THE DEVELOPMENT OF SELF-EVALUATION IN NON-COGNITIVE COMPETENCE

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Abstract

In recent years, researches are emphasizing the importance of investigating non-cognitive competence, but few of them apply integrative assessment approach to understand several non-cognitive capabilities at one time. The purpose of this study was to develop an integrative self-evaluation questionnaire for non-cognitive competence. The questionnaire has three dimensions which are Grit, Optimism and Gratitude. The Grit dimension consists of three categories, Concentration, Ability of problem solving and Independence. The Optimism dimension includes the positive and negative thinking. The Gratitude dimension consists of the degree and the content of appreciation.

The participants are 27 students of a girl’s high school in southern Taiwan. The questionnaire uses 5-point scale. Data were analyzed by descriptive statistics. This questionnaire is a combination of the Grit scale by Angela Duckworth, the Optimism and Pessimism Inventory (OPI) by William N. Dember, and the Gratitude Questionnaire (GQ-6) by Michal E. McCullough. A factor analysis was executed to explore the latent factors of the integrated questionnaire. The Cronbach α coefficients for individual dimensions are between .79 to .87. The questionnaire has good internal consistency and reliability.

The result of this preliminary study showed that this self-evaluation questionnaire has good reliability. A more comprehensive self-evaluation questionnaire would be proposed in the future study. More non-cognitive dimensions will be included like Zest, Curiosity and Self-control.

Keywords: non-cognitive competence, self-evaluation tool, grit, optimism, gratitude.

1 INTRODUCTION

In the contemporary world of rapidly developing information technology and intensive knowledge competition, governments strive to help children develop aptitudes for continual learning, research and development, deep thinking, and problem-solving. Therefore, educators must pay special attention to learning-by-doing processes in children because observation of such processes enables educators to accurately evaluate children’s learning progress and provide proper guidance. Tough (2013) proposed that cognitive skills alone are insufficient, particularly among children from impoverished backgrounds, and that the most crucial indicators of a successful life are noncognitive skills.

The importance of academic learning tends to be overemphasized. A child failing to achieve good grades is usually attributed to carelessness or lack of preparedness, whereas the effects of children’s innate noncognitive capabilities receive little attention. A charter school network in the United States called the Knowledge is Power Program (KIPP) advocates the following seven “characteristic strengths”: Grit, Zest, Optimism, Self-control, Gratitude, Social Intelligence, and Curiosity, and stresses that students’ accomplishments are closely related to these characteristics.

This study developed an integrated noncognitive competence self-evaluation questionnaire with a particular emphasis on Grit, Optimism, and Gratitude. The proposed questionnaire analyzes the noncognitive capabilities of students and provides a reference for teachers to assist students in their development. Therefore, this questionnaire could serve as a measurement tool for future educational assessment.

2 LITERATURE REVIEW

The concept of noncognitive abilities refers to students’ attitudes, capabilities, and character rather than their academic skills. Numerous studies have indicated that noncognitive abilities are more crucial than cognitive abilities (Farkas, 2003; Heckman et al., 2006). Noncognitive ability is a fairly broad term that can also be referred to as “competencies,” “personality traits,” and “soft skills” (Education Endowment Foundation, 2013).
Noncognitive skills have a considerable impact on personal achievements. They not only affect a person's academic performance but also his or her career path and social status (Brian, 2002). Carneiro and Heckman (2003) proposed that cognitive and noncognitive abilities can both be acquired. Therefore, the formulation of educational policies and on-site teaching should pay close attention to the development of noncognitive competence.

2.1 Grit

“Grit” has been the subject of much recent discussion. Grit as perseverance and passion for long-term goal (Duckworth, 2007) Duckworth considers grit as more crucial than intelligence and defines it as unwavering passion and perseverance in pursuit of a long-term objective that cannot be deterred by setbacks. Furthermore, Duckworth asserts that such passion and perseverance can be acquired through nurture and indicates that children with stronger will tend to learn more and are more likely to eventually achieve success. By contrast, children with innately superior abilities do not necessarily go on to be more successful. This observation is in stark contrast to the conventional practice of judging children's learning achievements based on their cognitive abilities.

Dweck (1999, 2008) classifies the mindsets that may affect success as the fixed mindset and growth mindset. The fixed mindset blames mistakes and failures on limitations related to innate abilities, whereas the concept of the growth mindset is based on capabilities being trained through diligence. In reality, brains can be trained as can muscles. People with the growth mindset are more willing to rise to challenges and face failure and tend to view criticism as an opportunity for improvement. Duckworth based her theorem on the growth mindset and advocated that grit can be nurtured in children through training and changes in their external environments.

2.2 Optimism

Previous studies on optimism can be divided into the following two camps: “dispositional optimism” (Scheier & Carver) and “optimistic explanatory style” (Peterson & Seligman). Both camps interpret optimism from a cognitive perspective but are conceptually slightly different. Ding (2003) proposed that the difference between the two camps lies in the optimistic explanatory style being overly conscious of negative events, even to the extent of overlooking the influence of positive events. By contrast, dispositional optimism adopts an individual’s attitude or disposition toward life events as the standard for evaluation with no particular inclination toward positive or negative events. Numerous studies have found that the degrees of dispositional optimism and optimistic explanatory style exhibit only low to medium correlation with one another (Scheier & Carver, 1992). Both camps consider optimism as the expectation of positive results and pessimism as the expectation of negative results.

The development of optimistic thinking is an indispensable aspect of education. Optimistic and pessimistic attitudes can deeply affect students’ learning and social behaviors. Optimism is often associated with positive thinking; fortitude; effective problem-solving capabilities; academic, sporting, and vocational success; good health; and popularity. By contrast, pessimism is often associated with depression, passivity, failure, social alienation, and higher rates of morbidity and mortality (Peterson, 2000). Moreover, numerous studies conducted in Taiwan have found that optimistic students usually obtain higher academic achievements and exhibit greater self-efficacy in learning, regardless of educational level (Ding, 2003; Li, 2004; Hou, 2007). Furthermore, such students exhibit greater endurance when facing academic frustrations and tend to actively tackle such frustrations (Wu, 2006; Chang, 2000). Given the increasing levels of pressure and frustration faced by students in the contemporary world, lasting optimism and high self-esteem can help students to face challenges and learn and recover from setbacks (Yen, 2009). Seligman (1990) proposed that the optimistic explanatory style can be developed from childhood and can subsequently influence how individuals interpret aspects of adulthood. In summary, optimism has a profound influence on the learning experiences of students and its development is crucial for education.

2.3 Gratitude

In addition to the transfer of knowledge and skills, affective development of the concept of “make life worth living” is an essential aspect of education (Lee, 2009). Gratitude is a key emotion associated with socialization (Emmons & McCullough, 2003) and is a positive emotional reaction expressing gratefulness, a cognitive-affective state achieved following cognitive analysis of a life event (Bono & McCullough, 2006). Gratitude is a complex construct conceptualized as a sentiment, attitude, ethical value, habit, character, or coping response (Lee, 2009).
Many previous studies on gratitude have been conducted from ethical, prosocial, attributive, and personality-related perspectives. McCullough et al. (2002) divided the experience and expression of gratitude into the following four dimensions: intensity, density, span, and frequency. Intensity refers to the intensity of appreciation experienced by an individual capable of gratitude in response to positive events. Density refers to the number of people to whom an individual expresses appreciation in response to a positive event or success. Span refers to daily-life scenarios where individuals experience or express appreciation. Frequency refers to the number of times appreciation is felt during a specific period. McCullough et al. (2002) proposed that the moral standing of gratitude makes it a crucial moral affection. Therefore, a grateful person exhibits more altruistic behaviors and attributes the gains that he or she acquires to the help of others rather than to his or her efforts. Hence, attributing success to the contributions of others enhances the intensity, increases the frequency, and expands the density and span of gratitude (McCullough et al., 2002). Furthermore, Watkins, van Gelder, and Frias (2009) adopted the perspective of “trait gratitude” to explain that grateful individuals possess the traits of contentment, attribution of gratitude, and enjoyment of simple things and that the more capable of gratitude an individual, the easier and more frequently he or she experiences gratitude.

3 METHODS

The present study was an exploratory study. The participants, research instruments, and methods are discussed in this section.

3.1 Participants

This study recruited participants from a public girl’s high school in southern Taiwan. A total of 27 students aged 15–18 years were enrolled. Subsequently, 27 valid questionnaires were retrieved.

3.2 Questionnaire

3.2.1 Questionnaire Design

The proposed integrative questionnaire was designed based on the seven characteristic strengths advocated by KIPP schools emphasizing Grit, Optimism, and Gratitude. Fig. 1 presents the overall structure of the questionnaire, described as follows:

A. Grit

The Grit section was compiled based on the Grit Scale introduced by Duckworth and consisted of three subsections and ten items to test the participants’ levels of Grit. Specifically, the Concentration subsection contained four items, the Ability of Problem-Solving subsection contained three items, and the Independence subsection contained three items.

B. Optimism

The Optimism section was compiled based on the optimism and pessimism inventory (OPI) proposed by Dember and consisted of two subsections and nine items. The Positive and Negative subsections contained five and four items, respectively.

Dember considered optimism and pessimism as different but related traits, thereby contradicting the conventional Life Orientation Test (LOT) introduced by Scheier and Carver, which adopted a one-dimensional basis for assessment: the higher the LOT score, the greater the optimism level. Because numerous studies using the OPI have confirmed that optimism and pessimism are different but related traits, they must be measured separately (Ding, 2002).

C. Gratitude

The Gratitude section was compiled based on the Gratitude Questionnaire-Six-Item Form (GQ-6) introduced by McCullough et al. (2002) and designed to measure gratitude experienced by the participants. This section consisted of two subsections and eight items. The Appreciation Degree and Content of Appreciation subsections contained four items each.

McCullough et al. (2002) developed the GQ-6 as a tool for measuring gratitude. The GQ-6 employs positive and negative phrases to assess individuals’ experiences and expressions of appreciation upon receiving help from others in daily life. It is divided into the following four dimensions: intensity,
density, span, and frequency. The present study adapted the GQ-6 and divided the Gratitude section into the Appreciation Degree and Content of Appreciation subsections to investigate the participants’ sense of appreciation in the context of learning at school.

3.2.2 Scoring
The questionnaire employed a 5-point scale system enabling the participants to answer the questions based on personal feelings and actual situations (1: “strongly disagree,” 2: “disagree,” 3: “neutral,” 4: “agree,” and 5: “strongly agree”). A higher score indicated a higher level of approval; however, reverse-scoring questions were included to check the validity of answers.

3.2.3 Data Analysis
This study used SPSS software for analysis and data were extracted from the completed questionnaires. To verify the reliability and validity of the questionnaires, factor analysis was conducted and the Cronbach’s $\alpha$ coefficient was computed separately for each dimension. Subsequently, the results were used as the basis for the addition or reduction of the level of correlation between items until the questionnaire had achieved favorable reliability and validity.

4 RESULTS AND DISCUSSION
This section discusses reliability and validity to understand whether the questionnaire achieved the desired levels of both.

4.1 Reliability
The dimensions were analyzed first, followed by the internal consistency $\alpha$ value of each section. Table 1 lists the coefficient $\alpha$ of each dimension and shows that the $\alpha$ values were between .78 and .86, with an overall internal consistency of .84. Therefore, all $\alpha$ values were over .65, thereby satisfying the standard established by DeVellis (1991). Hence, the questionnaire had favorable internal consistency, and thus favorable reliability and validity.
Table 1 Mean Cronbach’s α of each dimension

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Number of Items</th>
<th>Mean Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grit</td>
<td>10</td>
<td>.78</td>
</tr>
<tr>
<td>Optimism</td>
<td>9</td>
<td>.87</td>
</tr>
<tr>
<td>Gratitude</td>
<td>8</td>
<td>.86</td>
</tr>
</tbody>
</table>

Table 2 shows that the Cronbach’s α values of the Grit subsections were between .75 and .79, with a mean of .78. The values of the Optimism subsections were .86 and .84, and the mean was .87. Those of the Gratitude subsections were .83 and .85, and the mean was .86.

Table 2 Cronbach’s α value of each subsection

<table>
<thead>
<tr>
<th>Subsection</th>
<th>Mean Cronbach's α</th>
<th>Concentration</th>
<th>Ability of problem solving</th>
<th>Independence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grit</td>
<td>.78</td>
<td></td>
<td>.76</td>
<td></td>
</tr>
<tr>
<td>Optimism</td>
<td>.87</td>
<td></td>
<td>.79</td>
<td>.75</td>
</tr>
<tr>
<td>Gratitude</td>
<td>.86</td>
<td></td>
<td>.83</td>
<td>.84</td>
</tr>
</tbody>
</table>

4.2 Validity
The factor analysis results are shown in Table 3 and indicate that in addition to the original three sections with seven subsections, two more subsections were identified. However, Table 3 also reveals that the two additional subsections each contained only one item, implying that these two items (numbers 27 and 6) exhibited a lower degree of correlation than did the others. Therefore, these two items were deleted to maintain validity.

Table 3 Factor analysis results

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 2</td>
<td>.148</td>
<td>.508</td>
<td>.207</td>
<td>-.188</td>
<td>.124</td>
<td></td>
<td>.638</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question 8</td>
<td>.460</td>
<td>.107</td>
<td></td>
<td>-.210</td>
<td>.349</td>
<td>.541</td>
<td>.119</td>
<td>.400</td>
<td></td>
</tr>
<tr>
<td>Question 27</td>
<td>-.215</td>
<td></td>
<td></td>
<td></td>
<td>-.142</td>
<td>.851</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question 6</td>
<td>.105</td>
<td>.253</td>
<td>.119</td>
<td>.160</td>
<td>.159</td>
<td>.268</td>
<td>.135</td>
<td>.784</td>
<td></td>
</tr>
</tbody>
</table>

5 CONCLUSIONS AND FUTURE WORK
The analytical results of this study indicate that the proposed questionnaire had favorable reliability and validity. However, they also exhibited relatively low reliability in the Grit section, implying that the phrasing of the questionnaire items in this section may require more attention. In addition, the factor analysis results showed that two items had to be removed for the questionnaire to achieve favorable reliability and validity.

A more comprehensive version of the questionnaire is currently undergoing development and will be constructed based on the seven characteristic strengths advocated by KIPP schools, namely Zest, Social Intelligence, Curiosity, Self-control, Grit, Optimism, and Gratitude. The integrated questionnaire
should be answered by students in classrooms and requires a larger sample to verify the reliability and validity of each section, adjust the items, and increase the practicality of the questionnaire. For the follow-up to the present study, the researchers intend to collect noncognitive competence data from high schools in Taiwan for analysis. The findings based on these data are expected to serve as a reference for educators and industry–academia collaborations.

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REFERENCES


