International Journal of Vocational Education and Training

Volume 21
Number 1
2013

Davison M. Mupinga
Editor

Official Publication of the
InternationalVocational Education and Training Association

International Journal of Vocational Education and Training

Volume 21, Number 1

The *International Journal of Vocational Education and Training* is the official refereed publication of the International Vocational Education and Training Association (IVETA). It is published bi-annually and sent to members and subscribers. Regular individual membership dues are US $50.00 per year. For subscription information, change of address, or to purchase additional copies of the journal, contact Barbara Ann Herrmann, Executive Secretariat, IVETA, 186 Wedgewood Drive, Mahtomedi, MN 55115. Phone her at 651-770-6719 or email her at iveta@visi.com.

ISSN: 1075-2455

International Journal of Vocational Education and Training

Volume 21, Number 1

International Journal of Vocational Education and Training
Volume 21 • Number 1 • 2014

Table of Contents

Articles

An Assessment of CTE Programs in Rural School District based on Carl Perkins Academic Standards and Placement Identifiers
Annie Snow and Mabel CPO Okojie 5

Promoting female enrolment in technical and vocational education program in Nigeria
Shirley A. Chinyere 16

Effect of cognitive apprenticeship instructional method on students' achievement and skill performance in automobile mechanics
James F. Maigida and Benjamin A. Ogwo 30

Instructional materials utilization and students' performance in practical agriculture
S. O. Nsa, S. Ikot, and M. F. Udo 44

Perception of TVET educators on the implementation of public private partnerships in technical and vocational education in Nigeria
Bernard Numgwo Atsumbe, Raymond Emmanuel, Benjamin Senchi Bargu, and Ayanda Samuel Owodunni 55

Making the case for career development in high schools
Davison M. Mupinga and Patrick J. O'Connor 68

Curricula Development Perspectives. The Russia Case.
Olga Oleynikova 75

Publication Guidelines 76

As a refereed journal, the *International Journal of Vocational Education and Training* depends on qualified individuals to serve as manuscript reveiwers. We send feature article manuscripts to three reviewers. So as not to overwork our reviewers, we need some of you to join us for a one-year term.

If you have a record of publications, research experience, and an interest in gaining additional practice in the use of the Publication Manual of the American Psychological Association, please submit your vita to Dr. Davison M. Mupinga, Editor, International Journal of Vocational Education and Training, School of Teaching, Learning, and Curriculum Studies, College of Education, Health and Human Services, Kent State University, P.O. Box 5190, 316 White Hall, Kent, OH 44242-0001, USA, Email: dmupinga@kent.edu.

Message From the Editor

Due to technological advances, tight economic conditions and the ever changing global market forces, technical and vocational education and training (TVET), researchers and practitioners have struggled and continue to struggle to find the best way to navigate the turbulent times. At the core of issues affecting vocational education is how these programs can stay current and continue to serve their purposes. This is no easy task and there is no easy solution either. Thanks to researchers and practitioners all over the world who continue to share their work and experiences through a number of avenues such as journals, newsletters, blogs, and conference presentations. These publications help us stay current on global practices, technological trends, manufacturing practices, and above all, best practices to implement vocational education.

Among the various TVET issues that researchers are currently focusing on is: accountability of TVET, equality in the workplace, effective instructional methods, career and curriculum development, and global competencies, just to name a few. Articles in this journal, attempt to provide insights into the above issues. Also presented from a practitioner perspective is the role of career development opportunities in high school and the call to rethink curriculum development practices.

The first article examines the extent to which career and technical education (CTE) programs meet the requirements of Carl Perkins funding. Lately, a number of CTE programs have sought to increase under-represented populations such as women and minorities. The second article looks at methods of increasing enrollment of females in TVET. Increasing student achievement and performance is at the core of instructional approaches. The third article describes and recommends cognitive apprenticeship instructional methods for improved achievement. The fourth article relates to a Confucian saying, "I hear and I forget. I see and I remember. I do and I understand" and it's focused on instructional approaches, specifically, the role of visual aids in increasing retention of knowledge. The need to guide students on their career plans is the focus of the fifth article. The article makes a case for providing career development opportunities at the high school level. In the last article, a practitioner describes a paradigm shift in the development of TVET curriculum from the Russian perspective. Essentially, the article calls for rethinking the development of TVET curriculum based on its role in a knowledge-based society.

Once again, readers are reminded that articles published in *IJVET* come from all over the world and as such some authors do not speak English as their first language. While great care has been taken to correct the verbiage, there may be some errors that went unnoticed. Like other past *IJVET* issues, the journal continues to touch on timely and relevant TVET issues. My sincere thanks to all the reviewers, authors, and the editorial staff who worked tirelessly to produce this *IJVET* issue. Please note that the articles in this journal do not reflect the position of the journal's editorial staff, reviewers, or policy of IVETA.

Davison M. Mupinga
IJVET Editor

An Assessment of CTE Programs in Rural School District based on Carl Perkins Academic Standards and Placement Identifiers

Annie Snow, M.S. (Ed.)
Director, Technical Education Center

Mabel CPO Okojie, Ph.D.
Mississippi State University

Abstract

This study was used to examine if career and technical education (CTE) programs implemented in a county district high schools met the requirements of Carl Perkins' indicators for successful CTE programs. The population of the study was made up 140 CTE students and 245 regular high schools students (non CTE students). The results showed that CTE completers found work and transitioned to higher education as indicators for successful Carl Perkins programs. The performances of CTE students and non CTE students were compared in some core academic subjects. The findings indicated that CTE students received higher test mean scores than the non-CTE students in core subjects represented in this study.

Keywords: *Career and Technical Education, Employability, Carl Perkins indicators, Transition, Post-secondary*

Introduction

Career and technical education programs are designed to help students acquire both core academic knowledge and workplace skills to enable them transition into postsecondary education or seek employment if they desire. The focus of this study was on career and technical education (CTE) programs implemented in a rural County District in southern part of the US. Miller (2008) & Bray (2010) explained that American workforce lacked the employability skills to keep American businesses and industries competitive in a global economy. The

inference was that many businesses and industries in the US did experience skill gaps. The report from the American Society for Training and Development (ASTD) (2006) asserted that poor preparation of students for the workplace skills was responsible for some of the causes of skill gaps in the United States. A survey of over 200 employers in the areas of manufacturing, financial services, government, and non-profit organizations indicated that the newly-hired high school and college graduates were not adequately prepared for jobs in businesses and industries (ASTD, 2006). Equally, the Secretary's Commission on Achieving Necessary Skills (SCANS) Report (1991) showed that many American students were not well prepared for entry-level jobs. The youth tended to leave school without the relevant skills and foundation knowledge that was necessary for successful job operations.

Castellano, Stringfield, & Stone (2001) as well as Herzek, (2008) maintained that CTE was considered important to students' job success; these authors believed that CTE could be seen as an instrument for strengthening students by providing job related skills. According to Hyslop (2008), CTE is considered relevant in preparing students for the job related skills and in keeping the United States competitive in a global economy. The essence of Carl Perkins Act of 2006 was to promote the development of services and activities that integrated challenging academic courses which could equip students with relevant academic knowledge and technical skills as well as employability skills to ensure workplace success. Brand (2003) remarked that "individuals with greater skills and education have higher standards of living, and added that CTE programs help students develop occupational and technical skills that lead to success in the labor markets" (p. 3). CTE programs have been implemented for over 10 years in the rural county district involved in this study but no study had been carried out to determine whether these programs have been successful in helping students to transition from high school to postsecondary or find employment as articulated by Carl Perkins Act (1998) using the following identifiers:

- Acquisition of academic knowledge
- Transition into post secondary education
- Acquisition of technical skills
- Successful placement in employment

The essence of this study was to use Carl Perkins identifiers to assess how much the objectives of CTE programs were met in terms of creating opportunity for job placement, transition into postsecondary education and/or be enlisted into the military.

Statement of the Problem

Therefore, the problem of this study was that CTE programs implemented

in a rural county district in a southern state of the US have not been assessed through scientific data collection to determine if the program as implemented met accountability standards based on Carl Perkins' indicators. These indicators required CTE completers to either pursue postsecondary education or secure employment in the field of training (or related field) or go into the military. Specifically, study was used to determine the percentages of CTE completers who had employment in the field of training or related area as well as those who transitioned into post-secondary education or went into military. This study was also used to determine whether significant differences existed between CTE participants and non-CTE participants (regular high school students) based on their test scores in United States History, English II Multiple Choice, Biology I, and Algebra I. The following research questions guided the study.

Research Questions

Research Question 1: What percentage of CTE completers met the Carl Perkins placement status indicators which were to transition into postsecondary education or obtain employment in field of training or related field and/or to join the military between 2006 and 2010?

Research Question 2: Did statistical significant differences exist between CTE participants and non-CTE participants (regular high school students) based on their test scores in United States History, English II Multiple Choice, Biology I, and Algebra I between 2006 and 2010?

The purpose of the Study

The purpose of the study was to determine whether CTE programs were relevant in providing students with workplace skills, and in creating opportunity for students to transition into postsecondary education. This study could contribute to the current literature on CTE programs. One of the limitations of this study was that one CTE center was involved in this study; this meant that the findings could only be generalized to this particular center but with caution, the findings could also be generalized to other CTE centers in the southern state which participated in the study.

Review of Related Literature

In 1862, the United States government passed the Morrill Act that could ensure that public land was allocated to each state as a permanent endowment for a college that would primarily focus on agriculture and mechanical (A&M) art. As a result, the schools were known as A. & M. colleges. With the passage

of the Morrill Act, vocational education subjects began to be taught at the high school level. Woodward (1969) found that students lacked the skill to use simple tools and persuaded secondary schools to integrate training in carpentry, drafting, bricklaying, home economics, printing, and machine work into the curriculum. Woodward's goal was to bridge the gap between theories and practice (Heil, 2007).

Woodward also wanted to show a connection between knowledge and doing things (manual dexterity). Woodward was an advocate for bringing together education and labor demands of modern society. With the inclusion of manual training into the curriculum, the support for Woodward's ideas continued to grow. By the early 1900, over 100 cities included manual training in their curriculum activities. Later the manual training schools became centers for specific subjects in the schools. The centers contributed to the growth of vocational education programs in secondary school systems in the United States (Westerink, 2010).

Career and technical education was designed to prepare youth and adults for jobs. Today, CTE programs continued to strive to prepare students for successful career by equipping them with the workplace skills, as well as the academic knowledge to transition into postsecondary education. In the last decade, the quality of workers has diminished because as Bray (2010), Hyslop (2008) and Kister (2002) observed that many workers lacked marketable skills such as technical and employability skills. CTE has been recommended as one of the ways to help solve the workforce issues that were facing the United (Bronson (2007), Reese (2010) and Stone III, 2010).

National Assessment of Vocational Education (NAVE) reported in 2004 that over 50% of CTE students completed the new basic curriculum that consisted of four years of English, three years of math, science, and social studies. The NAVE Report (2004) indicated that CTE students graduating from high school had an increase of about two percent in their earning. It was recorded in the US Bureau of Labor Statistics (2006) that some of the fastest growing occupations in the United States would require a CTE certification. As a result of the merits accorded to CTE, "many high schools now offer technical preparatory (tech-prep) programs, which were developed jointly by high schools and community colleges to provide a continuous course of study leading to an associate degree or other postsecondary credential" (US Bureau of Labor & Statistics, 2010, p. 2). School transitional programs such as job shadowing, cooperative education, tech-prep, and youth apprenticeships were also used to prepare students to enter into high-wage and high-skilled labor force (Brown, (2003), Lewis (2008) & Wonacott, (2001). Castellano (2005) reported that students taking one CTE class for every two academic classes reduced their risk of dropping out of school. Association for Career and Technical (ACTE) Brief

Report of June 2007 claimed that "by providing relevance and strong relationships between students and the education environment, CTE programs can be an effective means of ensuring that students complete high school" (p. 7). Also, the Report acknowledged that some CTE teachers were known to have developed business and industrial partnerships which provided guidance to CTE student organizations as a process of providing additional support. The county district involved in this study has established CTE programs for over 10 years and limited effort has been made to carry out a study aimed at assessing whether the center has created opportunity for students to transition into postsecondary education or find employment if they so desire.

Methodology

Research Design

This study employed ex post facto (a Latin phrase) for "after the fact)" research design. According to Gay, Mills, and Airasian (2012), because both the effect and alleged cause have already occurred and must be studied in retrospect" (p. 228). Ex post facto was used as a research design because the researchers used existing data to compare the performance of CTE students and the non-CTE students (regular high school students in US History, English II Multiple Choice, Biology I, and Algebra I. The researchers also analyzed existing data to determine the percentages of CTE completers who met the Carl Perkins' status indicators.

Population

The county school district involved in this study was located in the southern state of the US with a population of 11,814 (U.S. Census Bureau, 2010). During the 2009-2010 school years, there were 1,923 students enrolled in this county school district (Mississippi Assessment and Accountability Reporting System, 2010). The school district has two elementary schools, one middle school, one high school, one career and technical center, and one alternative school. Students in the school district were 99% African Americans. The career and technical center which participated in the study had seven programs as identified below:

1. Agricultural Sciences
2. Business Management
3. Marketing and Technology
4. Construction and Manufacturing
5. Science and Technology

6. Engineering and Mathematics
7. Transportation (Mississippi Department of Education, 2010)

The population of the high schools students who were in the county district were 675, these included both CTE students and non-CTE students. Out of a total of 675 students, 236 were CTE students and 439 were non-CTE participants (regular high school students). A systematic random sampling was used to select 140 CTE students out of 236. Also a systematic random sampling was used to select 245 non CTE students (regular high school students). Sample size calculator (http://www.surveysystem.com) was used to select a representative sample of 140 CTE completers and 245 non-CTE students (regular high school students). Therefore, the population of this study was made up of 140 CTE students and 245 non-CTE students (regular high school students).

Data Analysis

Research Question 1: What percentage of CTE completers met the Carl Perkins placement status indicators which were to transition to postsecondary education or obtain employment in field of training or related field and/or to join the military between 2006 and 2010?

Data for research question #1 was analyzed using percentages to identify CTE completers who met the Carl Perkins placement status indicators as identified in research question #1. The findings revealed that 77% of CTE completers (students who have completed their CTE programs) continued their education to post-secondary education in 2006. In 2007, 74% advanced to college education; in 2008, 88.23% entered college; in 2009, 90.69% of the completers had college admission and in 2010, 76.19% gained admission to higher education as shown in Table 1.

Table 1
Distribution of Students by Car Perkins Indicators

Year of Completion	Total # of Completers	Carl Perkins Indicators	# of Completers who met Carl Perkins Indicators	%
2006	60	1. Continuing education	46	76.66
		2. Employment in field trained or related	12	20.00

Year of Completion	Total # of Completers	Carl Perkins Indicators	# of Completers who met Carl Perkins Indicators	%
		3. Employment not related	0	00.00
		4. Military	2	3.33
		5. Not employed	0	00.00
2007	57	1. Continuing education	42	73.68
		2. Employment in field Trained or related	12	21.05
		3. Employment not related	1	1.75
		4. Military	0	00.00
		5. Not employed	2	3.50
2008	34	1. Continuing education	30	88.23
		2. Employment in field Trained or related	4	11.76
		3. Employment not related	0	0.00
		4. Military	0	0.00
		5. Not employed	0	0.00
2009	43	1. Continuing education	39	90.69
		2. Employment in field Trained or related	3	6.97
		3. Employment not related	0	0.00
		4. Military	1	2.32
		5. Not employed	0	0.00
2010	42	1. Continuing education	32	76.19
		2. Employment in field Trained or related	8	19.04
		3. Employment not related	1	2.38
		4. Military	0	00.00
		5. Not employed	1	2.38

Research Question 2: Did statistical significant differences exist between CTE participants and non-CTE participants (regular high school students) based on their test mean scores in United States History, English II Multiple Choice, Biology I, and Algebra I between 2006 and 2010?

T-tests were used to determine if there were statistical significant differences between CTE students and non-CTE students (regular high school students) in their mean scores in US History, English II Multiple Choice, Biology I and Algebra I from 2006-2010. The results indicated that there were no statistical significant differences between CTE students and non- CTE students in US History. However, the CTE students received a higher mean score (347.66) in US History than the regular high school students with a mean score of 342.84. Also, the results showed that there were no statistical significant differences between CTE students and the regular high school students in English II Multiple Choice; nevertheless, CTE students received a higher mean score of 398.84 than the regular high school students with a mean score of 377.58. The findings equally revealed that there were no statistical significance differences between CTE completers (students) and non-CTE students (regular high school students) in their mean scores in Biology I. However, CTE students had a higher mean score of 329.86 than the non-CTE students (regular high school students) who received a slightly lower mean score of 326.38. The findings equally indicated that statistical significant differences did not exist between CTE students and non-CTE students (regular high school students) in Algebra I. But the results did reveal a higher mean score (392.85) for CTE completers and a lower mean score (368.89) for non-CTE students (regular high school students).

Discussion of Findings, Conclusions, Implications and Recommendations

The findings overwhelmingly indicated that far greater majority of CTE students met one of critical Carl Perkins indicators which was participation in postsecondary education. However, a lesser number of students obtained jobs in related areas of training because a higher proportion of the CTE completers have transitioned to postsecondary education. For instance in 2006, 12 (20%) students found job in their field of training or related area; only two (3.33%) went to military. None of the students who completed their CTE program in 2006 remained unemployed. Also in 2007, two (3.50%) and in 2010 only one (2.38%) was not employed following graduation. The conclusion therefore, was that CTE programs provided opportunity for CTE students to experience college education which was considered as one of the primary objectives of CTE programs. These findings supported Brand (2003) who argued that the success of CTE programs should be measured among other things how CTE programs provided opportunity for increased post secondary education including increased technical and workplace competencies. The results of the

present study indicated that higher percentage of CTE completers pursued further education and that most CTE completers found jobs.

The findings of other researchers found that CTE provided opportunity for students to graduate from high school, gain workplace readiness skills, and transition into post secondary education (Bray, 2010; Hyslop, 2008; Reese, 2010). Based on the findings of this study, it could be concluded that CTE programs was successful in preparing students for post secondary education and to a certain extent for job market because only three (3) students who completed various CTE programs from 2006 to 2010 were recorded as unemployed. When the performances of CTE students and non-CTE students (regular high school students) were compared in various core academic subject areas, the t-test results showed no significant differences, however, it should be noted that the CTE students had higher mean scores in all the core academic subjects outlined in this study.

The implication of this study was that the CTE students who were assumed to be less able and in some cases deemed unfit to participate meaningfully in regular academic education received higher mean scores in US History, English II Multiple Choice, Biology I and Algebra I than the regular high school students. The findings of this study proved to the contrary; most of the CTE completers were able to transition into postsecondary educational institutions and those who wanted jobs found employment in their fielding of training or related field. Therefore, the findings of this study demonstrated that Car Perkins's placement indicators were met. This study could serve as a pilot study for a more robust study where larger a population could be involved in order to be able to improve generalization. A longitudinal study is recommended in order to collect data on the performance of the CTE students when they transition to college to ascertain if they are able to complete their college and graduate and whether they possess the high tech skills required in a technology-driven economy. It is also recommended that a survey study be carried out to assess teachers' and students' perceptions of the CTE programs in order to collect data to improve CTE curriculum periodically and to provide accountability data for school leadership and stakeholders.

References

ASTD Public Policy Council (2006). Bridging the skill gap: *How the skills shortage threatens growth and competitiveness … and what to do about it.* White paper.

ACTE Consortium (2009). Education for a strong economy. *National Association for State Directors of Career and Technical Education.* Retrieved from http://www.canyons.edu/offices/cte/downloads/CTEC%20Meeting%20Minutes%203-17-09.pdf

ACTE (2007). *Career and technical education's role in career guidance,* Issue Brief. Retrieved from http://www.acteonline.org

Brand, B. (2003). *Rigor and relevance: A new vision for career and technical education,* A white paper. Washington, DC: American Youth Policy Forum.

Bray, J. (2010). CTE: *education and workforce challenges.* Retrieved from http://www.pa-acte.org/CTE-Education+and+Workforce+Challenges1.ppt

Bronson, E. (2007). Helping CTE students to earn their potential. *Techniques,* 82(7), 31-32.

Brown, L. (2003). *Benefits of career and technical education.* Retrieved form http://www.calpro-online.org/eric/docd/tia00117.pdf

Carl D. Perkins *CTE improvement act (2006).* In ACTE news. Retrieved from http://www.acteonline.org/_room/media/_releases/.cfm

Carl Perkins Act (1998). *Vocational and Technical Education* Retrieved from http://www2.ed.gov/offices/OVAE/CTE/legis.html

Castellano (2005). Tracking students career paths from beginning to completion, *National Research Center for Career and Technical Education (POS) Studies* retrieved from http://cte.ed.gov/downloads/Castellano%20Transitional%20Link%20Tracking%20Students%2012-2.pdf

Castellano, M., Stringfield, S., & Stone III, J. R. (2001). *CTE reforms and comprehensive school reforms in high schools and community colleges.* St. Paul, MN: National Research Center for Career and Technical Education.

Gay, L. R., Mills, G., & Airasian P. (2012). *Educational research: competencies And analysis and application.* Boston, MA: Addison Wesley.

Heil, K. (2007). *Vocational education.* Retrieved from http://wwwreferenceforbusiness.com/encycloopedia/Val-Z/Vocational-Education.html#b

Hyslop, A. (2008). CTE's role in workforce readiness credentialing. Techniques, 83(6), 40-43.

Kister J. (2002). *Using standardized test data to improve instruction in career-technical education* (NOCTI White Paper) Bronson, MI NOCTI.

Lewis, M. (2008). *Effectiveness of previous initiatives similar to programs of study: Tech prep, career pathways, and youth apprenticeships.* Retrieved from http://scholar.lib.vt.edu.\/ejournals/CTER/v33n3/lewis.html

Miller, J. (2008). Labor market information for career cluster initiatives. *Techniques,* 83(6), 26-29.

Morrill Carl (1862). Morrill Land-Grant Act. Retrieved from http://www.colostate.edu/morrillact/part1.aspx

Mississippi Department of Education (2010). *Mississippi assessment and accountability reporting system.* Retrieved from http://orsap.made.k.12.ms.us//MAAR/index.jsp

Mississippi Department of Education of Education, Office of Vocational and Technical Education (2008a). *Mississippi construction education foundation: Construction industry career path.* Retrieved from http://www..mde.k12.ms.us/vocational/OVTE/construction.htm

Mississippi Department of Education (2006). *Redesigning education for the 21st century workforce in Mississippi.* Retrieved from http://www..mde.k12.ms.us/extrel/worhforce.html

National Association of Vocational Education (NAVE) (2004). *Final Report to Congress,* Retrieved on June 23, 2009 from http://www2.ed.gov/rschstat/eval/sectech/nave/index.html

Reese, S. (2010). Preparing workers for successful careers. *Techniques,* 85(5), 16-21.

Sample Calculator (2011). Retrieved from http://www.surveystems.com

SCANS Report (2000). *Skills and tasks for jobs.* The Secretary's Commission on Achieving Necessary Skills, US Department of labor. Retrieved from http://wdr.doleta.gov/opr/FULLTEXT/1999_35.pdf

Stone III, J. (2010). *Professional development for secondary career and technical education: Implication for change.* Louisville, KY: National Center for Career and technical Education, University of Louisville.

United States Bureau of Labor Statistics (2010). *Teacher-vocational.* Retrieved from http://www.bls.gov/ooh/Education-Training-and-Library/Career-and-technical-education-teachers.htm

United States Census Bureau. (2007). Retrieved from http://factfinder.census.gov

Westerink, D. (2010). *Manual training movement.* Retrieved from http://www.nd.edu/~rbarger/www7/manualtr.html

Wonacott, M. (2001). *The impact of work-based learning on students.* Adult Career and Vocational Education Columbus, OH. (ERIC Document, No. ED472364

Woodward, C.M. (1969). *The Manual Training School.* Arno Press and the New York Times, New York.

Promoting Female Enrolment in Technical and Vocational Education Programme in Nigeria

Ayonmike, Chinyere Shirley
Delta State University, Abraka, Nigeria

Abstract

This study examines methods of promoting female enrolment in TVET programs. 80 TVET professionals were selected from tertiary institutions and technical colleges in Delta State Nigeria. 3 research questions were asked and 2 Null hypotheses were stated. Questionnaires were used to collect data. The questionnaire was validated by 2 lecturers from Delta State University, Abraka Using test-retest method, a reliability co-efficient of 0.77 was obtained. Data were analysed using mean and standard deviation for the research questions and t-test statistical analysis for testing the hypotheses. The study revealed amongst others that, government should establish special TVET centers for girls. Hence, it was recommended that, government, the general public and TVET professionals should promote female enrolment in TVET programs.

Keywords: *Female, Enrolment, Promoting, Strategies, TVET*

Introduction

According to the National Policy on Education, Federal Republic of Nigeria (FRN, 2004), defined TVET as those aspects of the educational process involving in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Also, UNESCO (2001), posited that technical and vocational education (TVE) is used as a comprehensive term referring to those aspects of the educational process involving in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupation in various sectors of economic and social life. According to Egun and Tibi (2010), girls and women stand out clearly, as an academic disadvantaged group especially in the voca-

tional and technical field of engineering, agricultural and medical sciences. Also, they further opined that, the gap or imbalance between male and female education arose from a lot of cultural practices in society resulting from deeply fixed prejudices, attitudes, customs, behavioural decisions and procedure. These combine to discriminate against women rights and access to educational opportunities. It is against this backdrop that this study seeks to address the issue of poor enrolment of female citizens in Technical and Vocational Education and Training (TVET) programs in Delta State Nigeria.

Barriers to Female Enrolment in TVET Programs

Erinosho (1997), Ndahi (1987) in Edu and Edu (2012), separately observed that in the past, neither traditional nor western education in Nigeria encouraged or provide equal opportunities for women to enter the field of vocational and technical education in Nigeria. Also, other factors, which particularly confront girls in science enrolment, learning and achievement, especially in developing and underdeveloped countries include household factors (economic position, household size, and parents' education) and practices, biological composition (genetic deficit), psychological disposition (minds-sets, interests and attitudes); policy related factors (lack of goals and adequate monitoring of gender equality) and school related factors (school location, peer influence, facilities, role models, gender biased curriculum materials)(Erinosho, 1997; Onocha, 1998; and Ogwazor, 2001) in (Ogunkoya & Olatoye, n.d.).

Consequently, Hoffmann-Barthes, Nair, and Malpede (n.d.), opined that the issue of gender disparities in Scientific Technical and Vocational Education (STVE) must be placed in the context of Africa's problems of poverty, disease, malnutrition, famine, drought, civil strife, and war, combined with poor access to shelter, electricity and basic health services. Poverty is one of the most important factors adversely affecting the education in general and the education of girls in particular. According to International Rescue Committee (IRC, 2009) interview conducted for students on the assessment of the primary factors contributing to low female enrollment in TVET, particularly for training in traditionally male trade include; lack of awareness about the benefit from TVET; insufficient financial support; and financial consideration; concern about future job prospects.

However, Igbinedion and Ojeaga (2012), opined that, some of the factors responsible for low enrolment in TVE in Nigeria include; poor societal perception; poor entry level; poor societal attitude; lack of recognition; discrimination against graduate of TVE and elitism. Furthermore, internationally various scholars and organizations have reported similar barriers to female enrollment in education generally and technical vocational education in

particular. Notable among these literatures include that of Evans,1995; Evans and King, 1991; Evans and Heinz, 1993; Kember, 1981;UNESCO, 1999; Nawe, 2010; Wapula, 2009; Jyoti, 2012; and Trivedi, 1989. These literatures reported amongst others that the barriers to female enrollment in TVET programs include: cultural barriers (these barriers reflect the cultural and cross cultural social norms and traditions by which subservient status of girls is maintained); attitudinal barrier(these can be seen in the perceived differences in male and female roles and capabilities inculcated through socialization in the home and family, reinforced through schooling, vocational/career guidance services, experiences in the workplace, peer pressure and absence of female role models); and situational barriers (these factors can be seen in female roles in the family, lack of proper support from family members, financial situation and location of settlement); institutional barriers(this can arise from the way TVET institutions organized their programs some of which are lack of female teachers, lack of child care facilities, lack of medical department, lack of special TVET institution for female, inflexible selection and entry requirements).

However, in Africa, Caribbean, and South Asia the barriers to female enrollment in TVET programs include: relegation of women to the home; parental perceptions of cost/benefits of educating girls(this affects low income families particularly); patriarchy (female seclusion practices and early marriage); discriminatory labor market practices; masculine image of TVET projected in textbooks, media and popular assumptions; poor facilities, including teacher-supply, teacher quality and equipment; nature of TVET occupations which are not easily combined with child-rearing and child-care; lack of role models and career counseling; social factors which operates inside and outside the classroom; lack of female TVET teachers and more widely absence of female role models; gender bias TVET curriculum; inappropriate assumptions made by male TVET teachers; peer pressure; early marriage; privacy of girls; and location, physical facilities and hours of instruction; direct cost; demand for female to care for siblings, homes and farms (Williams, 1987).

Strategies to Promote Female Enrollment in TVET Programs in Nigeria

In recognition of the role of women education in the development of a nation the Federal Government of Nigeria thought it is wise to include women in the quest for technical advancement. Therefore, under technical education, government advocated for more effort in encouraging women to enter wider areas of technical education and that technical institutions which do not have facilities for female students will be encourage to do so (Edu & Edu, 2012). Also, IRC (2008) recommendations on how to improve female enrollment in

TVET revealed that;

1. Government institutions, NGOs, TVET providers and other stake-holders should lead community-wide awareness raising campaigns on the importance of female participation in TVET.
2. Awareness campaigns should be followed by scholarship for female enrollment in TVET
3. Career counseling can also be used to dispel misunderstandings about the dangers and challenges of working in traditionally male sector so that more women are interested in pursuing employment in these field.
4. Internship and job placement support for female TVET graduates.

Consequently, Egun and Tibi (2010), the following measures could assist in improving female enrollment in TVE, these include; educating parents on the importance of female education. There is need for parents to be enlightened by government on the benefit of women education which could be achieved through mass mobilization campaigns using the various media (in local languages) and the use of women occupying respectable position in the society as resource persons. He further states that, increasing the number of female teachers in schools (TVET institution inclusive), this will fade away the impression of certain jobs being meant for a particular sex. The presence of more female teachers in vocational and technical colleges will not only encourage but will also motivate girls into taking vocational technical courses in school and striving for higher position. In addition, government and non- governmental organizations should take more steps to establish female schools, female school fees should be reduced to the barest minimum if free education for them cannot be implemented.

Furthermore, Edu and Edu (2012) suggested that government and other stakeholders in education should embark on awareness programs through workshops and seminars to educate girls, women, parents and the general society on the benefits of vocational education for women. Moreso, they further state that, more female teachers should be made to teach vocational subjects to serve as role models for young girls' this will encourage girls to take up vocational careers for sustainable development. However government should also improve the physical, infrastructural and organizational standards of vocational institutions through better funding. The research of Ogunkola and Olatoye (n.d.) on "Strategies for Improving Participation and Performance of Girls in Secondary School Science in Nigeria; Science Teachers' Opinions" revealed the following strategies to improve female participation and performance in secondary school science; initiation of awareness programs or campaigns on the relevance of science or parents and girls; creation of prizes and other form of encouragements for healthy competition for girls in science; absolute priority should be given to ensuring access of girls into science by the local, state and federal government

in Nigeria; making the perceptions and attitudes of teachers' vis-à-vis girls in science positive; making learning environment attractive to inspire girls to study science; organizing science groups and clubs for girls; reviewing of gender biased curriculum materials; and resolution of the conflict between school and some traditional values, beliefs, practices and sex-stereo typed roles in favor of girls.

According to King and Hill (1991) identified the following strategies as successful in industrialized countries, these include: secondary and post-secondary scholarships; and vocational/technological programs linked directly with employment, together with a strong recruitment and guidance element. Bellew and King (1993) buttressed the above statement when they opined that the successful strategies in promoting female enrollment in TVET programs include: scholarship to address poverty and financial dependency; female teachers as role models to challenge traditional role assumptions; alternative, flexible provision to accommodate the double demands, expectations and constraints placed on many women; direct linkages into employment to counter barriers of employer resistance and other social pressures on completion of training.

Theoretical Framework

In this work, the Expectancy Theory of Motivation will be applied. This theory proposes that a person will decide to behave or act in a certain way because, they are motivated to select a specific behavior over other behaviors due to what they expect, the result of that selected behavior will be (Oliver, 1974) in (Wikipedia-Encyclopedia, 2012). Vroom (1964) defines motivation as a process governing choices among alternative forms of voluntary activities, a process controlled by the individual. The individual makes choice based on estimates of how well the expected results of a given behavior are going to match up with or eventually lead to the desired results. The Expectancy Theory of Motivation explains the behavioral process of why individuals choose one behavioral option over another. It also explains how they make decisions to achieve the end they make decisions to achieve the end they value. Vroom introduces three variables within the Expectancy Theory which are Valence (V), Expectancy (E) and Instrumentality (I). The three elements are important behind choosing one element over another because they are clearly defined;

1. Expectancy is the belief that one's effort (E) will result in attainment of desired performance (P) goals.
2. Instrumentality is the belief that a person will receive a reward, if the performance expectation is met. This reward may come in the form of a pay increase, promotion, recognition or sense of accomplishment.
3. Valence is the value the individual places on the rewards based on their needs, goals, values and sources of motivation.

Purpose of the Study

The purpose of this study is to ascertain what;

1. Government can do to help promote female enrolment in TVET programs in Delta State.
2. The general public can do to help promote female enrolment in TVET programs in Delta State.
3. TVET professionals can do to help promote female enrolment in TVET programs in Delta State.

Statement of Problem

Female choose to enroll in greater proportions in arts, human studies and social sciences than they do in mathematics, science and technology. The origin of this under representation of female has been largely structural, created in and through the social structures of institutions and the segmentation of the labor market, and internalized in values and beliefs about appropriate roles and expectations (Evans, 1995). Despite the clamoring of TVET professionals and international organizations like UNESCO to vocationalize education in Nigeria, TVET is still characterized by low enrollment, most especially the poor enrollment of female citizens in TVET programs in Delta State. This gender imbalance between male and female citizens in TVET programs pose as a challenge for achieving the goals and objectives of TVET as enshrine in the National Policy on Education (NPE).

Research Questions

The following research questions were used for this study;

RQ1: In what way can government help to promote female enrolment in TVET programs in Delta State?

RQ2: In what way can the general public help in promoting female enrollment in TVET programs in Delta State?

RQ3: In what way can TVET professional help in promoting female enrollment in TVET programs in Delta State?

Research Hypotheses

The following Null Hypotheses is stated for this study;

HO1: There is no significant difference in the mean response between TVET lecturers from tertiary institutions and teachers from technical colleges in Delta State on how government can promote female enrollment in TVET programs in Delta State.

HO2: There is no significant difference in the mean response between TVET lecturers from tertiary institutions and teachers from technical colleges in Delta State on how TVET professionals can promote female enrolment in TVET programs in Delta State.

Significance of the Study

The findings of this study will add to bulk of existing literature in TVET. Moreso, the findings of this study will inform government, the general public and TVET professionals on how they can promote female enrolment in TVET programs in Delta State. However, government, the general public and future researchers will use the findings for subsequent research.

Methods of the Study

This study adopted a survey research design approach which examines the methods of promoting female enrolment in TVET programs in Delta State. This design is consider appropriate because no variable will be manipulated in this study. The target population of this study is three hundred and thirty four (334) TVET lecturers and TVET teachers in TVET institutions in Delta State. A total of eighty (80) respondents were randomly selected for this study using balloting technique. Forty (40) TVET lecturers were drawn randomly from all TVET departments in tertiary institutions and forty (40) TVET teachers were also selected from all the technical colleges in Delta State. The data for the study were collected by the use of a questionnaire titled "Method of Promoting Female Enrolment in TVET Programs in Delta State". The questionnaire is on a 5-point Likert Scale which has 3 parts with 5 items each. Part A, is on how government can promote female enrolment in TVET programs in Delta State; Part B and C, is on how the general public and TVET professionals can promote female enrolment in TVET programs in Delta State respectively. The questionnaire was validated by 2 lecturers from the Department of Technical and Business Education, Delta State University, Abraka and all their corrections and suggestions was affected. The test retest method was used to determine the reliability of the instrument. The questionnaires were administered to 20 lecturers and teachers from TVET institutions in Edo State Nigeria who were not part of the 80 respondents used as sample for the study. The correlation co-efficient was 0.77. The data collected were analyzed using mean and standard deviation to answer the three research questions. The criterion mean of 3.00 and above was interpreted as agree and mean below 3.00 were interpreted as disagree. The two hypotheses were tested using the t-test statistical analysis at 0.05 level of significance.

Results and Discussion

Research Question 1: In what way can government help in promoting female enrolment in TVET programs in Delta State?

S/N	Government can help Promote Female Enrolment in TVET in Delta State Through	TVET LECTURERS			TVET TEACHERS		
		Mean	S.D	Remarks	Mean	S.D	Remarks
1	Compulsory and free TVET for girls in Delta State	2.95	1.65	Disagree	2.73	1.32	Disagree
2	Establishing special TVET centers for girls	3.88	1.45	Agree	3.63	1.58	Agree
3	Payment of study allowances to female TVE students in Delta State	3.35	1.53	Agree	3.40	1.60	Agree
4	Provision of employment for female TVE graduate immediately after school.	3.10	1.65	Agree	3.38	1.55	Agree
5	Provision of scholarship to the best female TVE graduates to study abr oad.	3.40	1.52	Agree	3.15	1.55	Agree
	Grand Mean and S.D	3.34	1.41		3.26	1.52	

The results in table 1 revealed that government should establish special TVET centers for girls, payment of study allowance for female TVET students, provision of immediate employment for female TVET graduates and provision of scholarship to the best female TVET graduates to study abroad. This findings are in agreement with Edu and Edu (2012), they posited that, under technical education, government advocated for more effort in encouraging

women to enter wider areas of technical education and that technical institutions which do not have facilities for female students will be encourage to do so. Moreso, IRC (2008); Edu and Edu (2012); Ogunkola and Olatoye (n.d.); Ndahi (2002); King and Hill(1991); Bellew and King (1993); and (Jyoti, 2012), are of the view that, internship and job placement support for female TVET graduates, government should establish female schools and reduce schools fees for female, creation of prizes and other form of encouragements for healthy competition for girls in science and government should build schools for girls to study technical and science subjects and establish scholarship funds to help qualify female students study engineering courses respectively.

Research Question 2: In what way can the general public help in promoting female environment in TVET programs in Delta State?

Table 2: Shows the Mean and Standard Deviation of Response from Respondents on How the general Public can Promote Female Enrolment in TVET programs in Delta State

S/N	General Public can help Promote Female Enrolment in TVET in Delta State Through	TVET LECTURERS			TVET TEACHERS		
		Mean	S.D	Remarks	Mean	S.D	Remarks
1	Changing their attitude towards TVET	3.98	1.31	Agree	3.95	1.43	Agree
2	Encouraging female enrolment in TVET by providing learning materials to TVE institutions	3.40	1.28	Agree	3.60	1.53	Agree
3	They should not be bias in the employment of female TVE graduates	3.35	1.27	Agree	3.56	1.47	Agree
4	Changing their feelings that TVET is a masculine course	3.35	1.51	Agree	3.58	1.36	Agree
5	Changing their perception generally about TVET	3.85	1.27	Agree	3.55	1.50	Agree
	Grand Mean and S.D	3.59	1.33		3.65	1.46	

The results in Table 2 revealed that, the general public should; change their attitude towards TVET, encourage female enrolment in TVET programs, should not be bias in the employment of female TVET graduates, change their feelings that TVET is a masculine course, and change their perception generally about

TVET. These findings are in line with Ndahi (2002), who observed that during the early period of the development of TVET in Nigeria, a technician was considered a male who could repair mechanical or electronic devices or product. It was not conceivable at that time to think of a female as a technician. However, Igbinedion and Ojeaga (2012), opined that some of the factors responsible for low enrollment in TVET in Nigeria include; poor societal perception, poor societal attitude, discrimination against TVET graduate and lack of recognition.

Research Question 3: In what way can TVET professionals help in promoting female enrolment in TVET programs in Delta State?

Table 3: Shows the Mean and Standard Deviation Response from Respondents on How TVET Professionals can Promote Female Enrolment in TVET in Delta State

S/N	TVET Professionals' can Promote Female Enrolment in TVET in Delta State Through	TVET LECTURERS			TVET TEACHERS		
		Mean	S.D	Remarks	Mean	S.D	Remarks
1	Organizing awareness campaign program on female enrollment in TVET programs	4.00	1.01	Agree	3.45	1.54	Agree
2	Organizing of occupational and vocational counseling program for girls	3.85	1.29	Agree	3.68	1.44	Agree
3	Awarding of scholarship to female TVET students	3.70	1.32	Agree	3.58	1.62	Agree
4	Educating the public on TVET program and the need for female enrollment in TVET	3.43	1.41	Agree	3.53	1.57	Agree
5	Provision of instructional materials for female TVET students	3.88	1.28	Agree	3.65	1.63	Agree
	Grand Mean and S.D	3.77	1.26		3.58	1.56	

The result in table 3 revealed that TVET professionals can promote female enrolment in TVET programs through; organizing awareness campaign program on female enrolment in TVET, organizing occupational and vocational counseling programs for girls, awards of scholarship to female TVET students, educating the public on TVET programs and the need of female enrolment in TVET, and the provision of instructional materials for female TVET students. This findings are in accordance with IRC (2008) recommendations on how to improve female enrolment in TVET which revealed that; government institutions, NGOs, TVET providers and other stakeholders should lead community-wide awareness raising campaigns on the importance of female participation in TVET, awareness campaigns should be followed by scholarship for female enrollment in TVET and career counseling. Also Egun and Tibi (2010) are of the view that parents should be educated on the importance of female education. However, the findings of Ogunkola and Olatoye (n.d.) research on "Strategies for Improving Participation and Performance of Girls in Secondary School Science in Nigeria: Science Teachers Opinion" revealed amongst others that, initiation of awareness programs or campaigns on the relevance of science for parent for parents and girls. These assertions were buttressed by the works of King and Hill (1991); Bellew and King (1993); (Jyoti, 2012).

Hypothesis I: There is no significant difference in the mean response between TVET lecturers from tertiary institutions and teachers from technical colleges in Delta State on how government can promote female enrolment in TVET programs in Delta State.

Table 4: Shows the t-test Analysis of Significant Difference between the Mean Ratings of TVET Lecturers and Teacher on How Government can Promote Female Enrolment in TVET Programs in Delta State

Group	N	Mean	Std	Df	Tcal	Tcrit	Decision
TVET Lecturers	40	3.34	1.41	78	0.244	1.664	Accept
TVET Teachers	40	3.26	1.52				

N =80, df=78, p<0.05, * Accept

Table 4 shows that there is no significant difference between the mean value of TVET lecturers and teachers and Teachers on how government can promote female enrolment in TVET programs in Delta State. Since the calculated t-value is less than the critical t-value. Thus, the Null Hypothesis is accepted.

Hypothesis II: There is no significant difference in the mean response between TVET lecturers from tertiary institutions and teachers from technical colleges in Delta State on how TVET professionals can promote female enrolment in TVET programs in Delta State.

Table 5: Shows the t-test Analysis of Significant Difference Between the Mean Ratings of TVET Lecturers and Teachers on How TVET Professionals can Promote Female Enrolment on TVET Programs in Delta State

Group	N	Mean	Std	Df	Tcal	Tcrit	Decision
TVET Lecturers	40	3.77	1.26	78	0.599	1.664	Accept
TVET Teachers	40	3.58	1.56				

N =80, df=78, p<0.05, * Accept

Table V shows that there is no significant difference in the mean rating of TVET lecturers and teachers on how TVET professionals can promote female enrolment in TVET programs in Delta State. Since the calculate t-value is less than the critical t-value. Thus, the Null Hypothesis is accepted.

Conclusion

Considerable attention needs to be directed towards promoting female enrolment in TVET programs in order to address the gender imbalance in terms of enrolment amongst male and female in TVET programs. To address this poor representation of female in TVET, government, non-governmental organizations, parents, TVET lecturers and teachers, TVET professional bodies or organization should work collectively to promote female enrolment in TVET through organization of workshop and seminars on the importance and benefit of female participation in TVET. Moreso, the introduction of various forms of motivation such as scholarships, special TVET institution for girls' only and immediate employment provision for female TVET graduates.

Recommendations

Based on the findings the following recommendations were made:

1. Government should establish special TVET centers for girls.
2. Payment of study allowance for female TVE students.
3. Provision of employment for female TVE graduates immediately after school.
4. Provision of scholarship to the best female TVE graduates to study abroad.
5. The general public should change their attitude and perception on TVET

programs.

6. TVE professionals such as teachers and lecturers should organized awareness campaign programs on female enrolment in TVET programs for the public, parents, and girls.
7. TVE professionals should organize occupational and vocational counseling program for girls and the provision of instructional materials for female TVET students.
8. TVE professionals should award scholarship to female TVET students.

The above recommendations can be achieved when government, TVET professionals, employers of labor, and other stakeholders work collectively. The role of government is to create an enabling environment by setting up policies that will help to generate special TVET fund that will be used to implement these recommendations. More so, government should improve funding of TVET programs at all levels. However, TVET professionals on their part should be focus on how to promote TVET and enrollment in TVET programs through adequate sensitization programs on the need of gender balance in TVET. These sensitization programs can take the form of research, awareness campaign, special project, talk show and promotional video/firms. The implication of the results/findings of this study to other developing countries is that the results and recommendations of this study will stand as a model for any of these countries that intend to improve female enrollment in TVET in other to curtail gender imbalance in education in general and TVET in particular.

References

Bellew, R.T. & E.M. King. (1993). Training women for nontraditional occupations" in E.M. King and M.A. Hill (eds.), *Educating women: lessons from experience*. John Hopkins University Press, Baltimore and London.

Edu, D.O. & Edu, G.O. (2012). Vocational education of women: a tool for community and national development in Nigeria. *Universal Journal of Management and Social Sciences, 2(2): 1-5.*

Evans, K., & W. Heinz. (1993). Studying forms of transition: methodological innovation in a cross-national study of youth transition and labour market entry. *Comparative Education* 30.

Evans, T., & B. King. (1991). *Beyond the text: contemporary writing on distance education*. Deakin University Press, Victoria, Australia.

Egun, A.C., & Tibi, E.U. (2010). The gender gap in vocational education: increasing girls access in the 21st century in the Mid Western States of Nigeria. *International Journal of Vocational and Technical Education, 2(2): 18-21.* Retrieved 20th July 2012 from http://www.academicjournals.org/IJVTE.

Federal Republic of Nigeria (2004). *National policy on education* (4th ed.) Yaba-Lagos: NERDC.

Hoffman-Barthes, A.M. Nair, S., & Malpede, D. (n.d) Scientific, technical and vocational education of girls in Africa. Summary of 21 National Reports, Retrieved 20th July, 2012 from http://www.google.com

Igbinedion, V.I. & Ojeaga, I.J. (2012). Use of career education and occupation information

services in boosting enrolment into vocational and technical education programs in Nigeria. *International Education Studies, 5(4).*

International Rescue Committee (2008). Assessment report on female enrolment in technical and vocational training, particularly in non-traditional occupations for women. National Working Group on Technical Vocational Education And Training (NWG/TVET), Retrieved 20th July, 2012 from http://www.legacyinitiative.net

Jyoti, T. (2012).Resource guide on gender mainstreaming into technical and vocational education and training in Bangladesh: ILO-TVET Reform Project. Dhaka, Bangladesh. Retrieved 4th September, 2013 from http://www.google.com

Kember, D. (1981). "Some factors affecting attrition and performance in a distance education course at the University of Papua New Guinea. *Distance Education 2(*2): 164-88.

King, E.M., & M.A. Hill. (1993). *Women's education in developing countries: barriers, benefits and policies.* John Hopkins University Press, Baltimore and London.

Nawe, J. (2010). Female participation in African universities: effective strategies for enhancing their participation with reference to the University of Dar es Salam, Tanzania.

Ndahi, H. (2002). Gender inequity in industrial and technical education in Nigeria: parents' perspectives in the 21st century. *Journal of Industrial Teacher Education, 39(2).* Retrieved July 20th 2012 from http://scholar.lib.vt.edu/ejournals/JITE/v39n2/ndahi.html.

Ogunkola, B.J. & Olatoye, R.A. (n.d). Strategies for improving participation and performance of girls in secondary school science in Nigeria: science teachers' opinion. Institute of Education, Olabisi Onabanjo University, Ago-Iwoye, Nigeria. Retrieved July 20th from http://www.google.

Trivedi, J.H. (1989). Women's development through distance education. *ICDE Bulletin, Vol. 21:17-22.*

UNESCO (1999). Scientific technical and vocational education of girls in Africa: section for science and technology education and section for technical and vocational education working document.

UNESCO (2001). Revised Recommendations Concerning Technical and Vocational Education. Retrieved July 24, 2012 from http://www.google.com.ng

Wapula, R.N. (2009). Attitutude as a factor in men's and women's participation in technical education in Botswana: implications for counseling education. *Journal of Psychology and Counselling.1(6).*

Wikipedia-Encyclopedia (2012). Expectancy theory. Retrieved 20th July 2012 from http://www.en.wikipeia.org/wiki//Expectancy_theory

Williams, G.A. (1987). Science technology and mathematics education for all, including women and girls in Africa." Keynote Address at the Commonwealth Africa Workshop on Gender Stereo-typing in Science, Technology and Mathematics Education. Report of a Commonwealth Africa Regional Workshop, Accra, Ghana

Effect of Cognitive Apprenticeship Instructional Method on Students' Achievement and Skill Performance in Automobile Mechanics

James F. Maigida
Federal University of Technology, Minna. Niger State, Nigeria
Benjamin A. Ogwo
State University of New York, Oswego

Abstract

This study determined the effect of cognitive apprenticeship instructional method on students' achievement and skill performance in automobile mechanics. The study adopted the quasi-experiment design which involved intact classes with a population of 144 National Technical Certificate II students. The instruments used for data collection were Automobile Mechanics Achievement Test and Automobile Mechanics Skill Performance Test. Mean and standard deviation were used to answer the research questions while Analysis of Covariance was used to test the null hypotheses. The study found among others that learners recorded improved achievement when cognitive apprenticeship instructional technique is employed for teaching automobile mechanics. The study recommended among others that cognitive apprenticeship instructional method be in cooperated into delivery method of the National Business and Technical Education Board curriculum.

Keywords: *Cognitive Apprenticeship, Automobile Technology, Achievement, Skill Performance, Technical College, Conventional Teaching Methods*

Introduction

Cognitive apprenticeship is an instructional method that originated from the traditional apprenticeship training programme which incorporates elements of structured learning. In the landmark study conducted by Collins, Brown and Newman in 1989, the age-long apprenticeship learning principles of on-the-job training were combined with the modern pedagogical practice of engaging students with problems in the context of real world experiences. Cognitive Apprenticeship Instructional Method (CAIM) is a framework outlining the methodology for teaching complex cognitive tasks through guided learn-

ing (Collins, Brown & Holum, 2004). Cognitive apprenticeship is viewed by LeGrand, Farmer and Buckmaster (1993) as an instructional tool that is aimed at facilitating the acquisition of thinking skills such as; cognitive skills and meta cognitive skills resulting in sustained participation within a community. This is achieved through guided learning by an expert who explains his/her action at every level of cognition/instruction.

Collins, Brown and Newman (1989) proposed the framework of CAIM to help educators in evaluating pedagogical methods in a learning environment. The framework constitutes of four cognitive apprenticeship method's building blocks: Content, Method, Sequencing and Sociology. Content is the type of knowledge required for expert's performance. According to Ukoha and Eneogwe (1996), contents are facts, observations, data, and perception drawn from what the mind of a learner has comprehended from experience and those constructs of the mind that recognise and rearrange those products of experience into ideas. Collins et al, (1989) explained that content dimension encompasses: domain knowledge, heuristic strategies, control strategies, and learning strategies. Domain knowledge refers to subject matter, specific concepts, facts and procedure involved in a vocation. While, heuristic strategies are generally applied techniques for accomplishing tasks. On the other hand, control strategies involves general approaches for directing one's solution process, and learning strategies explains how to learn new concepts, facts, and procedures.

Method dimension involves ways of promoting the development of expertise. They are designed to give learners the opportunity to observe, engage in, and invent or discover expert's strategies in context (Ukoha & Eneogwe, 1996). CAIM includes: modelling, coaching, scaffolding, articulation, reflection and exploration. These are aimed at developing the autonomous problem-solving capacities of the learner as the teachers' role fade. CAIM also pays attention to sequencing or timing in the exploration of progressively more complex practice and theories. This according to Racca and Roth (2001) progressively builds self confidence in the practice, and moves away from the traditional notion of sink-or-swim in traditional learning environment. Racca and Roth listed three principles that must be balanced in sequencing activities for students in CAIM environment as: global before local skills, increasing complexity, and increasing diversity. Meanwhile, the sociology dimension in CAIM entails the social characteristics of a learning environment. Sociology includes the following dimensions: situated or contextualised learning, community of practice, intrinsic motivation and co-operation or competition between learners.

CAIM develops in the learner an approach whose goal is to develop self-directed and independence and the use of a wide range of cognitive process in order to transfer learning in contexts they are yet to encounter. Duncan (1996) and Raisen, (1990) reported that CAIM was significantly more effective than

conventional/traditional models in classroom instruction for reading, writing and mathematics at secondary school level. Conventional/traditional teaching methods such as lecture, role playing, demonstration, field trip, discussion, project among others are socially acceptable teaching methods which have been used by teachers to present skills, knowledge, and appreciations to the learners in the class room or laboratory. These methods according to Aina (2000) lack innovations that could bring about effective teaching and learning process, because the methods tend to remove learning from its sphere of use and encourage rote learning. CAIM provides cognitive skills for the continuous changes in the competitive workplace; which might bring tremendous improvement in the teaching and learning of automobile mechanics that has become complicated in the recent years.

The automobile mechanics according to the Federal Government of Nigeria (FGN), (2013) is one of the vocational programmes offered at the Technical College level as Motor Vehicle Mechanics (MVM). Graduates of MVM from Technical Colleges according to the National Board for Technical Education (NBTE), (2004) should among others be able to inspect, identify problems, repair and service mechanical, electrical and electronic system and components of cars, buses and trucks. The is aimed at producing competent automobile technicians for Nigeria's technological and industrial development and to conduct examinations leading to the award of the National Technical Certificate (NTC) and Advanced National Technical Certificate (ANTC) for automobile craftsmen and master craftsmen respectively. However, Maigida (2013) observed that the automobile industry has changed the society dramatically over the years, and so appropriate system is needed to keep track of these changes. This can only be achieved by using appropriate instructional methods that would enable automobile practitioners acquire both academic and appropriate technical skills to function in the fast growing automobile industry. Hence, technical teachers must adopt instructional methods that are classroom-based but with strong links to the need of the workplace to allow for the acquisition of an array of workplace skills.

Students' achievement connotes academic performance in school subject as symbolised by scores or mark on an achievement test. According to Anene (2005), students' academic achievement is quantified by a measure of the students' academic standing in relation to those of other students. Atherson (2003) contended that students' achievement in teaching and learning is determined by several factors among which are teachers' attitude and enthusiasm, instructional methods, learning environment as well as students' attitude and background. Furthermore, one important role of the teacher is to order and structure teaching in order to enable students set personally achievable goals and to seek skills that would improve their academic achievement and skill performance.

Skill refers to the ability to perform expertly in a given activity. Okorie and Ezeji (1988) defined skill as manual/mental dexterity reflected in the performance of an operation. To possess a skill is to demonstrate the habit of acting, thinking or performing a specific activity which has become so natural and automatic to the individual through repetitive practice. Skill performance involves the use of senses, brain as well as the muscles (Gagne & Briggs, 2001). Automobile teachers are expected to equip automobile students with the requisite degree of technical and higher thinking skills in order to be productive in the workplace currently equipped with computerized facilities. Kuppuswamy (2007) identified individual perception, maturation, motivation or interest and readiness as factors that determine skill performance.

Providing quality education leads not only to improved achievement, but also ensures that boys and girls are fully able to realise the benefit of education. Therefore, adopting an approach that takes into account the relationship and interaction between males and females would address equality of access; equality in the learning process; equality of educational outcomes and equality of external results. Zafran and Zawitz (1997) conducted a research on gender differences in achievement. The results showed measureable differences in favour of boys in achievement and skill performance in mathematics and science related subjects. Generally, many studies conducted on gender differences found out that boys have better performance than girls in technology subjects. Hence, Ogwo (1996) advocated a paradigm shift from the teaching and learning methods (lecture and demonstration) in which the teacher attempts to impart knowledge to that which he/she acts only as a facilitator to re-image the expert's meta-cognitive learning process. This approach is central in CAIM. CAIM contrast the commonly used instructional methods by emphasising students' active roles in knowledge construction based on simulated cognitive modelling of subject-matter experts.

More so, failure of the commonly used teaching methods are evident in students' poor performance in the automobile mechanics public examinations as well as their inability to secure and retain jobs in the fast changing automobile workplace (Abati, 2009). Hence, there is need for change in the instructional methods used in technical college to enable the products of these institutions acquire integrated knowledge and higher order thinking skills required in the workplace. These changes become necessary in order to avoid the prevalent problem of students' poor performance in public examination and their inability to secure and retain jobs in the fast changing automobile workplace that requires fairly high-level academic skills.

Purpose of the Study

The purpose of the study was to determine: (1) Effect CAIM on students' achievement in automobile mechanic; (2) Effect of CAIM on students' skill performance in automobile mechanics; (3) Influence of gender on students' achievement in automobile mechanics; (4) Influence of gender on students' skill performance in automobile mechanics.

Research Questions

The following research questions guided the study:

1. What is the effect of CAIM on students' achievement in automobile mechanics?
2. What is the effect of CAIM on students' skill performance in automobile mechanics?
3. What is the influence of gender on students' achievement in automobile mechanics?
4. What is the influence of gender on students' skill performance in automobile mechanics?

Hypotheses

The following null hypotheses were tested at .05 level of significance using the Analysis of Covariance:

Ho_1: There is no significant difference in the mean achievement scores of students taught automobile mechanics with CAIM and those taught with the traditional methods.

Ho_2: There is no significant difference in the mean achievement scores of male and female automobile mechanic students on AMAT when exposed to CAIM.

Ho_3: There is no significant interaction effect of treatments given to students and their gender with respect to their mean achievement scores in automobile mechanics.

Ho_4: There is no significant difference in the mean skill performance scores of students taught automobile mechanics with CAIM and those taught with traditional methods.

Ho_5: There is no significant difference in the mean skill performance scores of male and female automobiles mechanic students on Automobile Mechanic Skill Performance Test (AMSPT) when exposed to CAIM.

Ho_6: There is no significant interaction effect of treatments given to students and their gender with respect to their mean skill performance scores in automobile mechanics.

Methods and Materials

The study adopted the quasi-experimental research design. Specifically, the pre-test post-test control group design was adopted because intact class were used for the study. Intact classes were used to avoid disrupting the programme of the institutions involved in the study. The study was conducted in six Technical Colleges in Niger State and the Federal Capital Territory, Abuja Nigeria on a population of 144 National Technical College II students of automobile mechanics. Each intact class composed of both male and female students.

The instruments for data collection were Automobile Mechanics Achievement Test (AMART) and Automobile Mechanics Skill Performance Test (AMSPT). The AMSPT identifies the motor skill that was measured at each level of instruction. The research instruments were prepared by the researchers to ensure uniformity in standard. While the actual teaching process was carried out by the teachers of the respective schools after a training period organised by the researchers. This was done to avoid subjects becoming suspicious that they were being used for experiment.

The AMAT which was a multiple-choice items was trial tested to determine its stability using test-retest reliability method on a randomly sampled population of 30 students at Federal Science and Technical College (FSTC), Zuru Kebbi State within an interval of three weeks. FSTC, Zuru was used because it did not form part of the study institutions but uses the same entry requirement as the study institutions. The test-retest reliability was determined using Pearson Product Moment Correlation Coefficient and was found to be .86. The inter-ratter reliability coefficient of AMSPT was determined by Kendells' Coefficient of Concordance and was found to be 0.85. Mean and Standard Deviation were used to answer the research questions. Whereas, Analysis of Covariance was used to test the six null hypotheses at .05 level of probability

Experimental Procedures

Students in the treatment groups were not informed that they were being involved in the research process. The experimental group was taught using CAIM lesson plans while the control group was taught using the commonly used lesson plans. The study was conducted during the normal lesson periods of the schools using intact classes, to avoid subjects becoming suspicious of the exercise using regular automobile teachers. On the first day of the exercise, a pre-test (AMAT and AMSPT) was administered to the treatment groups in the participating institutions. After the pre-test, an intensive teaching/training was given to all the groups by the automobile mechanics teachers in their respective schools.

The control group received instruction in a lecture and demonstration settings which concentrated on the delivery of all the areas of instruction. The sequencing pattern of the control group was arranged through the commonly used teaching methods in all the four systems of automobile mechanics covered: acquisition of automobile AC information; understanding of Electronic Injection System; knowledge in the use of O-B-Ds equipment for troubleshooting procedures in electronic ignition and application of Diagnostics Skill in automobile engine performance.

The experimental groups' methodologies were designed specifically to employ the CAIM elements described in the introduction. The learning activities were deliberately sequenced through modelling, coaching, scaffolding, articulation, reflection and exploration by shearing ideas on areas of difficulties and defining problems to be solved. For instance, as students identify component parts and their location, they were asked to visualize the functions of the parts and follow recommended troubleshooting procedures. Throughout the process, students were encouraged to verbalize their thoughts on how the components function in a system and to indicate what could occur if various components are malfunctioning. Then students were allowed hand-on-activities with systems which provide room to apply and develop diagnostic skills. The treatment for this research lasted for eight weeks, while each lesson lasted for 90 minutes. At the end of the treatment, a post-test was administered on both groups using AMAT and AMSPT test items. The exercise provided a post-test data for achievement, and skill performance after the treatment.

Results

The results are summarized according to the research questions and null the hypotheses tested

Research question 1

What is the effect of CAIM on students' achievement in automobile mechanics?

Table 1: Mean and Standard Deviation of Pre-test and Post test Scores of Experimental and Control Groups in the Achievement Test

Group	N	Pretest score		Posttest score		Mean Gain
		$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$
Experimental	71	4.09	1.61	32.61	1.66	28.52
Control	73	4.15	1.64	19.49	3.65	15.34

The result on table 1 shows that the students in the experimental group performed better in the achievement test than the students in the control group.

Research Question 2

What is the effect CAIM on students' skill performance in automobile mechanics?

Table 2: Mean and Standard Deviation of Pre-Test and Post-Test Scores of Experimental and Control Groups in the Skill Performance Test

Group	N	Pretest score		Posttest score		Mean Gain
		$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$
Experimental	71	2.92	.78	34.73	2.02	31.81
Control	73	2.91	.84	24.63	4.81	21.72

The data presented in Table 2 shows that students in experimental group performed better than the students in the control group in the skill performance test.

Research Question 3

What is the influence of gender on students' achievement in automobile mechanics?

Table 3: Mean and Standard Deviation of Pre-test and Post test Scores of Male and Female Students Taught Automobile Mechanics in the Achievement Test

	Cognitive Apprenticeship Instructional Method						Conventional Method					
	N	Pretest		Posttest		*Mean Gain*	N	Pretest		Posttest		*Mean Gain*
Gender		$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$		$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$
Male	47	4.42	1.55	33.46	1.67	29.04	51	4.45	1.60	20.07	3.75	15.62
Female	24	3.45	1.55	30.95	1.44	27.50	22	3.45	1.58	18.13	4.48	14.68

The data presented in Table 3 shows that male students taught automobile mechanics with CAIM had a mean score of 4.42 and standard deviation on 1.55 in the pre-test and a mean score of 33.46 and standard deviation of 1.67 in the post-test making a pre-test, post-test mean gain in the male students taught with CAIM to be 29.04. Meanwhile, female students taught automobile mechanics with CAIM had a mean score of 3.45 and standard deviation of 1.55 in the pre-test and a post-test mean of 30.95 and standard deviation of 1.44 with a pre-test, post-test mean gain of 27.50. Also, male students taught with conventional method had a mean score of 4.45 and standard deviation of 1.60 in the pre-test

and a mean score of 20.07 and standard deviation of 3.75 in the post-test making a pre-test, post-test mean gain in the male students taught with conventional method to be 15.62. Meanwhile, female students taught automobile mechanics with conventional method had a mean score of 3.45 and standard deviation of 1.58 in the pre-test and a post-test mean of 18.13 and standard deviation of 4.48, with a pre-test, post-test mean gain of 14.68. With these results male students taught automobile mechanics with CAIM had higher mean scores than female students in the Achievement Test. Also, male students taught automobile mechanics with conventional method had higher mean scores than female students in the achievement test.

Research Question 4

What is the influence of gender on students' skill performance in automobile mechanics?

Table 4: Mean and Standard Deviation of Pre-test and Post test Scores of Male and Female Students Taught Automobile Mechanics in the Skill Performance Test

	Cognitive Apprenticeship Instructional Method					Conventional Method				
		Posttest		Retention			Posttest		Retention	
Gender	N	$\overline{X}$	SD	$\overline{X}$	SD	N	$\overline{X}$	SD	$\overline{X}$	SD
Male	47	33.46	1.69	32.42	1.70	51	20.07	3.75	9.21	3.20
Female	24	30.95	1.00	30.75	1.01	22	18.13	4.48	8.95	3.26

Table 4 shows that male students taught automobile mechanics with CAIM had a mean score of 33.46 and standard deviation of 1.69 in the post-test and a mean score of 32.42 and standard deviation of 1.70 in the retention test. Meanwhile, female students taught automobile mechanics with CAIM had a mean score of 30.95 and standard deviation of 1.00 in the post test and retention mean score of 30.75 and standard deviation of 1.01. Also, male students taught with conventional method had a mean score of 20.07 and standard deviation of 3.75 in the post-test and a mean score of 9.21 and standard deviation of 3.20 in the retention test. Meanwhile, female students taught automobile mechanics with conventional method had a mean score of 18.13 and standard deviation of 4.48 in the post test and retention mean score of 8.95 and standard deviation of 3.26.

Hypotheses

HO_1: There is no significant difference in the mean achievement scores of students taught automobile mechanics with CAIM and those taught with conventional method

HO_2: There is no significant difference in the mean achievement scores of male and female automobile students on AMAT when exposed to CAIM.

HO_3: There is no significant interaction effect of treatments given to students and their gender with respect to their mean achievement score in automobile mechanics

Table 5: Summary of Analysis of Covariance (ANCOVA) for Test of Significance of Three Effects: Treatments, Gender and Interaction Effect of Treatments and Gender on Students' Achievement in Automobile Mechanics

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6368.301[a]	4	1592.075	152.986	.000
Intercept	13065.964	1	13065.964	1.256E3	.000
Pretest	8.413	1	8.413	.808	.370
Group	5365.898	1	5365.898	515.622*	.000
Gender	162.704	1	162.704	15.635*	.000
Group * Gender	2.477	1	2.477	.238	.626
Error	1446.525	139	10.407		
Total	104899.000	144			
Corrected Total	7814.826	143			

*Significant at sig of F< .05

The F-calculated value for Group is 515.622 with a significance of F at .000 which is less than .05. The null-hypothesis is therefore rejected at .05 level of significant. With this result, there is a significant difference between the mean achievement scores of students taught automobile mechanics with CAIM and those taught with conventional method. The F-calculated value for gender is 15.635 with a significance of F at .000 which is less than .05. This means that there is a significant difference in the mean achievement scores of male and female automobile students on AMAT when exposed to CAIM. Therefore, the null hypothesis of no significant difference in the mean achievement scores of male and female automobile mechanics students on AMAT when exposed to CAIM is rejected at .05 level of significance. The interaction of treatments and gender has F-calculated value of .238 with significance of F of .626. Since .626 is higher than .05, the null hypothesis for interaction effect of treatment and gender is accepted.

HO_4: There is no significant difference in the mean skill performance scores of students taught automobile mechanics with CAIM and those taught with conventional method

HO_5: There is no significant difference in the mean skill performance scores of male and female automobile students on AMSPT when exposed to CAIM.

HO_6: There is no significant interaction effect of treatments given to students and their gender with respect to their mean skill performance score in automobile mechanics

Table 6: Summary of Analysis of Covariance (ANCOVA) for Test of Significance of Three Effects: Treatments, Gender and Interaction Effect of Treatments and Gender on Students' skill performance in Automobile Mechanics

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3742.034[a]	4	935.509	68.868	.000
Intercept	8036.005	1	8036.005	591.575	.000
Pretest	20.284	1	20.284	1.493	.224
Group	3178.541	1	3178.541	233.990*	.000
Gender	42.979	1	42.979	3.164	.077
Group * Gender	.690	1	.690	.051	.822
Error	1888.188	139	13.584		
Total	131892.000	144			
Corrected Total	5630.222	143			

*Significant at sig of F< .05

The F-calculated value for Group is 233.990 with a significance of F at .000 which is less than .05. The null-hypothesis is therefore rejected at .05 level of significance. With this result, there is a significant difference between the mean skill performance scores of students taught automobile mechanics with CAIM and those taught with conventional method. The F-calculated value for gender is 3.164 with a significance of F at .077 which is higher than .05. This means that there is no significant effect of Gender on students' skill performance in automobile mechanics. Therefore, the null hypothesis of no significant difference in the mean skill performance scores of male and female automobile mechanics students on AMSPT when exposed to CAIM is rejected at .05 level of significance. The interaction of treatments and gender has F-calculated value of .051 with significance of F of .822, which is higher than .05. Therefore, null hypothesis for interaction effect of treatment and gender is accepted.

Discussion of Findings

The data presented in Table 1 provided answers to research question one. Findings reveals that students taught automobile mechanics with CAIM had a higher mean score than those taught with conventional method in the achievement test. The findings confirmed that the difference between the effect of CAIM and conventional teaching methods was statistically significant. The implication of this finding is that CAIM is more effective than conventional teaching methods in improving students' achievement in automobile mechanics. These findings compared favourably with the findings of Duncan (1996) who reported that CAIM were significantly more effective than conventional methods in classroom instructions in reading, writing and mathematics for improving students' thinking skills and knowledge at secondary school level. A plausible explanation on the effectiveness of CAIM could be viewed from the opinion of Campbell (1997) who believed that learning in CAIM is in a setting that is more like work with an authentic connection to students' live.

Furthermore, findings revealed that male students taught automobile mechanics with CAIM had higher mean scores than female students in the Achievement Test. Also, male students taught automobile mechanics with conventional method had higher mean scores than female students in the Achievement Test. Thus, there is an effect of gender on the achievement of students taught automobile mechanics in favour of boys. The findings are in line with research findings on male dominated culture in science and technology. The finding confirmed the research findings of Zatran and Zawitz (1997) on gender difference in achievement scores. In addition, there was no significant interaction effect of treatment given to students and their gender with respect to their mean achievement scores in automobile mechanics. The result indicates that the effectiveness of CAIM does not depend on the student's gender. Hence, CAIM is more effective than conventional method in improving students' achievement in automobile mechanics regardless of gender level.

The data presented in Table 2 provided answer to research question two. The result shows that students' skill performance in automobile mechanics improves significantly when taught with CAIM. This is evident in the higher mean scores obtained by the experimental group than the control group. Analysis of Covariance test result for hypothesis five presented in Table 6 confirmed that the difference between mean skill performance score of students taught automobile mechanics with CAIM and those taught with conventional methods was statistically significant. Showing that there was statistically significance difference between the mean skill performance scores of students taught automobile mechanics with CAIM and those taught with conventional methods.

Furthermore, the data presented in Table 4 answered research question four.

The result showed that male students taught automobile mechanics with CAIM had higher mean scores than female in the skill performance test. Similarly, male students taught automobile mechanics with conventional methods had higher mean scores than female students in skill performance test. Thus, there is an effect of gender on skill performance of students taught automobile mechanics.

Similarly, the interaction effect of treatments for gender had F-calculated value at .051 while significance of F was .822, which is higher than .05. Therefore, null hypothesis of no significant interaction effect of treatments given to students and their gender with respect to their mean skill performance scores in automobile mechanics is upheld, suggesting that effectiveness of CAIM on students' skill performance does not depend on gender. The interactive nature of CAIM helps learners to develop a suitable intellectual curiosity in learning for both sexes and provides enabling environment that would allow them analyse problems from different angles. It might be said from the findings of the study that the performance of girls compared to boys in this study improved significantly. This might be possible because CAIM provides structure to knowledge for the continuous changes in the competitive workplace. The issue in education should therefore be on the removal of the barriers that are interfering with girls' access to technology education.

References

Aba*ti, R. (2009).* PAN and a trouble automobile industry. The Guardian. April *3, 51.*

Aina. 0. (2000). Nigerian Technical and Vocational Education in the Near Future. Keynote *Address at the National Seminar on Technical and Vocational Education (TVE) in Nigeria Vision and Action.* 31st October-2nd November. Held at National Centre for Women Development, Abuja.

Anene, G.U. (2005). Home economics and the academic performance of a child. *Journals of home economics research,* 6, 1, 99-103.

Atherson, J.S. (2003). Learning and teaching intelligence. Retrieved on 30th January,2010 from www.dmu.ac.uk/-Jamesa/Learningintelling.htm.

Campbell, D. (1997). *The Mozart Effect.* New York: Avon Books.

Collins, A; Brown, J.S. & Holum, A. (1991). The 21st century learning initiatives. Retrieved on 21st August, 2009 from *www.en.wikipedia.org/wiki.http*

Collins, A; Brown, J.S. & Newman S.E. (1989). Cognitive apprenticeship: teaching the craft of reading writing and mathematics (Technical Report No 403). Cambridge, M.A., Bolt, Baranek and Newman. (Eric Document Reproduction service No ED 284 181).

Duncan,S. I..S. (1996). Cognitive apprenticeship in classroom instruction: implication for industrial and technical teacher education. *Journal of industrial teacher education.* 33, 3, 66-86.

Federal Government of Nigeria (FGN) (2013). *National policy on education.* Lagos: NERDC.

Gagne, N. L. & Briggs, L. J. (2001). *Principles of instructional design*. Florida: Holt, rinhart and Winston Kuppuswamy, B. (2007). *Advanced educational psychology.* Mysore: Sterling Publisher's Private Ltd.

LeGrand, B; Farmer, J.A. and Buckmaster, A. (1993). Cognitive apprenticeship approach to help adults learn. *New directors for adult and continuing education.* 59, 1, 69-78.

Maigida, J. F. (2013). Effect of cognitive apprenticeship instructional method on students' achievement, retention and skill performance in automobile mechanics. An unpublished Ph.D thesis, University of Nigeria, Nsukka.

National Board for Technical Education (2004). *National technical certificate examination (craft level) syllabus for engineering trades based on the NBTE modular curricular.* Kaduna. NBTE

Ogwo, B.A. (1996). Effects of metalearning instructional strategies on students' achievement in metalwork technology. An unpublished Ph.D thesis, university of Nigeria, Nsukka.

Okorie, J.U. and Ezeji, S. C. O. A. (1988). *elements of guidance, vocational and careere education.* Onitsha: pummer education publishers.

Racca, R. & Roth, W.F. (2001). Traditional apprenticeship vases cognitive apprenticaship in the electrical trade: implication for education programmes. paper presented at the annual meeting of the American educational research. University of Victoria

Raisen, S. A. (1990). Reforming education for work: *A cognitive science perspective.* San Francisco. Jessey- Brass

Ukoha, U.A. & Eneogwe, U.N. (1996). The instructional process in B.A. Ogwo (Ed.) *curriculum development and educational technology.* Makurdi: Onaivi printing and publishing Co. Ltd.

Zafran, A. & Zawitz, D. (1997). Gender and sex roles. retrieved on 4th march, 2010 from www.academics.tjhsst.edu/psycho./oldpsycho/ch.

Instructional Materials Utilization and Students' Performance in Practical Agriculture

Dr. S. O. Nsa, S. Ikot, and M. F. Udo
University Of Uyo, Uyo

Abstract

The study was conducted to determine the effects of instructional materials utilization on the performance of Junior Secondary Students in Practical Agriculture in Ikot Abasi Local Government Area. The study used a quasi-experimental design with a pretest post-test non-randomized control group arrangement. Intact class of 200 students were used for the study. To guide the study four specific objectives and four null hypotheses were formulated and tested at 0.05 level of significance. Students' achievement test in Practical Agriculture (SATPA) was developed to gather data for the study. The instrument was validated by research experts and the reliability coefficient of 0.80 was obtained using K-R 21. Data were analysed and hypotheses tested using t-test and Analysis of covariance (ANCOVA). The findings obtained were; there was a significant difference between the performance of students taught with instructional chart and those without and there was significant difference between the performance of students taught with instructional pictures and those taught without it among other findings. Based on the findings, it was recommended that teachers should use instructional materials in teaching practical agriculture where practical demonstration is not visible in order to enhance effective teaching and learning among other recommendations.

Introduction

The acquisition of basic vocational knowledge, skills and attitudes to facilitate occupational efficiency requires skill-oriented teaching and learning activities. Over the years, poor performance of students in public examinations has been blamed on the wrong choice of teaching methods by teachers. Teaching and learning activities have a lot to do with other variables such as instructional materials, school environment variables, students' factors and so on. In this

study, instructional materials utilization is the main focus in order to determine their effects on the performance of the students.

Instructional materials are devices developed or acquired to assist or facilitate teachers in transmitting, organized knowledge skills and attitudes to the learners within an instructional situation (Nwachukwu, 2006). Teachers use different instructional materials to motivate learning. Teachers often make use of textbooks, charts, models, graphics, realia as well as improvised materials (Awotua-Etebo, 2001). The success in the skill and knowledge acquisition in an instructional situation depends on the suitability of the instructional material, adequacy and effective utilization of the available materials (Olaitan and Agusiobo, 1994). Also the relevance of instructional materials to the objective of the lesson and the ease of use of the instructional materials are serious considerations in instructional materials utilization to better the learner's performance.

The performance of students in Agricultural Science and Practical Agriculture in Senior and Junior Secondary Schools respectively is not encouraged (Ikot, 2008). Ikot observed that the poor performance of students in Agricultural examinations may not be unconnected with non-utilization of suitable instructional materials. Many teachers go to classes to teach Agricultural science and Practical Agriculture as liberal arts without any material to assist them or the learners. Learning is facilitated when the learners make use of at least three of the sense organs namely: seeing, hearing and touching.

Literatures in methodology of teaching or pedagogy and instructional communication have explained and illustrated the effectiveness of instructional materials as a tool for improving students' performance in the learning of difficult concepts (Ibe-Bassey 1991; Etim, 1998 and Ikot, 2008). Inspite of the role of instructional materials in facilitating learning, students have failed to acquire the needed knowledge and skills in Agricultural Science.

This study was conceived to show empirically the effects of instructional materials utilization on the performance of students in secondary schools. The problem of the study are stated as follows:

(i) What are the effects of graphic instructional materials on the performance of Agricultural Science students in Secondary Schools?

(ii) What are the effects of filmstrip instructional package on student's performance in Agricultural Science in Secondary Schools.

Studies on learning theories and skill acquisition learning revealed that a single approach or strategy cannot adequately explain the concept of how people learn, how materials should be used, how the various interactions affect learning and how best to organize the teaching and learning process (Nsa, 2012).

The development of cognitive and psycho-productive competences in learners have a lot to do with the constructivist and the pragmatic theories. Constructivists' theory is based on the assumption that learners can learn to

construct or develop knowledge as they attempt to make sense out of their experiences in the teaching-learning situation. The constructivists maintained that the goals of instruction must be stated in such a way that they will help to develop learning and thinking and to focus on learners' active construction of knowledge-base and also to encourage active enquiry.

Review of Related Literature

Instructional charts and students' performance in practical agriculture

A chart is a two dimentional object. They are flat visual materials which may represent diagrams or a combination of pictorial, graphic, numerical or verbal materials prepared to give a clear visual summary of vital processes, concepts or a set of relationships (Ibe-Bassey, 2000). Charts are used to present ideas and concepts which may be difficult to understand if presented using the verbal code only. Walter (1998) noted that the use of instructional charts in teaching improves the students' reading skill and stimulates creativity in the learners. Charts present an abstract rendition of reality because what is presented is shown as effective in the cognitive domain of learning. Okechukwu (1997) studied the impact of graphic materials on students' academic achievement in history using 925 students as the population size and 120 as sample size in an experimental study adopting 2 x 2 factorial arrangements. The findings of the study showed that students taught history using graphic materials such as charts and pictures performed better than their counterparts who were taught using lecture method without graphic materials.

Instructional Pictures and Students' Performance in Practical Agriculture

Pictures are photographic representations of objects, people, places, events, things or concepts. Pictures in this context are still or motionless objects. They may be illustrations in textbooks, periodicals, catalogues, magazines, study prints and so on. Pictures are used to communicate abstract ideas in a more realistic way (Ibe Bassey, 1991, Etim, 2006).

A good picture should have good composition, a clear message, good contrast and sharpness with effective colours (Etim, 1998). Learners can learn from good quality pictures with or without the help of teachers. According to Okechukwu (1997) students taught with instructional pictures performed better than their counterparts taught without pictures.

Filmstrip Instructional materials and students performance in Practical Agriculture

A filmstrip is a roll of 35mm transparent film containing a series of related still pictures showing one concept at a time. A filmstrip can either be of a single or double frame format (Ikot, 2008).

Filmstrip can be used to teach skills, show relationships in order to convey knowledge, to affect attitude through individual and independent study groups or other tutorial groups viewing (Ibe Bassey, 1991). In a study to determine the effects of instructional materials utilization on performance of Junior Secondary Students' in Practical Agriculture in Ikot-Abasi Local Government Area, (Ikot, 2008) adopted a quasi-experimental design using the population of 1995 students and the intact class sample size of 225 students. The findings showed that there was significant difference between the performance of students taught with filmstrip and those taught without filmstrip.

Abaas, Bimbo and Ojo (2012) in a study to determine the effects of Animated Agricultural Science instructional packages on Attitude and performance of Junior Secondary school Students in South West Area, Nigeria, discovered that the animated Agricultural Science Instructional packages significantly influenced the academic performance of the selected students. Osokoya (2007) in a study to determine the effects of video-taped instruction on Secondary School students' achievement in History discovered that there was significant difference between the mean scores of students taught history with video-taped instructional packages and those taught with the conventional lecture method.

Purpose of the Study

The purpose of this study was to determine the effects of instructional materials utilization on performance of Junior Secondary School Students in Practical Agriculture. Specifically, the study sought to:

1. determine the difference in the performance of students taught practical agriculture using instructional charts.
2. determine the difference in the performance of students taught practical agriculture using instructional pictures.
3. determine the difference in the performance of students taught practical agriculture using the instructional filmstrips.
4. determine the joint influence in the performance of students taught practical agriculture using charts, pictures and filmstrips instructional materials and those taught without them.

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significant difference in the performance of students taught practical agriculture using instructional charts and those taught without it.
2. There is no significant difference in the performance of students taught practical agriculture using instructional pictures and those taught without it.
3. There is no significant difference in the performance of students taught practical agriculture using instructional filmstrips and those taught without it.
4. There is no significant joint influence of instructional materials (charts, pictures and filmstrips) on the performance of students taught practical agriculture and those taught without them.

Research Methods

Design of the study

This is a quasi-experimental study. It used a non-randomized pretest, post-test control group design. This design was adopted to determine the effects of instructional materials utilization on students' performance. The pretest performances were used to compare the entry behaviour or previous knowledge of the groups involved in the study. It also helped to check against sampling error inherent in random sampling method which is selection based on chance. The post-test was used to assess the knowledge gained after the lessons.

Population of the Study

All Junior Secondary School Two (JSS II) Practical Agriculture students in Ikot-Abasi Local Education Committee (LEC) constituted the population for the study. The population was 1785 students in twelve schools.

Sample and Sampling Technique

The sample size for the study was 200 students purposively selected at intact classes level in five schools that had not below 40 students per class.

Research Instrument

The instrument used to collect data for the study was called 'Students Achievement test in Practical Agriculture' (SATPA). It consisted of 50 multiple choice test items. The test items were constructed by the researchers based on the topics in this study (classification and feeding of farm animals).

Validation of the Instrument

Students' Achievement test in Practical Agriculture (SATPA) was validated by three experts in the department of vocational Education, faculty of Education, University of Uyo, Uyo. These experts ensured both face and contents validity of the instruments. The inputs that they made were incorporated in order to update the final copy of the instrument.

Reliability of the Instrument

The SAPTA instrument was administered to 40 students in the school that was not used for the main study. Split-halfs method of reliability was used and the scores were computed using Kudar-Richardson formula 21 (KR-32). The reliability co-efficient obtained was 0.80.

Research Treatment Procedures

The following procedures were used in order to administer the instrument.

- Permission was obtained from principals of the selected schools
- Agricultural science teachers who were used as research assistants were trained.
- Pretest on SATPA was administered to the five intact classes selected. The pretest examination lasted for 1¼ hours.
- The scripts were collected and scored
- The trained research assistants were given the instructional packages (the lesson plans and the instructional materials) to use in teaching. The packages consisted of charts for teaching of the experimental group one; picture materials for experimental group two, filmstrips materials for teaching group three; the fourth experimental group was taught using all the instructional packages in order to determine the interactive effects, while the fifth group was the control group taught without instructional materials.
- All the groups were taught for one week of three lesson periods of 40 minutes each.

- In the second week, post-test of the SAPTA were administered to the five groups. The test lasted for 1¼ hours (1 hour 15 minutes).
- The post-test scripts were collected and marked ready for analysis

Data Analysis

A t-test and analysis of covariance were used to test the null hypotheses at 0.05 level of significance.

Data Presentation and Interpretations

Hypothesis One

There is no significant difference in the performance of students taught practical agriculture using instructional charts and those taught without it.

Table 1: A t-test analysis showing the difference between the performance of students taught using charts and those without.

Source of Variance	Groups	N	x Mean	df	t-cal	t-cri	Decision at P < .05
Pretest	Experimental	40	32.38				
	Control	40	32.00	78	0.98	1.99	N.S
Post-test	Experimental	40	58.60	78	5.83	1.99	*
	Control	40	35.93				

* Significant at P < 0.05 level of significance
NS = Not significant at P < 0.05

Table 1 shows the difference between the performance of students in both pretest and post-test examinations in both experimental and control groups. The t-test shows t-value of 5.83 in favour of the experimental group at the P value of 1.99. This means that there is significant difference between the performance of students taught with charts (experimental) over control group taught without charts in the post-test examination. The null hypothesis was hereby rejected.

Null Hypothesis 2

Table 2: A t-test table showing the differences between the performances of students taught using pictures and those taught without.

Source of Variance	Groups	N	x Mean	df	t-cal	t-cri	Decision at P < .05
Pretest	Experimental	40	37.48				
	Control	40	32.00	78	1.04	1.99	N.S
Post-test	Experimental	40	51.40	78	4.56	1.99	*
	Control	40	35.93				

NS = Pre-test is not significant at P < .05
Post-test is significant at P < 0.5 level of significance

In the post-test examinations as shown in table 2, the t-test analysis shows a t-value of 4.56 in favour of those taught using picture instructional materials. It reveals a significant difference, therefore the null hypothesis that states there is no significant difference in the performance of students taught practical agriculture and those taught without was rejected.

Null Hypothesis 3

Table 3: A t-test table showing the difference between the performance of students taught using filmstrips and those taught without

Source of Variance	Groups	N	x Mean	df	t-cal	t-cri	Decision at P < .05
Pretest	Experimental	40	37.23				
	Control	40	32.00	78	1.02	1.99	N.S
Post-test	Experimental	40	52.63	78	4.33	1.99	*
	Control	40	35.93				

NS = Pre-test is not significant at P < .05
* Post-test is significant at P < 0.5 level of significance

Table 3 shows the post-test t-value of 4.33 greater than the t-critical value of 1.99 at df of 78 and P < 0.05 level of significance. The null hypothesis that states, that there is no significant difference between the performance of students taught with filmstrips and those without was rejected.

Null Hypothesis 4

There is no significant joint influence of instructional materials (charts, pictures and filmstrips) on the performance of students taught practical agriculture and those taught without them.

Table 4: Analysis of covariance of Post-test performance of students taught using charts, pictures and Filmstrips.

Source of Variance	Sum of squares	df	Mean squares	F-cal	F-crit	Decision at P < .05
Covariates Pre-test	1438.50	1	1438.50	2.34	3.35	N.S
Main effects	2712.74	2	1356.37	16.51	3.06	*
Explained	2787.16	3	929.05	11.31	2.67	*
Residual	16047.01		82.16			

Significant at P < 0.05

Table 4 shows that the main effects of use of instructional materials (charts, pictures and filmstrips) was significant at P < 0.05 level of significance, having revealed a calculated F-value of 16.51 over the critical F-value of 3.06. Thus the null hypothesis of no significant joint influence of instructional materials on student's performance in practical agriculture was rejected.

Findings of the study and Discussions

In testing null hypothesis one, the t-test analysis showed that there was a significant difference between the performance of the students taught with charts and those taught without charts. The finding in hypothesis one is in support of Ibe-Bassey (2000) who asserted that instructional charts appeals to the sensory organs and also enables learners to draw relationship between the various concepts taught.

In null hypothesis two, the analysis indicated a significant difference between the performance of students taught with instructional pictures and those taught without pictures. The finding in hypothesis two agrees with Etim (2006) that learners can learn more easily and retain the information longer when concepts and other subject matters are presented using instructional pictures.

Null hypothesis three showed that there was significant difference between the performance of students taught practical agriculture using filmstrips and those taught without filmstrips. This finding is in support of Osokoya (2007) and Abass, Bimbo and Ojo (2012) that students taught history using video-taped materials and students taught practical agriculture using animated instructional materials performed better than their counterparts taught using only lecture method.

In testing null hypothesis four, the analysis indicated that there was a significant difference between the performance of students taught practical agriculture using charts, pictures and filmstrips over their counterparts taught

without instructional materials. The significant difference may be attributed to the use of materials/treatment that is the use of instructional materials which offered close representations of ideas and concepts unlike teaching without those representations but as abstract concepts. The finding in hypothesis four is in line with Ibe-Bassey (2000); Etim (2006); Osokoya (2007) and Abaas, Bimbo and Ojo (2012) who indicated that students taught using charts, pictures, filmstrips, video taped materials and animated materials performed better than their counterparts taught using conventional lecture method.

Conclusion

Students taught practical agriculture using instructional charts, pictures and filmstrips performed significantly better than students taught without instructional materials.

In the process of teaching/learning, instructional materials that were used facilitated students understanding by supplementing, clarifying, revitalizing and emphasizing the teacher's verbal efforts. This goes along way to encourage the acquisition of knowledge, ideas, skills and attitudes in each learning activity.

Policy Implications

The role of instructional materials in the teaching/learning process cannot be overemphasized. They facilitate and encourage self-study or independent study in students. The finding of this study has shown that inadequate use or lack of use of instructional materials in the teaching/learning situation (lecture method) negates the objective of teaching. Teachers who do not make use of instructional materials hide in the cover of none supply of the teaching resources. Therefore, as a matter of policy implementation, the governments at all levels should supply regularly standardized instructional materials, some useful hard and soft wares for use in schools. The vocational, technology and science teachers should be trained, retrained and exposed regularly to make them to be up to date in the effective selection and utilization of instructional materials for effective teaching.

Recommendations

Consequent upon the conclusion of this study based on the findings, the following are recommended:

- Science, vocational and technology teachers should be resourceful in the selection and utilization of instructional materials that are useful in the concepts that they teach in each lesson.

- The teachers should be made to update their knowledge and skills in improvisation of instructional materials through seminars, workshops and conferences organized by governments and professional bodies.
- Teachers should develop positive attitudes towards the selection and use of instructional materials for teaching/learning.

References

Abass, B. T.; Bimbo, A and Ojo, A. O. (2012). Effects of animated agricultural Science Instructional Package on attitude and performance of Junior Secondary School Students in South-West Nigeria. *Mediterranean Journal of Social Science.* Vol. 3(1) pp. 425-435.

Awotua-efebo, E. B. (2001). Effective teaching: Principles and Practice, Port Harcourt, Para graphics.

Etim, P. J. (1998). Instructional Modules development for improving Agricultural Science Education in Nigerian Secondary Schools. *African Journal of Education and Information Management 1. (1)*

Etim, P. J. (2006). Issues in Educational Technology, Uyo. Abaam Publishing Company.

Ibe-Bassey, G. S. (1991). The Selection and use of Instructional materials. Implications for teachers' Effectiveness. *Journal of Educational Media and Technology 3(1) 66-86.*

Ibe-Bassey, G. S. (2000). Principles and Practice of Instructional Communication, Uyo: Dorand Publishers.

Ikot, A. S. (2008). Effects of Instructional Materials Utilization on performance of Junior Secondary Students in Practical Agriculture in Ikot-Abasi Local Government Area. Unpublished M.Sc. (ed) Thesis. University of Uyo, Uyo.

Nsa, S. O. (2012). Instructional Strategies and Students Skills Acquisition in vegetable production. *Journal of Business and Economic Review* Vol. 3(1).

Nwachukwu, C. E. (2006). Designing Appropriate Methodology in Vocational and Technical Education for Nigeria, Nsukka, University, Trust Publishers.

Okechukwu, A. R. (1997). The Impact of graphic materials on students' academic achievement in History. Unpublished M.Sc. (ed) Thesis. University of Uyo, Uyo.

Olaitan, S. O. and Aguisiobo, O. N. (1994). Teaching of clothing and Textile. New York John Wiley and Sons Publishers.

Osokoya, I. O. (2007). Effects of Video taped Instruction on Secondary School Students' Achievement in History, *International Journal of African and American Studies.* 6(1) pp.27-34.

Walter, A. U. (1998). Audio Materials: Their nature and use. New York, Harper and Row Publishers.

Implementation of Public Private Partnerships in Technical and Vocational Education in Nigeria

Bernard Numgwo Atsumbe, Raymond Emmanuel, and Ayanda Samuel Owodunni
Federal University of Technology, Minna, Niger State, Nigeria
Benjamin Senchi Bargu
Ministry of Science and Technical Education, Kebbi State, Nigeria

Abstract

This study focused on the implementation of public private partnership (PPP) strategies in technical and vocational education in Nigeria. Three research questions guided the study. A descriptive survey design was employed and sample for the study comprised of 270 staff of technical colleges and higher institutions where technical education program are offered in Niger and Kaduna states. The instrument for data collection was face validated by 3 experts in technical education from federal university of technology, Minna. A reliability coefficient of 0.71 of the instrument was determined using Cronbach alpha. Data were analyzed using mean and standard deviation. The results showed that the implementation of PPP has numerous challenges. It was recommended that PPP strategies should be utilized in the provision of infrastructure and services in technical and vocational education in Nigeria.

Keywords: *Partnership, technical colleges, technical education, vocational education, services*

Introduction

Public private partnership (PPP) is a sustainable effort between the public and private sectors in which each contributes to planning and resources needed to accomplish a mutually shared objective (Asian Development Bank, 2012). The term PPP describes a range of possible relationships among public and private entities in the context of infrastructure and other services. Public private partnership according to Dolapo (2009) is a contractual arrangement between a government agency and a private sector/non-governmental/civil society that allows for greater private sector participation in the delivery of infrastructure or

services. It is about how government services is funded and operated through a partnership of government and private sector companies. The aims of PPP include mobilization of private investment for infrastructure development, socio-economic growth, poverty reduction and provision of needed services. Dolapo further stated that PPP is carried out in order to provide infrastructure and services in various areas such as agriculture, sport, housing, micro-finance (economy), health, education etc.

The objective of PPP in education sector is for the provision of educational facilities, educational services, operational services, management services and professional services. When these facilities and services are provided through PPP, experts are of the view that it may lead to effective and efficient governance. Other advantages of the PPP in the education sector include: (a) private sector (non-governmental organizations or civil society organizations) brings resources and expertise that government lacks. (b) it enhances acceptance by private sector to venture into societal development where they are stake holders. (c) risks are allocated to those best able to handle them. (d) future funds are not tied up in servicing depts. (e) it increases government's capacity to invest. (f) it leads to greater budget transparency. (g) infrastructure/services are delivered when they are needed. (h) it ensures accountability and (i) it encourages customer service orientation with respect to public services.

In the light of these laudable merits of PPP in the education sector, it becomes very necessary for it to be adapted and effectively implemented in technical and vocational education and training in Nigeria given the glaring challenges of poor funding and inadequate facilities in the sector that has arise partly due to the expensive nature of technical and vocational education. Technical and vocational education (TVE) according to United Nations Educational Scientific and cultural organization (UNESCO) (1999) refers to those aspects of the educational process involving in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Specifically, FGN (2004) define technical education as that aspect of education that leads to the acquisition of practical and applied skills as well as basic scientific knowledge. It is a planned programme of courses and learning experiences that begins with exploration of career options, support basic academic and life skills, and enables achievement of high academic standards, leadership and preparatory for industry-related work. This type technical education is commonly found in tertiary institutions in Nigeria. On the other hand, vocational education and training prepares learners for careers that are based in manual or practical activities related to a specific trade, occupation or vocation. This kind of training is com-

monly found in technical colleges. Okoro (1999) viewed technical college as vocational institutions where skills are imparted to trainees in various trade areas. Hence, in this study, those responsible for the training of students in technical colleges are referred to as vocational educators

TVE is known to increase productivity of individuals, profitability of employers and expansion of national development. A knowledgeable workforce, one that is both highly skilled in a particular occupation and also exhibits flexibility is seen as the most important human capital required for the development of a country (Berlia, 2012). This can be achieved with a well implemented TVE because it is basically occupational in nature which makes individuals self-reliant. This implies that the acquisition of occupational skills in TVE will improve the standard of living of it recipients and by extension improve national development. Based on the importance of TVE to national development, Okpor & Hassan (2012), opined that sustainable access to technology development in Nigeria can best be achieved through PPP with technical and vocational education. However, the authors were quick to add that PPPs are still at infancy stage in Nigeria. In the same vein, UNESCO (1999) stressed that due to the challenges of poor funding and inadequate facilities in TVE, government and non-governmental organizations, private firms and private individuals should make a collective effort in improving education in this sector through the formulation and effectively implementation of PPP goals and strategies.

The PPP strategies that are implementable in TVE include but not limited to the following: provision of facilities and machineries for improving skill training in TVE institutions, provision of training in various trades of TVE, and provision of other services. If these strategies are being adequately implemented in TVE since the inception of PPP in Nigeria, the nation should have started feeling the impact of PPP in the sector as well as experiencing a more speedy technological development by now. However, it appears that the positive impact of the PPP in TVE has not been adequately felt in Nigeria given the teaming unemployed youths rooming the streets due to lack of employable skills. Could it be that the PPP arrangements are not adequately implemented in Nigeria?. This study therefore, sought to investigate the implementation of PPP in TVE in Nigeria.

Purpose of the Study

The purpose of this study is to determine the extent to which PPP strategies are implemented in TVE by stakeholders for improving skill training in Nigeria.

Research Questions

The following research questions guided the study:
To what extent are PPP strategies implemented in TVE in Nigeria?
What are the challenges to the effective implementation of PPP in TVE?
What are the strategies that could be employed to enhance effective implementation of PPP in TVE?

Research Methods

The study adopted the descriptive survey design. Survey researches according to Best (1997) involves assessing behaviours, preferences, perceptions and opinions of a sample. The population of the study consists of 541 staff of technical colleges and higher institutions where technical education programme is offered in Niger and Kaduna states. The population distribution is as follows; 235 staff of six technical colleges in Niger state, 26 technical education lecturers in Federal University of Technology, minna in Niger state, 250 staff of five technical colleges in Kaduna state and 30 technical education lectures of Kaduna polytechnic in Kaduna state. 50% of the staff in each institution was sampled using the simple random sampling technique. This gave a total of 270 staff. Data was collected using a 48-items questionnaire designed by the researcher and known as public private partnerships implementation instrument (PPPII). The PPPII was made up of three sections: A, B & C based on research questions 1, 2 and 3 respectively. In section A, the PPPII was structured using the four point rating scale of Very High Extent (VHE), Moderate Extent (ME), Low Extent (LE) and Very Low Extent (VLE). While in sections B & C, the PPPII was structured using the four point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). These ratings have weights of 4, 3, 2 and 1 beginning from the highest to the lowest respectively. The instrument was face validated by three experts in technical education in Federal University of Technology, Minna and their comments and suggestions were considered in preparing the final draft of the instrument. The instrument was trial tested in Government Technical College, Bunza and data collected were used to determine internal consistency of the items of the instrument using the Cronbach alpha method which resulted to a reliability coefficient of 0.71. Data collected for the study were analyzed using mean and standard deviation for the research questions. The four point scale was statistically interpreted as follows: VHE&SA=3.00-4.00, ME&A=2.00-2.99, LE & D=1.00-1.99 and VLE&SD=0.01-0.99.

Results

Research Question 1

To what extent are PPP strategies implemented in TVE in Nigeria?

The result that emerged from table 1 shows that all the PPP strategies are being implemented to a low extent with means ranging from 1.00 - 1.99 except for items 3,5 & 12 which are being implemented at moderate extent with a mean rating of between 2.00-2.90. Item 5 On the organization and sponsoring quiz and debate programmes as well as speech and prize given days in schools was agreed by respondents as most implemented while items 2, 9, & 10 on Provision of opportunities for TVET Teachers to regularly update their work-place experience, Provision of operational services such as cleaners and school wardens and Provision of scholarships to deserving and hardworking students were regarded as not implemented respectively.

Table 1: Mean Responses of Staff on the Extent of Implementation of PPP Strategies in TVE in Nigeria.

S/No	ITEMS	Technical Educators			Vocational Educators		
		X	SD	DEC	X	SD	DEC
1	Provision of training in various vocational trades for local artisans and the teaming unemployed youths	1.66	0.40	LE	1.36	0.31	LE
2	Provision of opportunities for TVET Teachers to regularly update their workplace experience	1.33	0.35	LE	1.04	0.28	LE
3	Provision of opportunities for Industrial attachment for students	2.11	0.53	ME	2.90	0.38	ME
4	Provision of facilities such as water, electricity, classrooms and hostels in various institutions for effective training of students	1.61	0.23	LE	1.90	0.36	LE

5	Organization and sponsoring quiz and debate programmes as well as speech and prize given days in schools	2.82	0.21	ME	2.90	0.46	ME
6	Provision of tools, equipment and instructional materials for effective teaching and learning	1.91	0.52	LE	1.99	0.49	LE
7	Provision of security outfit to help in effective school management	1.66	0.68	LE	1.82	0.53	LE
8	Facilitation and provision of professionals in various trades to deliver talks on speech in prize given days of schools	1.51	0.46	LE	1.76	0.58	LE
9	Provision of operational services such as cleaners and school wardens	1.44	0.35	LE	1.32	0.30	LE
10	Provision of scholarships to deserving and hardworking students	1.64	0.30	LE	1.23	0.41	LE
11	Provision of experts or professional in management to educate/ train managers of TVE in order to improve poor management	1.94	0.70	2.00	1.88	0.69	LE
12	Attachment of Technical and Vocational Education students to enterprises for practical work experience	2.32	1.00	ME	2.00	189	ME
13	Interaction between teachers and relevant company officers to draw up result oriented attachment programmes for students	1.99	0.74	LE	1.76	0.67	LE

14	Provision of maintenance services for existing facilities in Tech. & Voc. Institutions for effective training purpose	2.11	0.88	ME	1.93	0.77	LE
	GRAND MEAN	1.65	0.87	LE	1.45	0.88	LE

Research Question 2

What are the challenges to the effective implementation of PPP in TVE in Nigeria?

Results emerging from table 2 indicated that respondents disagreed with items 4 and 11 on Inability to find the right partners and Lack of local talent in the area of technical and structuring competence respectively as least challenges but they agreed with all other items posed to them as challenges to the implementation of PPP in technical and vocational education in Nigeria. Items 13 & 7 on Implementation of PPP projects in Nigeria is affected by the fact that PPPs are relatively new phenomena in the country and Sidelining of TVET teachers when articulating the framework of PPP respectively were identified as major challenges to effective implementation of PPP in TVE in Nigeria. See table 2 for details.

Table 2: Mean responses of staff on the challenges to the effective implementation of PPP in Nigeria

S/No	ITEMS	Technical Educators			Vocational Educators		
		X	SD	DEC	X	SD	DEC
1	Lack of political will for proper implementation of PPP.	3.23	0.86	SA	3.22	0.80	SA
2	Misconception of the terms of PPP	3.17	0.85	SA	3.31	0.67	SA
3	Fear of Risk of Failure by parties involved.	3.41	0.72	SA	3.11	0.76	SA
4	Inability to find the right partners	1.09	0.43	D	1.23	0.54	D
5	Stringent legal process involved in partnership arrangements.	2.04	0.54	A	2.44	0.43	A
6	Lack of clear understanding of government objectives in TVET	3.56	0.86	SA	3.61	0.71	SA

7	Sidelining of TVET teachers when articulating the framework of PPP	3.66	0.85	SA	3.81	0.77	SA
8	Perceived lack of transparency in PPP	3.00	0.69	SA	3.05	0.80	SA
9	Inattentiveness on the part of government to partnering opportunities	2.03	0.47	A	2.99	0.78	A
10	Misconceived notion that PPP weakens the government's ability to implement its policies	0.91	0.67	SD	0.86	0.75	SD
11	Lack of local talent in the area of technical and structuring competence	1.03	0.62	D	1.22	0.68	D
12	Lack of adequate comprehension of the fundamentals of PPP by participants (government & private sector)	3.44	0.76	SA	3.56	0.72	SA
13	Implementation of PPP projects in Nigeria is affected by the fact that PPPs are relatively new phenomena in the country.	4.00	0.81	SA	4.11	0.61	SA
14	Leadership and management in PPP not fulfilling contractual agreement	2.91	0.56	A	3.11	0.64	A
15	Insufficient participation of the private sector in the PPP relationships	3.02	0.59	SA	3.21	0.54	SA
16	Inadequate follow-up/ motivation by government agencies to encourage/ forge cooperation	3.33	0.66	SA	3.51	0.77	SA

17	Lack of knowledge/ appreciation of the immense longer term benefit of PPP.	3.41	0.87	SA	3.22	0.74	SA
18	Many people exploit the PPP arrangement as a means of cheap labour or a means of making money.	3.55	0.53	SA	3.24	0.63	SA
	GRAND MEAN	3.45	0.71	SA	3.53	0.82	SA

Research Question 3

What are the Strategies to enhance PPP implementation in TVE in Nigeria?

The data on table 3 showed that respondents agreed that the strategies presented could be adopted as means of enhancing the implementation of PPP in TVE in Nigeria. The most accepted strategies by the respondents are items 3, 16 & 8, which emphasized that TVET teacher and other stakeholders, should be involved in articulating the framework of PPP, Holding workshops/seminars to sell benefits of PPP and Creating an enabling institutional environment in which partnering relationships can flourish respectively. See table 3 for details. This implies that these strategies if adapted, they could lead to improve implementation of PPP in TVE in Nigeria.

Table 3: Mean responses of staff on the strategies to enhance PPP implementation in TVE in Nigeria

S/No	ITEMS	Technical Educators			Vocational Educators		
		X	SD	DEC	X	SD	DEC
1	Allocate risks and responsibilities to parties best able to handle them.	3.00	0.76	SA	3.02	0.69	SA
2	Mutual objectives and goals of the partnerships should be properly articulated to all stakeholders.	2.79	0.42	A	3.22	0.45	SA
3	TVET teachers and other stakeholders should be involved in articulating the framework of PPP.	3.99	0.77	SA	3.98	0.67	SA
4	Government to create enabling environment for partnership	2.80	0.48	A	2.98	0.54	A
5	Provision of the right political will	3.00	0.24	SA	3.30	0.68	SA
6	Establishing enabling legal institutional and regulatory framework	2.43	0.39	A	3.76	0.33	SA
7	There should be quality control and standard setting in the PPP project	2.91	0.34	A	2.34	0.24	A
8	Create an enabling institutional environment in which partnering relationships can flourish.	3.78	0.33	SA	3.67	0.34	SA
9	Identify areas in government where impediments to partnerships may exist.	3.20	0.61	SA	2.64	0.43	A

10	Recognize and acknowledge publicly the valuable contributions that current private sector partner's organizations make to the government.	2.80	0.39	A	3.42	0.56	SA
11	Government to develop and support clear policies that encourage partnership building	3.10	0.29	SA	3.00	0.65	SA
12	Identify existing non-partnered government programmes that could benefit from partnerships.	3.57	0.38	SA	2.96	0.41	A
13	Promote continued dialogue among all stakeholders to define the common goals and remove potential obstacles to partnerships.	2.93	0.41	A	2.39	0.70	A
14	Set the tone for transparency by creating solid financial and technical regulatory frameworks.	3.30	0.66	SA	2.98	0.55	A
15	A fair amount of Education & communication in both Public & Private sector should be encouraged.	2.30	0.36	A	2.63	0.65	A
16	Hold workshops/seminars to sell benefits of PPP.	3.67	0.29	SA	3.68	0.62	SA
	GRAND MEAN	3.07	0.46	SA	3.05	0.22	SA

Discussions

The findings of this study revealed on table 1 that most of the PPP strategies are implemented at a low and moderate extend. Furthermore, the grand mean of the responses of respondents shows that the PPP is not adequately implemented in technical and vocational education in Nigeria. This finding is not surprising, given the challenges faced by technical and vocational educators in imparting this type of education in the country. Okpor and Hassan (2012) stated that for effective implementation of technical and vocational education in Nigeria, it is necessary to involve the PPP to aid in the provision of facilities and services. In the same vein, Alitheia Capital Real Estate (ACRE) (2010) maintained that the PPP is the answer to Nigeria's infrastructure and services delivery problems. Ogwo and Oranu (2006) also noted that the implementation of the objectives of technical and vocational education in Nigeria is not being adequately achieved because of lack of necessary facilities and services. Hence, the need for the effective implementation of PPP strategies in the provision of infrastructure and services in technical and vocational education in Nigeria.

Findings emanating from table 2 show a whole lot of challenges to the implementation of PPP in technical and vocational education in Nigeria. Out of these challenges, respondents rated the newness of PPP in Nigeria as the biggest challenge with a mean rating of 4.00 and 4.11 for technical and vocational educators respectively. While it is true that PPP transactions are relatively new in Nigeria when compared to some other countries, it has been noted by Alitheia Capital Real Estate (ACRE) (2010) that in the last decade, over twenty-five (25) major infrastructure projects have been rolled out through PPPs. It was added that the federal government of Nigeria, state and local government areas (LGAs) have contributed over N10 trillion to this. This is quite encouraging given the scenario of the situation on ground. However, a whole lot more need to be done in other to enhance the transactions of PPP in Nigeria especially in technical and vocational education.

Findings in table 3 showed that respondents agreed with all the items presented as a means of reducing the challenges militating against effective implementation of PPP in technical and vocational education. However, respondents strongly believe that if TVET teachers are adequately involved in articulating the framework of PPP it will go a long way in reducing the challenges to effective implementation of PPP in technical and vocational education.

Conclusion and Recommendations

Based on the findings of this study, it can therefore be concluded that even though PPP is not adequately implemented in TVE, the PPP remains the best approach to delivering infrastructure and services in technical and vocational education in Nigeria, This can be explained by the fact that TVE is capital intensive as such government alone cannot adequately fund this type of education. Therefore, if the much-needed technological and economic development must be achieved and sustained, the PPP arrangement seems to be the most viable option in TVE and other sectors in Nigeria. Based on the findings of this study, the following recommendations were made:

1. PPP strategies should be highly utilized in providing infrastructure and services in technical and vocational education and the needs of other sectors of the economy in Nigeria.
2. All stakeholders in PPPs including TVE teachers should be involved in articulating PPP objectives especially in TVE and work towards implementing it.
3. Government should create enabling environment for PPP to flourish in technical and vocational education

References

Alitheia Capital Real Estate (ACRE). (2010). Public Private Partnership is the answer to Nigeria's Infrastructure problems. Retrieved 2nd August, 2012 from: www.acre.org

Asian Development Bank. (2012). Public-Private Partnership Hand book. Retrieved 1st September, 2012 from: www.adb.org

Best, J.W. (1997). *Research in Education.* New Jersey: Prentice Hall

Berlia, S. (2012). Technical Vocational and Training: Existing Systems, Schemes, Models and Best Practices. Retrieved August 10th 2013 from www.aserf.org.in/articles/Paper_TVET.doc

Dolapo, K. (2009). *Design and Implementation of Public Private Partnerships (PPPs) in Education Case Study- Technical and Vocational Education*. Lagos: Supreme Management Training and Consultancy Public-Private Partnership.

Federal Government of Nigeria (FGN) (2004). *National Policy on Education*. (4th Ed). Lagos:NERDC Press.

Ogwo,B.A & Oranu,R.N.(2006). *Methodology in Formal and Non-formal Technical/Vocational Education.* Nsukka: University of Nigeria Press Ltd.

Okoro,O.M. (1999). *Principles and Methods in Vocational and technical Education.* Nsukka: University Trust Publishers.

Okpor,I & Hassan, N. (2012). Public Private Partnership for Skill Acquisition and Vocational Technical education Development in Nigeria. *Mediterranean Journal of Social Sciences*. 3(4), 91-94.

UNESCO. (1999). New Trends in Technical and Vocational Education series: "Getting the Stakeholders Involved; Partnership at Work in Three countries from Africa, Asia and Eastern Europe". ISBN: 92-803-1181-6. Paris

Making the Case for Career Development Opportunities in High School

Davison M. Mupinga & Patrick J. O'Connor
Kent State University, USA

Abstract

Students need guidance on their goals or career plans so that their educational experiences have focus and meaning. Career development is one approach that aligns school with careers thereby help students make seamless transitions from one school level to another or from school to the workplace. However, current practices seem to place little or no importance on career development in high schools (Hurley & Thorp, 2002). This article argues for providing career development opportunities at the secondary level. It describes the concept of career development, its rationale, and current status in high school. The intent is to provide US school districts with a rationale to begin thinking of how career development opportunities can be integrated into the high school curriculum.

Key words: *career development; high school, career planning; guidance; workforce development*

Introduction

Career development refers to any systematic efforts to establish and refine a worker's identity through exploring, committing to, and reconsidering career alternatives across the life span (Hynes & Hirsch, 2012; Porfeli & Lee, 2012). Such efforts, which can be through stand-alone programs or components of specific programs, can include career exploration, job searches, supervised work experiences, and technical skill development. Currently, efforts are being made at the elementary and high school levels, in out-of school programs, workforce development programs, employment, and higher education to prepare individuals to make better occupational decisions as well as prepare them for the workforce. Better decision making could lead to finding a job or choosing an occupation for which one is better suited, thereby increasing the chance of sticking with it. Given that human capital is a prerequisite for economic

success, any country's competiveness becomes questionable whenever poorly prepared students are fed into the workplace (Alliance for Excellent Education, 2008). The lack of career guidance for high school students certainly contributes to graduates who do not have skills needed by the employers. In fact, employers have referred to the failure of schools to equip teenagers with the basic skills they need for work a "national scandal" and they urged curriculum reform (Lipsett, 2007). In a recent conversation with a college admissions counselor, it was evident that even high school graduates interested in pursuing further education were underprepared and some even walked into admission interviews with very little or no knowledge of the institution or program. Also troubling was the fact that some high school students "did not have the prerequisite courses for the academic or technical programs they desired to study" (J. Smith personal communication, October 15, 2013). It, therefore, does not matter whether students are proceeding on to higher education, occupational training or workforce; they need career guidance.

Today's employers report difficulties finding competent and creative workers needed to compete in the global economy (Symonds, 2012). This situation is primarily caused by a mismatch between the qualifications of potential employees and the skills and competencies needed for particular jobs (McKinsey Global Institute, 2012). According to future job projections, 30 % of jobs will require some post-secondary education but not necessarily a bachelor's degree while 33% will require a bachelor's degree or higher (Carnevale, Smith, & Strohl, 2010). However, the norm is to push students to complete a 4-year degree despite the fewer job opportunities upon graduation. Even more unsettling is the notion of a one-size fits all approach—where college is for everyone. However, the success of US schools in producing college graduates has declined considerably in recent years. One source reports that the US has dropped from number 1 to number 15 in the world in college attainment (Carville & Greenberg, 2012). With businesses calling for more properly trained workers, many are questioning the value of a traditional four-year college education.

Besides, not many high school students are enrolling in post-secondary education and those who enter post-secondary institutions do not complete a degree. According to the U.S. Department of Education (2011), 55% of those entering four-year colleges as full-time students complete their degrees within six years, while only 27% of those entering two-year institutions complete degrees or certificates within an appropriate timeframe. Also, there is a growing trend called 'reverse transfer' where students go back to earn an associate degree after getting their bachelor's degree. This switch from a 4-year to a 2-year program and lack of completion of educational programs may indicate lack of proper planning; and essentially results in wasted time and money for these students thus creating what Bill Symonds calls a "wasted generation" (Houghton, 2012).

What also makes the lack of career direction cause for concern is the high cost of higher education, very competitive and scarce job opportunities, and the student debt and financial burdens which are at their highest (Syre, 2012). Perhaps the percentage of students who do not complete respective post-secondary education may be better saved by alternative experiences. Students can be exposed to alternative experiences through carefully designed career development programs before they graduate from high school. Unfortunately, these days, many high school students are not getting the guidance on their goals or career plans they deserve because very few schools provide career development opportunities.

Rationale for Career Development

Most students can describe what they are studying or doing or "taking." However, they have a difficult time describing what they are learning, why they are learning the material, or how they can use the material outside the classroom. For instance, when asked why they are doing an assignment, a common response is, "Because it's required," or "Because the teacher told me to." Some students may indicate that they need it for college. Few students will relate the assignment to the acquisition of knowledge or skills that lead to successful adulthood. They do not connect what they are doing in school with their lives after school. Perhaps this problem is caused by educators who do not explain the relevance or application of what they teach to the outside world. Through career programming, better thought of as a framework that "helps bring schools, community-based organizations, extracurricular activities, and employers together to support youth development" (Hynes, 2012), schools can provide the much needed career direction. The Center on Education and the Workforce at Georgetown University did a study on the preparation of young people for careers and identified two main facts: 1) "the ability of individuals to connect education, training and careers has become key to employability" and 2) "in spite of its growing importance, our ability to match education alternatives with career option is woefully underdeveloped" (Carnevale, Smith & Strohl, 2010).

It is important for school leaders to identify ways to restructure the experiences secondary students have regarding career development. The following ten points illustrate the need for career development:

i) Unprepared graduates – According to Race to Nowhere data, students (except those in career and technical education [CTE]) are not prepared for anything after high school
ii) Job opportunities for students with little career development are limited and decreasing

iii) It takes students with little preparation longer to find a job leading to greater unemployment and for longer time periods.
iv) The amount of remediation in higher-education continues to increase
v) The most negative post-graduation outcomes are with minority students.
vi) Most students who receive career development are in CTE programs
vii) There is no assortment of career development services available to meet the various needs of different student groups
viii) Many minority and at-risk students are not in CTE programs and they receive very little career development information and/or experiences
ix) Personnel and resources available to support career development are limited
x) Common core and academic expectations/requirements are increasing

Current Status of Career Development

Despite the rationale for career development outlined in the above paragraphs, there is so much variation on the practices on the ground. Traditionally, the task of planning students' career has been the responsibility of guidance counselors. By virtue of their training, school or guidance counselors, in some cases, career counselors, have been a vital piece of the college-readiness puzzle for high school students. They have assisted high school students to decide what careers they were interested in and appropriate for them, and helped map out plans for students to reach their desired goals. However, this is no longer the case. While guidance counselors are still in available in secondary schools, their responsibilities have changed. According to Sheehy (2012), the counselors are now tasked with clerical duties, stealing their focus from student achievement. Furthermore, some counselor-to-student ratios of about 1:500 (Greene & Greene, 2004) make it difficult to effectively assist students to develop their career plans. Another disturbing situation seen in the jobs performed by guidance counselors is that high schools are not effectively using them (College Board, 2012; DeNisco, 2013). For instance, in a 2012 survey of 806 middle school and 2,084 high school counselors, about 70 percent of high school counselors were tasked with administrative and clerical duties while 60 percent of them were tasked with test coordination (College Board, 2012). While schools assign responsibilities as they see fit, it may be a waste of resources to assign school counselors to mundane administrative tasks. One expert, Martin, observed that "school counselors … are required to have a master's degree, while teachers are not…[therefore] to assign the kinds of clerical, low-level duties that school counselors are doing across the country is a terrible underutilization of a really, really critical force of people that could be redeployed to do meaningful … things for students" (Sheehy, 2012). It is apparent that school counselors' daily tasks don't allow them to put their skills to work.

Appropriate Role for Career Development in High School

The appropriate role is to provide a variety of programs and services to students in secondary school. Schools need an assortment of services designed to meet the needs of multiple student groups. Regardless of a student's immediate plans from high school, career development programming is needed. In fact, a school should consider offering a continuum of career development programs, activities and services ranging from support for students who drop-out of high school to those planning for professional careers years into the future.

In addition, career development programming should equip students to adjust to changes that occur after high school. Students should prepare for multiple outcomes, for example, the university students should also prepare for immediate employment as they will most likely work while in college and may need immediate employment should they leave college early for any reason.

Students' experiences after high school can change and they must be equipped to make appropriate changes. There are, for example, 37 million Americans who have college credits but no degree (Merisotis, 2012). Where does the student who drops out of college go? Also, it is estimated that students will change jobs as many at 10 times in their work career. This job change indicates that students will be using job searching and preparation skills throughout their lifetime.

There are multiple student groups in high schools with varying needs and each group needs career development information and services specific to their needs. Each group will have different expectations and outcomes for their after high school plans, with some groups having multiple outcomes. The following seven student groups account for most of the students in a high school;

- students with disabilities
- students at-risk of dropping out of high school
- students planning for immediate employment after high school
- students with post-secondary goals for apprenticeships or diploma programs
- student planning to enter the military
- students planning for an associate degree at a two-year college
- students planning to attend a university.

Each of these groups has unique needs and there is need to take into account these needs when designing career development opportunities.

Conclusion and Recommendations

From the arguments presented, many employers and educators agree on the need for career development opportunities in high school. Given the increased enrollments, limited time and personnel resources common in today's schools, the key issue becomes how to provide career development opportunities. Obviously, the

approach where one individual, the career guidance counselor, is responsible for career development programs is no longer feasible. Therefore, to provide meaningful career development opportunities to all high school students, schools may need to look at using the existing classroom teachers and staff. For teachers, this suggestion does not imply adding something new to what the teachers do, but modifying how teachers currently teach their subjects. Fortunately, many career and technical education programs have traditionally provided career development opportunities to their students; and these programs could serve as models for other academic programs. At this point, not providing students with the necessary career development opportunities is detrimental to them.

This article makes the case for an important role for career development in secondary education. The current situation and rationale for career development indicate a need to be addressed. School districts need to mobilize their resources and re-establish priorities to include this important area in the education and lives of young people. This article sets the stage for a second article that describes a process US school districts can employ to deliver meaningful information and programming in career development.

References

Alliance for Excellent Education, (2008). How does the United States stack up? *International Comparisons of Academic Achievement, Fact Sheet.* Retrieved from http://www.all4ed.org/files/IntlComp_FactSheet.pdf

Carnevale, A., Smith N., & Strohl, J. (2010). Help wanted: Projections of jobs and education requirements through 2018, Center on Education and the Workforce, Washington, DC, Georgetown University

Carville, J., & Greenburg, S. (2012). *It's the middle class, stupid!* Penguin Group, New York, NY.

CollegeBoard, (2012). The College Board 2012, national survey of school counselors and administrators report on survey findings: Barriers and supports to school counselor success. Retrieved from http://media.collegeboard.com/digitalServices/pdf/nosca/Barriers-Supports_TechReport_Final.pdf

DeNisco, A. (2013, February 13). School counselors underutilized, survey says. Retrieved from http://www.districtadministration.com/article/school-counselors-underutilized-survey-says

Greene, H., & Greene, M. (2004). The endangered college counselor. *University Business, 7,* 21-24.

Houghton, K. (2012, May 26). Speaker tells education summit it's not the economy, it's the work force. Retrieved from http://www.unionleader.com/article/20120526/NEWS02/705279934&template=mobileart

Hynes, K., & Hirsch, B.J. (eds)., (2012, Summer). Next steps for research and practice in career programming: Career Programming: Linking Youth to the World of Work, *New Directions for Youth Development Summer, 2012 (134)*,107-114.

Hurley, D., & Thorp, J. (Eds) (2002). Decisions Without Direction: Career Guidance and Decision-Making Among American Youth. Retrieved from http://www.constructmyfuture.com/Teachers/Resources/PDF/dwd.pdf

Lipsett, A. (2007, August 23). Employers bemoan teens' lack of skills. *Education Guardian,* Retrieved from http://www.theguardian.com/education/2007/aug/23/schools.uk1

McKinsey Global Institute, (March 2012). Help wanted: The future of work in advanced economies. Retrieved from http://www.mckinsey.com/Insights/MGI/Research/Labor_Markets/Future_of_work_in_advanced_economies

Merisotis, J. (2012, January 19). The Critical Connection between the Higher Education and the American Dream, *The Huffington Post.* Retrieved from http://www.huffingtonpost.com/jamie-merisotis/the-critical-connection-b_b_1215874.html

Porfeli, E.J., & Lee, B. (2012, Summer). Career development during childhood and adolescence. *New Directions for Youth Development, 134,* 11-22

Sheehy, K. (2012, November 30). Report: High school guidance counselors underutilized. *US News.* Retrieved from http://news.yahoo.com/report-high-school-guidance-counselors-underutilized-171336466.html

Syre, S. (2012, June 12). The real cost of higher education in Mass. Retrieved from http://www.bostonglobe.com/business/2012/06/12/the-real-cost-higher-education/4a5stX6TtgFwwOVSsFxo3N/story.html

Curricula Development: The Russian Perspective

Olga Oleynikova
Centre for VET Studies, Russian Federation

Abstract

The article describes a paradigm shift in the design and development of TVET curricula under the influence of developmental changes relating to the transition from the industrial to the postindustrial paradigm (European Commission, 2010). The method resulting from the re-thinking of the role of TVET in the knowledge-based globalized society is called the functional analysis method. It integrates three key components namely; i) the requirements of the employment, both current and anticipated, ii) a flexible curricula structure and content that can be modified to the changing situation, and iii) the assessment specification that links the first two. The article also shows examples of positive changes in the use of this method as observed in Russia.

Key words: *curriculum design, functional analysis, flexible curriculum*

Introduction

The quest for better quality curricula in vocational education and training (VET) has a long history. Methodology of curricula design is subject to change, mirroring changes in society, economy and production. With the passing of time new roles seem to take precedence over old and established ones. For a long time VET that had originated within the labor market and economy in the format of apprentice training sought its own identity and a rightful place within the education system, which was natural and justified. However, together with positive aspects, the identity quest had resulted in severing links with the origins of VET, namely with the labor market and with end users of the VET system graduates. Therefore, in line with the logic of societal evolution and development, a reverse movement followed aimed at re-building links with the labor market and at putting in place market-oriented VET thus returning VET to its roots.

To this end, diverse methodologies emerged to link the labor market requirements to the content of VET, for example task and job analysis. In the context of the industrial paradigm that was relatively stable and characterized by slowly changing labor markets, production systems and industrial relations, it was enough to rely on the description of job tasks resulting from workplace observations performed by a limited group of experts at a limited number of enterprises. The outcomes of these observations were then translated into the structure and content of curricula that focused largely on the occupation-related competences and did not involve transversal or key competences. The latter emphasis being of less importance to industrial economies.

However, when the post-industrial epoch took over from its predecessor, the situation changed radically and dramatically. The post-industrial paradigm meant globalization, with global challenges requiring unprecedented responsibilities from people as well as well-developed soft\ key\transversal competences that were not so much in demand earlier. These challenges were also related to the growing uncertainty conditioned by the unprecedented pace of technological development and an ensuing need to adapt to these changes calling for a wide variety of soft skills (Muraveva, 2004). On top of that, the organization of work and organizational behavior patterns changed due to the transition from mass production to client-oriented production.

Functional Analysis

All of the above required radical new approaches to address the new situation. One of such approaches is the functional analysis method. The method describes what people do at work in a rapidly changing economy, as the overall aim to improve the performance of our industries and service sectors. In view of the above, we cannot afford to base our TVET system only on what people actually do at work at this given moment. If current performance in our industries and service sectors were adequate to meet the needs of the economy, then we would not need to make any changes either to our economy or to our TVET system. However, this is not the case and there is need for a method which looks beyond current work activities and employment standards.

In a nutshell, the functional analysis has been developed to meet the requirements of the post-industrial paradigm and to overcome a number of limitations in task and job analysis (that can still describe work activities in stable occupations which do not change very much) – that in sum can be described in the following way:

- Task and job analysis is based on observing what people do now. It is necessary to describe what people should do based on international benchmarks.

- Task and job analysis tends to produce specifications which are highly detailed and expensive to develop. Changes in conditions usually require a separate analysis. The level of detail creates a lot of bureaucracy and administration.
- Task and job analysis was originally developed at a time when work activities were broken into small cycles, routine manual activities and clerical tasks, and typical of mass production systems and paper based bureaucracies.
- Finally, task and job analysis is a development from the production systems designed using the principles of scientific management – where the non technical aspects of work are removed leaving small-scale tasks stripped of the planning, problem solving, communication and coordination skills. And it is these non technical aspects which underpin the requirements of the modern economy as workforces are required to become multi-skilled and adaptable.

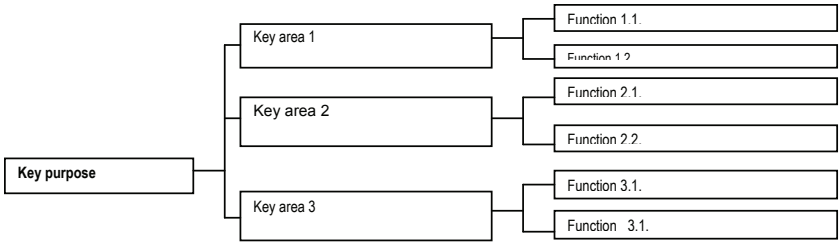
Therefore, if our aim is to improve the performance of our industries and service sectors in a rapidly changing economy - TVET systems cannot be based on what people actually do at work, now. This means that a method relevant for the current context should include:

- the best examples of current practice – what is happening now and what works well;
- authoritative judgements about what should be happening now – based on international benchmarks and standards of best practice;
- authoritative judgements about what important aspects of competence will be needed in the future – so that TVET students are prepared for changes which we know about;
- the new requirements of employment which are related to the significant changes in the economy;
- a flexible structure so that it can be modified to include the rapid changes in methods, technology and culture.

The functional analysis embraces all of the above, and as a result, it can send the TVET system relevant signals that are transparent and that can be used to design curricula. In the end, this would produce graduates who can fit into the continuously and often unpredictably developing labor market, and do it throughout their lives.

The functional analysis procedure embraces a consecutive description of three elements: i) the key purpose of the sector /occupation; ii) key areas the sector/occupation can be divided into based on the knowledge, skills, tools and methods used; and iii) concrete labor functions making up each key area (Mansfield & Mitchel, 1996). For example, key purpose of a hotel receptionist (front desk attendant) would be "to process and facilitate the arrival, accommodation and departure of hotel guests". Similarly, a computer technician needs to "iinstall and test computers, peripherals and networks".

Figure 1. Structure of the Functional Map



The module specification is a tool used to ensure a justified selection of the types of knowledge and its volume. It demonstrates a paradigm change in favor of the student, and is transparent for the teachers, students, employers. It has added value in that it can be used to plan teaching and learning as well as assessment. Table 1 below shows the structure of the module specification.

Table 1. Module Specification
Title of the module (the function to be acquired)
Module statement: Upon completion of the module the student will be able to (title of function) ….

Activities (internal learning outcomes)	Skills	Knowledge	Resources

In Russia, like everywhere in the world, the identification of the most appropriate method of interpreting the labour market demand had been a big and unresolved issue until the piloting of the functional analysis started in the early 2000s. This has led to an overhauling of the core approaches in the TVET standards setting and has triggered off development of occupational standards in various sectors of the economy.

The advantages of the functional analysis method as perceived in Russia can be summed up as follows:

i) Validity—it is based on data obtained from surveys performed at a representative number of enterprises, as well as on data relating to the pro-

spective developments and international benchmarks (the latter relevant in the context of the global economy);

ii) Special focus on all categories of competences/skills, both occupational and transversal (key/ soft skills);

iii) Transparency—the identified functions relating to the work activity (namely, to the technological, or business processes employed in a certain occupational are, or occupation) can be clearly transformed into interdisciplinary modules that make up the structure of the occupational part of the VET curricula (that in Russia has three parts – general education subjects, occupational theory subjects, and occupational modules);

iv) Clarity and transparency for both employers and curriculum designers;

v) Clear signals about the volume and character of knowledge to be included in the program of study, skills and behaviors to be developed in students. These are tightly linked to the work roles and behaviors associated with concrete functions that need be performed to ensure that a certain occupation meets its core objective;

vi) All aspects of knowledge are linked to the performance (important functions required in employment);

vii) It produces descriptions which are independent of the technology or methods which are used to achieve the function; and

viii) The descriptions of behaviors and their content can easily be transformed into assessment criteria.

References

European Commission, (2010). A strategy for smart, sustainable and inclusive growth. Europe 2020. Brussels. Retrieved from http://ec.europa.eu/eu2020/index_en.htm

Mansfield B., & Mitchel L. (1996). Towards a competent workforce. Gower Publishing, Brookfield, Vermont.

Muraveva A. (2004). Knowledge-based economy. Journal Labor Abroad. # 4.

Oleynikova O., Muraveva A. et al. (2009). Design and implementation of competence-based modular methods. Alfa-M., Moscow

Publication Guidelines for the International Journal of Vocational Education and Training

The *International Journal of Vocational Education and Training* reflects regional contributions and is international in scope. Its purposes are to provide a forum for the discussion of vocational education and training issues and practices; to assist in the dissemination of information on research and practice; and to strengthen the lines of communication among individual researchers and practitioners, institutions, and organizations. In addition, it provides a platform for individual views on relevant issues.

The Editorial Board passed a resolution requiring membership in IVETA in order to publish in the Journal, with effect from Volume 14.2. The Journal publishes feature articles on research, theory, and practice broadly related to international vocational education and training. The largest section of the Journal is devoted to empirical research articles. General articles and research manuscripts submitted for publication should he between 1,200 and 5,000 words in length and should adhere to rules in the most recent edition of the Publication Manual of the American Psychological Association (APA) with the exception of placing tables in-column in the text where you prefer them to appear. Articles should deal with some relevant aspect of educational opportunity such as educational research, evaluation, instruction, teaching methods, policy making, or theoretical discourses related to education and training.

In addition, the Journal solicits book, test, and computer hard/software reviews (500-700 words) and research in brief manuscripts (800-1,200 words) with similar publication goals. Authors interested in submitting a manuscript are required to follow the APA format as noted above. Email manuscripts that conform to the required specifications to: dmupinga@kent.edu.

Style and Submission Requirements

Copies. Submit electronic copies to: ijvet@kent.edu.

Style. Adhere to the most recent APA edition to format your manuscript. Please remember the exception: Place any tables or figures in-column where they should appear. Any paper that does not otherwise follow APA style will not be considered. Make certain that documentation (reference) format rules are double-checked. In addition, avoid footnotes, and do not include your name or affiliation on any page after the title page. No more than 5% of a paper's text should be direct quotations. Insert only one space after punctuation at the end of sentences.

Tables and Figures. Tables and figures should relate directly to the content of the manuscript and should not repeat information given in the text. Please remember that the Journal publishes in black and white, not in color. When creating or saving a copy of your manuscript for Journal publication, please create tables and figures in black and white (you may need to return to your original manuscript and configure tables and figures for black and white reproduction). Figures should be provided on high-quality, glossy white paper and

should fit on one page. Tables should not exceed one page, and there should be no more than three tables per article. Also, do not place table or figure titles inside the table or figure.

General Articles and Research Manuscripts. General articles and research manuscripts must be between 1,200 and 5,000 words long, or not more than 25 typed pages (double-spaced). Authors should keep tables and figures to a minimum and include them in-column at the appropriate point(s) of insertion. Emphasis is placed particularly upon manuscripts that are research-oriented.

Cover Page and Title. Authors must include a removable cover page that is attached to each manuscript. This cover page should include the title of the manuscript and the name, address, phone number, email address, and institutional affiliation of each author. The title should be no more than 12 words.

Abstract. An abstract describing the manuscript should be included on a separate sheet. The abstract must be less than 120 words. Please follow APA guidelines when writing the abstract.

Book Reviews. Book reviews should be between 500 and 750 words in length and contain the following information: complete bibliographic entry, including cost (hard- and softcover, if available); the thesis of the book; a brief description of the argument (main ideas); sample passages quoted and/or commentary on writing style; shortcomings and strengths; intended audience (whom the book will most benefit in the international education and training community); your opinion of the book; and what you think the book contributes to the international vocational education and training community.

Test Reviews. Test reviews should be between 500 and 750 words in length and contain the following information: complete bibliographic entry, including cost; the main purpose(s) of the test; a brief description of the administration and time; shortcomings and strengths; intended audience (whom will the test most benefit in the international education and training community); your opinion of the test (citing similar tests and the pros and cons relative to those tests); and what you think the test contributes to the international vocational education and training community.

Review Process. Once your manuscript has been received, it will be checked for conformity to style and Journal requirements, then forwarded to at least three peer review readers who will read your manuscript and make recommendations as to whether to accept or reject it for publication. Unless the manuscript is inappropriate for review due to length and/or topic, manuscripts submitted to the *International Journal of Vocational Education and Training* are anonymously reviewed by a peer review reader group as noted above. You will receive a publication decision within a reasonable amount of time (normally 3 to 5 months). Do not submit manuscripts concurrently under consideration by another publication or manuscripts that were previously published. Indicate a statement on the cover page is the manuscript is being reviewed or has been submitted for publication elsewhere.

Mailing Instructions. Please include your email address if you have one. Manuscripts with requisite hard copies can also be forwarded to:

Dr. Davison Mupinga, Editor
International Journal of Vocational Education and Training
Kent State University
College of Education, Health, and Human Services
School of Teaching, Learning, and Curriculum Studies
P.O. Box 5190 412 White Hall
Kent, Ohio 44242-0001 USA
(330) 672-2656
Email: ijvet@kent.edu

Call For Papers

Currently, IJVET is accepting original manuscripts from scholars and practitioners worldwide focusing on TVET. The spring 2012 issue focuses on: Technical Vocational Education and Training (TVET) Staff Development: Meeting the Needs of the Knowledge Economy. Authors wishing to have articles reviewed and published in this volume are encouraged to submit their manuscripts by August 30, 2011 to dmupinga@kent.edu.

Please note that per current requirements, you must be an IVETA member to publish in the IVETA Journal. However, IVETA membership is easily obtained. Visit http://www.iveta.org/members/index.php/IVETA-Basics/Frequently-Asked-Questions.html for details on obtaining membership. Then click on the "Membership Application" box at the top of the page [or go to http://www.iveta.org/members/images//newmbrshipapp.2009.pdf]

Topic Areas of Interest

In general, IJVET accepts articles on all general aspects of TVET, however, the journal welcomes manuscripts that meet the general criteria of significance and scientific excellence, and will publish: original articles in basic and applied research, case studies and critical reviews, surveys, opinions, commentaries and essays including, but not limited to the following topic areas:

- Information and communication technologies and TVET
- Comparative studies in TVET
- Financing TVET
- Implementation & evaluation of TVET programs or education
- New and emerging practices in TVET
- TVET as continuing or lifelong Learning
- Transfer of Training
- Formal, Informal & Non-formal TVET
- TVET policies at local, national, and international levels
- Occupational competencies and TVET
- National Vocational Qualifications & Occupational Standards,
- Occupational Certification, Licensing & Accreditation
- Cost Effectiveness and Quality Based TVET
- Instructional methods and TVET

For guidelines on submitting manuscripts, please visit: http://www.iveta.org/members/index.php/Members-Information/IVETA-Journal-Publication-Guidelines.html

Editorial Board Members

IJVET is also seeking members willing to serve as reviewers for the journal. If you are interested in joining our team of reviewers please, send your resume to: dmupinga@kent.edu

IVETA Membership Application or Renewal

FAX: 1-651-305-9600
E-Mail: iveta@visi.com

Please Print or Type All Information!

Name_____
Last First Middle Initial

Title_____

Organization_____

Street Address_____

City_____State_____ZIP_____

Country_____

Telephone No._____

FAX No._____

E-Mail Address_____

Internet Address _____

You are invited to attach your business card here.

Areas of Interest (List only three)

_____
_____
_____

Areas of Expertise (List only three)

_____
_____
_____

Type of Membership (check one) ☐ New ☐ Renewal

Printed Version of the Journal ($35US) ☐

Category of Membership (check one)

☐ Regular (US $50.00) Electronic per year

☐ Student (US $25.00) Electronic per year

☐ Organizations (US $300.00) per year

Organizational Members: You may contact the Executive Secretariat for information on bank transfers. This does not apply to individual memberships

The membership term one year from the time you sign up. You may pay for more than one year. Check the appropriate box below.

☐ 1 year ☐ 2 years ☐ 3 years ☐ 4 years ☐ 5 years

How did you find out about IVETA

☐ An IVETA member encouraged me to join, please give member name

_____

☐ Through the Web Site
☐ Through an IVETA conference
☐ By reading the IVETA Journal
☐ Other _____

METHOD OF PAYMENT:

Check on US Bank or Money Order. You may also pay using Western Union, MasterCard or VISA. If you use Western Union make the funds Out to the Executive Secretariat and send her the number Western Union gives you.

Amount Enclosed $_____

Send US Bank Check or money order to address below.

IVETA
186 Wedgewood Drive
Mahtomedi, MN 55115 USA
Telephone: 1-651-770-6719
FAX: 1-651-305-9600
E-Mail: iveta@visi.com

Credit Card Payment

Amount Authorized $_____

Please charge my ☐ VISA ☐ MASTERCARD

Account No._____

Expires:_____

_____
(Type or Print Name as it appears on card)

Authorizing Signature of Card Holder ***(Must be signed)***