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Knowledge and Skills Gap Analyses of Technical Universities in Ghana

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Abstract

The human capital of every organization which comprises of its portfolio of skills and knowledge, makes the organization distinct and also gives it competitive advantage since they are intangible assets that cannot be counterfeited by rivals. Polytechnics in Ghana were converted to Technical Universities in 2016 with a unique mandate to churn out graduates that meet the expectations of the industry. The study analyses the skills and knowledge gaps of technical universities and how these can affect their quest to deliver on their new mandate. All the Technical Universities in Ghana were considered for the study, and a non-probability sampling technique which is convenience sampling was used to select participants for the study who were mainly teaching staff, accountants or senior accountants where appropriate. The study employed a descriptive survey research design. Results of the study revealed that,

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there are huge skills and knowledge gaps which are enshrined in the technical universities governing instruments particularly the Technical Universities Act since greater part of the teaching staff see industrial skills, knowledge in competency mode of curriculum development and delivery as well as research and proposal writing skills to be very important, yet a significant number of them do not possess these skills and knowledge. The study made some theoretical and empirical contributions that will help technical universities and their stakeholders. Limitations and recommendations that will guide future researchers who may be interested in researching on a similar topic was also outlined.

Keywords: Skills, knowledge, technical universities, Ghana, gaps, TVET.

1.0 INTRODUCTION

There is no doubt about the importance of Technical and Vocational Education and Training (TVET) in building a nation. In fact, many researchers have identified positive correlation between technical and vocational education and industrial development as well as social progress of any country. Without skilled technical manpower produced by TVET institutions for industries, national development would be very difficult to realize (Budu-Smith, 2005). In Ghana, the main purpose of TVET education is to equip people especially the youth with the necessary technical and professional skills that will make them more relevant to the industry and the country as a whole. The emphasis is on training people for self-employment and innovativeness. It is in light of this that the Government of Ghana recently has given more recognition to the TVET by converting eight Polytechnics to Technical Universities (TUs) and also rolled out a number of TVET programmes such as the TVET Voucher Project (GTVP), Skills Development Fund (SDF) all with the aim of addressing poverty alleviation by

equipping the youth with the skills that will make them relevant to the industry both within and outside Ghana.

The Government recognizes technical universities as a means of developing the technical and skilled human resource base which Ghana needs urgently as a key strategy of getting the required manpower that will drive the nation in its journey to become industrialized economy. To achieve the said objective, it requires a policy framework and direction as well as a radical shift in the design and delivery of the TVET curriculum at all levels as well as developing the human resource with the requisite skills of TVET institutions especially at the technical university level (Afeti, Baffour-Awuah and Budu-Smith, 2003).

Despite the commitment of the government to make TVET education relevant to national development at the technical university level, it appears there is huge gap in terms of the manpower with the requisite skills and knowledge required and what is currently available within the technical universities. Per the Technical Universities ACT 922 as amended in ACT 974, there are certain skills and knowledge that are required from teaching staff of those universities. These skills and knowledge among others include industrial experience, knowledge in competency-based mode of curriculum development and delivery as well as attainment of terminal degree which enhances one's research and proposal writing skills. Despite these required competencies as contained in the ACT, there are others that are implicit but are necessary if lecturers are to offer good service to students. Among some of these implicit skills and knowledge according to Koehler and Mishra (2009); Ingvarson et al (2014); Darling-Hammond (2006); Esiner (2002); Ball, Thames and Phelps (2008); Mertler and Campbell (2005); are knowledge of subject matter, pedagogical skills, public speaking, time management, creating a participatory learning environment,

entrepreneurial skills, leadership and communication skills, research and proposal writing skills, monitoring the development of students, students control and tolerance.

Primarily, skills and knowledge required by the job are not determined by the employee as these are the prerogative of the employer. For technical universities, relevant stakeholders determine the directions of TVET education and for such determination to receive legal backing, there should be an ACT that will guide its implementation. It is from this ACT that other governing instruments such as scheme of service and statutes are prepared. It is the duty of managers of Technical Universities to develop strategic documents taking into consideration the relevant governing instruments. These strategic documents outline various projects to be executed together with the needed manpower with the requisite skills and knowledge. If the required manpower with the requisite skills and knowledge are not available within these universities, then the government objective of churning out graduates who are industry ready and also be self-employed will not be achieved. Achieving this objective calls for researchers to develop a tool that will guide managers of these universities to identify the skills and knowledge gaps that are within. In determining the skills and knowledge gaps of technical universities, various related literature were reviewed by the authors, documents on government policy agenda on TVET education were consulted and preliminary interviews with six (6) employers were conducted for the researchers to come out with a model as how this can be done and this is illustrated in figure 1.

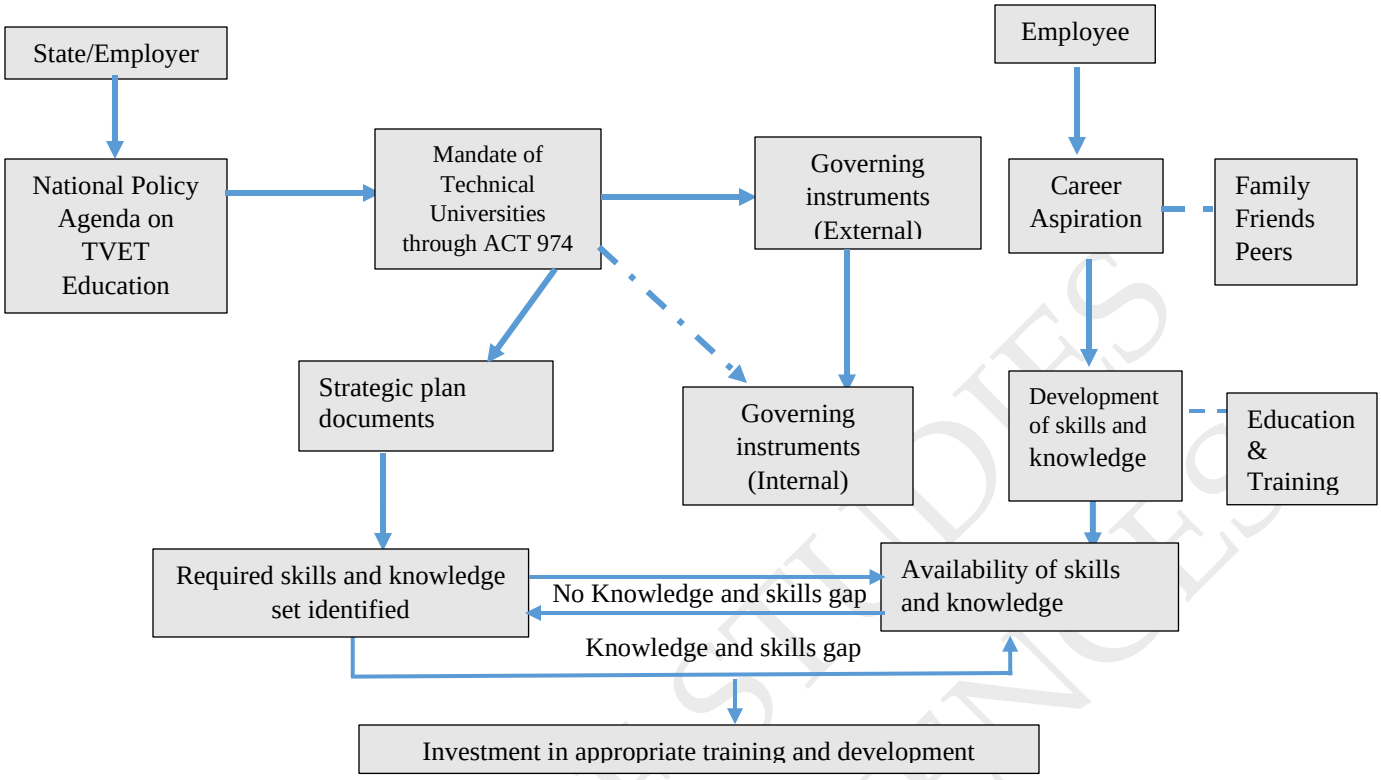

Figure 1: Proposed model for determining knowledge and skills gap for technical universities in Ghana developed by the researchers

The proposed model developed guided the researchers in terms of coming out with the relevant questions that needed to be captured in the questionnaire.

2.0 THE STUDY AREA – TECHNICAL UNIVERSITIES

Polytechnics in Ghana were first established with the aim of offering craft courses (Baiden, 1996). What necessitated the need to pay much attention to technical education was the Industrial Development Policy in 1960 coupled with the rapid technological progress in many areas in Ghana (Ministry of Education, 1993). Since Polytechnics were offering second-cycle craft courses whilst only the universities were offering degree programmes, there was a gap in the manpower supply needs of the country since the number of universities in Ghana were not many. With this problem,

a number of technical institutes were established mainly in Accra, Kumasi and Takoradi to train lower and middle-level skilled manpower to fill the gap.

In 1963, the technical institutes were re-designated as Polytechnics to run non-tertiary programmes. In 1992, Polytechnics were upgraded to tertiary status based on the Polytechnic Law (PNDCL 321) and in 1994 it started running Higher National Diploma (HND) programmes (Amegashie-Viglo, 2014). Despite Polytechnics given the autonomy to run tertiary programmes, there was problem with image as many Senior High School (SHS) graduates prefer to enroll in the existing state universities than the Polytechnics. With this problem coupled with the need for the government to get more SHS graduates to pursue technical and vocational programmes, the government laid a bill before Parliament and passed the Technical Universities ACT 922 to convert Polytechnics to Technical Universities. The government also set up a technical committee to ascertain which of the Polytechnics qualify to be converted to Technical University using criteria such as qualification level and practical industrial experience of lecturers, the collaboration of the Polytechnics with industry and business, infrastructure, equipment and training facilities. The committee recommended six Polytechnics namely Kumasi, Accra, Takoradi, Sunyani, Koforidua and Ho. Finally, Cape Coast and Tamale Polytechnics were also converted making the number of technical universities in Ghana to be eight. The main objective of these technical universities is to provide higher education in engineering, science and technology based disciplines and vocational education and training, applied arts and related disciplines.

Currently technical universities are running undergraduate programmes with some especially Kumasi Technical University running postgraduate (MTech) programmes in Engineering and Applied Science related disciplines.

3.0: METHODOLOGY OF THE STUDY

The main objective underlying the study is to analyse the knowledge and skills gap within technical universities in Ghana. In order to achieve the above objective, the researchers developed a research design. A research design constitutes the blueprint for the collection, measurement and analysis of data. According to Altarawneh (2009), is about organizing research activities, such as data collection, and analyzing them based on systematic methods that help to fulfil the research aims. In the opinion of Sekaran (2003), a research design includes a series of rational decisions such as: identifying the purpose of the study; whether it is exploratory, descriptive or hypothesis. Though there are significant number of designs available for the researchers to choose but the main research tool used by the researchers was survey and this is shown in the figure below:

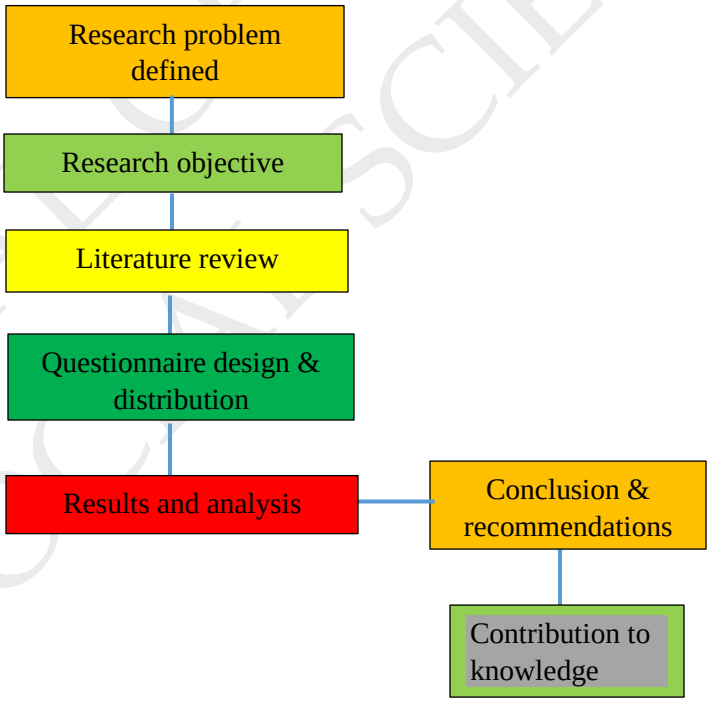

Figure 2: Research design for the study

The target population of the study based on a summary sheet of audit report by the National Council for Tertiary Education (NCTE) of senior members (teaching) of technical universities in 2018 was 1483 and this can be shown below:

Table 1: Target population and sample size of the study

Technical University	No. of staff (Teaching)	Sample size(n)
Accra	179	43
Cape Coast	100	25
Ho	190	46
Koforidua	202	49
Kumasi	154	38
Sunyani	212	52
Takoradi	280	68
Tamale	166	41
Total employees	**1483**	**362**

From the target population, a sample was drawn with a size of 362. The choice of sample size of 362 was based on Fisher (2007) recommendation that if one has a population range of 1322 - 1584 and wants an error of about 5% in the survey results, then the sample size to be used for the estimated range of population should be between 298- 310. In this study, the researchers accepted 5% margin of error and as such sampling 362 out of the population of 1483 was more than what Fisher even recommended. Fisher's argument is also in line with the comment given by Saunders et al (2002) who were also of the view that using 5% margin of error in a study means 95% of the researcher's results of data are certainly true; however there is a 5% chance that the true value would be outside of the range. The determination of sample size (n)

of each technical university as shown in Table 1 was obtained through the calculation of:

$$\frac{total\ no.of teaching\ staff\ in\ each\ technical\ university}{total\ no.of population\ (N)} \times 100 = \frac{k}{100} \times sample\ size$$

The sampling technique adopted by the researchers to obtain the sample size from each technical university was convenience sampling. In doing this, the researchers distributed questionnaires to the first number of lecturers they came across on each campus based on the sample size allotted to each technical university. The questionnaires centred on proposed relevant skills and knowledge drawn from the model developed, literature, the technical universities ACT 922 and the governing instruments of technical universities.

Data extracted from the questionnaires were cleaned and coded after which an independent sample t-test statistic was performed to identify the needs gap for different skills and knowledge of lecturers of technical universities. In doing this, lecturers were asked to rate the importance of a skill or knowledge item and the extent to which these lecturers possess these skills or knowledge.

The same data collection instrument was also used for accountants and senior accountants of technical universities where appropriate to rank their universities financial commitment in terms of training lecturers to acquire those skills or knowledge. The skill or knowledge that was ranked the number one by most of the technical universities in terms of financial commitment was adjudged the number one priority skill or knowledge and vice versa. The researchers compared this data with the skill or knowledge teaching staff of technical universities considered as most important and the extent to which they possess the skill or knowledge.

4.0 FINDINGS AND DISCUSSIONS OF RESULTS

Skills and knowledge gaps are gaps between what employers require their employees to have to be able to perform their jobs and what those employees currently possess in their field of work. These 'skills and knowledge set' are determined by the employer and employees are supposed to possess them in order for the employer to declare them as competent. Despite the fact that employers play a key role in the determination of the required knowledge and skills set, when employees work in an organization over a period of time, they also identify what skills and knowledge they need to possess in order to catch up with the current demands or specifications of the job.

Judging from this, it means both the employer and the employee should have a role in coming out with the required skills and knowledge that are relevant to the job. The researchers in determining the skills and knowledge set that are relevant to teaching staff in technical universities came out with the following skills and knowledge after reviewing related literature, the Technical Universities Act 922 and other governing instruments as can be seen in the table below:

Table 2: Identified skills and knowledge set for technical universities teaching staff

Skills set	Knowledge set
Pedagogical skills	External and Internal governing instruments used to run university
Entrepreneurial skills	Competency-based mode of curriculum development and delivery
Communication skills	Creating participatory learning environment
Research and proposal writing skills	Monitoring students development
Leadership skills	University administration and governance
Industrial skills	Current trends in subject area
Public speaking	Information and Communications Technology
Time management	Students control and tolerance

Source: Derived from review of related literature, Technical Universities Act 922 and Technical Universities governing instruments.

These skills and knowledge set were used in the questionnaire and the respondents were asked to rate them according to how important they are in performing their jobs as teaching staff. Data extracted from the questionnaire and the calculated independent sample t-test statistic based on the respondents ratings of these identified skills can be seen in the tables below:

Tables 3 and 4: Mean scores of training needs gap for different skills and independent sample t-test of the relevance of skills needs

Skills types	**Frequency response rate of importance of skills to technical universities**							**Training need gap mean score**	
	1	**2**	**3**	**4**	**5**	**T-test**	**P**	**M**	**R**
Industrial Skills	0%	0%	0%	36.5%	63.5%	-.845	.420	4.580	1
Research and proposal writing skills	0%	0%	0%	47.5%	52.5%	-1.780	.000	4.512	2
Entrepreneurial skills	0%	0%	15.6%	17.2%	67.2%	2.458	.000	4.231	3
Communication skills	0%	5.5%	23.5%	14.5%	56.5%	2.784	.000	3.986	4
Leadership skills	0%	9.0%	11.1%	34.2%	45.7%	3.412	.000	3.597	5
Pedagogical skills	5.2%	14.5%	24.3%	48.1%	7.9%	2.578	.000	3.117	6
Public speaking	15.2%	17.3%	38.7%	25.9%	2.9%	-4.258	.009	2.986	7
Time management	25.6%	32.8%	24.7%	3.8%	13.1%	3.154	.000	2.145	8

1 = Not important; 2 = Somehow important; 3 = Neutral; 4 = Important; 5 = Very important

Skills types	Frequency response rate of extent to which teaching staff of technical universities possessed these skills					T-test	P	Training need gap mean score	
	1	2	3	4	5			M	R
Communication skills	3.0%	10.1%	9.9%	15.0%	62.0%	-.635	525	4.106	1
Pedagogical skills	13.1%	2.0%	13.0%	14.2%	57.7%	-1.560	134	4.004	2
Leadership skills	3.5%	30.5%	11.5%	12.0%	42.5%	3.216	257	3.958	3
Public speaking	15.2%	30.0%	16.8%	0.5%	37.5%	4.634	.000	3.534	4
Entrepreneurial skills	17.0%	23.1%	15.7%	8.1%	36.1%	4.253	.000	3.254	5
Research and proposal writing skills	23.2%	17.2%	22.3%	6.3%	31.0%	3.218	.000	2.978	6
Time management	25.8%	27.3%	15.4%	10.2%	21.3%	2.568	.000	2.769	7
Industrial Skills	41.5%	38.8%	15.8%	1.5%	2.4%	-5.587	.000	1.587	8

1 = Poor; 2 = Fair; 3 = Average; 4 = Good; 5 = Excellent

Table 3 above shows the skills required by technical universities teaching staff and their ratings of these skills in terms of their importance in helping them to provide effective teaching as required by the mandate of technical universities in Ghana. On the other hand, table 4 shows the extent to which the teaching staff of these technical universities possess these skills (from poor to excellent). From the tables, it can be seen that the three most important skills to these teaching staff based on the highest mean scores, are industrial skills (very important 63.5%; important 36.5%; mean 4.580), followed by research and proposal writing skills (very important 52.5%; important 47.5%; mean 4.512) and entrepreneurial skills (very important 67.2.%; important 17.2%; mean 4.231).

Conspicuously, as can be seen in table 4 most teaching staff of technical universities in Ghana do not have these skills, as industrial experience of teaching staff scored the lowest with 96.1% been average or below. This means that a significant number of these teaching staff claim not to have any experience from the industry or their experience is below what is expected to assist them to offer practical training to students.

Again, more than 50% of the respondents considered their skills in research and proposal writing as well as entrepreneurship to be average or below. This really shows that training gaps in these areas are very huge and there is the need for resources to be committed in these areas in order to bridge these skills gap. These findings actually buttress the arguments by many stakeholders most of whom are educationists that, the conversion of Polytechnics to Technical Universities should have been done in piecemeal preferably on pilot basis so that more resources could have been mobilized and committed to train the teaching staff to acquire those skills.

Knowledge types	Frequency response rate of importance of knowledge acquisition to technical universities					T-test	P	Training mean score	
	1	2	3	4	5			M	R
Current trends in subject area	0%	0%	0%	30.9%	69.1%	-.765	.000	4.820	1
Competency-based mode of curriculum development and delivery	0%	0%	11.0%	21.3%	67.7%	1.234	.000	4.450	2
External and Internal governing instruments used to run university	0%	0%	3.5%	35.3%	61.2%	2.117	.000	4.102	3
Information and Communications Technology	0%	0%	17.5%	30.2%	52.3%	1.481	.000	3.827	4
University administration and governance	0%	0%	19.4%	33.2%	47.4%	1.261	.000	3.664	5
Creating participatory learning environment	0%	0%	18.0%	52.3%	29.7%	2.548	.000	3.125	6
Monitoring students development	12.0%	18.0%	25.6%	31.5%	12.9%	1.324	.000	2.681	7
Students control and tolerance	24.7%	10.3%	34.0%	26.7%	4.3%	1.247	.000	1.254	8

Teaching staff of technical universities are required not to only possess certain skills, but are also expected to acquire some knowledge in order to help them in their delivery. Most of these required knowledge are captured in the governing instruments of these universities whilst others are implied but are expected that teaching staff will acquire them. The sampled teaching staff were asked to rate the importance of some knowledge

Knowledge types	Frequency response rate of extent to which teaching staff of technical universities have these knowledge							Training mean score	
	1	2	3	4	5	T-test	P	M	R
Current trends in subject area	0%	0%	1.5%	22.3%	76.2%	-.829	.000	4.768	1
Information and Communications Technology (ICT)	0%	0%	8.3%	51.8%	39.9%	1.257	.000	4.316	2
Students control and tolerance	0%	0%	12.7%	48.7%	38.6%	1.897	.000	4.181	3
Monitoring students development	0%	1.5%	17.6%	43.9%	37.0%	1.285	.000	3.942	4
Creating participatory learning environment	0%	0%	39.6%	28.0%	32.4%	1.276	.000	3.418	5
University administration and governance	1.1%	27.3%	37.5%	34.1%	24.3%	2.174	.000	2.986	6
External and Internal governing instruments used to run university	0%	38.3%	39.7%	15.3%	6.7%	2.105	.000	2.344	7
Competency-based mode of curriculum development and delivery	28.9%	54.9%	8.8%	3.2%	4.2%	1.355	.000	1.984	8

as captured in table 2 in relation to their jobs and the extent to which they have acquired these knowledge. The responses based on their ratings and the extent to which they have acquired these knowledge can be captured in the tables below:

Tables 5 and 6: Mean scores of training needs gap for different knowledge and independent sample t-test of the relevance of knowledge needs

1 = Not important; 2 = Somehow important; 3 = Neutral; 4 = Important; 5 = Very important

1 = Poor; 2 = Fair; 3 = Average; 4 = Good; 5 = Excellent

Table 5 shows the knowledge required by technical universities teaching staff and the ratings of these knowledge in terms of their importance in helping them to provide effective teaching to students. From the table, a lecturer having an in-depth knowledge in the course been delivered was considered as the most relevant knowledge required (very important 69.1%; important 30.9%; mean 4.820), followed by having knowledge in competency-based mode of curriculum development and delivery (very important 67.7%; important 21.3%; mean 4.450) and knowledge in external and internal governing instruments used to run the university (very important 61.2%; important 35.3%; mean 4.102).

In terms of the extent to which teaching staff have acquired the relevant knowledge as captured in table 6, one can see that knowledge in the course a teaching staff handles came on top (Excellent 76.2%; Good 22.3%) and this is followed by knowledge in ICT (Excellent 39.9%; Good 51.8%) and knowledge in students control and tolerance (Excellent 38.6%; Good 48.7%). However knowledge in competency-based mode of curriculum development and delivery as well as knowledge in external and internal governing instruments used to run the university were adjudged as the least knowledge that teaching staff of technical universities possess as more than 60% of the teaching staff of technical universities claim their knowledge in these areas were either average or below.

This assertion means that, training gaps in these areas are very wide and as such attention needs to be paid in addressing these gaps since competency-based mode of curriculum development and delivery is one of the philosophical pillars upon which polytechnics were converted to technical universities. The need to pay much attention to addressing these gaps is also in line with the importance the United States of America Department of Education attaches to the relevance of competency-based mode of curriculum development and delivery as a way of universities churning out graduates they are relevant to the industry. According to their report in (2002) cited by Edwards

et al (2009), competency-based curriculum summarizes academic and professional profiles, defines new objectives in the learning process, enhances learning environments and shifts the concept of learning as a permanent attitude towards knowledge acquisition and hence the need for universities to adopt it.

As stated earlier, the table also shows huge training gap in the area of teaching staff knowledge in external and internal governing instruments used to run the respective technical universities. Just like any other university, technical universities are run using relevant governing instruments and it is necessary that teaching staff are abreast with the provisions contained in these governing instruments. Application of these provisions vis-à-vis teaching staff little knowledge about them can create discomfort when they are applied on them.

4.1 TECHNICAL UNIVERSITIES FINANCIAL COMMITMENT IN AREAS OF DEVELOPING SKILLS AND KNOWLEDGE OF TEACHING STAFF

Training investment should be directed towards addressing skills and knowledge gaps as can be seen in tables 3 and 4. This investment only becomes beneficial when they are directed at areas where skills and knowledge gaps are high. The overall ranking of various skills and knowledge based on data from respondents in terms of technical universities areas of financial commitment in addressing skills and knowledge gaps are shown in tables 7 and 8.

Tables 7 and 8: Ranking of skills and knowledge types in terms of TUs financial commitment in their development

Skill types	**Frequency of ranking**	**Percentage**
Pedagogical skills	1	12.5
Entrepreneurial skills	0	0.0
Communication skills	0	0.0
Research and proposal writing skills	5	62.5
Leadership skills	1	12.5
Industrial skills	1	12.5
Public speaking	0	0.0
Time management	0	0.0
Total	**8**	**100**

Source: Researchers fieldwork 2019

Knowledge types	**Frequency of ranking**	**Percentage**
External and Internal governing instruments used to run university	0	0.0
Competency-based mode of curriculum development and delivery	1	12.5
Creating participatory learning environment	1	12.5
Monitoring students development	0	0.0
University administration and governance	0	0.0
Current trends in subject area	4	50.0
Information and Communications Technology	2	25.5
Students control and tolerance	0	0.0
Total	**8**	**100**

Source: Researchers fieldwork 2019

From tables 7 and 8, data was obtained by asking technical universities to rank the number one skills and knowledge they have committed lot of financial resources since they were converted to technical universities taking cognizance of their new mandate. As can be seen in table 7, the skills most of the universities claimed they have committed lot of financial resources for their teaching staff to acquire is research and proposal writing. To the researchers, this is very good since inventions and new technologies as well as grants and funding for most university projects hinges on research and proposal writing and technical universities ranking it as the number one skills they have committed lot of financial resources is in line with achieving their new mandate.

However, juxtaposing the findings in table 7 with table 4, it can be realized that, most teaching staff of technical universities do not have this skill based on a mean score of 2.978 as in table 4. This finding may be in line with the literature by Rae (2000) that though committing financial resources to develop the skills of employees are very important, one should also not lose sight of getting the training processes right especially at the needs assessment stage where the training objective is clearly spelt out and evaluation is done based on the stated objective. Training programmes should be well planned and coordinated if the desired objectives for the training are to be met.

In terms of knowledge types, most technical universities (50%) claim to have committed lot of financial resources in training their teaching staff to be abreast with the current trends in the courses they handle. Again, juxtaposing this claim with tables 5 and 6, one will realized that this knowledge was considered to be the most important to technical universities teaching staff (mean: 4.820) and it was also considered as the most knowledge technical universities teaching staff claimed to have acquired (mean: 4.768). However, knowledge in competency based mode of curriculum development and delivery was rated as the second most important knowledge teaching staff of technical universities want to acquire but only one university as can be seen in table 8 considered it as the number one priority in terms of committing financial resources to develop the knowledge

of their teaching staff in that area. This is not surprising as the reason may not be far from literature by Johnstone and Soares (2014) that adoption of competency mode of curriculum development and delivery is capital intensive in terms of training and acquisition of the necessary logistics to ensure successful implementation. Since technical universities rely mostly on their Internally Generated Funds which are often very limited to develop their staff, they may prefer to embark on training investments that are less capital intensive in order to achieve their training objectives.

5.0 CONCLUSIONS

Polytechnics in Ghana were converted to technical universities with a clear mandate to churn out graduates with skills and knowledge that will meet the expectations of the industry. This means technical universities should have the required portfolio of skills and knowledge that will enable them meet what are expected of them. Some of the skills and knowledge such as industrial experience, competency mode of curriculum development and delivery as well as research and proposal writing are captured in the technical universities governing instruments and teaching staff are expected to possess them in order to deliver what are expected of them. Training gaps in these areas are very wide as though teaching staff of technical universities considered them to be very relevant, yet greater part of the teaching population do not have these skills or possess this knowledge. It is therefore not surprising that despite it is mandatory per the technical universities Act 922 for all programmes run by these technical universities to be in the competency based mode, about less than 15% of the programmes are in conformity with this mode whilst more than 85% are subject-based.

Though industrial skills to be possessed by teaching staff is a requirement per the Technical Universities Act, training gap in this area is also very huge and it is very strange technical universities have not strongly paid attention to address this gap looking at their training, skills and knowledge priorities to bridge this gap. As this gap

continues to widen, government expectations of using technical universities to bridge the skills and knowledge expectations required by the industry will be difficult to achieve. This is based on the fact that skills and knowledge possessed by teaching staff of technical universities will determine the talent of graduates these universities will churn out.

6.0 EMPIRICAL AND THEORETICAL CONTRIBUTIONS OF THE STUDY

Literature shows that a lot of research has been done on Technical, Vocational Education and Training (TVET) within the context of Ghana particularly how it can be promoted to equip the youth with the necessary skills to be self-employed. Since Polytechnics in Ghana were converted to technical universities in 2016, there is no evidence of literature on the training gaps of technical universities especially after staff of these universities were audited by the National Council for Tertiary Education and were duly migrated onto the Ghana Public Universities Salaries Structure (GPUSS) in 2018. This assertion is based on the researchers' extensive scan on other scholarly works on TVET education in Ghana where it was revealed that most research works does not focus on technical universities but rather on technical and vocational institutes. This research empirically contributes to the literature by showing the skills and knowledge gaps that can be witnessed within technical universities in Ghana and the training priorities which training investment must be done.

Theoretically the researchers based on various related literature reviewed, developed a model (figure 1) that can be used by technical universities in Ghana to determine their skills or knowledge gaps. Such a model can be applied by future researchers who are interested in other similar fields of study to determine the training gaps of organizations which they may use for their study.

7.0 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The study through review of related literature and other governing instruments of technical universities, identified eight skills and knowledge that are relevant for teaching staff of these universities to possess in order to provide services that are expected of them. The study though identified the magnitude of training gaps in each skills and knowledge set, more emphases were placed on the skills and knowledge types where training gaps were huge notably industrial skills, knowledge in competency mode of curriculum development and delivery as well as research and proposal writing skills. It is therefore recommended that future researchers should also look at the other areas where training gaps were identified and how this can affect technical universities in their quest to deliver on their new mandate.

Just like all universities in Ghana, the categorization of staff particularly senior members in technical universities are into teaching and non-teaching. The study only focused on assessing knowledge and skills gap of teaching staff in these universities. It is therefore recommended that, future research in a similar area should focus on the skills and knowledge gaps of non-teaching staff so that one can have a bigger picture about the training gaps within technical universities in Ghana.

References

[1] Afeti, G., Baffour-Awuah, D. and Budu-Smith J. (2003). *Baseline Survey for the Introduction of Competency - Based Training in Polytechnics*, National Council for Tertiary Education (NCTE)/Japan Internal Cooperation Agency (JICA).

[2] Altarawneh, I. (2009). Training and development evaluation in Jordanian banking organizations. *Research and Practice in Human Resource Management, 17*(1), pp. 1-23.

[3] Amegashie-Viglo, S. (2014). Organisational Change Management of the Transition of Polytechnics in Ghana to Universities of Technology: A Theoretical Framework for Managing Transitional Challenges. *Journal of Education and Practice*, 5(25), 93–99

[4] Baiden, F. A. (1996). Technical and vocational education in Ghana. The Development of Technical and Vocational Education in Africa: Case Studies from Selected Countries, 81–122.

[5] Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, 59(5), 389–407

[6] Budu-Smith, J. (2005). The Need for Polytechnics to Assert and Create a Niche for Themselves among Tertiary Institutions in Human Resource Development: J*ournal of Polytechnics in Ghana* Volume 1, No.1

[7] Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs*, Jossey Bass

[8] Edwards M. et al (2009). *Training and Development.* Albany, NY: State University of New York Press.

[9] Eisner, E.W. (2002). *The kind of schools we need,* Phi Delta Kappan, 83, 576-583

[10] Fisher, C. (2007). *Researching and writing a dissertation: A guidebook for business Student*, (2nd ed). Ashford Colour Press, England.

[11] Ingvarson, L. et al (2014). Best practice teacher education programs and Australia's own programs. Canberra: Department of Education.

[12] Johnstone, S. M., & Soares, L. (2014). Principles for developing competency-Based education programs. *Change*, 46(2), 12– 19

[13] Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, pp 60-70.

[14] Mertler, C. A., & Campbell, C. (2005). Measuring teachers' knowledge and application of classroom assessment concepts: Development of the assessment knowledge inventory. Paper presented at the meeting of the American Educational Research Association, Montreal, Quebec, Canada.

[15] Rae, L. (2000). *Effective planning in training and development*. London: British Library.

[16] Saunders et al (2002). *Research Methods for Business Students*, London, Prentice Hall.

[17] Sekaran, U. (2003). *Research methods for business: a skill building approach* (4th ed.). New York: John Wiley and Sons.

[18] Technical Universities Act 2016 (Act 922). Assembly Press, Accra