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Influence of Automated Machine Tools on Practical Skills Development of Mechanical Technology Students in Rivers State Universities

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Abstract: *This study investigated the influence of automated machine tools on practical skills development of Mechanical Technology students in Rivers State Universities. Three research questions were posed and three null hypotheses were tested in the study. The study employed a descriptive survey research design. The study was carried out in Rivers State. A questionnaire titled "Influence of Automated Machine Tools on Practical Skills Development of Mechanical Technology Students' (IAMTPSDMTS)" was used to collect data from the respondents. The research instrument was content validated by three (3) experts in Vocational and Technology Education for content validation. The internal consistency of the instrument was established using Cronbach Alpha reliability method. Their responses were scored and computed using Cronbach alpha reliability method and 0.75 was obtained as reliability coefficient of the instrument. The researcher administered and retrieved the questionnaire by himself on the spot for analysis. Data collected from the research were analysed using mean and standard deviation. Z-test was used to test the hypothesis. The findings of the study revealed that the use of automated machine tools have influence on the skill development of mechanical technology students in Rivers State Universities. In line with these findings, it was recommended that; Universities running engineering and technology based courses should be equipped with modern machines and equipment. This is to ensure students are trained to meet with the trends of production. Funding should be increased to technology-based faculties and institutions to enable them acquire more automated machine in there workshops. Also, the cost of these machines should be subsidized for institutions of learning. Lecturers and instructors of technological-based courses should be encouraged and sent for refresher courses on the use of 21st century machines used in the industries.*

Keywords: *Automation, Machines tools, Practical Skills, Mechanical Technology, Universities.*

INTRODUCTION

Technical Vocational Education and Training (TVET) as a programme, focuses on practical learning in the areas of science and technology. TVET programmes are divided into theory and practice, and are overseen by National Board for Technical Education (NBTE) (NBTE, 2016).

Technical and Vocational Education and Training (TVET) serves multiple purposes. A key purpose is preparation of youth for work. This takes the form of learning and developing work related skills and mastery of underlying knowledge and scientific principles. According to UNESCO (2022), TVET comprises education, training and skills development relating to a wide range of occupational fields, production services and livelihoods. UNESCO further stated that TVET empowers individuals, organizations, enterprises and communities and fosters employment, decent work and lifelong learning thereby promoting inclusive and sustainable economic growth and competitiveness, social equity and environmental sustainability.

TVET is a form of education whose primary aim is to prepare persons for employment in recognized occupation and this encompasses field of study(agricultural education, fine and applied arts education, business education and vocational trades in soap making, hairdressing, computer training among others) (Ojimba, 2012). It is seen strictly as that aspect of education, whose task is concerned with the preparation of skilled manpower.
TVET is a form of education, training or retraining which is directed towards developing the learner to become productive in a paid employment or self-employment (Kpanep, 2011). It was further stated that "quality vocational and technical education resources assures students-learners' competency in practical knowledge, skill and mastery of their chosen career which finally will transform into technological development". Also Okoye and Okwelle (2013) described TVET as the form of education that supports development of the head (knowledge), training of the hand (dexterity) and enriching the heart (conscientiousness and painstaking),-the 3Hs. Furthermore, it was opined that TVET is a total departure from the previous emphasis on 3Rs,-reading, writing and arithmetic, which was fundamentally a form of credentializing entry into elite status with its graduates/products wandering about seeking for the non-existing white collar jobs.

TVET is run in Technical Colleges, Polytechnics, Colleges of Education, Vocational Entreprise Institutes and Universities. University according to Merriam Webster in Imed (2022) is an institution of higher learning providing facilities for teaching and research and authorized to grant academic degrees. It is composed of an undergraduate division that awards bachelor's degrees and a graduate or professional school, which grants master's or Ph.D. degrees. According to the British perspective, a university is an institution with the authority to award a degree and is prominent enough in the research field (Alemu, 2018). The purpose of university education is to facilitate the advancement of knowledge and the development of high cognitive skills in the community. As a result, people become productive members of society who care about the well-being of others.
In Nigeria, Universities that run TVET programmes includes; University of Nigeria, Nsukka, Nnamdi Azikiwe University, Awka, Ignatius Ajuru University of Education, Port Harcourt, Rivers State University among others. TVET programmes in Nigeria are provided leading to the production of craftsmen, technicians and technologists (Ayomike, et al., 2015). Areas of specialization in TVET includes electrical/electronic technology, building technology, automobile technology and mechanical technology.
Mechanical Technology is a hands-on curriculum that provides an in-depth course of study in the technological aspects of the mechanical design profession (Cayuga Community College, 2022). The Mechanical Technology Education Programme is designed to equip students with knowledge, skills, professional competencies and aptitudes to enable them teach the courses or subjects at all levels of education (Oguejiofor & Ezeama 2019). Students are exposed to the current technology used in industry and prepared for careers in the field of mechanical design and technology. Mechanical technology education students put knowledge into action, develop skills in generating and using mechanical and fluid energy, develop machines and products, install and maintain machines, and solve repetitive engineering problems. The emphasis of mechanical technology is practical skills development.

Practical skills development involve the acquisition of self-help and life-saving skills and lessons that you can learn (often easily), teach to others, and practice every day to prepare and protect you and others' health(Centre for Disease Control and Prevention, 2021). Through practical skills development, learners acquire the requisite skills to operate machine necessary for their day-to-day work experience in the work environment. These skills include the ability to operate and manipulate a machine tool. *Machine tools are defined as a tool which while*

holding the cutting *tool would be able to remove metal from the workpiece (Club Technical, 2018). Machine tools can be classified as general purpose, production, special purpose or single purpose machine tools. They can also be classified based on the cutting points in the machine tools. Under this classification, machine tools can further be categorized as single point or multi point machine tools. Some examples of machine tools include the lathe,* shaper, planner, broach, drill, gear shaper, hobbing machine, hone, milling machine, screw machines, saws, grinding machines etc. *Machine tools can be* manual or automated.

Automation could be defined as the technology dealing with design of machine tools and systems utilising electronics and computer systems to produce the final product at minimum cost, involving minimum labour intervention, producing components of high accuracy and desired tolerances repeatedly without causing rejections (Vivek, 2020). Completely automated production system would involve automatic machine tools like machining centre to remove material as desired, industrial robots and material handling systems, automated assembly lines, automated inspection systems like machine vision and automated quality control systems, and computer system for planning, data collection, feedback, decision making to take control action and present the desired information on visual display units in a concise and easily assimilitable form. Automation systems could be fixed type, programmable type, or flexible type.

In fixed automation, the sequence of processing is fixed for one particular product. Such a system can be used for mass production of a product. Its initial cost is high and any changes in product design can be incorporated with difficulty. If product has to be changed, then lot of modifications, new additions, etc. may be required and to accommodate same would be very costly and time consuming. When it comes to automation in mechanical technology, Computer Numerical Control (CNC) takes the lead role. Computer Numerical Control is the method of incorporating mechanisms of equipment with computer control and eliminating the need for manual interruption to shift tooling operations.

The latest trend in automation is computer integrated manufacturing, i.e., to use computer not only for actual production and manufacturing, but also in designing the product, carry out complete planning for manufacture, perform all business related functions like inventory of raw materials, and other stocks, actual sales, sales forecast, orders in hand, maintenance needs of various machine tools.

The advantages of automation include:

i) Increased productivity (greater output per hour of labour input),
ii) Improved product quality,
iii) Reduction of scrap (particularly beneficial for costly raw material),
iv) More safety (due to operator taking the supervisory role instead of active and direct physical participation),
v) Reduced manufacturing lead time,
vi) Reduction of in-process inventory, etc. (Vivek, 2020)

It is always advantageous to automate monotonous and hazardous jobs. With more and more automation, human errors are totally eliminated and product quality improved and rejects minimised, prices reduced and ultimately standard of living of people increased. Most industries in this 21st century carry out production using automated machine tools. To be employable, mechanical technology graduates need to acquire the requisite skills to operate these automated machines in order to function effectively in the workplace. It also enhances their market value in the industry.

Statement of the Problem

The survival of any industry is majorly dependent on the calibre of technologists available in its workforce. Abdullahi (1995) cited in Anaele (2022), stated that for any industry, be it

mechanical or civil to remain in production, it would require the services of competent mechanical engineering technologists. These technologist operate and maintain machine tools used in the production processes and by extension help in solving the problem of unemployment which is a major challenge in Nigeria today. Upon graduation, mechanical technologists are supposed to have a knowledge of operation of varieties of machine tools (manual and automated).

With the economy being more globalized than ever, it is important to have background and a skill set that allows mechanical technology graduates to become engrossed in the global economy upon graduation. It is pertinent for these graduates to have skills in automation in mechanical technology to be ready to fit into the global market place on which today's economy depends on.

Furthermore, nowadays, computers and electronic devices are used to control the operation of machine tools. As a result, production is faster, precise, accurate and cost effective than what was obtainable in the past. In this regard, Nwoye (2013) noted that computer numerical control (CNC) systems regulate a host of mechanical related operations. It therefore becomes necessary for Universities to equip Mechanical Technology students with practical skills in basic computer operations and applications for them to perform their functions effectively and efficiently in any organization by using computer to control and carry out production. Due to advancement in modern machine shop practice, the occurrence of regular machine and product failure is coming down.

However, the skill level of most mechanical technologists today in Nigeria and Rivers State in particular remain appalling as most skill-based courses such as lathe operations, drilling operations and milling operations are carried out using manual and obsolete machine tools making practical trainings to be undertaken using manual machines. In past years, universities and other tertiary institutions have collapsed due to abject neglect by successive governments (InfoGuide Nigeria, 2023). Our tertiary institutions haven fallen into dilapidation of basic infrastructure and products of such schools are not given adequate training to compete with their counterparts from other countries. Many schools lack basic equipment for conducive learning, most especially for practical classes, and those that claim to have are managing the obsolete manual ones. Hence, the students only learn the theoretical steps rather than carrying out the practical aspects. Udogu (2015) in Ibeneme, and Udeh, (2021) observed that the instructors and lecturers may also not be acquainted with the new practical skills in the modern manufacturing industry. It is obvious that if these trends are not addressed, universities in Nigeria will continue to produce Mechanical graduates with irrelevant and outdated skills that will deprive them of employment opportunities in industries that uses modern tools and machines for operation. It can be deduced that Mechanical Technology graduates in Nigeria generally and Rivers State in particular, may have acquired little or no practical skills for the operation of automated machine tools and for sustainable employment. It is against this background that this study is undertaken to determine the influence of automated machine tools on the practical skills development among mechanical technology students in Rivers State Universities.

Purpose of the Study

The purpose of the study was to investigate the influence of automated machine tools on practical skills development of Mechanical Technology students in Rivers State Universities. Specifically, the study sought to

1. Determine the influence of automated lathe on practical skills development among Mechanical Technology Students in Rivers State Universities.
2. Determine the influence of automated drilling machine on practical skills development among Mechanical Technology Students in Rivers State Universities.
3. Determine the influence of automated milling machine on practical skills development among Mechanical Technology Students in Rivers State Universities.

Research Questions

Three research questions guided the study.

1. What is the influence of automated lathe machine on practical skills development of Mechanical Technology students in Rivers State Universities?
2. What is the influence of automated drilling machine on practical skills development of Mechanical Technology students in Rivers State Universities?
3. What is the influence of automated milling machine on practical skills development of Mechanical Technology students in Rivers State Universities?

Hypotheses

Three hypotheses were formulated and tested at .05 level of significance.

1. There is no significant difference in the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated lathe on practical skills development of Mechanical Technology students in Rivers State Universities.
2. There is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated drilling machine on practical skills development of Mechanical Technology students in Rivers State Universities.
3. There is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated milling machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Methodology

Descriptive survey design was adopted for the study. The population of the study was 60 respondents, comprising 43 Technical Education Lecturers and 17 Instructors in Rivers State University and Ignatius Ajuru University of Education, Port harcourt (Departmental Record, 2023). The study was a census as the entire population was studied. This is in consonance with Maduabum (2007) who stated that a survey in which the entire population is studied is referred to, as census. The choice of census is due to the manageable size of the population. A structured questionnaire titled' Influence of Automated Machine Tools on the practical Skills Development of mechanical technology students'(IAMTPSDMTS) was used for data collection. The instrument consisted of 30 items on automated machine tools aimed at eliciting responses on a Likert -5 point rating scale of Strongly Agree(SA), Agree(A), Undecided(U), Disagree(D),Strongly Disagree(SD) with numerical values of 5,4,3,2 and 1 respectively. Copies of the instrument was given to three experts in Vocational and Technology Education for face and content validation. Their recommendations and corrections were incorporated in the final version of the instrument before administration. The internal consistency of the instrument was established using Cronbach Alpha reliability method. Twenty (20) copies of the instrument was administered to Technical Education lecturers and instructors in Niger Delta University, Bayelsa State, which is outside the area of the study but possessed similar characteristics with the area of the study, in terms of curriculum. Their responses were scored

and computed using Cronbach alpha reliability method and 0.75 was obtained as reliability coefficient of the instrument. The instrument were retrieved on the spot for analysis. Data collected from the research were analysed using mean and standard deviation. The statistical Z-test was used to test the hypothesis. A mean score of 3.00 and above indicated agreement with an item, while a mean score below 3.00 indicated disagreement with the item. 60 copies of the questionnaire were distributed and all retrieved, depicting a 100% return rate

Results

Research Question 1: What is the influence of Automated Lathe machine on practical skills development of Mechanical Technology students in Rivers State Universities?

Table 1: Mean and Standard deviation on the influence of Automated Lathe on Practical Skills Development of Mechanical Technology students.

S/No	Item Statement	Lecturers			Instructors		
	Knowledge of Automated Lathe could enhance practical Skills development on:	X	SD	RMK	X	SD	RMK
1	Facing operation	3.40	0.85	Agree	4.00	0.95	Agree
2	Knurling operation	3.67	0.76	Agree	3.92	1.00	Agree
3	Threading operation	3.85	0.70	Agree	3.83	1.03	Agree
4	Tapping operation	3.75	0.72	Agree	4.25	0.72	Agree
5	Reaming operation	3.57	1.00	Agree	3.95	0.93	Agree
6	Boring operation	3.60	0.96	Agree	3.82	1.02	Agree
7	Drilling operation	4.20	0.50	Agree	3.79	1.10	Agree
8	Parting operation	3.80	0.72	Agree	3.81	1.04	Agree
9	Turning operation	4.10	0.54	Agree	3.76	0.99	Agree
10	Grooving operation	3.36	1.02	Agree	3.80	0.92	Agree
	Grand Mean	**3.73**	**0.77**		**3.89**	**0.97**	

Source: Field Survey 2023

Table 1 shows that all the 10 items on the influence of Automated Lathe on practical skills development of mechanical technology students in Rivers State Universities had their mean values ranging from 3.36 to 4.25 which is above the decision limit of 3.00. Further-more, Table 1 revealed that the lecturers had a standard deviation ranging from 0.50 to 1.02 while the Instructors had a standard deviation ranging from 0.72 to 1.10. These indicate that the respondents were homogeneous or close in their opinions. It indicates at a glance that automated lathe has influence on the practical skills development of mechanical technology students in Rivers State Universities.

Research Question 2: What is the influence of Automated Drilling Machine on practical skills development of Mechanical Technology students in Rivers State Universities?

Table 2: Mean and Standard deviation on the influence of Automated Drilling Machine on Practical Skills Development of Mechanical Technology students.

S/No	Item Statement	Lecturers			Instructors		
	Knowledge of Automated Drilling Machine could enhance practical Skills development on:	X	SD	RMK	X	SD	RMK
11	Countersinkng operation	3.45	0.88	Agree	3.90	0.97	Agree
12	Reaming operation	3.68	0.78	Agree	3.82	1.02	Agree
13	Counterboring operation	4.10	0.69	Agree	3.83	0.99	Agree
14	Tapping operation	3.85	0.75	Agree	4.15	0.75	Agree
15	Spot facing operation	3.67	1.00	Agree	3.98	0.94	Agree
16	Boring operation	3.70	0.86	Agree	3.86	0.96	Agree
17	Drilling operation	4.11	0.47	Agree	3.82	0.98	Agree
18	Core drilling operation	3.82	0.81	Agree	3.79	1.02	Agree
19	Step drilling operation	3.95	0.56	Agree	3.81	0.95	Agree
20	Rotary drilling operation	4.12	0.98	Agree	3.80	0.89	Agree
	Grand Mean	**3.85**	**0.78**		**3.88**	**0.95**	

Source: Field Survey 2023

Table 2 reveals that all the 10 items on the influence of automated drilling machine on practical skills development of mechanical technology students in Rivers State Universities had their mean values ranging from 3.45 to 4.15 which is above the decision limit of 3.00. Further-more, Table 2 shows that the lecturers had a standard deviation ranging from 0.47 to 1.00 whereas the Instructors had a standard deviation ranging from 0.75 to 1.02. These implies a homogeneity by the respondents in their opinions. It denotes at a glimpse that automated drilling machines has influence on the practical skills development of mechanical technology students in Rivers State Universities.

Research Question 3: What is the influence of Automated Milling Machine on practical skills development of Mechanical Technology students in Rivers State Universities?

Table 3: Mean and Standard deviation on the influence of Automated Milling Machine on Practical Skills Development of Mechanical Technology students.

S/No	Item Statement	Lecturers			Instructors		
	Knowledge of Automated Milling Machine could enhance practical Skills development on:	X	SD	RMK	X	SD	RMK
21	Plain or slab milling operation	4.05	0.89	Agree	4.11	0.85	Agree
22	Up and down milling operation	3.78	1.12	Agree	3.89	1.00	Agree
23	Face milling operation	3.89	0.64	Agree	3.83	1.03	Agree
24	End milling operation	3.90	0.90	Agree	3.45	0.72	Agree
25	Gang milling operation	3.59	0.87	Agree	3.15	0.93	Agree
26	Straddle milling operation	3.62	0.93	Agree	3.90	1.02	Agree
27	Groove milling operation	3.79	1.04	Agree	3.79	1.10	Agree
28	Gear milling operation	4.20	0.68	Agree	3.48	1.04	Agree
29	Side milling operation	3.71	1.10	Agree	3.88	0.99	Agree
30	T –Slot milling operation	4.01	0.98	Agree	4.10	0.92	Agree
	Grand Mean	**3.85**	**0.95**		**3.78**	**0.97**	

Source: Field Survey 2023

Table 3 discloses that all the 10 items on the influence of automated milling machine on practical skills development of mechanical technology students in Rivers State Universities had their mean values ranging from 3.15 to 4.20 which is above the decision limit of 3.00. Also, Table 3 shows that the Mechanical Technology Lecturers had a standard deviation ranging from 0.64 to 1.12 whereas the Mechanical Technology Instructors had a standard deviation ranging from 0.85 to 1.10. These implies a consistency by the respondents in their judgment. It denotes at sight that automated milling machines has influence on the practical skills development of mechanical technology students in Rivers State Universities.

Test of Hypotheses

The result of test of the null hypotheses is presented in Tables 4-6

Hypothesis 1

There is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated lathe on the practical skills development of Mechanical Technology students in Rivers State Universities.

Data gathered to test the hypothesis are analyzed and presented in Table 4.

Table 4: T-test analysis between the mean responses of Mechanical Technology Lecturers and Instructors on the Influence of Automated Lathe on practical skills development of Mechanical Technology students in Rivers State Universities.

Respondents	N	$\bar{x}$	SD	df	t-calc	t-crit	P	Decision
Lecturers	43	3.73	0.77	58	1.18	1.96	.05	Accept
Instructors	17	3.89	0.97					

Source: Field Survey 2023

Table 4 is the T-test analysis between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated lathe on practical skills development of Mechanical Technology students in Rivers State Universities. Result in Table 4 revealed that t-cal (1.18) is less than t-crit (1.96) which indicates that the hypothesis was accepted. Therefore,

there is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated lathe on the practical skills development of Mechanical Technology students in Rivers State Universities.

Hypothesis 2

There is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on influence of automated drilling machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Data gathered to test the hypothesis are analyzed and presented in Table 5.

Table 5: T-test analysis between the mean responses of Mechanical Technology Lecturers and Instructors on the Influence of Automated Drilling Machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Respondents	N	$\bar{x}$	SD	df	t-calc	t-crit	P	Decision
Lecturers	43	3.85	0.78	58	1.22	1.96	.05	Accept
Instructors	17	3.88	0.95					

Source: Field Survey 2023

Table 5 is the T-test analysis between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated drilling machine on practical skills development of Mechanical Technology students in Rivers State Universities. Result in Table 5 shows that t-cal (1.22) is less than t-crit (1.96) which indicates that the hypothesis was accepted. Thus, there is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated drilling machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Hypothesis 3

There is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated milling machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Data gathered to test the hypothesis are analyzed and presented in Table 6

Table 6: T-test analysis between the mean responses of Mechanical Technology Lecturers and Instructors on the Influence of Automated Milling Machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Respondents	N	$\bar{x}$	SD	Df	t-calc	t-crit	P	Decision
Lecturers	43	3.85	0.95	58	0.98	1.96	.05	Accept
Instructors	17	3.78	0.97					

Source: Field Survey 2023

Result in Table 6 revealed that t-cal (0.98) is less than t-crit (1.96) which indicates that the hypothesis was accepted. Hence, there is no significant difference between the mean responses of Mechanical Technology Lecturers and Instructors on the influence of automated milling machine on practical skills development of Mechanical Technology students in Rivers State Universities.

Discussion of Findings

Analysis of data in Table 1 revealed that the respondents agreed with all the items in the research question. Thus, the study revealed that automated lathe has influence on practical skills development of mechanical technology students in Rivers State Universities. This finding is in line with Ogundola, Popoola and Oke (2010) in Emenu (2019) who stated that the use of

automated machines have significant impact on the practical skills development of students taught or trained using them as compared to those taught using manual machines. This is also in line with the view of Becker and Maunsaiyat (2014) who asserted that there was a significant difference in students' preference on determining effectiveness of computer numerical control lathe CNC as against analog lathe methods for vocational students. Further-more, data in Table 4 revealed that there is no significant difference between the mean responses lecturers and instructors on the influence of automated lathe on the practical skills development of Mechanical Technology students in Rivers State Universities. This is an indication that the influence of automated lathe on practical skills development of students is acknowledged by lecturers and instructors in Rivers State Universities.

Analysis of data in Table 2 revealed that the respondents agreed with all the items on the research question. Thus, the study revealed that automated drilling machine has influence on the practical skills development of mechanical technology students in Rivers State Universities. This in in support of the findings of Sule, Lkama and Usman (2020) who stated that a significant difference exist in the mean academic achievement of students taught using CNC drilling machine and those taught using analog drilling machine on drilling operation. This is also in line with the submission of Okoro (2013) who stated that students taught with automated machines would find it easier to fit into employment in the modern industries, since production is carried out using computer numerical machines. Also, data in Table 5 revealed that there is no significant difference between the mean responses lecturers and instructors on the influence of automated drilling machine on the practical skills development of Mechanical Technology students in Rivers State Universities. This is a clue that the impact of automated drilling machine on practical skills development of students is recognised by lecturers and instructors in Rivers State Universities.

Analysis of data in Table 3 revealed that the respondents agreed with all the items on the research question. Thus, the study revealed that automated milling machine has influence on the practical skills development of mechanical technology students in Rivers State Universities. This is in consonance with Solomon (2018) who stated that students trained using modern machines and equipment are assets to industries in this 21st century. He further stated that when training of students is carried out with modern means, it is easier for such students to find job placements upon graduation.

Conclusion

The study examined the influence of automated machine tools on the practical skills development of mechanical technology students in Rivers State Universities. Based on the findings of the study, it was concluded that the use of automated machines is very vital for the skill development of students and trainees in order for them to compete favourably with their counterparts in other climes. Graduates need to familiarize with these machines to enable them meet the 21st century industrial requirements. Automated machines are the current tools for mass production, so there usage in the training process cannot be undermined. This will increase the output of graduates and by extension the gross domestic product (GDP) of the country.

Recommendations

Based on the findings of the study, the following recommendations were made;

1. Universities running engineering and technology based courses should be equipped with modern machines and equipment. This is to ensure students are trained to meet with the trends of production.

2. Funding should be increased to technology-based faculties and institutions to enable them acquire more automated machine in there workshops. Also, the cost of these machines should be subsidized for institutions of learning.
3. Lecturers and instructors of technological-based courses should be encouraged and sent for refresher courses on the use of 21st century machines used in the industries.

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