Competency Development of Electronic Skill Manual Workers in Akwa Ibom State as the determinant of Maintenance of Digital Video Disc (DVD) Players and Video Signals Decoders

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ABSTRACT

This study was to assess the competency development of electronic skill manual workers in Akwa Ibom State as the determinant of maintenance of digital video disc (DVD) players and video signals decoders. A descriptive survey research design was used in the study. The study area was Akwa Ibom State. The Population of the study consisted of all the registered electronics artisans in the informal sector of Akwa Ibom State. The instrument for data collection was a questionnaire titled "Competency Development of Electronics Skill Manual Workers Questionnaire (CDESMWQ)". The Validation of the Instrument was subjected to face validity by three lecturers of the University of Uyo who are experts in the field of vocational education, measurement and evaluation and electrical/electronic engineering. The Reliability of the Instrument was confirmed with the pilot test using 30 electronics skill manual workers in Akwa Ibom State who were not used of the study. A Cronbach Alpha reliability coefficient of 0.88 was realized. The instrument was administered by hand on the respondents with the help of two research assistants and the method of data analysis was means and standard deviation used for answering the research questions while the null hypotheses was tested with the t-test statistic at .05 probability level. The study concluded among others that location is not a significant factor in the competency development needs of urban and rural based skill manual workers in Akwa Ibom State for maintenance of the selected electronics appliances namely DVD Players and video signal decoders. It was therefore recommended that the federal and state ministries of education should organize workshops, seminars and conferences to synthesize electronics technology teachers and students on the need to attend professional development or training programmes, such as workshops, seminars and conferences as well as read professional electronic journals and books to enable them update their knowledge and skills on recent developments in the electronics industry.

KEYWORDS: Competency Development, Electronic, skill manual workers, Akwa Ibom State, digital video disc (DVD), video signals decoders and maintenance

Introduction

It is highly incontrovertible that newer models of electronics appliances which are more portable, economical and more durable with better aesthetic designs and improved

technology than previous models are appearing in the electronics market almost on a yearly basis. For instance, the conventional cathode ray tube (CRT) television is gradually being phased out by the LCD (liquid crystal display), plasma, and DLP (digital light processing) television technology (Goldwasser, 2009a). Laughlin (2014) reported that even newer types of television known as LED (light emitting diode) and LED and OLED (organic light emitting diode) television technology are coming out to challenge LCD and plasma television technology. Similarly, solar powered radio receivers are gradually replacing the conventional battery-powered radio receivers (Atkins, 2009). In all these technological products, maintenance is an essential factor as it prolongs the service life of the appliances.

Makanjuola et al (1999) defined maintenance as the sum total of all the functions and activities that are carried out every day in order to keep any item or engineering equipment in good operating condition. The maintenance of electronic appliances in Nigeria is mostly done by the skill manual workers most of whom are found in the informal sector of the economy. Ayonmike (2010) defined a craftsman as a skilled worker in a particular occupation, trade craft who is able to apply a wide range of skills and a high degree of knowledge to basically non-receptive work with a minimum of direction and supervision.

It is worthy to note that as the electronics industry moves from the simple technology of the conventional transistorized electronic appliances to the present stage of digital electronics technology, it goes beyond the capacity of most of the skill manual workers in the urban and rural areas in developing countries to maintain the new high technology electronic appliances (Callebs, 2000). Callebs maintained that whereas faults in the conventional analogue appliances and components can be diagnosed by mere visual inspection, the digital types require scanning equipment for trouble shooting. In addition, most of these high technological equipment are not available to the informal sector skill manual workers and even when provided, their knowledge base will not suffice for the use of the equipment.

Statement of Problem

The low level of technical competencies of the electronics skill manual workers experience in Nigeria needs professional training on their areas of deficiency to enable them update their knowledge and competencies to be in line with the demands of the contemporary electronic industry. However, the specific areas of deficiency where the electronics skill manual workers need additional training for successful maintenance of electronic appliance have not been identified. Hence, it would be difficult for any meaningful and effective retraining programme to be organized for them. Therefore, the non-identification of the competency development of electronic skill manual workers in Akwa Ibom State for effective maintenance such as digital video disc (DVD) players and video signals decoders constitute the major problem to the electronic industry and which needs to address.

Purpose of the Study

1. The technical competency development needs of skill manual workers in Akwa Ibom state for maintenance of digital video disc (DVD) players.
2. The technical competency development needs for skill manual workers in Akwa Ibom State for maintenance of video signals decoders.

Research Questions

The following research questions were formulated to guide the study:

1. What are the technical competency development needs of skill manual workers in Akwa Ibom State for maintenance of digital video disc (DVD) players?
2. What are the technical competency development needs of skill manual workers in Akwa Ibom State for maintenance of video signals decoders?

Hypotheses

Ho_1: There is no significant difference in the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of digital video disc (DVD) players.

Ho_2: There is no significant difference in the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of video signals decoders.

The Concept of Needs Assessment

A need literally refers to a situation in which something is necessary, especially something that has not yet happened or is not yet available. It is a strong feeling of what an individual should have in order to live a normal, healthy and comfortable life. A need assessment therefore is yet a systematic process for determining and addressing needs, or "gaps" between current conditions and desired conditions "wants". The discrepancy between the wanted conditions must be measured to appropriately identify the need (Wikipedia, 2012b).

Moreover, Leigh, Watkins, Platt and Kaufman (2000) offered a more précised and holistic definition of needs assessment. According to them, needs assessment is the formal process of identifying needs and gaps between current and desired results, placing those needs in priority order based on the cost to meet each need versus the cost for ignoring it and selecting most important needs (problems and opportunities) for reduction or elimination.

In a nutshell, needs assessment can help determine current performance of knowledge levels related to a specific activity, as well as indicate the optimal performance or knowledge needed. Moreover, one conducts a training needs assessment to seek information about:

(1) Optimal performance or knowledge

(2) Actual or current performance or knowledge

(3) Feelings of trainees and other stakeholders

(4) Causes of identified problems; and

(5) Solutions

Technology of DVD Player and its Common Faults

Goldwasser (2011) posited that the transformation of CD players and CDROMs from laboratory curiosities to the economical household appliances have revolutionized the musical recording industry and have made possible multimedia computing. He added that these developments depend on the availability of two technologies: low power low cost solid state laser diodes and mass produced large scale integrated circuits. He pointed out that without these, a CD player using 1960's technology would be the size of dishwasher. He added that DVD (Digital Versatile – or Video Disc) players (which are now widely available and will completely replace CD players in a few years), is different in many aspects from the

CDs and Laser Discs players. For instance, he noted that the digital processing of the data from a DVD is fundamentally different than that of a CD.

Fixya.com (2012) posited that DVD players use an intricate laser device to scan the surface of the DVD. The DVD disc itself is made up of many different ridges and valleys, for too small for the eye to see. The laser, however, picks them up and translates them into binary code used to construct images and sound. When a message appears that there is no disc in the player when there is, it indicates a problem with the disc, the laser, or the loading mechanisms. Fixya.com identified four common problems of the DVD player as Disc and Power Setting problems, Loading Mechanism problems, Lens problems and Servo Alignment problems.

Goldwasser (2011) posited that the types of problems found in a DVD player can be classified into several categories as follows:

1. Mechanical problems such as dirt, lubrication, wear, deteriorated rubber parts, dirty/bad limit switches, physical damage.

2. Electrical Adjustments problems such as coarse tracking. Fine tracking, focus, laser power.

3. Power problems which occur mostly with portables in form of weak batteries, inadequate, defective, or improper AC wall adapter.

4. Bad connections such as broken solder on the pins of components that are stressed like limit or interlock switches, or audio or power jacks, internal connectors that need to be cleaned and reseated, broken traces on flexible cables, or circuit board damage due to a fall.

5. Electrical Component Failure. These are rare except for power surge due to storm and lightening strike and related damage which could sometimes only blow out components in the power supply.

By implication, the technical competency needs of skill manual workers for effective maintenance of the DVD player should invariably include his ability to diagnose and completely repair the listed faults.

Technology of Video Signal Decoders and its Common Faults

Video signal decoder or television signal booster or satellite receiver is a type of cable television signal booster used to boost a weak antenna or cable signal. It can also be used to boost a signal that needs to be split into multiple outputs from one input. According to Nice and Harris (2005), a satellite receiver has four essential jobs:

1. It de-scrambles the encrypted signal in order to unlock the signal; the receiver needs the proper decoder chip for that programming package. The provider can communicate with the chip, via satellite signal, to make necessary adjustments to its decoding programs. The provider may occasionally send signals that disrupt illegal de-scramblers as an electronic measure (ECM) against illegal users.

2. It takes the digital MPEG-2 or MPEG-4 signal and converts it into an analog format that a standard television can recognize. In the United States, receivers

convert the digital signal to the analog National Television Systems Committee (NTSC) format. Some dish and receiver setups can also output an HDTV signal.

3. It extracts the individual channels from the larger satellite signal. When the channel is changed on the receiver, it sends just the signal for that channel to the television. Since the receiver spits out only one channel at a time, it is impossible to tape one programme and watch another. It is also impossible to watch two different programmes of two TVs hooked up to the same receiver. In order to do these things, which are standard on conventional cable, an additional receiver is needed.

4. It keeps track of pay-per-view programmes and periodically phones a computer at the provider's headquarters to communicate billing information.

Digifix Ltd (2006) identified power supply failure as the most common fault on the satellite receiver and it accounts 95 percents of all faults. These can include no satellite signal received, stuck in 'Standby', picture breaking up on recording, box making a bussing noise – and many more symptoms. They cautioned that simply replacing the power supply with a new one will only provide a short term cure as failure of the power supply is usually due to using poor quality capacitors in manufacture and it will not be long before the new one suffers the same fate. By inference, a competent electronics craftsman should be able to diagnose and completely repair the identified faults in the satellite receiver, hence his technical competency needs for effective maintenance of the satellite receiver should therefore include his ability to diagnose and completely repair the identified faults.

Methodology

A descriptive survey research design was used in the study. The area for the study was Akwa Ibom State. The Population of the study was made up of all the registered skill manual workers in the informal sector of Akwa Ibom State. The instrument for data collection was a questionnaire titled "Competency Development of Electronics Skill Manual Workers Questionnaire (CDESMWQ)". The Validation of the Instrument was subjected to face validity by three lecturers of the University of Uyo who are experts in the field of vocational education, measurement and evaluation and electrical/electronic engineering. The Reliability of the Instrument was confirmed with the pilot test using 30 skill manual workers in Akwa Ibom State who were not used of the study. A Cronbach Alpha reliability coefficient of 0.88 was realized. The instrument was administered by hand to the respondents with the help of two research assistants and the method of data analysis was mean and standard deviation used for answering the research questions while the null hypotheses was tested with the t-test statistic at .05 probability level.

Result and Discussion

Research Question 1: What are the technical competency development needs of skill manual workers in Akwa Ibom State for maintenance of digital video disc (DVD) players?

Table 1: Technical Competency Development Needs of Skill manual workers in Akwa Ibom State for Maintenance of Digital Video Disc Players (DVD) (N=258)

S/N	Technical Competency Development Items for Maintenance of Digital Video Disc Players (DVD)	X	SD	Remark
1	Repairing power supply problems in DVD players	2.21	0.50	N
2	Repairing disc loader/disc changer mechanism problems In DVD players	3.79	0.63	N
3	Using digital pattern generator to repair video problems In a DVD player	3.48	0.82	N
4	Correcting audio problems in DVD players	2.55	0.90	N
5	Repairing problems of CD optical pick-up mechanism	3.48	1.31	N
6	Repairing laser problems in DVD players	2.10	0.92	N
7	Rectifying tracking (seek and play) problems in DVD players	1.82	0.63	N
8	Repairing remote control problems in DVD players	2.66	1.07	N
9	Repairing playing speed problems in DVD players	2.20	0.60	N
10	Repairing overheating problems in DVD players	2.35	1.15	N
11	Repairing skipping and repeating problems in DVD Players	3.75	1.03	N
12	Repairing slow start up problems in DVD players	2.40	0.86	N
13	Repairing picture board problems in DVD players	2.37	0.72	N

* N= Needed; NN= Not Needed

Table one shows the response on the technical competency development needs of skill manual workers in Akwa Ibom State for maintenance of DVD Players. As table 1 indicates, four out of the thirteen listed items have mean responses above 3.00 while nine items have mean response below 3.00. This implies that majority of the skill manual workers in Akwa Ibom State agreed that the four items are their technical competency development needs for maintenance of DVD players while they disagreed on the other nine items whose mean responses fell below the cut off point. This indicates that the skill manual workers in Akwa Ibom State need additional training on these four items to facilitate their effective maintenance of DVD Players while they do not need additional training on these nine items.

Research Question 2: What are the technical competency development needs of skill manual workers in Akwa Ibom State for maintenance of video signals decoders?

Table 2: Technical Competency Development Needs of Skill manual workers in Akwa Ibom State for Maintenance of Video Signal Decoders (N = 258)

S/N	Technical Competency Development Items for Maintenance of Video Signal Decoders	X	SD	Remark
14	Using special tools like jeweler's screwdrivers to disassemble and re-assemble parts on printed circuit boards safely and properly	3.97	0.81	N
15	Using bench soldering equipment properly and safely	2.79	1.09	NN
16	Using digital voltmeters properly and safely to test voltage across components in a video signal decoder	2.32	1.22	NN
17	Using signal generators properly and safely to detect faulty component in video signal decoders	3.85	0.74	N
18	Using frequency synthesizers to diagnose faults in video signal decoders	3.98	0.66	N
19	Repairing power supply problems in video signal Decoders	2.35	1.04	NN
20	Repairing poor picture quality problems in video Signal decoders	2.16	0.97	NN
21	Correcting remote control problems in video signal decoders	1.66	0.99	NN
22	Using network analyser to repair signal reception problems in video signal decoders	3.78	0.46	N

* N = Needed; NN = Not Needed

The result with respect to the technical competency development needs of skill manual workers for maintenance of video signal decoders is presented in Table 2. As shown, the mean responses of four out of nine listed items are above 3.00 while the mean responses of the other five items are below 3.00. This implies that majority of the skill manual workers in Akwa Ibom State agreed that the four items are their technical competency development needs for maintenance of video signal decoders while they disagreed on the five items. This indicates that the skill manual workers in Akwa Ibom State need additional training on the four listed items to facilitate their effective maintenance of video signal decoders while they do not need additional training on the other five items.

Testing of Hypotheses

For testing the hypothesis, the grand mean of the responses of urban and rural based skill manual workers on their technical competency development needs for maintenance of the selected electronic appliances was computed and used in the analysis.

Ho_1: There is no significant difference in the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of digital video disc (DVD) players.

Table 3: Test for significant difference between the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of digital video disc (DVD) players

Group	N	Grand Mean X	SD	Std. Error (SE)	t	Df	Sig of t*
Urban Skill manual workers	132	2.70	0.28	0.02	-0.03	256	0.98
Rural Skill manual workers	126	2.70	0.33	0.03			

***Not Significant at p ≤ 0.05**

Table 3 show a summary of the t-test analysis of the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of DVD players. As Table 3 reveals, the level of significance of t is higher than 0.05. This implies that the obtained value of t is not significant. Hence the null hypothesis is upheld.

Ho_2: There is no significant difference in the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of video signals decoders

Table 4: Test for Significant Difference between the mean Responses of Urban and Rural-Based Skill manual workers in Akwa Ibom State on Their Technical Competency Development Needs for Maintenance of Video signal Decoders

Group	N	Grand Mean X	SD	Std. Error (SE)	t	Df	Sig of t*
Urban Skill manual workers	132	2.95	0.42	0.04	-1.17	256	0.25
Rural Skill manual workers	126	3.02	0.47	0.04			

***Not Significant at p ≤ 0.05**

Table 4 shows result of the t-test analysis of the mean responses of urban and rural-based skill manual workers in Akwa Ibom State on their technical competency development needs for maintenance of video signal decoders. As Table 4 reveals, the level of significance of t is higher than 0.05 hence the null hypothesis is upheld.

Discussion of Findings

The study found four items as technical competency development needs of skill manual workers for maintenance of DVD players. These include repairing disc loader/ disc changer mechanism problems, using digital pattern generator to repair video problems in a DVD player, repairing skipping and repeating problems in DVD player and repairing problems of CD optical pick-up mechanism. The findings with respect to repairing disc loader/disc changer mechanism problems, repairing skipping and repeating problems as well as repairing problems of CD optical pick-up mechanism in DVD players supports the views of Goldwasser (2009) who identified similar items as the common problems in DVD players. With respect to using digital pattern generator to repair video problems in a DVD player. This finding is in agreement with that of Alio (2006) who identified a similar item as one of the technical competencies needed by skill manual workers in Enugu State.

More over, the study also found four items as being technical competency development needs of skill manual workers for maintenance of video signal decoders. These were using signal generators properly and safely to detect faulty components in video signals decoders, using special tools like jewelers to disassemble and re-assemble parts on printed circuit boards safely and properly: using frequency synthesizers to diagnose faults in video signal decoders and using network analyser to repair signal reception problems in video signal decoders. These findings lend credence to the works of Austin Community College (1999) who identified similar items as some of the technical competencies needed by electronics technicians.

Conclusion

Based on the findings it could be rightly concluded that location is not a significant factor in the competency development needs of urban and rural based skill manual workers in Akwa Ibom State for maintenance of the selected electronics appliances namely DVD Players and video signal decoders. Therefore, any training programme for skill manual workers in the state on enhancing their technical competencies for the maintenance of the selected electronics appliances should not discriminate between urban and rural based skill manual workers as they will equally benefit from the same training package.

Recommendations

The following recommendations were made based on the findings of the study

1. The federal and state ministries of education should organize workshops, seminars and conferences to synthesize electronics technology teachers and students on the need to attend professional development or training programmes, such as workshops, seminars and conferences as well as read professional electronic journals and books to enable them update their knowledge and skills on recent developments in the electronics industry.

2. The federal and state ministries of commerce and industry and related parastatals should organize workshops, seminars and conferences to synthesize electronics skill manual workers in Nigeria on the need to attend professional development programmes such as workshops, seminars and conferences as well as read professional electronic journals and books to enable them update their knowledge and skills on recent developments in the electronic industry.

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