Confirmatory Factor Analysis of a Scale Measuring Creative Self-efficacy of Undergraduate Students

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Abstract

This study aimed to explore and validate the factor structure of creative self-efficacy scale. Confirmatory factor analysis was used to assess the factor structure of the five-factor creative self-efficacy. A total of 105 undergraduate students (34 male and 71 female) completed this 25-items creative self-efficacy scale. The results showed that single latent factor structure was acceptable fitted. The highest and lowest loadings were working style and tolerance of ambiguity, respectively. The reliability estimate of the five factors (idea generation, concentration, independence, tolerance of ambiguity, and working style) were 0.42, 0.55, 0.71, 0.32 and 0.73. The most important factor was working style followed by independence, concentration, idea generation and tolerance of ambiguity.

1. Introduction

Creative self-efficacy is one of the necessary abilities to develop creative skills of students which lead to potential development that prompts change, further development, and creativity in working procedure and behavior (Choi, 2004; Lee & Kemple, 2014; Mathisen, 2011). It is expanded from Bandura’s Social Learning Theory about self-efficacy, meaning one having beliefs or being confident in his/her self-justification towards the expression in different circumstances. It is the reflection of self-confidence in behavior; also, it is the perception of the ability within oneself to take actions (Bandura, 1986, 1997; Zulkosky, 2009). A person who has high level of belief in
his/her own ability tends to be self-confident and look at troubles and obstacles as kinds of challenges. These people are likely to set the high goal and endeavor to overcome those challenges by themselves (Michale, Hsu & Fan, 2011).

Tierney and Farmer (2002) has developed the idea of creative self-efficacy and defined it as a degree of personal belief in ability that produces the creative outcomes or products. Creative self-efficacy is an important aspect which constructs creativity in working. Employees would be able to achieve their goals and be creative if they believe in their own efficacy (Bare et al., 2008; Beghetto, 2006; Gong et al., 2009; Tierney & Farmer, 2002). Moreover, for students, having high degree of belief in self-efficacy in would lead to creativity and creative behavior, and their behavior could also be predicted (Cheng, Shiu & Chung, 2012; Lizarraga & Closas, 2014; Tan, Li & Rotgans, 2011; Yu, 2013). In addition, students who have high degree in creative self-efficacy tend to believe in academic ability and participate in academic activities or join after-school group activities. Additionally, they tend to further their education in undergraduate level (Beghetto, 2006). Therefore, studying about creative self-efficacy is important and required for learners’ development.

Tan, Ho and Young (2007) studied creative self-efficacy of high school students using five-point rating scale developed from the study of the students’ learning context. This scale was divided into three aspects, which were creative self-efficacy in cognitive style, working style and personal trait, and Domain-relevant skill. The result also show that the model fitted the empirical data, from the mention results, it showed that the three cases of the factor affected to the student’s creative self-efficacy competence.

Tan, Li and Rotgans (2011) examined creative self-efficacy measurement in various aspects. The measurement scale was developed for learners by developing the components used in the measurement which came from the link between the theories of creativity consisting of idea generation, concentration, working style, independence, and tolerance of ambiguity (Amabile, 1983, 1997). According to the research, it was found that all five components are related to creative self-efficacy. It can be used to predict students’ behavior. Also, the five components have positive relationship to one another among themselves.

From the study of papers and related research, an interesting topic in education about components of creative self-efficacy was found. From those researches, it was found that most of the studies of creative self-efficacy were in the forms of antecedents and consequences study while purposive studies of specific attributes or components of being creative self-efficacy are not widely found. Therefore, researcher is interested in studying components of creative self-efficacy by validating them according to Tan, Li and Rotgans’ (2011) five components of creative self-efficacy: idea generation, concentration, independence, tolerance of ambiguity, and working style. These five components reflect one’s perception, belief, and confidence in contained creative ability, which help increase students’ creative ability and creative behavioral actions.

This study was purposed to investigate the construct validity of measurement scale for creative self-efficacy. Most of the studies of creative self-efficacy in education were conducted with students in high school level (Beghetto, 2006; Tan, Li & Rotgans, 2011; Tan, Hill & Kikuchi, 2008; Tan, Ho & Young, 2007) and university level (Lizarraga & Closas, 2014; Yu, 2013; Cheng, Shiu & Chung, 2012), and there has not been any research that clearly concludes about the measurement of creative self-efficacy components; furthermore, there are various components to be used. Therefore, researcher has chosen the former research which contains the similar method to this one, that is, undergraduate students are the subjects. Also, the creative self-efficacy components were selected to be studied according to Tan, Li and Rotgans’ (2011) five components, which are, idea generation, concentration, independence, tolerance of ambiguity, and working style.

2. Method

2.1 Sample

A sample of 105 undergraduate students attending public university in Bangkok, Thailand participated in this study. A simple random sampling was used to select them.

2.2 Instrument

A self-evaluation questionnaire developed by Tan, Li and Rotgans (2011) to examine students’ creative thinking was used. The questionnaire used a five-point Likert scale, ranging from 1 to 5 (strongly disagree - strongly agree), and assessed the following five dimension: Idea generation (5 items), for example, “I am an initiative person”:...
Concentration (5 items), for example, “I can focus on doing something valuable”; Independence (5 items), for example, “I can work on task that allow for my evaluation”; Tolerance of ambiguity (4 items), “I can delay judgment when coming up with ideas”; Working style (6 items), “I am willing to master knowledge I need for creative task”.

3. Results

3.1 Confirmatory Factor Analysis

According to five-factor model of creative self-efficacy, the factor that showed highest level of mean was working style (mean = 4.07, SD = 0.50), followed by concentration (mean = 4.06, SD = 0.51). The relationship among factors ranged from 0.12-0.73, with highest correlation between working style and tolerance of ambiguity. In order to explore and assess the suitability of data, Bartlett’s Test of Sphericity and Kaiser-Meyer-Olkin (KMO). The results indicated that the correlation matrix was not an identity matrix (Chi-Square=1090.73, df=300, p<.05) with KMO index was 0.85 (see Table 1.1).

The goodness of fit for the model was assessed using a chi-square statistics, CFI, RMSEA, and SRMEA. Acceptable fit was judged accordingly to the criteria recommended by Hu and Bentler (1999): CFI and TLI values greater than or equal to .95 and RMSEA and SRMR values less than or equal to .06 and .08, respectively.

As the result for confirmatory factor analysis, it was found that the creative self-efficacy factor structure was showed the acceptable fit to the data ($\chi^2 = 5.98$, df = 4, p = 0.21 , CFI = 0.99, TLI = 0.98, RMSEA = 0.07, RMR=0.03) (see Table 1.2). All factor loading were statistically significant, with highest loading on working style ($\beta = 0.86$), followed by independence ($\beta = 0.84$), concentration ($\beta = 0.75$), idea generation ($\beta = 0.64$), and tolerance of ambiguity ($\beta = 0.57$), respectively. The item reliability also showed significant, ranged from (0.32 to 0.73) (see Table 1.2 and Fig. 1). The factor score equation was presented follows:

$$CSE = 0.49 \text{ (IDG)} + 0.21 \text{ (CON)} + 0.09 \text{ (IND)} + 0.20 \text{ (TOA)} + 0.05 \text{ (WKS)}$$

Table 1.2 Results of confirmatory factor analysis of a scale measuring creative self-efficacy
4. Discussion

The validity testing results for creative self-efficacy measurement model show that the model itself contains construct validity and is workable as its measurement goes along with empirical data. There is the relationship among variables. An observable variable which has highest loading is working style, while the lowest is tolerance of ambiguity. This finding is not relevant to the research of Tan, Li and Rotgans (2011) of which observable variable having highest loading is idea generation and the lowest is working style. This might be because of the context in which creative self-efficacy measurement scale was used; that is, the context in this research and another one in Tan, Li and Rotgans’ are different. In Tan, Li and Rotgans’ research, the scale was conducted with high school students while that of this research was used with undergraduate students, who might have a higher role of perception about working responsibility or doing activities than high school students.

In addition, the study shows the relationship among creative self-efficacy which affect thinking, motivation, and decision on surroundings. This concept is relevant to Tan, Ho and Young’s (2007) research which proposed that creative self-efficacy consists of three patterns which are cognitive style, working style and personal trait, and Domain-relevant skill. Further studies are necessary to develop additional knowledge into causative model, and develop strategies or methods to increase creative self-efficacy and working potential for students, teachers, or managers.

References


