

CREATIVITY AND INVENTIONS IN VOCATIONAL AND TECHNICAL EDUCATION

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Abstract

Creativity in Vocational and Technical Education is designed to develop skills, attitude, abilities, understanding work habits, appreciation, knowledge and information needed by people to enter and make progress in employment on a useful and productive basis thereby solving problems in a better way and being innovative by their art of creativity. Vocational and Technical Education is regarded as the most reliable instrument for individual and societal survival, but the creative individuals are in the minority of the society. Creativity enhances this aspect of education bases for creativity and creativity is the bases for vocational and technical education. This paper looked at the concept of vocational and technical education, creativity, roles of creativity in vocational and technical education and major challenges of vocational and technical education. The solution strategies to the problems were proffered. Play way or child centered curriculum should be emphasized in schools to enhance creativity in vocational and technical education.

Keywords: Creativity, Vocational and Technical Education

Creativity has long been admired by many because creative mind is often seen as unattainable gift that some fortunate persons have been endowed with. The idea of a person being creative is usually surrounded by mystery and wonders (Paul, 2011). For

one to be creative he must possess creative potentials which is the bases for creativity. It is the rallying point for every creative activity. Akinboye (2003) stated that without creativity, man is not able to make full use of information resources available, but locked up in old

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habits, structures, patterns, concepts, and perceptions. Adeyanju (1996) described creativity as the capacity of persons to produce compositions.

Creativity makes tremendous impact on human and societal development. It brings changes to the lives of the people, human processes and increase people's way of thinking which eventually results in creative products. There is no product without creative thinking. It is creative thinking that serves as incubating room for creative activities. Animashaun (2004) suggested that thinking is the bases of all action. If properly done, rational decisions and responsible actions highly rewarding to the thinker and beneficial to the society would be the result.

Scholarly interest in creativity involves many definitions and concepts pertaining to a number of disciplines: education, technology, linguistics, business studies, song writing, etc., intelligence, creative ability, the potential for fostering creativity through education and training. This paper therefore examines creativity and inventions in Vocational and Technical Education.

Definition of Concepts

Invention is regarded as mental characteristics that allow a person to think outside of the box which results in innovative or different approaches to a particular task (www.wikipedia.com). Oxford Advanced Learners Dictionary (New 8th Edn) described invention as the ability to have new and interesting ideas.

It is also the action of inventing something, typically a process or device to discover.

Vocational Education

Vocational education according to Ngaloru (2012) is the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge related to occupations in various sectors of economics and social life. Vocational education is further understood to be:

- An integral part of general education
- A means of preparing for occupation fields and for effective participation in the world of work.
- An aspect of life long learning and preparation for responsible citizenship.
- An instrument for promoting environmentally sound sustainable development.
- A means for facilitating employment and poverty alleviation.

Vocational education refers to semi-skilled workers or sub-professionals, it includes guidance and counseling in connection with training and other instructions directly related to an occupation. In line with this, Danko (2006) opined that vocational education is any programme of specialized education designed to prepare individuals for entrance or additional training into specific occupation.

Technical Education

Technical education refers to post secondary courses of study and practical training aimed at preparation of technicians to work as supervisory staff. It is a planned program of courses and learning experiences that begin with exploration of career options, support basic academic and life skills and facilities achievement of high academic student. Technical education is instrumental in making the remarkable contribution to economic growth of the developing countries by way of suitable man power production according to the needs of the industry, society and the global world as a whole. To produce fully skilled manpower in the present era of science and technology, acquiring technical skill is needed (Ngaloru, 2012). Technical education prepares men and women to work as artisans, craftsmen, technicians and engineers in many engineering professions (Monyei 2012).

Vocational and Technical Education:

Vocational and technical education is aimed at producing the manpower that will apply the acquired knowledge towards the improvement of the environment and solution to their environmental problems. Nigeria being one of the less develop nations require vocational based education for its technological and industrial development since vocational and technical education is a field of study for the development of skills, attitudes and

creativity in individuals (Ngaloru, 2012).

Agusiobo (1984) considered vocational and technical education as that education which prepares an individual for entry into and progress in the world of work. According to Osuala (1987) Vocational and technical education refers to equipping individuals for gainful employment into recognized occupations as semi-skilled workers, technicians or sub-professionals. Okorie (2001) defined vocational and technical education as a form of education whose primary purpose is to prepare a person for employment in recognized occupations.

Technologies are based on invention and innovations while creativity is the tool of invention and innovation is the product. Vocational technical education is made simple and easier with creative mind (Ngaloru, 2012).

Creativity

Deiss (2004) pointed out that there is a connection between creativity and innovation but they are not necessarily the same, creativity is the act of generating new ideas and new perspectives. Innovation on the other hand occur when creativity is applied and a product or service results.

Creativity involves the production of novel, useful product (Mumford, 2003) the production or something original and worthwhile (Mumford, 2003).

Torrance (2005) described creativity as a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, etc on identifying the difficulty or problems, then searching for solutions, making guesses, or formulating hypothesis about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them, and finding possible results.

Creativity is an act of turning new and imaginative ideas into reality. It is characterized by the ability to perceive the world in new ways, to find hidden patterns and to generate solutions.

Characteristics of Creative Individuals

- One characteristic of creative people as measured by some psychologists is what is called divergent production, divergent production is the ability of a person to generate a diverse assortment.

- Creative individual has cognitive process of dedication to problem solving and developing expertise in the field of their creative expression.

- Creative individual has motivational drive which could be intrinsic (internal) drive within a person e.g interest, desires, hopes, goals etc or extrinsic (external) outside of a person. e.g payment, rewards, fame.

- From personality-traits perspective, there are a number of traits that are associated with creativity in people. Creative individuals tend to be more open to new experiences, are more self confident, more ambitious, self accepting, impulsive, driven, dominant and hostile compared to people with less creativity.

- From evolutionary perspective, creativity may be a result of the outcome of years of generating ideas. Creative individuals tend to be patient, and will have to persevere for long time to achieve the set goal.

- From historical perspective; creative people in history usually had supportive parents, but rigid and non-nurturing.

- Creative individuals have a great deal of energy but they are also often quiet and at rest.

- Creative individuals tend to be smart, yet also naïve at the same time.

- Creative individuals seem to harbor opposite tendencies on the continuum between extroversion and introversion.

- Creative individuals are also remarkable humble and proud at the same time.

- Most creative individuals are very passionate about their work, yet

they can be extremely objective about it as well.

- The openness and sensitivity of creative individuals often expose them to suffering pain yet also a great deal of enjoyment.

Enhancing Creativity in Vocational and Technical Education Students

Creative thinking can liberate people from the bondage of any form of negativity and backwardness (Animashaun, 2004). Creativity in individuals can be enhanced through the following process:

- **Training:** Creativity begins with foundation of knowledge, learning a discipline and mastering a way of thinking. You learn to be creative by experimenting, exploring, questioning assumption, using imagination and synthesizing information. Training will help to bring the learner to the understanding of the innate potentials. Training will build up the child's understanding toward emotional attachment to a particular issue (Michael et al., 2012). Training also constitutes a process of human development (Akinboye, 2003).
- **Imagination:** Finke et al. (1992) proposed the "Geneplore" model, in which creativity takes place in two phases: a generative phase where an individual constructs mental representations called preinventive structures, and an exploratory phase

where those structures are used to come up with creative ideas. Read (1998) asserted that the power of imagination is the ultimate creative power, individual creative abilities will blossom and flourish the more they apply imagination of life.

- **Developing Creative mind:** creativity involves two process: thinking and producing. If you have ideas, but don't act on them, you are imaginative, not creative. Creativity is a skill that can be developed and a process that can be managed. Paul (2011) stated that creativity is manifested by outside influence that are developed in the mind of the creative person. Guilford (1967) stated that the creative mind is made up of convergent thinking and divergent thinking. Convergent thinking involves aiming for a single, correct solution to a problem, whereas divergent thinking involves creative generation of multiple answers to a set of problem.

- **Collaboration:** Sometimes creative works are not achieved on individual note, there is need to get the input of others in other to achieve ones creative potentials (Michael et al., 2012). Paul (2011) asserted that creative individuals tend to soak up the atmosphere around them and they use what they have acquired towards their creativity.

- **Research:** creativity can be enhanced through creative research. Creative research is the type of research

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carried out on a particular subject matter or field to find new ideas or new innovations. This involves associating, questioning, observing, networking and experimenting for discovery.

- **Teaching and Learning**

Process: Creativity in individuals can be enhanced through teaching and learning process. To promote creative thinking, educators need to identify what motivates their students especially their area of interest and structure teaching around it. Providing students with a choice of activities completely allow them to become more inquisitive or curious and therefore creative in completing the task.

- **Motivation:** The aspect of motivation within a person's personality may predict and enhance creativity in the person. There are two types of motivation; Extrinsic motivation: i.e external factors device from outside of a person for example payment, rewards, fame etc. Intrinsic motivation i.e internal factor: drive within a person to participate or invest as a result of personal interest, desires, hopes, goals etc.

- **Conducive Environment:** for every creative potential to thrive, there must be a conducive environment. Environment exerts power on abilities either suppress or allows it to manifest. Creativity is required at all stages of the educational and product development process from the generation of new

product ideas to their utilization. Creativity can be fostered by a supportive, nurturing, trustworthy environment conducive to realization.

Manifestation of Creativity in Individuals

Creativity can manifest in individuals through the following:

- **Artistic Expressions:**

Sometimes through arts, individuals internal creativity (skill) can be expressed and demonstrated. In the words of Sigmund Freud, the unconsciousness of a person can be viewed through the present events that occur in the individual (Nnachi 2009). This has to do with skills of decoration, beautification and appreciating the beauty of nature.

- **Unusualness or Novelty:** A product is creative when it is novel and appropriate. Creativity gives you a competitive advantage by adding value to your services and products. Mukherjee (2002) asserted that for response to be novel or unusual the judgment standard ought to be the prevailing norms and the corresponding aesthetic response would be one of surprise.

- **Early Detection and Intervention:** Creativity can manifest in individuals at early stage of life, the creative potentials should be harnessed as fast as possible in order to sustain its operational process for the continuous

benefit of both the individual and the society at large.

- **Appropriateness and Condensation:** Creativity in individual, can manifest through appropriateness of work i.e creativity has to be appropriate. On this that further improvement on the creative ideas can be possible (Mukherjee, 2012). In order to be creative you need to be able to view things in new ways, you need to be able to generate new possibilities or new alternatives.

- **Fluency and Flexibility:** Investigation on why some people are more creative than others have focused on variety of factors. It represents the frequency of shifts from one possibility to another and bring out possible solutions when needed that no one else would be able to (Adeyanju, 1996).

- **Skill Exhibition and Acquisition:** Beliefs that only special, talented people are creative and you have to be born that way diminishes our confidence in our creative abilities. Creativity can be identified in creative individuals through their skill exhibition. This is much more applicable in vocational education e.g crafts, dancing, singing, designing, agriculture, business, music etc. the manner and ways creative people exhibit their skills is always different because it always differs from the way other people do their own things. (Michael et al., 2012).

- **Evaluating Individual Creative Ability:** Manifestation of creativity in individuals can be through evaluating individual creative ability. Several attempts have been made to develop a creativity quotient (CQ) of an individual similar to the intelligence quotient (IQ). Providing students with problem solving activities to complete allows them to become more curious, and therefore creative in completing the task.

- **Play-way Method:** As advocated by John Dewey, Maria Montessori through play-way method, the child discovers himself. Creativity is manifested when the child plays within his environment, he observes and interacts with the objects found in his environment. This will stimulate his innate ability thereby unleash his creative potentials.

Harnessing Creative Potentials in Vocational and Technical Education
Michael, et al (2012) highlighted the process of harnessing creative potentials in students as follows:

- **Timing:** Mukherjee (2002) rightly observed that an individual may have a creative product but go unnoticed or not appreciated because the creative potential in the individual in question was manifested at a wrong time. Creative potential if not harnessed, can die in an individual or remain dormant

all through life without the society reaping its benefits.

- **Meditation:** meditation involves stilling or calming the wandering mind and focusing it towards a certain thought or situation in order to arrive at a solution for a specific individual and the entire society.

- **Self Awareness:** Read (2002) described it as a process of non-judgemental form of watching one's daily actions and thoughts in the present moment in a detached frame of mind. The individual is aware of his environment and concerned with the trend of events; thereby evoke an internal mechanism that will provoke the creative prowess into initiating solution for such circumstance.

- **Light Heartedness:** This is explained as an excellent frame of mind to keep the personality ego from getting a right hold of the psyche and shifting creative thought (Read, 2002). The act of occupying our mind so much with thoughts of social, political, environmental events to a large extent inhibits the manifestation of creative potential.

- **Learning:** Learning constitutes part of the process through which creative potential is harnessed. Whichever area of life activities one wants to be creative in, always try to spend time to learn about it. Utilize any given opportunity to master the

mechanisms of the very art you are learning. This serves as a very important process of developing and enlarging ones creative capacity.

- **Developing the Art of Creativity:** creativity depends on act of strong focusing, deep meditation and imagination. This facilitates creative potential to a great extent. Paul (2011) remarked that those who tend to think that they have little creative ability are most likely the ones who use their creativity the least. Hence, creative power can be developed through developing the art of crafting.

- **Psychological Safety and Freedom (ego strength):** Isenberg and Jalongo(2006) observed that children feel psychologically safe when significant others accept them as having unconditional worth. Also when children feel free to play with ideas, they tend to develop an inner state of psychological freedom. This gives them the liberty for emotional and self expression which further enhances their creativity.

Benefits of Creativity in Vocational and Technical Education

Today, creativity forms the core activity of a growing section of the global economy. People with creative potential are the pillar on which the development of the society depends. Creative enhances the child's feeling of self esteem and self worth. It also provides a balance for intellectual development. Creative potentials allow

people to be themselves. Creative potentials liberate people from continuous formal life style and moves them to the level of extraordinary performance and intuitive imaginary outcomes (Michael et al., 2012).

Creativity is the most crucial factor for future success. A skilled and knowledgeable workforce improves the investment climate because skilled workers create an attractive economic investment for investors (Kayode, 2011). Investing in knowledge and skill is seen as the cornerstone of developing an employable and global competitive workforce. Acquisition of skills open doors economically and socially rewarding jobs.

Paul (2011) reported that some creative individuals in history were able to excel in their craft and work by just looking at a situation differently. Shaibu (2004) maintains that creative people have to be different because they hate conventional pattern of ideas and routine activities. They are original, curious to learn more and withdraw to find answers to pressing and difficult problems.

In vocational and technical education, originality is not enough, the idea must also be appropriate, useful and attainable.

Since creative potential is innate ability or capacity embedded in individual, purposefully for human development, harnessing and utilizing it should be given a top priority by the society. Its realization and harnessing should be fast tracked by the society and government of the day especially within

the educational sector. Adeyanju (1996) further noted that society should promote and give encouragement and cooperation to the minority who have been specially blessed as creative. Creativity helps students identify problems where others have failed to do so.

Fostering Creativity in Vocational and Technical Education

Nickerson provides a summary of the various creativity techniques that have been proposed which include approaches that have been developed by both academia and industry:

- (1) Establishing purpose and intention (aims and objectives)
- (2) Building basic skills (skill empowerment).
- (3) Encouraging acquisition of domain (Specific knowledge)
- (4) Stimulating and rewarding curiosity and exploration
- (5) Building motivation especially internal motivation
- (6) Encouraging confidence and a willingness to take risk
- (7) Focusing on mastery and self-competition
- (8) Promoting supportive beliefs about creativity
- (9) Providing opportunities for choice and discovery
- (10) Developing self-management (metacognitive skills)
- (11) Teaching techniques and strategies for facilitating creative performance
- (12) Providing balance (Feed back)

Roles of Creativity in Vocational and Technical Education

Vocational and technical education has many roles to play in national development, creativity is a pre-requisite or component of vocational and technical education, in addition to innovation, better products and services.

- Creativity equips an individual with vocational skills that increases his productivity.
- Creativity gives an individual the advantage of increased employability and higher job ability due to their novelty.
- Creativity is an individual enables him or her to be engaged in productive work. Olaitan (1996) cited in Nchekwube(2004) stressed that a nation that promotes vocational education promotes the ability of its citizens to qualify for and hold productive employment.
- Creative individuals in vocational education make intelligent use of the product of technology, utilize new technologies, develop better entrepreneurial skills and become more innovative workers.
- Creativity in vocational education also plays the role of refining a person's attitude to work (responsible worker).
- Through training, creativity in vocational education can provide them

with social contacts and responsible participation in an organization.

- Creativity in vocational education enables one to command self respect and the respect of others.
- Creativity in vocational education helps to reduce the rate of drop-out in school through the provision of training opportunities which suits their interest and ability.
- Creativity in vocational education stimulates technological and industrial development.
- Creativity in vocational education helps to prevent waste of human resources.
- Creativity in vocational education enables one to be competitive and innovative in both products and services.

Major Challenges of Creativity in Vocational and Technical Education

It should be noted that whatever problem that confronts Vocational and technical education is equally a challenge to creativity. Agbo (2004) and Okoh (2000) cited in Monyei (2012) identified the problems hindering vocational and technical education as follows:

- Poor implementation
- Absence or misuse of integrated approach
- Lack of qualified teaching staff

- Improper funding
- Poor staffing
- Public negative attitude
- Inefficient industrial and institutional performance
- Inadequate research efforts
- Deficiency of instructional materials like visual, audio and audio-visual materials
- Inadequate vocational education policies
- Deficiency of instructional facilities like laboratories, workshop etc.
- Inadequate teacher education programmes.
- Misconception about vocational and technical education.

Conclusions

Creativity has been judged to be the basic pedestal through which vocational and technical education can thrive and be sustained. Creativity in vocational and technical education makes a lot of contribution to the development of the society and nation in general. In essence, they form the nucleus of technological advancement in the society and its educational process. Vocational and technical education is the most reliable educational vehicle to economic prosperity, industrial supremacy and national development. It reduces the rate of unemployment in the society because it develops saleable skills in students that they can become easily employable after school (Ezema, 2004) and become self reliance, they can be employer of labour through job

creation. Identifying and harnessing creativity in students at the early stage of their lives holds so much potential for the future and survival of vocational and technical education in Nigeria. Hence there is need to advocate for creativity in creative individuals for mass emancipation, poverty alleviation, technology advancement for national transformation and development.

Recommendations

1. Emphasis should be on creativity learning i.e skills and practical acquisition by restructuring of curriculum to enhance action learning process, which will enhance vocational and technical education.
2. More conducive learning environment should be provided to promote creative thinking, environment can suppress ones potentials or brings it out.
3. Adequate facilities and infrastructure should be provided by establishing technical school for training especially at secondary school level to facilitate the creative process since training enhances creativity while creativity enhances vocational technical education.
4. Play way method, child centered curriculum and project system of learning should be encouraged as this will enable students to express themselves freely on issues of interest and this will facilitate self discovery.

5. Self expression of emotion, dreams and ideas among students should not be suppressed but be encouraged and allowed to its fullest.
6. The importance of creativity in vocational and technical education to the nation, the individual and the society at large should often be emphasized in order to enhance creativity among students by creating timetable in schools for creativity (crafts/handwork- skill acquisition).
7. The government, Non government organizations, all stakeholders must ensure adequate funding of the programme that is capable of forestalling and maintaining modern trends in terms of facilities and infrastructures and personnel at all educational level.

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