

Preparation of Graduate Automotive Teachers for the World of Work in Kenya

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Abstract

Automotive teacher education and training in Kenya is aimed at preparing accomplished teachers to facilitate the learning process in secondary and post-secondary Technical and Vocational Education and Training (TVET) institutions offering power mechanics and automotive engineering respectively. This involves imparting the necessary knowledge and skills both in pedagogy and discipline content. This study assessed the adequacy in preparation of the graduate automotive teachers from University of Eldoret for the world of work. Areas considered were the knowledge and skills they acquired during training and what is required of them in the world of work and their job performance at the workplaces. The study employed descriptive survey design and data was collected through questionnaires, interviews and document analysis. Respondents were teachers' supervisors in the work places, graduate automotive teachers who had undergone the training and teaching in TVET institutions and fourth year automotive teacher trainees in the University. Data was analyzed using descriptive statistics with the help of Statistical Package for Social Scientists (SPSS). Content analysis was also applied in analyzing data from the documents. The findings reveal that there is some mismatch between the training acquired and that which is required in the world of work. In addition, the job performance of graduate automotive teachers is not in phase with the requirements of the work place. More is required of them than what they learn. The study recommends a review of the teacher training curriculum to reflect the additional content in the revised Kenya National Examination Council (KNEC) Modular syllabus in TVET institutions besides strengthening proper collaboration with the TVET institutions and the automotive industry in the face of changing technological trends.

Key Words: Automotive, Graduate Teacher, Preparation, World of Work

Introduction

Background Information

Automotive teachers in Kenya are trained in three institutions of higher learning. These are Moi University (from 2011) and University of Eldoret both of which follow the integrated model in preparing degree level teachers for four years and Kenya Technical Teachers College which trains diploma level teachers on pedagogical skills for one year. These teachers are prepared to teach power mechanics, drawing and design and mathematics in secondary schools as well as automotive engineering in TVET institutions in Kenya. They may also be useful professionals in the automotive firms. There are three categories of TVET institutions under the ministry of Education, Science and Technology offering training to students who do not secure chances in the university. These are the National Polytechnics which offer higher national and ordinary diplomas, Institutes of Science and Technology and Technical Training Institutes which offer ordinary diplomas and certificates.

Teachers play an important role in imparting knowledge, skills and attitudes to students. Teacher education and training development in Kenya is an issue of concern. Recommendations have been made by education reports, starting from the Ominde report of 1964 on provision of sufficient and well trained teachers in the Kenyan schools. Currently, the government embarked on Vision 2030 whose strategies include modernizing teacher training and strengthening partnerships with private sector, including provision of efficient, motivated and well trained staff in the provision of quality education for all. Maleche et al. (2006) report that:

At a meeting of the committee of Deans (2003) it was noted that although B.Ed graduands are well endowed in methodology, they lack depth in content teaching subjects. In other fora within universities, claims of poor quality B.Ed graduates have been raised. The accusation of deficiency in content is conveniently placed at the door of Schools of Education, ironically by those faculties specifically charged with teaching content... (p. 213).

Kitainge (2005) noted that the automotive industry is one of the fastest growing industries with the need for style, speed, and power impacting on design and manufacture. Like any other kind of technology, automotive technology, is a discipline that will always be affected by technological changes and standards of the industry. This requires automotive teachers to have advanced knowledge and skills if they are to

deliver effectively in training automotive technicians. People who have the relevant knowledge and skills not only make capital equipment more productive but also make effective use of machines and equipment they work with (Obudho, 2008). While there is the general assumption that education and training supports work performance, the link is not clear as to how training should be framed to promote acquisition of the skills, attitudes and knowledge that are useful for work and life in general. According to Kerre (2000), many training institutions (especially government-funded ones) have not modernized their curricula and facilities so there have been a lot of complaints about mismatch between the products of the education systems and the labour market demands. Critics have also argued that the lack of inputs from prospective employers into curriculum design and training delivery in universities and colleges is partly responsible for the mismatch. Riechi (2010) observed that there is the absence of effective labour market mechanisms, such as tracer surveys and consultations with employers and alumni, to enable training institutions (including universities) adjust curricula in order to meet the changing needs of the industry. The Kenyan tertiary institutions face a deficit in terms of quantity and quality of our human resources (Republic of Kenya, 2004), hence raising the major concern: Is Kenya's TVET teacher education and training effective, especially in terms of adoption of modern technology, innovation to transform the knowledge generated into final products and equipping the graduates with the desired knowledge and skills necessary to be effective as productive workers? This concern motivated the study.

Statement of the Problem

The quality of technical and vocational education and training greatly depends on the quality of its teaching force. To ensure quality of TVET programmes, the quality of the teacher is critical among other important considerations such as training equipment and learning and teaching materials (Ferej, Kisilu & Ooko, 2012). However, the quality of graduate automotive teachers in Kenya cannot, at present, meet the current demands of the job market due to constantly changing world of work. The Kenya Vision 2030 recognizes that there is a mismatch between the level of skills imparted by the education system as a whole and the requirements of the labour market (GoK, 2007). It thus suggests corrective measures in order to meet the demands of the

new economy. In view of this, Technology Education Department which is charged with the responsibility of training technology teachers at University of Eldoret has been preparing and producing graduate technical teachers since 1989 and the quality and relevance of its graduate automotive teacher training program needed to be ascertained given the current nature of work places. The study looked at the issue of relevance in the training of graduate automotive teachers in the context of a changing world and work conditions through assessing the adequacy in preparation for the world of work.

Study Objectives

The study was guided by the following specific objectives.

- (a) To investigate if there is a relationship between the knowledge and skills graduate automotive teachers acquire during training and those required in the world of work;
- (b) To determine the attitudes of supervisors towards the performance of graduate automotive teachers in the world of work.

Methodology

Research Design

The study employed a descriptive survey design. Kerlinger (2003) argues for the use of surveys in educational fact-finding because they provide a great deal of information which is accurate. This preference is due to efficiency of the design in collecting large amounts of information within a short time without manipulation of the variables. According to Sproul (1995) descriptive survey is the only means through which views, opinions, attitudes and suggestions for improvements regarding the phenomenon under study can be achieved.

Research Methodology

Heuristic methodology was adopted in this study. Heuristic inquiry affirms the possibility that one can live deeply and passionately in the moment, be fully immersed in the mysteries and miracles and still be engaged in the meaningful research experience (Craig, 1978 cited in Patton, 1990). Since the researcher has been involved in the aspects of the research as a teacher trainee and a graduate teacher, this methodology fits

the study. In this regard, the authors' reflections and experiences are vital in explaining the situations particularly in University of Eldoret.

Sample and Sampling Procedure

The study was carried out in Uasin Gishu and Nandi counties, North Rift region in Kenya. It involved the teacher training institution, TVET institutions and automotive industry. University of Eldoret which until 2011 was the only higher education institution training degree level technology education teachers was the focus of this study. The TVET institutions studied were Eldoret polytechnic, Rift Valley, Kaiboi and Ol'lessos technical training institutes. Identified automotive workshops were also studied. The choice of the TVET institutions is because they all offer Automotive Engineering both at diploma and certificate levels and representative of others not included in sample. The workshops studied were those which have recently attached the sampled automotive teacher trainees. Only the latest samples of the syllabi recommended for use in these institutions was analyzed.

The study was done on a total of 45 participants drawn from three groups namely: 20 graduate automotive teachers who underwent the training in UoE and working in TVET institutions, 15 fourth year automotive teacher trainees in UoE who had undertaken their attachment as well as teaching practice and 10 supervisors of graduate automotive teachers which included 4 heads of automotive/mechanical engineering departments (HoDs) in TVET institutions and 6 automotive workshops supervisions within Eldoret town. Stratified proportionate sampling was applied in selecting the graduate automotive teachers and automotive teacher trainees. The supervisors in the automotive workshops were identified by snowball while all the HoDs in the TVET institutions were all involved since no sampling was applied.

Methods of Data Collection

Data collection is a specific, methodical method of gathering information relevant to research purpose, or of addressing research objectives, and hypotheses (Burns & Grove, 2003). Patton (1990) suggests that using a combination of data sources and collection methods is a validating aspect which cross-checks the data. Several methods were used to collect data for this research. These were researcher designed

questionnaires, documents analysis and interviews guided by interview schedules. Questionnaires were administered to all the participants while interview schedules were used on a smaller portion of the sample of the participants to confirm their opinions. Document analysis was used for the syllabi of the institutions. However, the data discussed in this paper is from questionnaires and document analysis. Willingness of the respondents to participate in the data collection determined inclusion in the study.

Data Analysis

The data obtained from the field were coded for completeness and accuracy of information after each data collection day and before storage. Data was captured through Microsoft Excel and analyzed both qualitatively and quantitatively. The answered questionnaire copies were first grouped manually according to categories of the respondents. Based on the information gathered during data collection, coding and analysis of data was done using the Statistical Packages for the Social Sciences (SPSS). In the study, descriptive statistics including frequencies, percentages and charts were used. Content analysis was also used in analyzing the syllabi used for training in the institutions.

Results and Discussion

Relationship between Knowledge and Skills Acquired by Graduate Automotive Teachers and those Required in the Workplace

The study sought to investigate the relationship between the knowledge and skills acquired during automotive teacher training and what is required at the work place. An analysis of the syllabi for training graduate automotive teachers and that used in training automotive technicians was done and the areas of mismatch were identified and are presented in figure 1. The figure shows the number of topics missing in the teacher training curriculum but is in technician syllabus and are labeled as ‘_deficient topics’ and those present in teacher training syllabus but are missing in technician syllabus and are labeled as ‘_excess topics’.

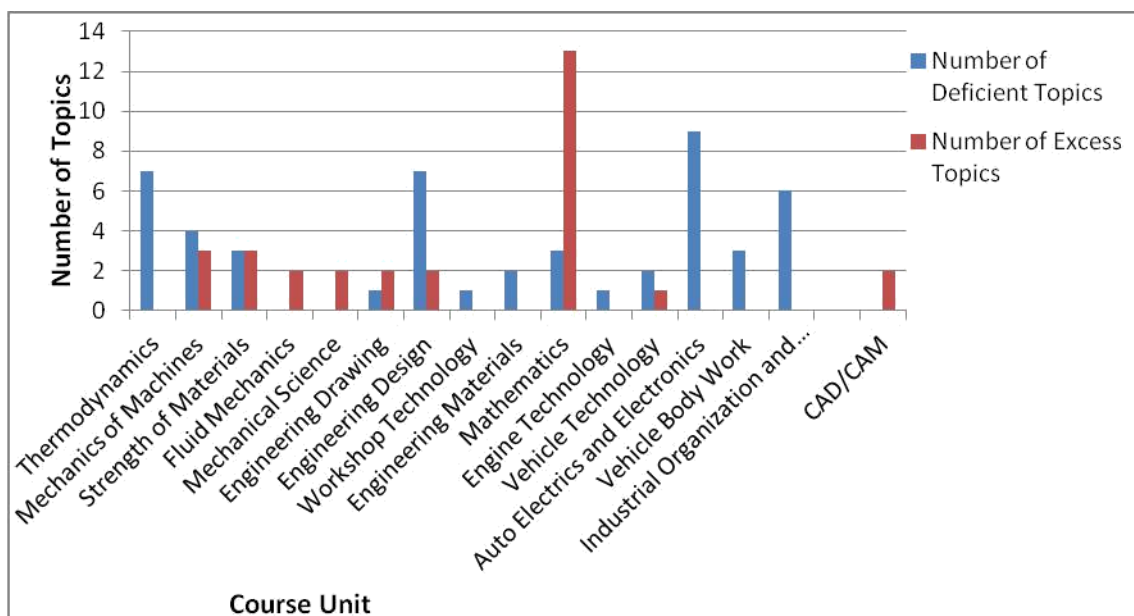


Figure 1. Distribution of Number of Topics of Mismatch for Various Course Units

From figure 1, it is evident that there exist areas of mismatch with regard to the courses and topics graduate teachers were trained on and what they are expected to deliver in their places of work. From the questionnaire, it was noted that CAD/CAM which seems to match with 2 topics in excess was never covered during teacher training. Trainees cited the non inclusion of the unit in the syllabus and hence not taught at all. In addition, the Vehicle Body Works which is still a new unit in modular curricula has not been included in the teacher training curriculum. The study reveals that the graduate automotive teachers are well prepared to teach Mathematics, Mechanical Science, and Fluid Mechanics. None of these had deficient topics. Their preparation in Mechanics of Machines, Strength of Materials, and Engineering Drawing is satisfactory though there were close to 4 topics in deficit but with some in excess. The worst affected units are thermodynamics, engineering design, auto electrics and electronics, vehicle body works and industrial organization and management. These had between 3 and 9 topics in deficit.

The graduate automotive teachers were also asked which area of automotive they were comfortable teaching. Their responses are as shown in figure 2

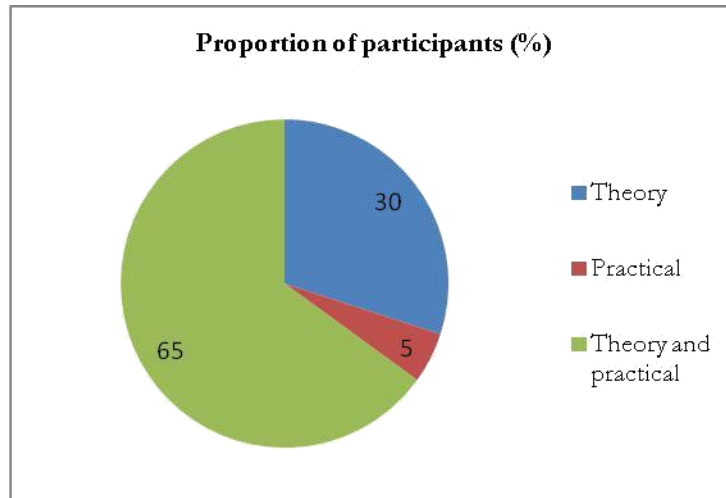


Figure 2. Graduate Automotive Teachers' Preferential Teaching Areas

Majority of them (65%) were comfortable teaching both theory and practical while only 5% were comfortable with only the practical. A third of the teachers felt they could only handle the theory comfortably. The main reason for these preferences is the initial teacher training in the area. This implies that practical content area need to be emphasized in preparing the teacher trainees so as to be able to perform to expectations in their work places upon employment.

Graduate automotive teachers were asked to indicate the course units that they felt their training adequately prepared them for work. The study was limited to the following groups of course units: mathematics, automotive technology, mechanical technology and technical drawing. Their responses are shown in figure 3.

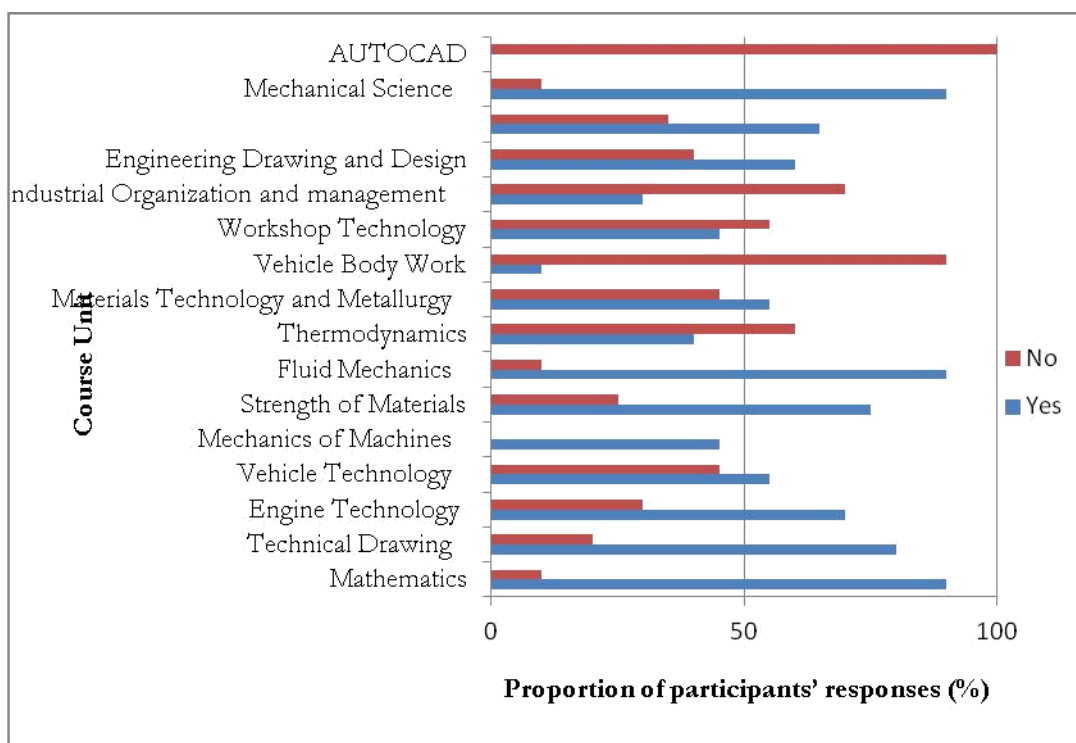


Figure 3. Graduate Teachers' Preparation in Various Course Units

More than 50 % of the participants expressed the view that they were prepared well in the following units: mathematics, technical drawing, engine technology, vehicle technology, strength of materials, fluid mechanics, materials technology and metallurgy, engineering drawing and design, vehicle electrical and electronics and mechanical science. They expressed a contrary opinion on the remaining 6 units. It is worth noting that these findings correspond to those obtained through document analysis.

Attitudes of Supervisors towards the Performance of Graduate Automotive Teachers in the World of Work

The opinions of the supervisors both in institutions and industry pertaining the teachers' skills which are demonstrated through job performance were sought. They were senior personnel responsible for supervising graduate automotive teachers in their respective places of work. 70 % of them had first degree and over 6 years experience. The opinions were classified in the following manner with regard to the performance of teachers using the Likert scale (Kothari, 2003): Very Good, Good, Average, Poor and Very Poor. The rating is presented in figure 4.

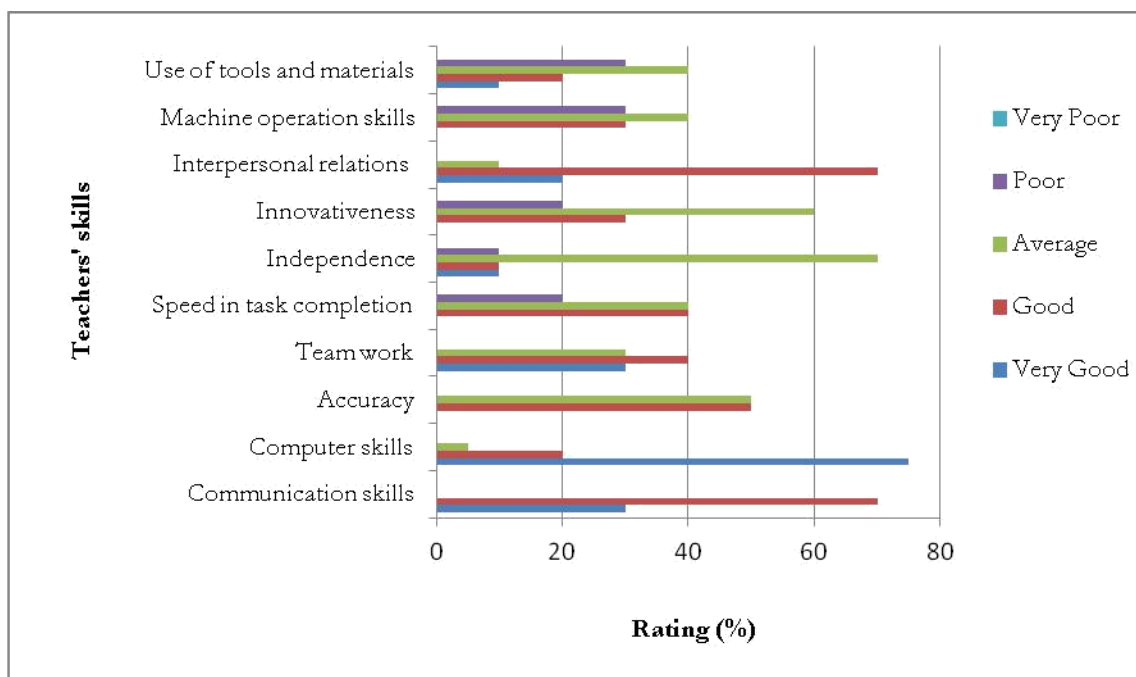


Figure 4. Supervisors' Performance Rating of Graduate Automotive Teachers in the World of Work

It was noted that many supervisors (75%) rated the teachers as very good in computer skills. Interpersonal relations and communication skills were rated as good by 70 % of the supervisors while accuracy, independence and innovativeness were averagely rated. 40 % of the supervisors rated teachers as average on the use of tools and materials, machine operation skills and speed in task completion. A third of the supervisors felt that teachers were either average or very good on team work while 40 % rates them as good. These skills are considered as important aspects of job performance which teacher trainees need to acquire during initial teacher training. Efforts should thus be made to impart and develop them in the teacher trainees.

Kerre (1995) observed that in the current state of changing needs of societies and the work place, new knowledge and technologies are altering the skill requirement for production and maintenance. He therefore suggests that quality assurance be sought by both trainees and employers to ensure that the current mismatch between trainees and employment opportunities is arrested. If this is done, it will improve their job performance at work place. The attitude of supervisors can be attributed to the changing work environment where new technologies and work organization demand new skills

and also that UoE Graduate Automotive Teacher Training programme has not innovated to accommodate such changes.

Conclusion and Recommendations

Conclusion

In a nutshell, it was found that there is some mismatch between the knowledge and skills acquired during training and those required in the world of work. Some course units were not covered in teacher training yet are part of what the graduate teachers are expected to teach. Key among them is CAD/CAM and Vehicle Body Work. Besides, some of the topics in the course units were in deficit of those in the KNEC curricula. This includes such course units as thermodynamics, mechanics of machines, engineering design, vehicle electrical and electronics, workshop technology and industrial organization and management which had more than four topics in deficit. This puts the teachers at a disadvantaged position as they have to learn on the job which subsequently may render them ineffective resulting to low performance. However, graduate teachers were found to be adequately prepared in course units like mathematics, fluid mechanics and mechanical science. In addition, supervisors rated the graduate teachers from average to good in most of the skills they exhibit during job performance. Computer skills was the only course rated as very good. This implies that teacher trainers need to expose the trainees to various skills which are vital for good job performance in the field of automotive. The worst hit include use of tools and materials, machine operating skills, innovativeness and speed in task completion. The existence of a relationship between what the graduate automotive teachers learnt in UoE and what is required of them at the work place is a good indication that not everything learnt was irrelevant, however more needs to be done to enhance this relationship and improve it through the review of syllabus.

Recommendations

Based on the findings of the study, the following recommendations are advanced to TVET Teacher Training Institutions: First, the current graduate automotive teacher training syllabus was observed, as not offering some of the knowledge and skills required by the TVET institutions and the automotive industry. It is therefore

recommended that the subjects in the syllabus should be streamlined so as to meet the automotive industry needs. A revision of the syllabus is necessary to accommodate the additional courses and content in KNEC modular syllabus. Secondly, there is need to strengthen proper collaboration with the TVET institutions and the automotive industry in the face of changing technological trends. A liaison between the automotive industry and University of Eldoret should be encouraged. This can be achieved through seminars, workshops, industrial visits, attachments, and exhibitions. This will go a long way in fostering a healthy relationship between the University and the world of work. Third, the teacher training institution should have model work places so that the teacher trainees are exposed to more specialized tools and equipment. Trainees become better workers when dealing with familiar environment. Having facilities that are similar to the workplace in the institution will help in promoting the trainees' confidence at work.

Furthermore, the industry players should be involved in designing the training programs so that the trainees have a broad view of the field of study. There is also a need for greatly improved funding for teacher training programs in general and automotive in particular as is considered pivotal to economic and industrial development of any nation and realization of Kenya's vision 2030. Training should also provide for the changes in technology by being flexible, and accommodative to the world changes. Apart from these, training should have more time and emphasis on the employability skills and emphasized that they also very important just like the real skills of repairing the cars and the teaching of automotive. There is also need to prolong the industrial attachment period from the current 2 months to at least 6 months to enable trainees gain adequate relevant experience as it is vital in the teaching of automotive. The university should assist trainees secure the more relevant industries for the attachés. Finally, emphasis of course coverage should be separated from performance in examinations on which it is currently pegged. Teacher trainers should thus dedicate same teaching vigor to both theory and practical lessons. Practical examinations ought to be carried out on a continuous basis as well as well as at the end of semester to promote application of skills acquired.

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