one-parameter logistic IRT model. The items with the difficulty ' b ' values within -3 to +3 were expected to be selected (Aye Aye Myint, 2000 cited in Aye Aye Aung, 2015). In order to develop new scale, out of the 59 items, the items which were not in the range of difficulty value -3.00 and +3.00 and gender and region DIF items were removed from the Emotional Intelligence Scale. Finally, there were only 33 items left in the new Emotional Intelligence Scale (EIS) for the student teachers. It was found that the item difficulty parameter (b) values were from -2.85 to +2.93 and the mean of these estimates is -0.66. There are 10 items of positive b values and 23 items of negative b values. It was found that 69.70% of the items were negative b values, so it was concluded that the scale is relatively easy for the group. However, the Emotional Intelligence Scale can measure to some extent for both average and high EI levels.

Item Information Function and Test Information Function

Item information functions can play an important role in test development and item evaluation in that they display the contribution items make to ability estimation at points along the ability continuum (Hambleton et al., 1991). The test information function was calculated to know accurately the maximum amount of information obtained from the scale. The amount of information provided by a set of test items at an ability level is inversely related to the error associated with ability estimates at the ability level (Hambleton & Swaminathan, 1990). The steeper the slope, the smaller the item variance, thus, the greater the information will be provided. The IICs and TIC of the new Emotional Intelligence Scale (EIS) with 33 items are illustrated in figure 2 and 3.

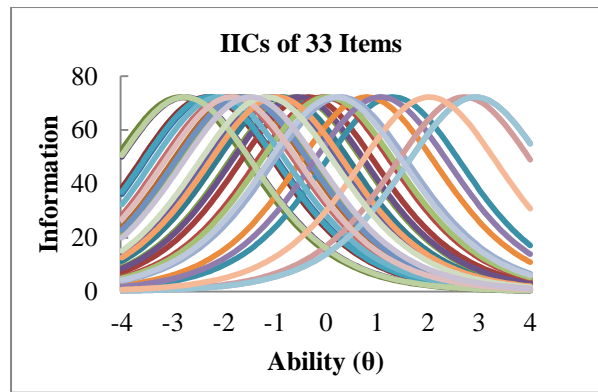


Figure 2 Item Information Curves for the New Emotional Intelligence Scale (EIS) with 33 Items

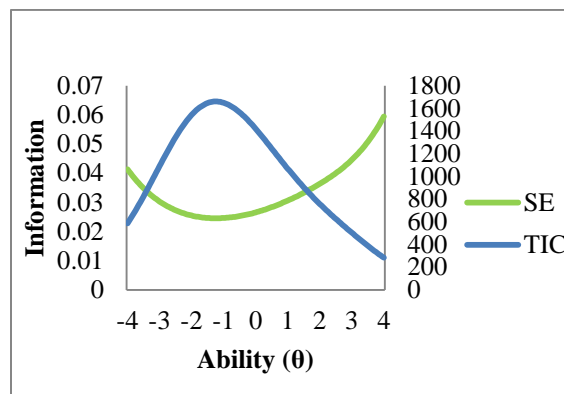


Figure 3 Test Information Curve for the New Emotional Intelligence Scale (EIS) with 33 Items

The TIC shows that the smaller standard error across the ability scale lies between the ability range of -3.5 to +1.5 and the both ends of the scale have larger standard errors. So, it was found that the Emotional Intelligence Scale will be most suitable for student teachers whose ability (θ) range is from -3.5 to +1.5, but it cannot provide enough information for the student teachers whose ability levels are higher than +1.5 (above $\theta = +1.5$) and lower than -3.5 (below $\theta = -3.5$). In this scale, the maximum amount of information was $I(\theta) = 1654.59$ at $\theta = -1.4$. Thus, it was observed that this test would provide the highest information for the student teachers who lie on ability level (θ) at -1.4.

Ability Parameter Estimation

In addition, the participants’ raw scores and their ability scores were also investigated. The range of ability estimates was from -4.00 (the lowest ability score) to +4.00 (the highest ability score) and the mean of the ability was +0.03.

Conclusion and Suggestion

The main purpose of this study was to develop the new Emotional Intelligence Scale (EIS) for student teachers by applying one-parameter logistic model of item response theory (IRT). In order to develop the new EIS, the confirmatory factor analysis, checking the assumption of unidimensionality and item and ability parameters estimations were carried out.

According to the result of confirmatory factor analysis, 59 items were left in the Emotional Intelligence Scale. There were 16 items in Empathy Social Awareness, 17 items in Self-Regulation, 18 items in Self-Awareness/ Optimism and 8 items in Managing Emotions. Then, the result of the assumption of unidimensionality also showed that there was a reasonable fit between the chosen model and the data set.

Moreover, item and ability parameters estimation for new Emotional Intelligence Scale (EIS) was carried out with 1-PL model. Then, items with the difficulty parameter value between -3.00 to +3.00 were chosen for the new Emotional Intelligence Scale (EIS). Finally, there were 33 items: six items in Empathy Social Awareness, sixteen items in Self-Regulation, four items in Self-Awareness/Optimism and seven items in Managing Emotions in new Emotional Intelligence Scale (EIS) for student teachers. These items were free from bias against gender and region and their difficulty range was from -3.00 to +3.00.

Besides, it was found that the new Emotional Intelligence Scale (EIS) will be most suitable for student teachers whose ability (θ) range is from -3.5 to +1.5, but it cannot provide enough information for the student teachers whose ability levels are higher than +1.5 (above $\theta = +1.5$) and lower than -3.5 (below $\theta = -3.5$). In this scale, the maximum amount of information was $I(\theta) = 1654.59$ at $\theta = -1.4$. Thus, it was observed that this test would provide the highest information for the student teachers whose ability level lie at (θ) = -1.4. This new Emotional Intelligence Scale (EIS) can be useful in measuring the emotional intelligence of student teachers in Myanmar.

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