Integration Of Automobile Technological Developments Into Nigeria Technical College Motor Vehicle Mechanics Work Curriculum

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In Nigeria, technical colleges produce craftsmen for various sectors of the economy and are regarded as the principal vocational institutions. It offers various mechanical trades among is Motor Vehicle Mechanics (MVM). The program of Motor Vehicle Mechanics trade in Nigeria technical colleges is designed to produce competent auto-mechanics craftsmen for Nigeria technological and industrial development. According to National Board for Technical Education (NBTE, 2001), auto-mechanics craftsmen are expected to test, diagnose, service and completely repair any fault on the motor vehicle to the manufacturer’s specification. For this to be achieved, a National curriculum is adopted in all technical colleges accredited by the NBTE.

The curriculum for motor vehicle mechanic work in the technical colleges is developed to offer a complete secondary school education in general education in addition to occupational area while the central purpose of motor vehicle mechanic work trade is to provide its recipient with the skill required for work in the automobile industry. With technological advancement, computers are used to control virtually most operation in automobiles. Apart from the carburetor that has been replaced by Electronic Injection System, the ignition system has also witnessed changes from conventional point type with a magnetic pick-up coil to electronic ignition system.

In a nutshell, technological development has brought several changes and modifications in automobile systems that are imported or assembled in this country. Within this contest Okorie (2001) noted that an important issue of workforce development in Nigeria is to ensure that human resources are developed to such an extent that the achievement of desired rate of technological changes will not be impeded through lack of personnel with suitable skills. Thus, importation and the assemblage of automobiles with new technological devices in Nigeria have implications for workforce development in technical and vocational education.

The new technological development having implications for the work of auto-mechanics should be integrated into the skills contents and learning contents of the curriculum of technical education programs. Elobuike (1999) viewed that the production of craftsmen on motor vehicle mechanics by technical colleges should be based on the need of automobile industries; consequently, the curriculum contents should be directly related to what industries and business need to make graduates easily work in the industries. These called for curriculum contents that are directly related to the new technological development to be integrated into technical colleges’ curriculum.

Enemali (1991) carried out a study to evaluate the quality of training received and its influence on job performance of technical college graduates in the industries in Benue State, Nigeria. The study was to find out the relevance and adequacy of curriculum contents for training the right skills in technical college graduates for self and industrial employment. 157 respondents comprise 50 technical college educators, 71 graduates of technical college and 36 employers of graduates from technical college.
and industries in Benue State, Nigeria. The finding of the study revealed that there was low rate of the degree of relevance of training in technical college curriculum content with the industrial skills for self and industrial employment. Agbata (2000) conducted a study to determine the relevance of the technical college auto-mechanics curriculum to the automobile industries in Anambra State, Nigeria. The findings showed that technical college curriculum for motor vehicle mechanics as assessed by the appraisal from students was low relative to the automobile industry occupational needs.

However, the integration of automobile technological developments into Nigeria technical college motor vehicle mechanics work curriculum will involve combining the theoretical and practical contents of automobile technological development into the existing technical colleges motor vehicle mechanics work curriculum. If the systems of these new brands of vehicles are not integrated into the learning contents of programs for training the automobile craftsmen, the new trend may spell a doom for the transport sector and the entire automobile craftsmen produced in the technical colleges in Nigeria.

Statement of Problem

The influence of technology has rendered traditional skills inadequate for the world of work while creating need for new and often sophisticated skills. In the automobile industry there have been complex changes in the systems and components of automobiles that are imported or assembled in Nigeria. The new development has greatly brought about changes in the skills required of auto-mechanics craftsmen for employment in the automobile industry. However, most of these new developments in automobile components and systems are not reflected in the learning contents of the curriculum used in the training of auto-mechanics craftsmen in Nigeria technical colleges. Invariably, there is a mismatch of motor vehicle mechanics work curriculum and the skills required for employment in the automobile industry. Supporting this view, the United Nation Educational Scientific and Cultural Organization (UNESCO, 1999) observed that the mismatch of curricula in technical and vocational education with the needs of the enterprises is a key issue not only in African countries but also world wide. UNESCO explained that in African countries, the relevance and appropriateness of the curricula for preparing students for the world of work is not reviewed on a regular basis.

However, technological developments in automobiles are changing day by day. The current curriculum is therefore said to be behind the state of art. It follows that the learning contents and skills that can be acquired through the curriculum must be short of adequate with some of them completely obsolete.

Apparently, the mismatch of curriculum of motor vehicle mechanics work of the technical colleges has created a gap between the trade theory and practice components of the curriculum and the current automobile technology. It has equally resulted into a situation whereby the auto-mechanics craftsmen being produced in the technical colleges are without skills required for employment in the automobile industries thereby worsening the situation of unemployment in Nigeria. Based on this, industries do not rely on the training giving to the graduates of the technical colleges rather any one employed must first be retrained before handling any repair. Most industries prefer craftsmen that have already acquired the necessary skills to test, diagnose, service and repair any automobile defect.

However, the continuous use of the current curriculum for the training of automobile craftsmen and expecting it to be functional will be likened to a wide-goose chase. Therefore, it is pertinent to integrate into the technical college motor vehicle mechanics curriculum the necessary theoretical and practical contents of technological developments in automobile.
Purpose of the Study

The purpose of this study is to identify automobile technological developments that are important to be integrated into technical college automobile curriculum. Specifically, the study will seek to:

1. Identify theoretical contents of technological developments in automobile.
2. Identify practical contents of technological developments in automobile.
3. Identify the instructional tools, materials, equipment and machine for training in the new content areas.

Research Questions

1. What are the theoretical contents of technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges?
2. What are the practical contents of technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges?

Hypotheses

HO 1: There is no significant difference in the mean responses of automobile industries workshop supervisors and technical teachers of motor vehicle mechanics work on the theoretical contents of technological developments in automobile.

HO 2: There is no significant difference in the mean responses of automobile industries workshop supervisors and technical teachers of motor vehicle mechanics work on the practical contents of technological developments in automobile.

Significance of the Study

The findings of this study will be of immense benefits to curriculum planners such as National Board for Technical Education (NBTE). The findings will hopefully influenced future trends in planning and reviewing the curriculum contents of the motor vehicles mechanics work programs in Nigeria. The society will benefit from the more efficient and effective services to be rendered by the graduates of technical colleges in Nigeria that will pass through such improved courses of the study of motor vehicles mechanics work programs. The trainers of motor vehicle mechanics program such as in technical colleges, colleges of education, and universities of technology and department of vocational teacher education in other universities who are offering such program to the newly identified contents of automobile curriculum to train students. The findings will as well be beneficial to the school administrators on the need to send the subject teachers for refresher course in the areas of new developments in automobile vehicles and the automobile industry work skills. The result will also allow teachers and instructors of motor vehicles mechanics work to identify their areas of deficiency on which they may need to update their knowledge. Finally, the result of the study will help the students who passed through this newly integrated automobile curriculum to be equipped with relevant automobile work skills and knowledge needed in other to be able to cope with the trend in the new developments in the automobile industry.
METHODOLOGY

The study was conducted using survey research design. The design is suitable since the study solicited information from the teachers of motor vehicle mechanics work in the technical college and automobile industries workshop supervisors on integration of automobile technological developments into technical college motor vehicle mechanics work curriculum.

Area of Study

The study was conducted in South-Western geopolitical zone of Nigeria. The States under this zone include: Ekiti, Lagos, Oyo, Ogun, Ondo and Osun States. The zone has 17 technical colleges that offer motor vehicle mechanics work. The zone equally has 20 automobile companies with their branches spread over the 36 States of Nigeria and the Federal Capital Territory, Abuja, Nigeria. All the automobile companies have their headquarters in Lagos, Nigeria (Industrial Training Fund, 2007).

Population and sample

The targeted population for this study was made up of all the motor vehicle mechanics work teachers in all the NBTE accredited technical colleges in south-western zone of Nigeria and all the twenty automobile industries workshop supervisors in their headquarters. Information gathered from the 17 technical colleges in zone under study revealed that there were only 32 motor vehicle mechanics work teachers. The automobile industries workshop supervisors were made up of 20 supervisors. These gave a total population of 52. No sampling was carried out since the number of the population was small. Therefore, the entire population was used as respondents for the study.

Instrument

The instrument for data collection for this study was a structured questionnaire, which was developed by the researchers. The questionnaire consisted of three sections (A, B and C). Section-A centred on items designed to find out the theoretical contents of technological developments in automobile. Section-B contained items designed to find out the practical contents of technological developments in automobile. Section-C dwelled into items designed to find out the instructional tools, materials, equipment and machine for training in the new content areas. The questionnaire items were formulated based on four-point scale type. Items for Sections A, B and C contained four responses category each. The responses categories were Very Important (VI), Important (I), Less Important (LI) and Not Important (NI). These responses categories were assigned numerical values of 4, 3, 2 and 1 respectively. The respondents were required to check and mark (×) against response category that best satisfies their opinion.

Validation of the Instrument

The questionnaire was subjected to face validation by an expert in the Department of Vocational and Technical Education, University of Nigeria, Nsukka. The questionnaire was as well subjected to content validation by an expert in the automobile industry. Each of the validators was served with a copy of the instrument and were required to review the items, comment on suitability, suggest modification, appropriateness or otherwise on the instrument before the final copy was produced and used for the study.
Reliability of the Instrument

A trial test was conducted for the purpose of determining the reliability of the instrument used for the study. In the trial test, five automobile industries workshop supervisors in Anambra Motor Manufacturing Company (ANAMCO) at Enugu in the eastern part of Nigeria and five motor vehicle mechanics work teachers from technical colleges in Enugu State were used. The validated questionnaire was administered on the respondents. Their responses were used in the computation of the reliability coefficient of the instrument using Cronbach Alpha (α) formula. The reliability coefficient established were as follows: Section A – α = .82; Section B – α = .78 and Section C – α = .80.

Method of Data Collection

Copies of the questionnaire were administered to the respondents by the researchers. The administered questionnaire was collected after two weeks. Out of the 52 questionnaire copies administered, 49 were duly filled by the respondents and returned. It was these numbers that were analyzed to generate the data used for answering the research questions and hypotheses. The return rate was 94.23%.

Method of Data Analysis

The data generated from the use of the questionnaire were analyzed using mean, standard deviation and t-test. The mean and standard deviation were used to answer research question 1-3. Any item with the mean of 2.50 and above was considered important while any item less than 2.50 was considered unimportant. However, each of the three hypotheses was tested using t-test statistics at level of significance of .05.

Results

Research Question 1

What are the theoretical contents of technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges?

Table 1: Mean Responses of Industries Workshop Supervisors and Technical Teachers on Theoretical Contents of Technological Developments in Automobile that are important to be integrated into the curriculum of the Motor Vehicle Work Program in the Technical College.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Items</th>
<th>X</th>
<th>SD</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Automotive workshop layout and facilities.</td>
<td>3.89</td>
<td>0.30</td>
<td>Important</td>
</tr>
<tr>
<td>2.</td>
<td>Automotive workshop safety (sources and types of hazards, safety rules, devices and equipment).</td>
<td>4.00</td>
<td>0.00</td>
<td>Important</td>
</tr>
</tbody>
</table>
3. Introduction to motor vehicle mechanics new system work tool and equipment. 3.59 0.50 Important
4. Service manual and vehicle specifications for new automobile system (interpretation and uses). 3.70 0.50 Important
5. Engine performance testing (power, torque, engine efficiency, etc.). 3.51 0.50 Important
6. Routine servicing (procedure). 3.80 0.41 Important
7. Motor vehicle emissions and control (introduction to types, sources and effects of emission, emission analysis and control system). 3.80 0.61 Important
8. Waste management in automotive workshop (oils collection and air conditioning, refrigerant recovery and recycling – ARC3). 3.51 0.68 Important
9. Integration of electrical/electronics and mechanics in the motor vehicles (introduction to motor vehicle mechatronics). 3.29 0.65 Important
10. Sensor and sensed systems of motor vehicles (sensor types, principles and characteristics). 3.29 0.79 Important
11. Actuators and micro-controls: type and functions and principles. 3.51 0.51 Important
12. Actuator control (control algorithms, logic systems and circuit). 3.51 0.51 Important
13. Semi-conductor devices: Types, characteristics, construction and applications. 3.69 0.47 Important
14. Electrical/electronics symbols, circuits and schematics. 3.31 0.65 Important
15. Multiplex electrics and wiring: signals and current flow controls. 3.59 0.67 Important
16. Testing and faults diagnosis: Tools, equipment and procedures. 3.59 0.67 Important
17. Anti-lock braking system (ABS): Principles of operations and types. 3.80 0.41 Important
18. Safety airbags and curtains: Principles of operations, installation, re-activation or replacement of deployed airbags. 3.59 0.50 Important
19. All wheel drive (AWD) system: Design and operation. 3.49 0.51 Important
20. All wheel steering (AWS) system: Design and operation. 3.80 0.41 Important
21. Active suspension with electronic variable damping: Mechanism and operation. 3.59 0.67 Important
22. Electronic stability program (ESP) and traction control system (TCS): Design and principle
No. of respondents = 49

The data presented in Table 1 shows that item 2, automotive workshop safety (sources and types of
hazards, safety rules, devices and equipment) has the highest mean rating of 4.00 and item 22, electronic stability program (ESP) and traction control system (TCS) and item 40, major repairs and recondition of vehicle systems were rated as the second highest mean rating of 3.90. Items 10 and 24 ranked the least mean rating of 3.29 but still showed an indication that the mean responses of automobile industry workshop supervisors and technical teachers to all the items are still greater than 2.50. This implies that all the items in Table 1 were rated as important theoretical contents of the new technological developments in Automobile to be integrated into the curriculum of Motor Vehicle Mechanics Work program in the technical colleges.

Research Question 2

What are the practical contents of technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges?

Table 2: Mean Responses of Industries Workshop Supervisors and Technical Teachers on Practical Contents of Technological Developments in Automobile that are important to be integrated into the curriculum of the Motor Vehicle Work Program in the Technical College.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Items</th>
<th>X</th>
<th>SD</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conduct engine performance test and determine needed repair</td>
<td>3.69</td>
<td>0.27</td>
<td>Important</td>
</tr>
<tr>
<td>2.</td>
<td>Perform on-board computer diagnosis on Electronic Control Unit (ECU).</td>
<td>3.59</td>
<td>0.67</td>
<td>Important</td>
</tr>
<tr>
<td>3.</td>
<td>Diagnose and carried out needed repairs on Multiplex electrics and wiring: Signals and current flow controls.</td>
<td>3.31</td>
<td>0.65</td>
<td>Important</td>
</tr>
<tr>
<td>4.</td>
<td>Perform oil and lubrication service on normally aspirated and turbo-charged engines.</td>
<td>3.41</td>
<td>0.67</td>
<td>Important</td>
</tr>
<tr>
<td>5.</td>
<td>Conduct engine performance test using engine analyzer and determine needed repair.</td>
<td>3.59</td>
<td>0.67</td>
<td>Important</td>
</tr>
<tr>
<td>6.</td>
<td>Inspect, repair or replace electronic ignition components.</td>
<td>3.41</td>
<td>0.50</td>
<td>Important</td>
</tr>
<tr>
<td>7.</td>
<td>Perform on-board computer diagnosis.</td>
<td>3.69</td>
<td>0.47</td>
<td>Important</td>
</tr>
<tr>
<td>8.</td>
<td>Diagnose electronic injection system faults and determine needed repairs.</td>
<td>3.80</td>
<td>0.41</td>
<td>Important</td>
</tr>
<tr>
<td>9</td>
<td>Diagnose emission control system and determine needed repairs.</td>
<td>3.41</td>
<td>0.50</td>
<td>Important</td>
</tr>
<tr>
<td>10</td>
<td>Install, re-activate or replace deployed airbags.</td>
<td>3.20</td>
<td>0.41</td>
<td>Important</td>
</tr>
<tr>
<td>11</td>
<td>Diagnose and determine needed repairs on All Wheel Drive (AWD) system.</td>
<td>3.59</td>
<td>0.50</td>
<td>Important</td>
</tr>
</tbody>
</table>
12. All Wheel Steering (AWS) system: Replace or repair according to manufacturers’ specifications. 3.59 0.50 Important

13. Active suspension with electronic variable damping: mechanism and operation. 3.41 0.50 Important

14. Check operation of anti-lock braking system: Adjust or repair according to manufacturers’ specifications. 3.69 0.47 Important

No. of respondents = 49

The data in table 2 indicated that item 8 which is on diagnosing electronic injection system faults and determining needed repair, has the highest mean rating of 3.80. Items 1, 7 and 54 which are on: conduct engine performance test and determine needed repair; perform on-board computer diagnosis and check operation of anti-lock braking system respectively were rated as the next highest mean ratings of 3.69 while item 10 which is on install, reactivate or replace deployed airbags ranked the least mean rating of 3.20. This revealed that the mean responses of industry workshop supervisors and technical teachers to all the items were greater than 2.50. This implies that all the items in table 2 were rated as important as the practical contents of the new technological developments in automobile to be integrated into curriculum of the motor vehicle mechanic work program in the technical colleges.

Hypothesis 1

HO 1: There is no significant difference in the mean responses of automobile industries workshop supervisors and technical teachers of motor vehicle mechanics work on the theoretical contents of technological developments in automobile.

Table 3: t-test analysis of the mean responses of automobile workshop industry supervisors and technical teachers on the theoretical contents of technological developments in automobile to be integrated into curriculum of the motor vehicle mechanics work program in the technical colleges.

<table>
<thead>
<tr>
<th>Technical Teachers</th>
<th>Industry Supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 30</td>
<td>N = 19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items Mean Stan. Dev</th>
<th>Mean Stan. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>X SD₁ X SD₂</td>
<td></td>
</tr>
</tbody>
</table>

1. 3.90 0.30 3.89 0.31 0.05 0.95
2. 4.00 0.00 4.00 0.00 -- -
3. 3.60 0.50 3.57 0.50 0.14 0.89
<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>3.70</td>
<td>0.47</td>
<td>3.70</td>
<td>0.47</td>
</tr>
<tr>
<td>5</td>
<td>3.50</td>
<td>0.51</td>
<td>3.52</td>
<td>0.51</td>
</tr>
<tr>
<td>6</td>
<td>3.80</td>
<td>0.41</td>
<td>3.78</td>
<td>0.42</td>
</tr>
<tr>
<td>7</td>
<td>3.80</td>
<td>0.61</td>
<td>3.79</td>
<td>0.63</td>
</tr>
<tr>
<td>8</td>
<td>3.50</td>
<td>0.68</td>
<td>3.52</td>
<td>0.69</td>
</tr>
<tr>
<td>9</td>
<td>3.30</td>
<td>0.65</td>
<td>3.26</td>
<td>0.65</td>
</tr>
<tr>
<td>10</td>
<td>3.30</td>
<td>0.79</td>
<td>3.26</td>
<td>0.80</td>
</tr>
<tr>
<td>11</td>
<td>3.50</td>
<td>0.51</td>
<td>3.52</td>
<td>0.51</td>
</tr>
<tr>
<td>12</td>
<td>3.50</td>
<td>0.51</td>
<td>3.52</td>
<td>0.51</td>
</tr>
<tr>
<td>13</td>
<td>3.70</td>
<td>0.47</td>
<td>3.67</td>
<td>0.47</td>
</tr>
<tr>
<td>14</td>
<td>3.30</td>
<td>0.65</td>
<td>3.32</td>
<td>0.67</td>
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<tr>
<td>15</td>
<td>3.60</td>
<td>0.67</td>
<td>3.58</td>
<td>0.69</td>
</tr>
<tr>
<td>16</td>
<td>3.60</td>
<td>0.67</td>
<td>3.58</td>
<td>0.69</td>
</tr>
<tr>
<td>17</td>
<td>3.60</td>
<td>0.41</td>
<td>3.79</td>
<td>0.42</td>
</tr>
<tr>
<td>18</td>
<td>3.60</td>
<td>0.49</td>
<td>3.57</td>
<td>0.51</td>
</tr>
<tr>
<td>19</td>
<td>3.50</td>
<td>0.51</td>
<td>3.47</td>
<td>0.51</td>
</tr>
<tr>
<td>20</td>
<td>3.80</td>
<td>0.41</td>
<td>3.79</td>
<td>0.42</td>
</tr>
<tr>
<td>21</td>
<td>3.60</td>
<td>0.67</td>
<td>3.58</td>
<td>0.69</td>
</tr>
<tr>
<td>22</td>
<td>3.90</td>
<td>0.31</td>
<td>3.89</td>
<td>0.32</td>
</tr>
<tr>
<td>23</td>
<td>3.70</td>
<td>0.47</td>
<td>3.74</td>
<td>0.45</td>
</tr>
<tr>
<td>24</td>
<td>3.30</td>
<td>0.79</td>
<td>3.26</td>
<td>0.81</td>
</tr>
<tr>
<td>25</td>
<td>3.40</td>
<td>0.49</td>
<td>3.42</td>
<td>0.51</td>
</tr>
<tr>
<td>26</td>
<td>3.40</td>
<td>0.50</td>
<td>3.42</td>
<td>0.51</td>
</tr>
<tr>
<td>27</td>
<td>3.80</td>
<td>0.41</td>
<td>3.79</td>
<td>0.42</td>
</tr>
<tr>
<td>28</td>
<td>3.60</td>
<td>0.49</td>
<td>3.58</td>
<td>0.51</td>
</tr>
<tr>
<td>29</td>
<td>3.60</td>
<td>0.49</td>
<td>3.58</td>
<td>0.51</td>
</tr>
</tbody>
</table>
30. 3.50 0.51 3.47 0.51 0.18 0.86
31. 3.70 0.47 3.68 0.48 0.11 0.91
32. 3.50 0.50 3.52 0.51 0.18 0.86
33. 3.60 0.50 3.63 0.50 0.22 0.83
34. 3.70 0.47 3.68 0.48 0.11 0.91
35. 3.80 0.61 3.79 0.63 0.06 0.95
36. 3.50 0.51 3.52 0.51 0.18 0.86
37. 3.70 0.47 3.73 0.45 0.27 0.79
38. 3.50 0.68 3.47 0.70 0.13 0.90
39. 3.30 0.65 3.32 0.67 0.08 0.94
40. 3.90 0.31 3.89 0.32 0.06 0.95

* significant @ sig (2-tailed) ≤ 0.05.

-t cannot be calculated because the standard deviations of both groups are 0.

Table 3 shows that t cannot be computed for item 2 because the standard deviation of both groups are 0 (zero). However, all other items in Table 3 had a calculated sig. (2-tailed) value greater than 0.05. This implies that there was no significant mean difference between the responses of technical teachers and automobile industries workshop supervisors for these items. With this result, the null hypothesis (H₀₁) of no significant means difference between the responses of technical teachers and automobile industries workshop supervisors on the theoretical contents of technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges was upheld at a level of significance of 0.05.

Hypothesis 2

H₀₂: There is no significant difference in the mean responses of automobile industries workshop supervisors and technical teachers of motor vehicle mechanics work on the practical contents of technological developments in automobile.

Table 4: t-test analysis of the mean responses of automobile workshop industry supervisors and technical teachers on the practical contents of technological developments in automobile to be integrated into curriculum of the motor vehicle mechanics work program in the technical colleges.
Table 4 shows that each of the items had a calculated sig (2-tailed) value greater than 0.05. This implies that there was no significant mean difference between the responses of technical teachers and automobile industries workshop supervisors for the items in Table 4. With this result, the null hypothesis (HO\textsubscript{2}) of no significant means difference between the responses of technical teachers and automobile industries workshop supervisors on the practical contents of technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges was upheld at a level of significance of 0.05.

Discussion

The data presented in Table 1, provided answers to research question one. The result revealed that all the forty theoretical contents of the technological developments in automobile were rated important to
be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges. The acceptance of all the identified new theoretical contents of the technological developments in automobiles by both the automobile industries workshop supervisors and technical teachers of auto-mechanics as important to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges is ideal and in agreement with the present state of technological development. The result is a pointer that challenges in the motor vehicle mechanics work curriculum must be responsive in order to maintain its relevance in the dynamic world of work. This result is in line with assertion of Olitan (1996) that various production tasks which were manually performed have become mechanized and in some cases, these are automated with computer technology.

Schwaller (1993) and Nice (2001) both agreed that the incorporation of new technologies in modern automobiles make vehicles more complex, though some of the new technologies make automobile vehicles easier to service. Schwaller (1993) insisted that service personnel needs not only the understanding of the parts, nomenclature and operation but also requires great deal of knowledge and skills in the selection and correct application of tools, correct procedures of fault diagnosis, disassembling and reassembling. Meeting these requirements must come from the identification of the relevant technologies and covering all their relevant components in motor vehicle mechanics work curriculum.

The underlying principles of electronic controls of automotive systems according to Bezdek (1992) are in fuzzy sets and fuzzy logic systems. Sensors are however said to be the primary feeders of these systems. The introduction of mechatronics components particularly addressed these basics. It is also reflected in curriculum for similar programs in Japan (Murata and Stern, 2002). In line with Awokoya (1981) that the characteristics of a quality education program should include relevance, adaptability and international link among others. The new contents of the curriculum in addition to providing the necessary technical base will also help to bridge the gap in international standards.

In accordance with the theoretical contents regarded as important by the respondents, the data presented in table 2 provided answers to research question two. Table 2 revealed that all fourteen practical contents of the technological developments in automobile are important to be integrated into the motor vehicle mechanics work curriculum of the technical colleges. This result indicated that acquisition of basic practical skill on test, diagnose, service and repair are required for the new changes in automobile mechanic work in automobile industries. Okoro (1999) writing on the need for production of skilled auto-mechanics explained that a well-trained motor mechanic would be able to diagnose and repair automobile faults quickly and accurately.

In Table 3, a t-test statistic was used to test the first hypothesis formulated on the theoretical contents of the technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges. At the calculated t-value, 39 items had a calculated sig (2-tailed) value greater than 0.05. Hence, the null hypothesis of no significant difference was upheld for these items. However, t cannot be computed for item 2 based on the fact that the standard deviation of both groups for the item is 0 (zero).

In table 4, the same t-test statistic was used to test the second hypothesis formulated on the practical contents of the technological developments in automobile to be integrated into the curriculum of motor vehicle mechanics work program in the technical colleges. At the calculated t-value, all the 14 items had a calculated sig (2-tailed) value greater than 0.05. Hence, the null hypothesis of no significant
difference was upheld for all the items.

Conclusion

The study has identified the theoretical and practical contents that are important to teach the new technological developments in automobile and at the same time integrate the theoretical and practical contents identified into existing modules of the motor vehicle mechanics work curriculum of technical colleges in Nigeria. It is hoped that if all these theoretical and practical contents are taken into consideration in the training of auto-mechanics craftsmen in the technical colleges, the students will graduate from the technical colleges with the knowledge and practical skills required to meet the needs of the industry and evolving technological developments in the automobile industries. Consequently, the students will be able to face the challenges of work in the automobile industry if employed, establish their own workshop in the absence of paid employment, become employers of labour instead of depending solely on paid employment and thereby contribute their own quota to the industrial development of Nigeria and the world at large.

Recommendation

Based on the findings of this study, the researchers hereby made the following recommendations:

1. The regulatory agency of technical education in Nigeria, the National Board for Technical Education (NBTE) should conduct a review of curriculum for motor vehicle mechanics work programs in technical colleges with a view to include the new theoretical and practical contents for studying the new technological developments in automobiles.

2. Government and Administrators of technical colleges in Nigeria should ensure the provision of adequate workshop and equipment for an effective implementation of the curriculum to be reviewed.

3. The teaching staff (teachers/instructors) should undergo appropriate retraining to update their knowledge and skills for effective implementation of the new curriculum.

4. Constant seminars, workshops and conferences should be organized for technical college teachers/instructors and students to keep them abreast of the new developments in automobile.

References


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