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**PERCEIVED IN-SERVICE NEEDS OF ELECTRICAL AND ELECTRONICS
TEACHERS IN DELTA AND EDO STATE.**

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Abstract

The study was designed to identify the technical competencies in which the Electrical and Electronics teachers need in-service. The design of this study was an ex-post factor survey. A total of 78 Electrical and Electronics teachers in Delta and Edo States were the subjects for the study. The instrument used was a questionnaire, developed validated and pilot-tested to establish the reliability. Data were collected and analyzed using means and t-test. The findings from the study indicated that these technical teachers need in-service in nine electrical competencies and nineteen electronics competencies. Implications of these findings were highlighted and recommendations were made based on the findings.

Introduction

The purpose of teacher education is to provide teachers with intellectual and professional background adequate for their assignment and to make them adaptable to any changing situation not only in the life of their country, but in the wider world (Federal Republic of Nigeria, 1981). The teacher occupies a crucial position in the education process and his /her contribution will either aid or hinder effective learning. The modern technological age with its accompanying explosion of knowledge calls for teachers who are ready to keep abreast of the constant changing needs of the individuals being taught as well as that of the society.

Evans and Terry (1971) emphasized the need for vocational educators to continue to improve their performance and update themselves in the discipline(s) which provide(s) the subject matter, and the basic knowledge for an occupation. In Delta and Edo States, refresher courses which were organized in 1988 and 1990 for technical teachers. Covered topics on politicizes, general education, evaluation of staff and students, and issues on continuous assessment. These efforts appear to be inadequate for technical teachers to cope with new curriculum content in areas of specialization for the 6-3-3-4 system of education.

The purpose of this study was to identify technical competencies perceived as important by technical teachers in Delta and Edo States. The study also identified the in-service needs of electrical and electronics teachers. The identification of the in-service needs of this group of teachers will assist administrators in planning meaningful in-service programme that would help the technical teachers fulfil their roles in the educational process.

To carry out the research, three research questions were posed. The study sought answers to the following questions:

1. What are the technical competencies perceived as important by electrical and electronics

teachers in post-primary schools in Delta and Edo States?

2. What are the expressed performance levels of the electrical and electronics teachers on the identified competencies?
3. What are the competencies in which electrical and electronics teachers need in-service training?

This study assumed that technical teachers are the best sources for obtaining information on their in-service training needs.

Methodology

Population and Sample

The population of the study consisted of 78 electrical and electronic teachers at the post-primary school level in Edo and Delta States. Thirty-three of the teachers were NCE graduates, twenty seven were City & Guilds (Final), six had National Diploma while twelve were University graduates. 48 teach in technical colleges and 30 in secondary school. This was made up of 64 male and 14 female teachers (Ministry of Education, 1990). There was no sampling because the population was not large.

Instrument

The instrument used for this study was a questionnaire. Ideas and items in the questionnaire were generated from performance objectives stated in the syllabi for senior secondary schools and National Technical Certificate Curriculum and module specifications. The questionnaire was designed to elicit from the respondents their self-perceived importance level of each competency and their self-expressed current ability to perform each competency. The questionnaire contains competency statements in electrical and electronics' Respondent were expected to rate the level of importance which they attached to each competency element as well as their performance level on a 5-point scale

- 1 = Not important/low performance,
- 2 = Little importance/Below average performance,
- 3 = Average importance/Average performance,
- 4 = Slightly above average, and
- 5 = High importance/High performance.

The instrument was face validated by four vocational educators and two measurement and evaluation experts. It was pilot tested on eight electrical and electronics teachers not used for the main study. The reliability coefficient value for the pilot study is 0.87 for electrical and 0.92 for electronics using the Cronbach alpha (α).

Data Collection and Analysis

A total of 78 copies of the questionnaire were distributed (45 for electrical and 33 for electronics). The return rate for electrical is 90 percent and that of electronics is 94.3 percent.

Data collected for the study were analyzed using means and t-test. Specially, the first and second research questions were analyzed by computing the mean scores for each competency for the respondents. Competences with mean scores equal to or greater than 3.5 were considered essential

and important. The extent to which the respondents can perform the competences were also determined as explained above. The third research question was analyzed using multiple correlated t-test. The purpose of the correlation analysis was to measure the strength of the relationship between the two variables (importance and performance levels). Any item that is statistically significant constitutes a need. Other indices used to determine a need are that the competency must be important to the technical teacher and the mean level of performance of such competency should be less than 3.5.

Finding and Discussion

The list of competences perceived as important for effective teaching of Electrical and the expressed performance level of the teachers is as shown in Table 1. For each item of Electrical competency, the mean level of importance is significant higher than the mean level of expressed performance. Nine competences were possessed at a level lower than 3.5

TableE 1: Comparison of levels of importance and performance for Needs of Electrical Teachers

| Item | Competency | Perceived Importance X_i | Expressed Performance X_p | Calculated t-value |
|--------------------------------|--|----------------------------|-----------------------------|--------------------|
| Domestic Installation | | | | |
| 1 | Carrying out surface wiring of buildings | 4.47 | 3.96 | 3.04 |
| 2. | Carrying out concealed conduit installation works | 4.22 | 3.42 | 3.30 |
| 3. | Carrying out tests on completed installation | 4.58 | 3.78 | 4.01 |
| 4. | Diagnosing earthing faults | 4.58 | 3.53 | 5.86 |
| 5. | Applying current regulation regarding surface wiring | 4.67 | 3.82 | 6.01 |
| 6. | Installing protective devices | 4.58 | 3.76 | 4.13 |
| 7. | Fault diagnosing and repair of in-door installation | 4.64 | 3.82 | 4.74 |
| 8. | Applying the necessary safety measures | 4.67 | 4.04 | 3.80 |
| Industrial Installation | | | | |
| 9. | Installing different types of ducts accurately | 4.33 | 3.11 | 5.44 |
| 10. | Maintaining electrical equipment | 4.42 | 3.73 | 3.17 |
| 11. | Installing lightning arresters | 4.11 | 3.22 | 4.08 |
| 12. | Distributing electrical load in building site | 4.20 | 3.29 | 4.22 |
| 13. | Description of sub-station equipment | 4.27 | 3.53 | 3.76 |
| 14. | Analyzing overhead distribution system | 4.56 | 3.62 | 4.96 |
| AC Machines | | | | |
| 15 | Principles of operating AC Motors | 4.51 | 3.80 | 3.77 |
| 16. | Principles of operating AC generators | 4.51 | 3.89 | 3.46 |
| 17. | Principles of operating polyphase machine | 4.16 | 3.42 | 3.61 |
| 18. | Diagnosing faults in AC machines | 4.51 | 3.69 | 3.87 |
| 19. | Rewinding transformers | 4.24 | 3.33 | 4.22 |

| DC Machines | | | | |
|-------------------------------------|---------------------------------------|------|------|------|
| 20. | Principles of operating DC Motors | 4.60 | 3.84 | 4.23 |
| 21. | Principles of operating DC generators | 4.56 | 3.76 | 4.11 |
| 22. | Rewinding electrical machines | 4.38 | 3.16 | 5.34 |
| 23. | Repairing domestic appliances | 4.64 | 3.93 | 3.74 |
| Battery Charging and Repairs | | | | |
| 24. | Constructing simple cell of a battery | 4.00 | 3.18 | 2.97 |
| 25. | Repairing faulty cells in a battery | 4.40 | 3.47 | 5.10 |

The Electrical teachers are found to need in-service training in nine (36%) out of the 25 technical competencies in Electrical. The competency items are 2,9,11,12,17,19,22,24, and 25 in

Table 1: These are listed below:

1. Carrying out concealed conduit installation works
2. Installing different types of ducts accurately
3. Installing lightning arrestors
4. Distributing electrical load in building site
5. Principles of operating polyphase machines
6. Rewinding transformers
7. Rewinding electrical machines
8. Constructing simple cell of a battery
9. Repairing faulty cells in a battery

The competencies perceived as important for effective teaching of electronics in schools are as presented in table 2 below. The data on Table 2 revealed that the mean rating between the levels and importance and performance are significant at 0.05 level of probability for all the electronics competencies. The t-value ranged from 3.18 (Energy band theory of semiconductors) to 13.04 (Analyzing integrated circuits). However, the Electronics teachers possessed 19 competencies at a level lower than 3.5. This implies that they need in-service training in 19 (67.8%) out of the 28 competencies in Electronics. The competency items are 1,2,3,4,5,6,7,8,9,10-, 11,12,13,14,17,21,24,25,26,27 and 28 (See table 2).

Table 2: Comparison of levels of importance and performance for Needs of Electronics Teachers

| Item | Competency | XI | XP | t-value |
|----------------------------|---|------|------|---------|
| Electronic Circuits | | | | |
| 1. | Constructing stabilizing low voltage dc power supply unit | 4.58 | 4.18 | 6.05 |
| 2. | Constructing signal injector using multi-vibrator circuit | 4.21 | 3.27 | 4.03 |
| 3. | Analyzing integrated circuits | 4.12 | 3.18 | 13.04 |
| 4. | Determining the effect of positive feedback on amplifiers | 4.15 | 3.21 | 5.21 |
| 5. | Explaining the operation of Oscillators | 4.52 | 3.36 | 5.75 |

| | | | | |
|----|---|------|------|------|
| 6. | Explaining the operation of multi-vibrators | 4.61 | 3.09 | 7.58 |
| 7. | Explaining the operation of logic gates | 4.39 | 3.42 | 4.22 |

Electronic Devices

| | | | | |
|-----|---------------------------------------|------|------|------|
| 8. | Energy band theory of semi-conductors | 4.39 | 3.73 | 3.18 |
| 9. | Characteristics of FET and Thyristors | 4.46 | 3.64 | 3.82 |
| 10. | Basic concepts of integrated circuits | 4.46 | 3.42 | 4.68 |
| 11. | Description of multi-electrode valves | 4.55 | 3.42 | 5.90 |
| 12. | Installing acoustic equipment | 4.36 | 3.06 | 5.96 |
| 13. | Repairing acoustic equipment | 4.55 | 3.36 | 6.22 |

Amplifiers

| | | | | |
|-----|---|------|------|------|
| 14. | Analyzing frequency responses of amplifiers | 4.30 | 3.24 | 4.78 |
| 15. | Mode of operating various classes of amplifier | 4.55 | 3.52 | 4.67 |
| 16. | Differentiating between power | 4.58 | 3.61 | 4. |
| 17. | Analyzing characteristics of operational amplifier | 4.27 | 3.49 | 3.88 |
| 18. | Constructing low voltage amplifiers using semi Conductors | 4.61 | 3.88 | 4.06 |
| 19. | Determining the gain of amplifier | 4.42 | 3.23 | 3.81 |

Communication system

| | | | | |
|-----|---|------|------|------|
| 20. | Principles of AM & FM Modulation | 4.90 | 3.97 | 3.47 |
| 21. | Methods of detecting AM and F.M. signals | 4.67 | 3.18 | 7.03 |
| 23. | Principles of radio transmission | 4.64 | 3.58 | 3.58 |
| 24. | Principles of radio reception | 4.70 | 3.61 | 3.60 |
| 25. | Transmission of sound and picture signals | 4.49 | 3.24 | 5.42 |
| 26. | Reception of sound and picture in monochrome TV | 4.49 | 3.15 | 5.92 |
| 27. | Principles of scanning and synchronization | 4.45 | 2.67 | 7.46 |
| 28. | Analyzing Colour TV circuits | 4.52 | 2.70 | 8.34 |
| 29. | Principles of Satellite Communication | 4.49 | 2.64 | 7.14 |

Conclusion and Recommendation

The technical competencies identified as important in this study represent what the Electrical and Electronics teachers in Delta and Edo States considered essential for successful teaching at the secondary school levels. Furthermore, the in-service needs identified in the study represent a list of what the Electrical and Electronics teachers considered as needs for effective performance of their tasks in schools and colleges. It is expected that adequately planned and implemented in-service programme that is based on the findings of this study will equip Electrical and Electronics teachers with necessary technical skill and knowledge needed to teach their occupational subjects effectively. As a result, student's standard of achievement in internal and external examinations will improve.

The findings of this study have implications for administrators, the teachers of Electrical/ Electronics programmes and students offering their subjects in schools and colleges. Based on the findings, the school administrators and policy makers will have a better understanding of the needs of

the teachers. The findings will serve as an initial input into the development and Electronics teachers. Such a programme would help teachers fulfil their roles in the educational process (Itotoh, 1989). The success of the students in examinations will depend, to a large extent, on the competence of the teachers. There is the need to incorporate the identified technical in-service needs into their pre-service curriculum (if they are missing) in order to prepare prospective Electrical/Electronic teachers for their teaching roles.

It is recommended that the vocational and technical division of the Ministries of Education for technical teachers to update and upgrade their knowledge and skills. The competencies in which teachers expressed low programme. Further research should be conducted to detect the factors responsible for the very low performance of these teachers in specific competencies. Besides, the study could be replicated in other states of Nigeria.

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