

Competencies Required by Students in Technology and Vocational Education for Sustainable Development in Secondary Education in Adamawa State, Nigeria

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Abstract

The study was aimed at determining the competencies required by the students in technology and vocational education for sustainable development in secondary education in Adamawa State. In doing this, two research questions were raised to guide the study based on the objectives. Descriptive survey research design was adopted. The study covered the entire five education zone in Adamawa State. Data collection was done using questionnaire administered to 460 teachers in the area of study. It was found that technology and vocational education teachers require competencies in technology and vocational education skills. It is therefore recommended that: (1) workshop should be organized to technology teachers to enable them acquire competencies in this area. (2) Training on competencies in vocational skills for sustainable development should be provided to teachers for the acquisition of the competencies identified.

Keywords: Competencies, technology and vocational education, Sustainable development.

Introduction

In the modern world the economy is closely associated with technologies that have changed the nature of industry. Since the 1960s it has become accepted that technological change has influenced the patterns of everyday life, restructuring work and leisure. Technology is playing an important role in the life of society. The changing context led government to reconsider the relationship between liberal education and vocational preparation and to be more responsive to changing labour market needs of nations (Turner and Henker, 2010). This demanded revision of educational policy and in particular, a consideration of the goals of education. The wave of educational reform movements at the end of the 1980s and beginning of the 1990s illustrate the attempts to re-configure educational systems of developing countries into what is described by Cowen,(2000) as a late-modern model.

A shift from the welfare state to the market-oriented or competitive state has occurred during that period. This has been accompanied by a shift in social expectations where the person socialized into the national culture is being replaced by a person able to live and work in the market-oriented state. The emphasis however, in this competitive state, is on the development of the strongest ideological pairing between education and knowledge/competition within the international economy.

Traditional direct preparation for work was the main goal of vocational education. It was perceived as providing specific training that was productive and based on teachers' instruction with the intention to develop understanding of a particular industry, comprising the specific skills or trick of the trade. The introduction of vocational courses in secondary schools usually involves very practical courses that can lead to the lowest level of certification. Certificates in areas such as construction, furnishing, processing, engineering and drawing give students practical skills and knowledge against very detailed description of the required outcomes. Competency-based training was chosen by Nigerian government as a model for vocational education (VE) for sustainable development (Stevenson 1999).

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Sustainable development according to Flannery (2002) is a part of international discourse since the early 1980s. Government and non-governmental organizations around the globe have become aware of and are expressing concern about the future of humanity and the quality of life for future generations. Watson, (2009) relates sustainable development to ways of thinking about the world and forms of social and personal practice that lead to: Ethical empowered and personality fulfilled individuals. Communities built on collaborative engagement, tolerance and equity, Social systems and institutions that are participatory, transparent and just and Environmental practices that value and sustain biodiversity and life-supporting ecological processes.

Competency is synonymous with learning to do. It is a process of designing and delivering strategies which helps a student to acquire knowledge, skills, and attitudes. It involves arranging skills, knowledge and attitudes to be learnt in hierarchy of difficulty. It is characterized by vigorous reliance on objectives set in skill acquisition. It also assumes that there is a direct relationship among learning activity, objectives and performance. In the context of this work, competencies in technology and vocational education means.

- i) Identification of all tasks to be learnt.
- ii) Determining what one would need to know and do in order to perform the identified tasks.
- iii) Arrangement of tasks in appropriate courses.
- iv) Organize knowledge and skill for each task into a hierarchy.
- v) Determine what one needs to know for mastery of each skill.

Based on the foregoing it is pertinent to determine the competencies in technology and vocational education for sustainable development in the study area.

The rationale for technology education and approaches to its teaching has been developed within the context of globalization. On the one hand, international circulation of ideas through social and political networks brings common elements to approaches and curriculum documents of different countries, and on the other hand, there are also specific, conceptualized characteristics and emphasis in the ways in which the policy is realized in specific national settings (Pavlova, 2007). The followings are the key competencies in technology educations.

- i) Technical competency, seeking emphasis on material and control systems in technology education.
- ii) Craft competency, emphasizing cultural and aesthetic values in technology education.
- iii) Technical production competency, seeking emphasis on modern mass production.
- iv) An engineering apprentice competency seeking emphasis on the preparation of future engineers.
- v) Modern technology competency which looks into the nature of work in the next century. Science and technology approach in which these two subjects are closely associated.
- vi) Design competency with a concentration on design seen by some as central to the study and practice of technology.
- vii) Problem solving competency focusing on the need for cross-disciplinary approaches.
- viii) Practical capability competency emphasizes personal and active involvement, and technological innovation approach with a driving force for social change (The British Council 2005).

The technological key competencies focuses on the capacity to use technological processes, systems, equipment and materials and the capacity to transfer knowledge and skills to new situations (Mayer, 2004). It specifies both personal attribute and key competencies. Skills which could be developed through vocational education courses and programmes and that contribute to a person's employability are:

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- 1) Communication skills that contribute to productive and harmonious relations between employees and customers.
- 2) Team work skills that contribute to productive working relationship and outcomes.
- 3) Problem-solving skills that contribute to productive outcomes.
- 4) Initiative and enterprise skills that contribute to innovative outcomes.
- 5) Planning and organizing skills that contribute to long-term and short-terms strategic planning.
- 6) Self-management skills that contribute to employee satisfaction and growth.
- 7) Learning skills that contribute to ongoing improvement and expansion in employee and company operation and outcomes.
- 8) Technology skills that contribute to effective execution of tasks (Australian Chamber of Commerce and Industry, 2011). The acceptance of the value of generic skills is important to the process of vocationalisation of secondary education.

Statement of the problem

The concept of sustainability has been a part of international discourse since the early 1980s. Government and non-governmental organizations around the globe have become aware of, and are expressing concern about, the future of humanity and the quality of life for the future generations (Flannery, 2002). The emergence of the issue had been motivated by a number of reports that suggested that humankind is living beyond the carrying capacity of planet earth. Over the last three decades the earth's biological diversity has declined by approximately 30%: (Corvalan, 2006). This global trend suggests that we are degrading natural ecosystems at a rate unprecedented in human history. The accumulating scientific evidence of this catastrophic development supports the need for a strong international response.

The international response could be in the area of acquiring competency in technology and vocational education by students. The competency will enable the future generation to protect our environment and other life-supporting elements. If this competency are not determined and provided to students, it may lead to the destruction of the biodiversity.

Adamawa State of Nigeria is part of the globe, as such there is need to determine the competencies in technology and vocational education for sustainable development. This will enable the State acquaint students with competencies that will enable them be able to conserve the environment for sustainable development.

Objectives of the study

The objectives of this study are to determine the:

- (i) Technology education competencies for sustainable development in secondary education in Adamawa State.
- (ii) Vocational education competencies for sustainable development in the study area.

Research questions

1. What are the competencies required in technology education for sustainable development in secondary education in Adamawa State?
2. What are the competencies required in vocational education for sustainable development in secondary education?

Methodology

The researchers adopted descriptive survey research design to carry out the research. The area of the study is Adamawa State. It is located in the North-East geographical zone of Nigeria. Adamawa State is made up of 21 local government areas with land mass of 8,068km (State ministry of land and survey 2013). The State consist, of five education zones, which are; Ganye, Gombi, Mubi, Numan and Yola. This study is limited to Adamawa State senior secondary schools in the five zones.

Two research questions were raised to guide the study. These questions were raised based on the objectives of the study. A structured questionnaire of 17 items with response options of very highly required, highly required, moderately required, lowly required and very lowly required was developed by the researchers and was utilized.

The instrument was validated by three experts from the department of vocational education Federal University of Technology Yola. The final draft of the instrument was done based on the suggestions of the validators. Kuder-Richardson formula was used to estimate the reliability of the instrument for the study. This is so because Uzoagulu (2011) posited that the formula yields co-efficient of internal consistency. The KR is obtained by administering a single test form to a group of test takers. The reliability co-efficient of the instrument was 0.89. The population for the study comprised all the 460 technology and vocational education teachers in all the senior secondary schools in Adamawa State. Purposive sampling was used for the study. This is because purposive sampling is relatively cheaper, easier and ensures that only those elements that are relevant to the research are included. The researchers administered 460 copies of the instrument to the respondents with the assistant of five research assistance, one from each of the five education zone in the State. Out of the 460 copies of the instruments distributed, 455 were completed and returned. Data collected were analyzed using mean and standard deviation.

Result and discussion

Research Question 1

What are the competencies in technology education for sustainable development in secondary education in the study area?

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S/N	Competencies in technology education	Mean	SD	Remark
1	Technical competencies that seek emphasis on material and control systems.	3.67	1.50	HR
2	Craft competencies that emphasize aesthetic values	4.56	1.81	VHR
3	Technical mass production competencies	4.54	1.65	VHR
4	An engineering competencies	3.55	1.62	VHR
5	Modern technology competencies	4.67	1.56	VHR
6	Science and technology competencies	3.30	1.00	MR
7	Problem solving competencies	3.52	1.07	HR
8	Practical capability competencies	3.77	1.09	HR
9	Technology innovation competencies	4.82	1.31	VHR

SD = Standard Deviation

Table 1 shows the mean score of senior secondary school technical education teachers on competencies in technological education. The table indicates that items 2, 3, 5 and 9 with SD 1.81, 1.65, 1.56 and 1.31 respectively have mean score range of 4.5 and above which based on the decision point means that the teachers very highly agreed with these items.

The table also indicates that the teachers' response to items 1, 4, 7 and 8 with SD. 1.50, 1.62, 1.07 and 1.09 respectively is high. This is because their mean response range from 3.50 and above. The teachers' response to item 6 with S.D. 1.00 is moderate; the mean is 3.30.

Research Question 2

What are the competencies required in vocational education for sustainable development in secondary education?

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S/N	Competencies in vocational education	Mean	SD	Remark
1	Communication skills	3.58	1.08	HR
2	Team work skills	3.61	1.11	HR
3	Problem solving skills	3.57	1.06	HR
4	Initiative and enterprise skills	3.59	1.08	HR
5	Planning and organizing skills	3.30	1.14	MR
6	Self management skills	3.63	1.07	HR
7	Learning skills	3.14	1.03	MR
8	Vocational skills for execution of tasks	3.71	1.12	HR

SD = Standard Deviation

The result in table 2 indicates the mean score of senior secondary education teachers on vocational competencies required for sustainable development in Adamawa State Nigeria. Items 1, 2, 3, 4, 6 and 8 with SD.1.08, 1.11, 1.06, 1.08, 1.07 and 1.12 respectively have mean score range of 3.5 and above which based on the decision point imply that the teachers highly require competencies in these items. The teachers moderately require competencies in item 5 and 7 with SD of 1.14 and 1.03.

Discussion of the findings

In the course of the study, it was discovered that technology and vocational teachers require competencies in technology and vocational skills for sustainable development in the study area. The competencies required are communication skills, team work skills, problem solving skills, self management skills among others. The findings is in line with the findings of Turner and Henker(2011), who reported that in the modern world, the economy is closely associated with technologies and vocational skills that have changed the nature of industrial skills and that as such, these modern competencies are required for the emerging skills in technology and vocational education.

Conclusion

On the basis of the findings of the study, the following conclusions were drawn. Technology and vocational teachers require competencies in technology and vocational competencies for sustainable development in the area of study. These competencies include; technical competencies, craft approach, technical mass production approach, an engineering approach etc. Vocational competencies include communication skills, team work skills, planning and organizing skills, self management skills among others.

Recommendations

Based on the findings of the study, the discussion and conclusion of the following recommendations were made.

1. The ministry of education should organize workshop to technology teachers to enable them acquire the competencies in this area.

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2. Training on competencies in vocational skills for sustainable development should be provided to teachers by the ministry of education for the acquisition of the competencies identified.

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