

CREATIVITY SELECTED ELEMENTS QUESTIONNAIRE (CSEQ): A CREATIVE ASSESSMENT INSTRUMENT FOR INTERACTIVE AND CREATIVE LEARNING ENVIRONMENT

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Creativity Selected Elements Questionnaire herewith shall be called (CSEQ) as a creative psychological assessment instrument was developed on the theoretical foundations of “Creative Product Semantic Scale” by Besemer & Quin (1987) and the “Propulsion Model” by Sternberg, Kaufman & Pretz (2002). It covered the four innate creativity elements of: Originality, Ingenuity, Resolution, Synthesis and four external creativity elements of Replication, Redefinition, Reconstruction, and Reinitiation. CSEQ was applied to study 900 students from three colleges (Engineering, Architecture and Information Technology) of Nueva Ecija University of Science and Technology herewith shall be called (NEUST) for: H1) The significant relationships between the selected student demographic variables, namely: age, gender, study preference, year of study, GPA, student reasons for studying their program, and student’s linguistic ability with the eight creativity elements; H2) The significant relationships between the selected family demographic variables, namely: parental family status, family income, and family educational background with the eight creativity elements. Highlights from the findings of the demographic, correlational, MANOVA and reliability statistical analyses were: 1) Age, gender, year of study, student reasons for studying their program, student’s linguistic ability had both positive and inverse significant relationships to/for creativity; 2) Mother’s educational background and family income had significant positive and inverse relationships to/for creativity. CSEQ could be: 1) Used for new student orientation for assessment of student creativity that would enable the development of creative leadership activities, projects and programs; 2) In the design, implementation and assessment of creative educational content, methods, strategies and presentations within NEUST environment; 3) In developing creative-centered experimental hubs for creative designs and trainings within NEUST environment for those identified with creative forte.

The topic of this current research, “Creativity Selected Elements Questionnaire (CSEQ): A Creative Assessment Instrument for Interactive And Creative Learning Environment,” was the result of the researcher’s interest in the study of creativity in the context of interactive and creative learning environment. Vernon (1978) notes that creativity was a buzzword in Educational Psychology as far back as 1978. It is not

something new in the field of education. Besides the educational environment, it was only recently that creativity was explained in terms of innovation in the work place which is now becoming crucial for organizational adaptation and survival. Recognition of creativity in educational environment and work place has combined to highlight the significance of creativity in economic value and social influence in varied areas of

humanity's endeavors and achievements that has evolved to become a need rather than a want justifying this current study involving CSEQ, an assessment instrument for interactive and creative learning environment (Palmon, 2011).

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CSEQ was applied to study 900 students from three colleges (Engineering, Architecture and Information Technology) of NEUST for testing: H1: There are significant relationships between the selected student demographic variables, namely: age, gender, study preference, year of study, GPA, student reasons for studying their program, and student's linguistic ability with the eight creativity elements; H2: There are significant relationships between the selected family demographic variables, namely: parental family status, family income, and family educational background with the eight creativity elements.

Definition of Terms

The definition of terms was provided for the purpose facilitating a clearer understanding. NEUST refers to Nueva Ecija University of Science and Technology which is publicly funded and is located in Cabanatuan city, Philippines. CSEQ refers to the Creativity

Selected Elements Questionnaire. Positive Psychology was envisioned by Seligman and Csikszentmihalyi (2000) as a means to motivate a change in the fixation with repairing the "worst things in life to building positive qualities." Strengths and Virtues refer to the six domains of core virtues, namely: Wisdom & Knowledge; Courage; Humanity and Love; Justice; Temperance and Transcendence. Selected Creativity Elements refers to the eight innate and external elements of creativity namely: Originality, Ingenuity, Resolution, Synthesis, Replication, Redefinition, Reconstruction, and Reinitiation. Propulsion model refers to the external criterion as proposed by Sternberg, Kaufman & Pretz (2002). Innate creativity refers to creativity elements of Originality, Ingenuity, Resolution and Synthesis. External creativity refers to creativity elements of Replication, Redefinition, Reconstruction, and Reinitiation. Originality was defined by Stokes (1999) as a kind of novelty that was useful, valuable and generative. Ingenuity, refers to smartness, originality and innovative in generating one-of-kind solutions for problems and needs (Peterson and Seligman, 2004). Resolution allows for the creation of something which is valuable, logical, useful, and understandable (Besemer & O'Quin, 1987). Synthesis refers to links that are constructed between two or more apparently separate ideas (Sternberg, Kaufman & Pretz, 2002). Replication refers to the known which is transferred to a new setting" (Sternberg, Kaufman & Pretz, 2002). Redefinition refers to the known which is extended in a new direction (Sternberg, Kaufman & Pretz, 2002). Reconstruction refers to the new life that is breathed into an approach previously abandoned (Sternberg, Kaufman & Pretz, 2002). Reinitiation refers to the thinking that begins at a radically different point from the current one and takes off in a new direction (Sternberg, Kaufman & Pretz, 2002).

Literature Review

In the literature review, the researcher examined the theoretical justifications for: 1) Contribution of positive psychology through the six strengths and virtues domains to the study of creativity (Peterson & Seligman, 2004); 2) The selection of eight creativity elements used for the development of CSEQ derived from the “Creative Product Semantic Scale” by Besemer & Quin (1987) and the “Propulsion Model” by Sternberg, Kaufman, & Pretz (2002); 3) The use of each of the eight elements of creativity (Originality, Ingenuity, Resolution, Synthesis, Replication, Redefinition, Reconstruction, and Reinitiation) derived from (Sternberg, Kaufman & Pretz, 2002); 4) The study of the demographic variables of the two hypotheses (Piers, 1968; Kuhn & Holling, 2009).

Method

Research Design

The current study is a causal comparative research that incorporates descriptive and inferential analyses methodology to achieve its objectives.

Participants

A total of 900 participants from three colleges (Engineering, Architecture and Information Technology) of NEUST comprised the study sample. The breakdown of student demographics consisted of 65.3% (n=588) male students and 34.7% (N=312) females. Their ages ranged from 15 to 32 years, with a mean age of 19 years. The samples for study preferences included abstract, social sciences, religion, science, arts, technical and math. In terms of ethnicity, they were all Pilipino and this was why ethnicity was not included as a variable in the demographics as statically it would be

meaningless. A purposive sampling technique was utilized for data collection as the research was targeted for the three colleges with seven study preferences. Participants gave informed consent prior to answering the questionnaires which were voluntary and involved no compensation. Strict confidentiality was observed to protect privacy

Instrumentation

CSEQ was divided into two sections: demographics and question items. The demographic sections were further divided into: 1) Student; 2) Family; 3) Family Education Background; 4) Reasons for Choosing the Program and 5) Student’s Linguistic Ability categories.

The questions items section consisted of a Likert scale of 40 items with a five point responses (1 – Not At All, 2- Seldom, 3 – Uncertain, 4 – Often, 5 – All the Time).

The item coding consisted of five items for each of the eight scales of: Originality (items 2, 4, 18, 14, 23); Ingenuity (items 5, 17, 32, 28, 36); Resolution (7, 21, 25, 19, 34); Synthesis (8, 24, 12, 37, 27); Replication (items 9, 31, 38, 16, 33); Redefinition (items 10, 29, 35, 22,39); Reconstruction (items 6, 40, 13, 26, 30); and Reinitiation (items 11, 15, 20, 3, 1).

Data Collection Procedures

The data collection process was carried out in two stages: the pilot study and the actual data collection. The pilot study of 100 % (n=300) cases was conducted on forty items. A Cronbach alpha of .886 (.89) was obtained which confirmed the participant’s comprehension of the scale items.

Actual Data Collection

For the actual data collection, a total of 1,050 CSEQ questionnaires were distributed to the three colleges, each receiving 350 copies. Out of the 1,050 CSEQ questionnaires were distributed, only 920 were returned to the researcher. The rest (130 questionnaires) were either lost or unaccounted for at the time of the collection. When the 920 questionnaires were individually inspected for errors, 20 questionnaires were found to be non-usable due to respondents' error in answering. Only 900 valid questionnaires were utilized for data analysis.

Data Analysis

The valid 900 questionnaires (n= 900) were statistically analyzed for Frequency, Percentile, Reliability, Pearson Correlation, MANOVA gender differences output.

Results

Demographic Analysis

The demographics profile of respondents consisted of two categories namely, student demographics backgrounds and family demographics backgrounds. In terms of student demographics backgrounds, the sample consisted of 900 students; 65.3% (n=588) male students and 34.7% (N=312) females. Their ages ranged from 15 to 32 years, with a mean age of 19 years. In terms of ethnicity, they were all Pilipino and this was why ethnicity was not included as a variable in the demographics as statically it would be meaningless. Their study preferences in an ascending order were as follows: 3.4% (N=31) abstract, 14.4% (N=130) social sciences, 6.7% (N=60) religion, 14.4% (N=130) science, 16.6% (N=149) arts, 25.7% (N=231) technical and 28.8% (N=259) math. In terms of year of study in ascending order, there were: 18.2% (N=164) 1st year, 22.4% (N=202) 2nd year,

27.8% (N=250) 3rd year, 21.4% (N=193) 4th year, 9.7% (N=87) 5th year and .4% (N=4) 6th year students. For GPA in ascending order: 6.3% (N=57) were 1.0, 8.0% (N=72) were 1.25, 8.2% (N=74) were 1.50, 8.8% (N=79) were 1.75, 16.1% (N=145) were 2.0, 16.4% (N=148) were 2.25, 19.0% (N=171) were 2.50, 16.4% (N=148) were 2.25, 19.0% (N=171) were 2.50, 12.7% (N=114) were 2.75, 4.1 (N=37) were 3.0 and .3% (N=3) were 5.0. Their reasons for their choice of programs were: 26.1% (N=235) considered them to be their field of interest, 15.8% (N=142) had related basic knowledge / experience, 19.1% (N=172) were graduates in those programs, 26.0% (N=234) saw them as an opportunity to study and work abroad, 10.8% (N=97) saw them as opportunity to begin and manage their own businesses and 2.2% (N=20) chose because they felt they couldn't find jobs for lesser qualifications. In terms of linguistics, for spoken languages: 2.3% (N=21) spoke 1, 65.0% (N=585) spoke 2, 9.1% (N=262) spoke 3, 1.3% (N=12) spoke 4 and 2.2% (N=20) spoke 5. In terms of linguistics, for written languages: 3.8% (N=34) wrote 1), 68.0% (N=612) wrote 2, 24.4% (N=220) wrote 3, 1.9% (N=17) wrote 4, 1.8% (N=16) wrote 5 and .1% (N=1) wrote 6. For family demographics backgrounds, the areas covered were parental family status in ascending order: 91.0% (N=819) were married, 6.9% (N=62) were separated, .2% (N=2) were divorced, 1.6% (N=14) were remarried and .3% (N=3) were orphaned. For family income in pesos in descending order: 11.4% (N=103) earned >25,000.00, 14.0% (N=126) earned 20,000 to 25,000.00, 17.0 (N=153) earned 15,000.00 to 20,000.00, 19.7% (N=177) earned 10,000.00 to 15,000.00, 22.1% (N=199) earned 5,000.00 to 10,000.00, 15.8% (N=142) earned < 5000.00 and .1% (N=1) earned 64.00. In terms of family educational backgrounds for fathers: 5.1% (N=46) were elementary levels, 3.9% (N=35) were elementary graduates, 8.0%

(N=72) were high school levels, 20.9% (N=188) were high school graduates, 27.4% (N=247) were college levels and 34.7% (N=312) were college graduates. For family educational backgrounds for mothers: 4.3% (N=39) were elementary levels, 4.4% (N=40) were elementary graduates, 7.7% (N=69) were high school levels, 24.9% (N=224) were high school graduates, 20.2% (N=182) were college levels and 38.4% (N=346) were college graduates.

Reliability Analyses

Prior to computing the eight scales of CSEQ, Reliability analysis was conducted on the items that represented these scales. The Cronbach alpha coefficients were: Originality (.48), Ingenuity (.50), Resolution (.50), Synthesis (.37) and four external creativity elements of Replication (.44), Redefinition (.49), Reconstruction (.35), and Reinitiation (.32). The computed Cronbach's alpha coefficients for all eight scales were a low to high and ranged from .32 to .50. This was expected given the small number of items representing each scale. The computed Cronbach's alpha coefficient for the eight scales of CSEQ was .84. Items are considered internally consistent if their corrected item-total correlations (I-T) are $\geq .33$ which represent approximately 10% of the variance of the total scale accounted for in the analysis. The corrected item - total correlations (I-T) were from a low (.47) to high (.64) which clearly proved internal consistency of the eight scales of CSEQ that justified its use.

Hypothesis Testing

The results of the two hypotheses testing were as follows:

H1: There are significant relationships between the selected student demographic variables, namely: age, gender, study

preference, year of study, GPA, student reasons for studying their program, and student's linguistic ability with the eight creativity elements.

A Correlational analysis of the selected student demographic of: age, study preference, year of study, GPA, student reasons for studying their program, and student's linguistic ability with the eight creativity elements found that: 1) Age had positive significant relationship with Replication ($r=.088$, $p<.05$); 2) Year of Study had an inverse significance relationship with originality ($r=-.077$, $p<.05$) and redefinition ($r=-.076$, $p<.05$); 3) Student reasons for studying their program had positive significant relationship with Synthesis ($r=.067$, $p<.05$); 4) Student's linguistic ability (spoken and written language) had positive significant relationship with Synthesis ($r=.067$, $p<.05$), ($r=.075$, $p<.05$) and Reinitiation ($r=.087$, $p<.05$);

A multivariate analysis of variance (MANOVA) was employed to test for gender difference among the eight creativity elements. The analysis yielded significant overall gender effect among the eight creativity elements, multivariate Pillai F Pillai $F(8,890)=2.71$, $p<.05$. However, follow-up tests of between-subject effects yielded significant male gender effects for the creative element of originality $F(1,897)=4.91$, $p<.05$; ingenuity $F(1,897)=4.70$, $p<.05$; Replication $F(1,897)=7.50$, $p<.05$ and Reconstruction $F(1,897)=11.11$, $p<.05$.

H2: There are significant relationships between the selected family demographic variables, namely: parental family status, family income, and family educational background with the eight creativity elements.

A Correlational analysis of the selected family demographic variables, namely: parental family status, family income, and

family educational background with the eight creativity elements found that: 1) Family educational background (mother's background) had a significant positive relationship with resolution ($r=.084$, $p<.05$) and Redefinition ($r=.074$, $p<.05$). 2) Family income had a significant inverse relationship with ingenuity ($r=-.071$, $p<.05$); resolution ($r=-.077$, $p<.05$); redefinition ($r=-.073$, $p<.05$).

Discussion

The researcher will divide the discussion of the findings into: 1) Findings from the Demographic analysis; 2) Findings on gender difference; 3) Findings from Hypothesis one and 4) Findings from Hypothesis two of this research.

Demographic Findings

The notable highlight from the demographic findings is the students' mean age. The students' ages ranged from 15 to 32 years, with a mean age of 19 years. What does the mean age indicate? According Stang & Story (2005), the students are in the adolescent period that emphasizes on biological, psychosocial and cognitive changes. And how does the transitional stage affect adolescence creativity? Wai, Lubinski, & Benbow (2005) reports in their longitudinal study that spans from age 13 to 33, that adolescence are prone to qualitative accomplishments when creativity is paired with their preferences. Thus, the opportunity to inculcate the students Engineering, Architecture and Information Technology within NEUST for qualitative accomplishments by pairing creativity with their preferences is open by the status of the students' mean age.

Discussion of Findings Of Hypothesis 1

Age had positive significant relationship

with Replication ($r=.088$, $p<.05$).

What has age to do with creativity element of replication? Researches related to age and creativity has pointed out that creativity can decline or increase with age. (McCrae, Arenberg, & Costa, 1987). And the creativity element of replication in which the known is extended in a new direction, can also decline or increase with age. In the field of music, it was found that classical composers were able to extend their known knowledge in new directions in terms of "melodic originality, melodic variation, repertoire popularity, aesthetic significance, listener accessibility, performance duration, and thematic size" as they aged (Simonton, 1991b). Thus, the students from the colleges of Engineering, Architecture and Information Technology within NEUST have the potential to extend their creativity abilities and skills in new directions as they mature with age.

Year of Study had an inverse significance relationship with originality ($r=-.077$, $p<.05$) and redefinition ($r=-.076$, $p<.05$).

This specific finding indicates that an increase in students' year of study have a decrease (inverse) in their creativity element of originality (novelty / generative) and redefinition (the known is extended in a new direction) creativity elements. Why? A possible explanation can be found in an article by Maisuria (2005) who noted the demise of creativity (originality / replication) in the national curriculum of England and Wales due to the demands of "standardization, centralization, and vocationalization of education" that focused on business-education orientation rather than a student-centered learning experience. Depending on the year of study, the students from the colleges of Engineering, Architecture and Information Technology within NEUST whose exposure (lesser / greater) to the demands of

standardization, centralization, and vocationalization of education may similarly focus on business-education-orientation and passing of examinations resulting in the decline of creativity (originality / redefinition). Thus, as an institution it is necessary to strategize towards a balance between creativity and bureaucratic demands.

Student reasons for studying their program had positive significant relationship with Synthesis ($r=.067, p<.05$).

Student reasons for the choice of their programs were positively associated with the creativity element of synthesis. Why? Synthesis involves linking between two or more apparently separate ideas (Sternberg, Kaufman & Pretz, 2002). When a student chose a program, he/she had to determine between multiple reasons in which each reason might have multiple advantages and disadvantages. In making a final decision, the student had to link (synthesize) the various reasons, advantages and disadvantages to derive to a specific reason to support their final choice. Thus, it is natural for the student to endorse the creativity element of synthesis.

Student's linguistic ability (spoken and written language) had positive significant relationship with Synthesis ($r=.067, p<.05$), ($r=.075, p<.05$) and Reinitiation ($r=.087, p<.05$).

Why was there a positive relationship between student's linguistic ability (spoken / written language) and creativity element of synthesis? The explanation may be found in the research done on spoken and written language. Olofin & Olusoji (2013) concluded that written and spoken languages are two different things and requires two different skills. The students endorsement of synthesis highlights the fact that different and separate ideas and skills had to be linked together to

bring about comprehension in communication (written & spoken). Thus, it was natural for the students to find a relationship and thereby endorse their linguistic abilities (written & spoken) with creativity element of synthesis.

Another important point is that spoken language in linguistics is always a blending within a social-cultural background that gives meanings to words that are used in shared communications (Samovar & Porter, 1987). When the students found a positive relationship between their spoken language and the creativity element of Reinitiation – they were endorsing their willingness to explore shared ideas and meanings in a different social-cultural linguistic platform than the one they were in currently. In short, they are willing to explore new starting points and directions in their lives (Sternberg, 2006).

Findings On Gender Difference

There was overall gender effect among the eight creativity elements, multivariate Pillai F (8,890)=2.71, $p<.05$. The follow-up tests of between-subject effects also yielded significant male gender effects for the creative element of originality F(1,897)=4.91, $p<.05$; ingenuity (1,897)=4.70, $p<.05$; Replication F(1,897)=7.50, $p<.05$ and Reconstruction F(1,897)=11.11, $p<.05$. This finding raises the issue for the need to develop the female students of the three colleges who lag behind in the creativity elements. It is not unusual as females still live in a 'Patriarchy world' (male ruled) in which the female gender suffers from discriminations, exploitations and inequalities which is not helpful for creative psychological developments (Walby, 1990).

Findings on Hypothesis 2

Family educational background (mother's background) had a significant positive Conclusion

relationship with resolution ($r=.084, p<.05$) and Redefinition ($r=.074, p<.05$).

It is interesting to note that the family educational background of the fathers had no significance relationship with the eight creativity elements. While the family educational background of the mothers had significant positive relationships with the eight creativity elements namely, resolution and Redefinition. Fasko (2000-2001) in his article entitled "Education and Creativity" had pointed out that creativity can be developed through education as creative activities are instances of learning. This findings together with the proposal of Fasko establishes that females living in a Patriarchy world (male-ruled) can develop creativity through education. In short, learnings and education empowers females to be creative (Robinson, 2001).

Family income had a significant inverse relationship with ingenuity ($r=-.071, p<.05$); resolution ($r=-.077, p<.05$); redefinition ($r=-.073, p<.05$).

Kiernan & Mensah (2011) have clearly shown in their research that parenting styles and persistent poverty is detrimental to children's' development including creativity. It is interesting to note in the current research that an increase in family income (economics) has an inverse impact on the creativity of children. How can this be explained? Despite the abundance of economic resources, children may decline in ingenuity (smartness, originality and innovative in generating one-of-kind solutions for problems and needs) if they are exposed to poor parenting styles (Ermisch , Iacovou & Skew, 2011). In short, though persistent poverty affects creativity - economic abundance with poor parenting styles also may lead to a decline in creativity.

The findings of this current research have at least three immediate uses: 1) It can be used for new student orientation for assessment of student strengths that would enable the development of student leadership activities, projects and programs; 2) It can be used in the design, implementation and assessment of creative educational content, methods, strategies and presentations within university environments; 3) It can be used in developing a creative-centered experimental hubs for creative designs within a university environment for those identified with creative strengths.

Limitations of the Study

The researcher would like to list five limitations of this study: 1) The single ethnicity of the sample (Pilipino) only could limit the objectivity of a wider possible responses; 2) The CSEQ questionnaire is a type of self-report measurement which is dependent on the participants' truthfulness in responding to the question items that cannot be realistically validated. The honesty of the respondents is accepted in good faith; 3) The question items can be rephrased and redesigned according different social-cultural perspectives that may affect the responses of the participants. 4) There is the possibility of additions of more than eight creativity elements which may prove the present research to be limited in its coverage of the scope of creativity elements; 5) There could be a limitation factor in the findings through the lack of execution of the CSEQ in other languages.

Delimitations

The researcher would like to list two delimitations of this study. 1) CSEQ was designed for measuring the eight creativity

elements and therefore it cannot be generalized for other forms of study (i.e., personality); 2) The current study was designed for student population (university level) and therefore caution must be exercised in generalizing to other age groups (i.e., high school).

Due to the above limitations and delimitations, the findings of this research should be interpreted with caution. However, regardless of the above limitations and delimitations, the study of CSEQ is a new psychological instrument for measuring the eight creativity elements but is based on the strong theoretical foundations of established researches.

Recommendations

The recommendations based on this study are:

1) Validation of CSEQ instrument within a multi-cultural population

In order to counter the points of one, three and five in Limitations, it is recommended that future research of CSEQ be conducted within a multi-cultural populations.

2) Future studies with different demographic parameters for generalization purposes.

In order to counter the point 2 in Delimitations, it is recommended that future researches would be designed to include different demographic parameters (age groups) for a wider generalizations.

Since this research utilizing CSEQ as a psychological assessment instrument is new, this research is only meant to be a pilot or exploratory study for more substantial research in the area of the eight creativity

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