

Construct Validity Test on Anxiety and Self-efficacy Instruments in Preparation for Competency Test Using Confirmatory Factor Analysis Method

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ORIGINAL ARTICLE

Construct Validity Test on Anxiety and Self-efficacy Instruments in Preparation for Competency Test Using Confirmatory Factor Analysis Method

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ABSTRACT

Introduction: Anxiety and self-efficacy are psychological factors that play an important role in competency testing. The high anxiety rate of competency test participants in Indonesia which reaches 94.9% and the contribution of self-efficacy in influencing competence reaches 68.7% causes anxiety and self-efficacy to be important to consider as a maximum effort to prepare for competency tests, but until now the right instrument has not been found that can measure anxiety and self-efficacy in competency tests. This study aims to develop an instrument that can identify anxiety and self-efficacy of competency tests that have been tested for validity and reliability. **Methods:** The author arranges 20 items of anxiety and 15 items of self-efficacy instruments with four answer scales. Content validity was carried out by expert judgment by three experts using the Delphi technique. The instrument was tested on 529 students. The construct validity test of the instrument used a confirmatory factor analysis (CFA) approach. CFA analysis testing was carried out with the help of MPlus 7.4 software. **Results:** The study resulted in a modified model that was fit with 11 valid anxiety items with an estimated value of 0.700-0.861 and seven valid self-efficacy items with an estimated value of 0.693-0.902. Internal consistency with Cronbach's alpha was 0.925 for anxiety and 0.897 for self-efficacy instruments. **Conclusion:** A short and valid instrument has been produced with a high estimated value for each item to measure anxiety and measure self-efficacy in the competency test.

Keywords: Instrument, Anxiety, Self-efficacy, Competency test

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INTRODUCTION

The competency test is defined as an assessment process to determine whether a person is competent or not in a certain unit of competence or qualification (1). The purpose of the competency test is to achieve graduates who meet performance competency standards. The policy for implementing competency tests has been carried out in Indonesia since the issuance of the Minister of Health Regulation No. 1796. The regulation explains that health workers, including nurses, must take a competency test to obtain a Registration Certificate as a condition to be able to work as a nurse. Preparations

continue to be carried out until the implementation of the competency test begins on August 1, 2013 (2).

The nursing diploma competency test method is carried out using a paper-based test (PBT). However, since the COVID-19 pandemic began in 2020, it has been carried out using a different method, namely the computer-based test (CBT). CBT is an exam method that uses a computer with an internet network and the questions are prepared on a portable hard disk. Participants will be given a log-in account. Participants' answers will be stored on a hard disk which will then be submitted to the central organizer. Each exam question is presented in the form of a vignette that describes a logical clinical situation. Participants are required to have analytical skills to be able to answer test questions. The change in the test method from PBT to CBT creates a higher psychological burden on both educational institutions

and participants. In addition, the learning process, which is mostly carried ²² online, in learning nursing clinical practice during the COVID-19 pandemic, has led to a lack of student experience in studying real nursing clinical cases. ²⁷ adds to the psychological burden of participants in preparation for the 2020 competency test.

The percentage of passing the nurse competency test results in Indonesia every year has increased but the percentage of participants who are declared incompetent is still high. Based on data from the ministry of education and culture in 2018, there were 54.89% of participants passed the competency test which increased to 55.16% in 2019. Participants who were incompetent in 2018 were 47.66% and decreased to 44.84% in 2019. The high percentage of participants who are declared incompetent needs serious attention, because based on permendikbud No 2 of 2020 (3) that the competency test will be applied as an exit exam starting in 2021. This means that ²⁴ the competency test will begin to be implemented as one of the requirements for graduation from vocational or professional education. This consensus decision is the concern of every educational institution to prepare students more optimally in facing the competency test. Passing the competency test is an absolute must before students are declared to have finished attending education.

Many factors can affect the passing of the student competency test. Several studies have been conducted in various countries. The results of the research in Kenya found that class attendance was related to graduation rates (4). In ¹¹ Ghana, Students' Cumulative Grade Point Average could be a good predictor of their performance in the licensure examinations (5). In addition, psychological factors also play an important role, namely anxiety and self-efficacy (6, 7). Anxiety is one of the factors that are often found when students carry out competency tests (8) The results showed that almost all nursing diploma students experienced anxiety in facing the competency test, which reached ⁵ 94.9%, and only 5.1% did not experience anxiety (9). There is a significant relationship between the level of anxiety with the results of the competency test (10). Research on self-efficacy was found in Ithwanudin's research, 2016 which concluded that self-efficacy contributed significantly to the achievement of competence, self-efficacy affected competence by 68.7% (11).

Identification of student anxiety and self-efficacy becomes an important variable in the preparation of the competency test. Identification as early as possible becomes the basis for appropriate interventions so that students are better prepared for competency tests. Anxiety and self-efficacy assistance is needed to avoid failure. Anxiety that is ignored will affect concentration in determining the correct answer choice during the ¹⁰ competency test. And self-efficacy can increase a

person's ability to achieve certain targets beyond their actual abilities (12). Anticipatory efforts can be made if students' anxiety and self-efficacy problems are immediately identified.

Currently, several anxiety instruments have been widely used, including Hamilton Anxiety Rating Scale (HAR-S) was developed by Max Hamilton and has now become a standard in measuring anxiety, especially in clinical approaches (13). Visual Analog Scale for Anxiety (VAS-A) is an easy-to-use instrument to measure anxiety in preoperative patients (14). The State-Trait Anxiety Inventory (STAI) developed by Spielberger in 1983 is an instrument that is widely used to assess the level of anxiety in general conditions as well as in psychiatry. STAI is commonly used to capture long-lasting characteristics and patterns of symptoms (13). The Beck Anxiety Inventory (BAI) was developed to assess clinical anxiety, emphasizing its use in psychiatric patients, but can also be used more broadly in non-clinical conditions (15). The DASS distinguishes between self-reported levels of anxiety, depression, and stress, developed by Lovibond (16). All instruments have good validity and good reliability (13-16). All instruments have the same purpose, namely to assess the level of anxiety, but the instrument that assesses the anxiety of special students facing the competency test has not been obtained.

³ Instruments to measure self-efficacy have also been developed by many experts including General self-efficacy is an instrument ¹⁶ measures a person's confidence in overcoming the demands, tasks, and challenges of life in general (17), Academic Self-Efficacy assesses the extent to which a person's confidence in performing academic behavior (18), Emotional Self-Efficacy Scale (SES) developed by Kirk, Schutte, and Hine in 2008, has four dimensions including regulating emotions, using thoughts as support, and understanding feelings (17,19). The three instruments aim to assess self-efficacy on different tasks and targets, and the validity and reliability have been tested with good results (17-19). A self-efficacy instrument that specifically assesses student confidence in facing the competency test has not been obtained.

Based on the above phenomenon, the authors see the need to research to develop an anxiety and self-efficacy competency test instrument that has been tested for validity and reliability so that it can contribute and be used as a reference for educational institutions incorrectly identifying the problems experienced by students.

MATERIALS AND METHODS

The research ¹⁹ design is a descriptive study, which describes the results of the construct validity test of an instrument. The total sample of the study was 529 respondents, consisting of all students who had passed

the Diploma in Nursing from four Nursing Educational Institutions in the West Java Region of Indonesia, which were taken randomly. The respondent is the first taker of the 2020 competency test.

Procedures and measurements are carried out by the measurement instrument development procedure (20) which consists of six stages, namely:

1. Proposal of the construct:

The constructs of anxiety and self-efficacy of the competency test were proposed according to a literature review and described as operational definitions of each construct. Anxiety in this study is defined as a state of worry for someone who complains that something bad (17) happen during the competency test. Meanwhile, self-efficacy is defined as self-confidence in one's ability to complete the competency test.

2. Construction of the pilot instrument:

The instruments are arranged based on indicators that have been determined by the results of a literature study on anxiety and self-efficacy. The author compiled a competency test anxiety instrument based on three aspects of anxiety developed by Ziedner (1998) which include cognitive, affective, and behavioral aspects. The cognitive aspect is a cognitive reaction when a person faces a situation including thinking that the situation will be difficult, thinking that it will get unsatisfactory results, the inability to cope with the consequences of the exam, and focusing on self-criticism; The affective aspect is an emotional physiological symptom such as shaking, nausea, cold sweats, feeling tense, nervous, worried, confused and so on; Behaviour aspects are behaviors that arise when faced with situations such as delaying, avoiding, and running away(21).

The competency test self-efficacy instrument is based on 3 dimensions of self-efficacy, namely the dimensions of level, strength, and generality developed by Bandura (22). Bandura explained that the level is related to the degree of difficulty of the task so it is necessary to measure confidence in the demands of the task that must be carried out by students; Strength relates to the strength of a person's belief in his abilities; Generality is a dimension that assesses the range of individual beliefs about their ability to carry out activities broadly or only limited to certain domains (12).

The results of the literature study are then poured into constructs and described into indicators along with operational definitions, then items are compiled based on predetermined indicators and then presented in the form of a questionnaire using Indonesian.

The competency test anxiety instrument consists of 20 items consisting of five cognitive aspects, eight affective items and seven behavioral items with four response scales that indicate the suitability of the statement with

what the respondent feels. All favorable items with the answer choices are very suitable (SS), suitable (S), less suitable (KS), and not suitable (TS).

The Self efficacy instrument consists of 15 items consisting of five items each with the dimensions of level, strength, and generality. with four response scales. All items are favorable with answer choices very sure (SY), sure (Y), less sure (KY), and not sure (TY). Instrument item scores 1-4.

3. Content validation

Content validity is carried out in 2 stages:

The first stage: The instrument readability test was carried out on five nursing diploma students aiming to find out how far the instrument could be understood, were there any problems in answering each item, which items according to the respondents were difficult to understand, and needed to be grammatically revised, which items had the same meaning or character. repetition of the previous item (12). The five students were asked to answer a questionnaire, then continued with a focus group discussion (FGD) to provide input according to the objectives of this stage. Items that need to be revised are revised according to the FGD recommendations.

The second stage is the validation of instrument content using the Delphi method. Expert judgment was carried out by three experts consisting of psychiatric nurses, psychologists, and language experts. All experts are Indonesian. And conduct an independent assessment. The experts provided qualitative considerations and assessments for each item with the qualifications of Adequate (M) and Inadequate (TM) items or revisions that were needed in terms of content, writing, and accuracy of words and sentences. Items are revised according to the advice of experts so that they were by the established operational definition concept, there were no repetitive items, the grammar was correct, easy to understand, and unambiguous

4. Instrument application to the sample (field test):

The instrument is presented in the form of an online questionnaire on google form then the author distributes the link address to the respondents. Informed consent is included. Respondents filled out one measurement.

5. Estimation of psychometric properties:

The instrument validity test was carried out by item analysis using a factor analysis approach with confirmatory factor analysis (CFA).

5 Psychometric analyzes.

Confirmatory factor analysis (CFA) was performed with the help of MPlus 7.4 software. The instrument's fitness was evaluated using the root mean square error of approximation (RMSEA), An $RMSEA \leq 0,08$ indicates satisfactory model matching (23). The

validity test via CFA was performed with the following steps: (1) A unidimensional fit model was obtained, (2) items with a negative loading factor and non-significance were excluded, and (3) correlated items were omitted.

Quality instruments are required to have high reliability. Finally, the instrument was tested for reliability to determine the attachment, dependence, determination, or constancy of the measurement results. Internal consistency analysis was performed with Cronbach's alpha to determine the reliability of the instrument.

ETHICAL CLEARANCE

This study was approved by Research Ethics Committee No. III/100/KEPK-SLE/STIKEP/PPNI /JABAR/X/2021.

RESULTS

The results of the CFA analysis showed that both anxiety and self-efficacy instruments had models that did not fit, with test results that can be seen in table I.

Based on table I, it can be explained that in the first model test, the results of the analysis of the two instruments showed that the model did not fit. After modifying the model, the fit model is obtained with RMSEA: 0.08 on the Anxiety instrument and 0.079 on the Self-efficacy instrument. So it can be concluded that the self-efficacy anxiety instrument has a fit/acceptable model.

Modification of the model is done using items with a negative loading factor, correlated and insignificant

Table I : Goodness of fit index instrument before and after modification of the model

| Instrument | RMSEA | RMSEA |
|---------------|---------------------------|--------------------------|
| | before Model Modification | after Model Modification |
| Anxiety | 0,129 | 0,08 |
| Self-efficacy | 0,146 | 0,079 |

Table II : Description and Factor Loading of Anxiety Instrument Items on Competency Test

| Item | Deskripsi | Faktor loading |
|------|--|----------------|
| 2 | Saya merasa sulit konsentrasi jika mengingat uji kompetensi | 0,709 |
| 5 | Saya merasa takut tidak mampu menjawab soal-soal uji kompetensi | 0,631 |
| 6 | Saya merasa gemetar jika mengingat uji kompetensi | 0,810 |
| 9 | Saya merasa tertekan mengingat uji kompetensi | 0,825 |
| 10 | Saya tidak bisa tidur karena mengkhawatirkan uji kompetensi | 0,808 |
| 11 | Saya merasa gugup menghadapi uji kompetensi | 0,830 |
| 14 | Saya merasa pusing mengingat uji kompetensi | 0,861 |
| 15 | Saya merasa takut menghadapi uji kompetensi | 0,838 |
| 16 | Saya merasa sulit memahami materi uji kompetensi | 0,753 |
| 18 | Saya sering tarik nafas dalam jika mengingat uji kompetensi | 0,700 |
| 20 | Saya merasa tidak tenang jika mendengar obrolan tentang uji kompetensi | 0,799 |

items are removed (dropped). 9 Items dropped on the anxiety instrument. So there are 11 valid items that can measure anxiety, namely items numbered 2,5,6,9,10, 11,14,15,16,18 and 20. The items dropped on the self-efficacy instrument are 8 items. So 7 items can measure the self-efficacy of the competency test namely items 1,8,9,11,12,14, and 15 which are said to be valid or only measure self-efficacy. All valid items have a high factor loading so that each item has a high role in the measurement. The description and factor loading of each valid item can be seen in tables II and III.

The unidimensional model of the anxiety instrument in the competency test can be seen in Figure 1.

Figure 1 shows that all items measure the anxiety variable without any correlation between items and none of them have negative values. The total number of items that measure anxiety is 11 items with a high level of estimation (estimated coefficient 0.700-0.861). The 11 valid items above are then written in the form of an anxiety instrument on the competency test.

The unidimensional model in Figure 2 shows that all items measure the self-efficacy variable without any correlation between items and no negative values. The total number of items that measure self-efficacy is 7 items with a high level of estimation (estimated coefficient 0.693-0.902). The 7 valid items above are

Table III : Description and factor loading of self efficacy instrument items on competency test

| Item | Deskripsi | Faktor loading |
|------|--|----------------|
| 1 | Saya mampu menjawab soal-soal uji kompetensi dengan baik | 0,693 |
| 8 | Saya mampu memaksimalkan kemampuan saya untuk menghadapi uji kompetensi | 0,803 |
| 9 | Saya akan berhasil lulus uji kompetensi sesuai kemampuan yang saya miliki saat ini | 0,845 |
| 11 | Saya siap menghadapi hasil uji kompetensi, apapun hasilnya | 0,860 |
| 12 | Saya mampu mempersiapkan diri menghadapi uji kompetensi sebaik mungkin | 0,898 |
| 14 | Saya akan mendapatkan hasil sesuai harapan, sesuai dengan kemampuan saya | 0,902 |
| 15 | Saya akan mendapatkan hasil sesuai target | 0,794 |

The unidimensional model of the self-efficacy instrument on competency test can be proven by

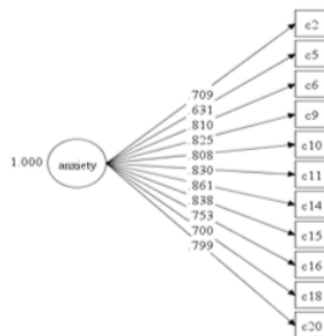


Figure 1 : Unidimensional anxiety instruments on competency test.

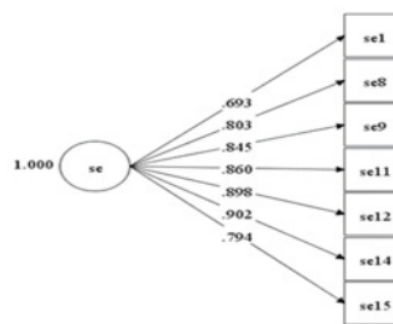


Figure 2 : Unidimensional self-efficacy instruments on competency test.

then stated in the form of a self-efficacy instrument on the competency test.

Finally, ¹² internal consistency analysis was performed using Cronbach's alpha. The Cronbach alpha value for the anxiety instrument was ⁷ 0.925 and the self-efficacy instrument was 0.897. If the value of Cronbach's Alpha > 0.7 then the research instrument is reliable. So the instrument of anxiety and self-efficacy has good reliability.

DISCUSSION

Identification of competency test anxiety is important by using the right instrument to maximize student preparation for the competency test. Ramos et al stated that anxiety is a normal, essential, and natural emotional condition that occurs in life as an adaptive defense mechanism that encourages a person to take action in the best way in dealing with new threats or situations (24). Silva and Araujo added that if anxiety is not identified then the condition can persist continuously and reach a high level of anxiety so that it can cause performance disturbances in daily activities, and physical/emotional imbalances until pathological conditions such as anxiety disorders occur (24). This of course will affect the emotional condition of the competency test participants.

For a long time, the concept of anxiety has been widely studied by experts and has produced various concepts. Initially, Liebert & Morris, 1967 stated that anxiety is seen as two components, namely worry and emotion. However, subsequent developments Zeidner, 1998 has defined anxiety include three different and complex aspects consisting of cognitive, affective, and behavior (21).

The theory of self-efficacy was first introduced by Bandura. ¹⁴ Self-efficacy is defined as a person's belief about his ability to feel, motivate himself, and take action to achieve certain goals. self-efficacy consists of three dimensions, namely level, strength, and generality. The self-efficacy function in a person will guide the selection of a person's activities because he can achieve it, increase endurance in the face of obstacles that the higher a person's self-efficacy, the greater the effort and perseverance, and affect his mindset and emotions because of the higher self-efficacy. High levels help create a feeling of calm in performing difficult tasks and activities (25).

The test of the validity of the anxiety and self-efficacy instruments ²⁰ this study was carried out with the CFA and the results of the analysis of the fit unidimensional model were obtained. The concept of anxiety and self-efficacy consists of several aspects that are multidimensional but they are interrelated

(21,25). Model testing in this study was carried out unidimensional. This is based on the view that in this study each item in each instrument is an indicator of research, the constructs studied in this study are not complex and the number of items analyzed is not too many. This is to the opinion of instrument measurement experts that treatment of items as indicators will produce a more complete and more complex measurement model because of the many parameters that must be estimated and factor loading which is strongly influenced by the similarity of words and sentences (26). Unidimensional models were also found in other studies which were almost similar (12,27-29).

The results of the validity test revealed a unidimensional model, meaning that each item only measured one variable, namely measuring the anxiety variable and the self-efficacy variable only. All instrument items meet the criteria as good items, namely the item has a positive factor load, the item is valid, and has no correlation between items (30). ⁴ After conducting factor analysis, it can be concluded that the instrument can be used to measure anxiety and self-efficacy in competency tests.

Obtained 11 items that can measure competency test anxiety. The 11 items have covered three aspects of anxiety developed by Ziedner (1998) which include cognitive, affective, and psychomotor aspects (21). The self-efficacy instrument of the competency test resulted in 7 valid statement items. The 7 items include the dimensions of level/magnitude, strength, and generality of the self-efficacy dimensions developed by Bandura (22). The high self-efficacy of students explains that students have confidence in themselves with full optimism and hope to be able to achieve the targets to be achieved without feeling hopeless. Self-efficacy possessed by students makes them able to deal with various situations. On the other hand, low efficacy causes a person to experience problems when taking a competency exam. This condition can hinder the success of students in facing the exam. With the competency test self-efficacy instrument, identification becomes faster and anticipatory treatment can be carried out immediately. Many researchers believe that self-efficacy is closely related to one's anxiety. Baron stated that overcoming one's anxiety can be increased through a strong feeling of self-efficacy (31).

Students who experience high anxiety need guidance to reduce the burden so counseling guidance is needed by academic supervisors (31). The form of anxiety experienced by students related to their studies is often referred to as academic anxiety which will have an impact on self-regulated learning so that it affects the activity of regulating information in memory (32).

LIMITATION

The resulting instrument uses Indonesian language so that its use is limited only to competency test participants who understand Indonesian. The use of instruments on respondents other than the nursing field has not been carried out.

CONCLUSION

A short and valid instrument has been produced to measure anxiety and self-efficacy on a competency test. The anxiety instrument consists of 11 items and the competency test self-efficacy instrument consists of 7 items. Instruments can be used to identify problems of anxiety and self-efficacy experienced by students in preparation for competency tests so that interventions can be carried out to increase the success of implementing competency tests so that students get maximum results.

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