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Relationship between Cognitive Intelligence, Entrepreneurial Creativity and Innovativeness among Technology Education Undergraduate Students in Niger and Kaduna States, Nigeria

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Abstract

The study established the relationship between cognitive intelligence, entrepreneurial creativity and innovativeness among technology education undergraduate students in Kaduna and Niger State, Nigeria. Two research questions were raised to guide the study and two hypotheses were formulated and tested at .5 level of significance. The study used survey method correlational research design. A total of 380 respondents comprising of 122 final year technology education undergraduate students from Federal University of Technology, Minna and 258 from Kaduna Polytechnic, Kaduna were used as population for the study. The two schools were selected using purposive sampling technique. Three instruments were used for data collection and include: Cognitive Intelligence Test (CIT), Entrepreneurial Creativity Scales (ECS) and Entrepreneurial Innovation Scale (EIS). Pearson's Product Moment Correlation was used to established the reliability coefficient of CIT and found to be .85 while Cronbach's Alpha statistics was used to established the reliability coefficients ECS and EIS and found to be .90 and .81 respectively. Data collected were analysed using Pearson Product Moment Correlation (PPMC) formula to answer the research questions and using table of critical values for Pearson's r to test the hypothesis at .05 level of significant. Findings from the study revealed that, there is positive significant relationship between cognitive intelligence and entrepreneurial creativity and innovation among technology education undergraduate students in Kaduna and Niger State, Nigeria. The study recommended that, Lecturers teaching entrepreneurship should focus on enhancing the cognitive intelligence of technology education undergraduate students to promote their entrepreneurial creativity.

Keywords: Cognitive Intelligence, Entrepreneurial Creativity and Innovation

Introduction

Entrepreneurship education is the type of education that seek to provide students with the knowledge, skills and motivation to encourage entrepreneurial success in a variety of settings. Uzo-Okonkwo (2013) perceived entrepreneurship education as the process of providing individuals with the ability to recognize commercial opportunities and the insight, self-esteem, knowledge and skills to act on them. The aim of entrepreneurship education according to Nabi and Holden (2018),is to serve as a primary source of economic growth that creates business opportunities, reduces unemployment and offers better prospects for students such as technology education undergraduate students.

Technology education undergraduate students are individual undergoing course of study in University or its affiliate institutions of learning leading to the award of Bachelor of Technology (B.Tech) degree. Maigida, Saba and Namkere (2013) described technology education undergraduate students as group of persons undertaking training in industrial and technology education courses that include automobile, building, electrical/electronic, metal and woodwork technology to serve the educational and industrial needs of the nation. High rate of unemployment among technology education graduates is revealed despite the expected role of serving the educational and industrial needs of the nation. However, Salami (2011) attributed the high rate of unemployment among these graduates to the lack of entrepreneurial creativity.

Entrepreneurial creativity is the ability to think new things, to develop new ideas and to discover new ways of looking at problems and opportunities of wealth creation. Bird (2012) defined entrepreneurial creativity as the ability to effectively generate novel solutions to relevant problems that can be a source of significant competitive entrepreneurial advantage especially in rapidly changing business environments. Entrepreneurial creativity is important to technology education undergraduate students because it is the first skill required in the process of innovation, providing the stimulus for opportunity discovery and creating new venture. Friday (2017)

stated that, absence of entrepreneurial creativity among students' results to lack of entrepreneurial skills that are required for the successful start of the business process. Lackof entrepreneurial skills is disadvantage not only during the launch of a new business but also during decisions taking throughout the entire business creation process. Furthermore, absence of entrepreneurial creativity among technology education undergraduate students may possibly be linked directly with entrepreneurial innovativeness.

Entrepreneurial innovativeness is the ability of applying creative solutions to problems and opportunities in order to meeting customers' needs and enhance wealth creation. Mathew, Manimala, Jose, and Raju (2016) defined entrepreneurial innovativeness as the successful implementation of creative ideas in order to discover new business opportunities leading to economic growth. Lack of entrepreneurial innovativeness reflects the degree at which technology education undergraduate students are unable to converts market opportunities into workable, profitable, and marketable ideas of significant impact on the society. Shane (2014) confirmed that, high number of university graduates remain unemployed due to lack of entrepreneurial innovativeness. Nevertheless, entrepreneurial innovativeness among graduates could be influence by their cognitive intelligence.

Cognitive intelligence is the ability to handle reasoning, solve problems, apply tricks think abstractly, comprehend complex ideas, learn quickly and learn from experience. Sternberg (2016) defined cognitive intelligence as the combination of verbal, numerical and spatial abilities, which includes visualizing, use of memory, word fluency, verbal relations, perceptual speed, induction and deduction. Cognitive intelligence is the intellectual capabilities such as writing, reading, logic, analyzing, reason and prioritizing. Bertua, Anderson and Salgado (2015) confirmed that cognitive intelligence has positive relationship with training proficiency and work performance. Nevertheless, this could be applicable to entrepreneurial creativity and innovation. Hence, the study seeks to determine the relationship between cognitive intelligence, entrepreneurial creativity and innovativeness among technology education undergraduate students in Kaduna and Niger State, Nigeria.

Statement of the Problem

Entrepreneurship education aimed at serving as a primary source of economic growth that creates business opportunities reduces unemployment and offers better prospects for students. Mathew and Ede (2019) stated that, despite the aim of entrepreneurship education, large number of technology education graduates remain unemployed Nabi and Holdeni (2018) confirmed that, university graduates in developing countries such as Nigeria constitute high number of the unemployed populace. Robertson, Collins, Medeira and Slater (2018) further disclosed that, the growing numbers of unemployed youth especially among graduates of technology education indicate the inability of entrepreneurship education in minimizing the unemployment problem. Persistence of unemployment among technology education graduates is a serious threat to the achievement of technology education goal. This shortcoming is attributed to lack of entrepreneurial creativity and innovativeness among technology education graduates. In order to enhance the entrepreneurial creativity and innovativeness, the study is therefore design to establish the relationship between cognitive intelligence, entrepreneurial creativity and innovativeness among technology education undergraduate students in Kaduna and Niger State, Nigeria.

Aim and Objectives of the Study

The aim of the study was to establish the relationship between cognitive intelligence, entrepreneurial creativity and innovativeness among technology education undergraduate students in Kaduna and Niger State, Nigeria. Specifically, the study sought to achieve the following objectives:

1. Determine the relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students in Kaduna and Niger States, Nigeria
2. Determine the relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students in Kaduna and Niger States, Nigeria

Research Questions

The following research questions guided the study

1. What is the relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students in Kaduna and Niger States, Nigeria?
2. What is the relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students in Kaduna and Niger States, Nigeria?

Hypotheses

The following null hypotheses were formulated and tested at .05 level of significance:

Ho1: There is nosignificant relationship between cognitive intelligence and entrepreneurial creativity amongtechnology education undergraduate students

Ho2: There is no significant relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students

Methodology

A survey method correlational research designwas employed for the study. The study was conducted in Kaduna and Niger States, Nigeria. A total of 360 respondents comprising of 122 final year technology education undergraduate students form Federal University of Technology, Minna and 238 from Kaduna Polytechnic, Kaduna were used as population for the study. The two schools were selected using purposive sampling technique. Purposive sampling technique was used because Federal University of Technology, Minna and Kaduna Polytechnic, Kaduna are the only two schools running technology education programme in the study area. Three instruments were used for data collection that include: Cognitive Intelligence Test (CIT), Entrepreneurial Creativity Scale (ECS) and Entrepreneurial Innovativeness Scale (EIS). CIT was adopted from Wonderlic (2019) and it comprises of 50 multiple choice questions with five responses options which were answered in five minutes to measure the cognitive intelligence of undergraduate technology education student. ECS was adopted from Munro (2015) and EIS from Nnubili (2016).Both ECS and EIS comprises of 10 items each on five-point rating scale of Strongly Agree (SA), Agree (A), Disagree (DA), Strongly Disagree (SD) and Undecided (UD) with numerical values of 5, 4, 3, 2, and 1, respectively to measure students' entrepreneurial creativity and innovativeness. The scales were tested by the authors and proved good for use. Hence, the need to establish the reliability and validity of the scales become negligible. Data collected were analyzed manually using PPMC formula to answer the research questions and comparing calculated and table of critical values for Pearson's r to test the hypothesis at .05 level of significance. PPMC was used for data analysis because it is considered as best index for establishing relationship between two variables. Decisions regarding research questions were taken based on r-calculated value from zero to one indicates positive relationship and r-calculated value from minus one to zero indicates negative relationship while decisions regarding hypotheses were taken based on r-calculated value above r-critical value indicates significant relationship and r-calculated value below r-critical value indicates no significant relationship.

Results:

Research Question 1

What is therelationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students?

Table 1: Relationship between Cognitive Intelligence and Entrepreneurial Creativity among Technology Education Undergraduate Students

Variables	$\bar{X}$	*N*	*df*	*r-cal*	*Decision*
Cognitive Intelligence	34.4	360	358	.85	There is Positive Relationship
Entrepreneurial Creativity	38.4				

Key $\bar{X}$ = Mean Score, N = Number of Students, df = Degree of Freedom, *r*-cal = Pearson's Calculated Value.

Table 1 revealed the value of $r = .85$. This indicate positive relationship between the cognitive intelligence and entrepreneurial creativity among technology education undergraduate students.

Research Question 2

What is therelationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students?

Table 2: Relationship between Cognitive Intelligence and Entrepreneurial Innovativeness among Technology Education Undergraduate Students

Variables	$\bar{X}$	*N*	*df*	*r-cal*	*Decision*
Cognitive Intelligence	34.4	360	358	.87	There is Positive Relationship
Entrepreneurial Innovativeness	36.4				

Table 2 revealed the value of $r = .87$. This indicates positive relationship between the cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students.

Hypothesis One

Ho_1: There is nosignificant relationship between cognitive intelligence and entrepreneurial creativity amongtechnology education undergraduate students

Table 3: Test for Significant Relationship between Cognitive Intelligence and Entrepreneurial Creativity among Technology Education Undergraduate Students

Variables	$\bar{X}$	*N*	*df*	*r-cal*	*r-crit*	*Decision*
Cognitive Intelligence	34.4	360	358	.85	.14	Significant
Entrepreneurial Creativity	38.4					

Table 3 revealed r-critical value at .05 level of significant and 358 degree of freedom for two tailed test is 0.138. Since *r*-calculated value(.85) is greater than *r*-critical value (.14), there is reason to reject the null hypothesis. Hence, there is significant relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students.

Hypothesis Two

Ho_2: There is nosignificant relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students

Table 4: Test for Significant Relationship between Cognitive Intelligence and Entrepreneurial Innovativeness among Technology Education Undergraduate Students

Variables	$\bar{X}$	*N*	*df*	*r-cal*	*r-crit*	*Decision*
Cognitive Intelligence	34.4	360	358	.87	.14	Significant
Entrepreneurial Innovativeness	38.4					

Table 4 revealed r-critical value at .05 level of significant and 358 degree of freedom for two tailed test is 0.138. Since r-calculated value (.87) is greater than *r*-critical value (.14), there is reason to reject the null hypothesis. Hence, there is significant relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students.

Findings

1. There waspositive relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students in Kaduna and Niger States, Nigeria.
2. There waspositive relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students in Kaduna and Niger States, Nigeria.
3. There was significant relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students.
4. There was significant relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students.

Discussion of Findings

Findings on the relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students in Kaduna and Niger States, Nigeria revealed a positive relationship. The finding is in line with the views of Merrell et al. (2013) that revealed positive relationship between social behaviour and self-concept in school settings. The finding implies that enhancing technology education undergraduate students' cognitive intelligence will positively impact their entrepreneurial creativity thereby making them competent to venture into entrepreneurial activities and become self-employed. However, findings on the test for significant relationship between cognitive intelligence and entrepreneurial creativity among technology education undergraduate students revealed significant. The finding concords with the findings of Deb and Grewal (2010) that revealed significant relationship between study habits and academic achievement of undergraduate home science final year students. The significant relationship could be based on the fact that entrepreneurial creativity required cognitive ability. Findings on the relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students in Kaduna and Niger States, Nigeria revealed a positive relationship. The finding is

agreement with the finding of Reiff and Gerber (2010) that revealed cognitive intelligence have positive correlation with social perception among students with learning disabilities. The finding implies that, enhancing technology education undergraduate students' cognitive intelligence will positively impact their entrepreneurial innovativeness thus, making them skilled to venture into entrepreneurial activities and become self-employed. On the other hand, findings on the test for significant relationship between cognitive intelligence and entrepreneurial innovativeness among technology education undergraduate students revealed significant. The finding concords with the findings of Bursack and Asher (2016) that revealed significant relationship between social competence and achievement in elementary school children. The significant relationship could be based on the fact that, entrepreneurial innovativeness required cognitive ability.

Conclusions

Based on the findings of the study, it was concluded that there is positive significant relationship between cognitive intelligence, entrepreneurial creativity and innovativeness among technology education undergraduate students in Kaduna and Niger States, Nigeria. The findings confirmed that cognitive intelligence is a strong determinant of entrepreneurial creativity and innovativeness. This implies that, enhancing technology education undergraduate students' cognitive intelligence will positively impact their entrepreneurial creativity and innovativeness thereby making them competent to venture into entrepreneurial activities and become self-employed.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Lecturers teaching entrepreneurship should focus on enhancing the cognitive intelligence of technology education undergraduate students to promote their entrepreneurial creativity.
2. Lecturers teaching entrepreneurship should focus on enhancing the cognitive intelligence of technology education undergraduate students to promote their entrepreneurial innovativeness.

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