

The Battle towards Skill Based Competency Integration to Knowledge Based Competency in the Sustainable Development of Growing Economy

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Abstract: *There is a marathon of the developing countries to enhance on industrialization establishment. One might ask why it took most of the developing countries too long to spend on innovation and creativity. The possible response might be; it is because of colonial influence, since the developing countries initially relied on aids from the early industrialized countries. The type of education, style of living and even the health attitude, were all driven from the master colony. The machinery, expertise and technology from the so called developed countries shifted the indigenous skill and knowledge into the past. The way we speak, dress and survive dramatically changed. These adoptions of foreign style slowly and slowly destroyed our culture. Even the indigenous food is no longer our favorite. It is now at a very late stage that the developing countries are trying to revert to their way of past lost doing of things or try to screen on what went wrong. This study attempts to investigate the current trend of knowledge and skill based competency among academic leaders' and their experience towards engineering curriculum. To obtain data, the investigator ensured that surveys were sent to different level of students studying bachelor of mechanical engineering course at University of Botswana. Based on 239 survey the study shows that 97.4% students appreciated to peruse skill based competency while 64.1% want knowledge based approach. 87.2% students preferred Personalized, Competency-Based Learning than the traditional learning in their education.*

Index Terms: *Knowledge, skill, sustainable development, technology transfer, competition, quality education.*

I. INTRODUCTION

In the early years of awake from colonialism to independent managerial of running the development of African countries (within the period of the 1960's) for example, "The case of Botswana". The white collar education was the most dominant respected national level. The people used to know that if one becomes a Teacher, Nurse, Secretary, Politician, District Commissioner and the like, that family one belongs

to; was highly respected. After a short period, industrialization took place. The mines, infrastructures, roads, as well as health care centers were became the needs. Unfortunately the majority of the people were not qualified to carry out the day to day operational service. The solution was to recruit experts from other countries to lead different sectors. The arising questions are: - Were the recruited personnel of the right caliber to transfer knowledge? Was the recruiting process tailored well? Were there plans to monitor if the expertise and knowledge from the foreigners properly transferred to the citizens? Looking at the standard of the development at present; one might doubt if proper transformation of knowledge and skill were done. Brockmann et al. did the study between France and England and found that, in France, the main development in recent decades has been the shift towards experiential learning and the recognition of the workplace as a site of learning. However, and in contrast to England, the holistic nature of the French education system still underlies the new approach. The focus has been on individual competence, based on the integration of different forms of knowledge, as well as social and personal faculties.[1] Competence-based education is the leading paradigm for innovation, both at the system level and at the level of learning environments. This is one of the main conclusions formulated by van Merriënboer et al (2002) in their study on the concepts of competence and competence-based education.[2] It should be recognized that the concepts of competence and competence-based education have been in use for a long time in education and human performance technology. Competence-based education is seen as an alternative for working with qualifications and qualification structures.[3] Specifying the competencies to be acquired by students does not automatically result in the design of effective learning activities. Planning, designing and implementing effective ways of learning require specific attention. Many authors in this field argue that learning arrangements and pathways should be based on principles of social, constructivist learning (cf. Mulder 2003 [4]; van der Sanden et al [2], 2003; Simons, 2003 [5]). Competencies can be defined as "clusters of related knowledge, skills, abilities and other requirements necessary for successful job performance.[6] Every position has its own set of competencies. In identifying competency requirements, it is important that the degree of mastery is related to the level of position in terms of level of responsibility, complexity and autonomy[7]. Performance development tools are used to assess the strengths of individuals and to determine areas that need development.

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The competencies should form the basis of performance development tools that managers use to assess the learning and development needs of evaluators. Agarwal et al shared the cases of sub-Sahara region and shows how important the integration of knowledge & practical learning through academia-industry collaboration. [8] Fortress learning define the both terms as an effective way to deliver the information that the learner needs to know, and in a way that assists them to learn.[9] It requires to-

- allow the learner to apply that information, and in ways that reflect how it could be applied in a real situation
 - give feedback to the learner about what they are doing that is correct, and what is incorrect, and (perhaps most importantly!) what makes it correct or incorrect
 - Guide the learner through a reflection on their learning.
- The competencies are intentionally stated as abilities and skills and not as a list of actions or tasks. It is based on the assumption that evaluators must have the requisite professional foundations and technical skills in order to ensure that evaluation design and processes are consistent with ethical requirements. A competency is a set of defined and observable skills, knowledge, abilities, and behaviors required to perform a specific job.[10]

II. KNOWLEDGE BASED COMPETENCY

How best knowledge might be acquired, and could it be defined. In short knowledge could be information and skill acquired through experience and learning. One of the authors: Merriam Webster [11], defines knowledge as “the fact or condition of knowing something with familiarity gained through experience”. In the developing countries the question is; are we pairing this knowledge expression with experience, or we are more interested in producing data after data which results in shelves of archives. The information which will be there for a long time before it could be off-shelved to creativity and innovation. The era has come which the undeveloped countries are now under pressure due to market internationalization. The booming international industrialization has proved that the global world is small. The rival interaction of business movement is fast. Suppose as the developing/undeveloped countries there is a need to radically integrate boldly the skill based research upon the theoretical research practice. Hopefully this might sustain the competitive products quality globally, hence minimizing the reliance of importing finished products.

III. SKILL BASED COMPETENCE

To define Skill-based versus Knowledge-based, Sam Lambert [12]; defines skill-based learning as learning which revolves around developing and using certain skills that can later be used to attain the mandatory knowledge and hence gain confidence. The skilled manpower, according to my thinking, is the ladder to link market penetration to the sustainable economic growth of individual countries. This therefore challenges the system of training curriculum plan and technology transfer. Since the revolutionary of political independent and self-governing from the colonized countries, personnel have been sent for further training to administer and lead where the needs were pinpointed. Unfortunately much has changed to the better. Some trainers like; Dr. Dodd,[13]

has believe that Skill-based training can be an approach that ties skills directly to job roles and lead to business value as employees. Hopefully the learners might smoothly absorb and process the skills to help grow and advance. In 2011, authors made a research on Street welding vendors, in Gaborone, Botswana, concentrating on slide-gate manufacturers and burglar doors, and we discovered that majority of gate makers in the country are foreigners. The table below is extracted from the paper of; Welding Opportunities in Botswana, Gaborone [6].

In the analyzing of table 1 on next page extracted, it could be seen that majority of gate producers within a selected area, the applied manufacturing skill is from neighboring countries. That is why this paper is concerned about technology based transformation system. Is the appropriate technology transfer done, during educational training? G.W. Douglass once emphasized that; it has recently become apparent that there is a need in Botswana to widen productive base to achieve sustainable development.[14] For any country to become competitive in this era of technology driven market, it is necessary to have a highly developed manpower in innovation and skills. Through the capacity building approach, which has been divided into 9 different approaches Agarwal et al shows that we can consider these approaches in education field also. Training alone will not be resulting the improved performance unless it is linked to an enabling institutional environment.[15] An essential characteristic of competence development is the integration of knowledge, skills and attitude to ensure successful performance. Competence development coincides with critical reflection on the diversity of tasks and problem situations that is encountered in professional practice [16]. Students must develop clear representations of the professional practice [17]. Therefore, proper integration of knowledge and skill development are the part of necessary improvement as shown in figure 1.

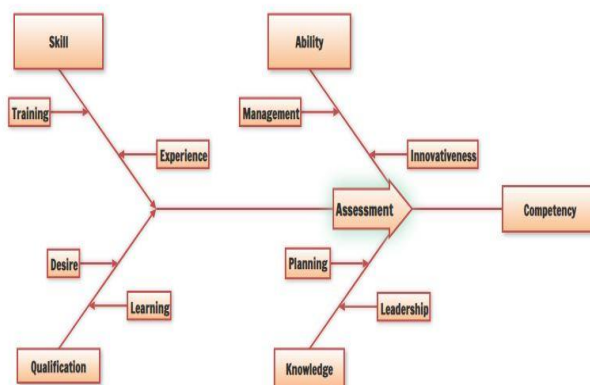


Figure 1- Integrated Competency Framework

Table 1 Data of Welding points along Gaborone –Gabane road (G-West line)[6]

Work Point	Product	Power Source	Monthly Power Bill (Pula)	Selling Price (Pula)	Approximate sales Per Month	Site owner
1	Sliding Gate 4 M Long	Generator	P500 – P600	P3000 - 00	0 to 1	Citizen
2	Sliding Gate 4 M Long	Residential House	P1000 fixed	P2400 – P2800	5 to 6	Foreigner
3	Sliding Gate 4 M Long	Residential House	P1000 fixed	P2500 – P3500	4	Foreigner
4	Sliding Gate 4 M Long	Residential House	P1000 fixed	P2400 – P3000	4	Foreigner
5	Sliding Gate 4 M Long	Residential House	P350 – P500	P2500	1	Foreigner
6	Sliding Gate 4 M Long	Residential House	P300 – P600	P2400	2	Foreigner
7	Sliding Gate 4 M Long	Residential House	P1000 fixed	P2200 – P3200	0 to 1	Citizen
8	Sliding Gate 4 M Long	Residential House	P800 fixed	P2400 – P3200	1	Foreigner
9	Sliding Gate 4 M Long	Residential House	P1000	P2400 – P3300	1 to 2	Foreigner

IV. THE SCENARIO OF APPROPRIATE TECHNOLOGY TRANSFER

Despite the local tertiary and international training of the workforce, the country is still challenged by the hit of rapid increase of jobless graduate, lack of competent workforce and a very low rate of job creation. The construction and major infrastructure projects are dominated by international companies. The majority of workforce in these projects is citizens but handling very lower responsibilities like artisan and laborers. What went wrong? Is the problem due to capital support or lack of skill based on the job? Is it inferiority complex of job selection? I suspect the foundation of education, right from basic to higher education was lacking something tangible. It was not tailored to properly to integrate theoretical materials with manual skill. Or the initiatives were not properly balanced among office workers and skill based employees? Research suggests that there are exceptional types of social media platforms that are used for effective learning purposes like YouTube, scribe, journal data bases eg.-SCOPUS, science direct, web of science, EBSCO, google scholar etc.

These platforms provide a variety of features that can be easily incorporated for learning & research purposes. Based upon the needs, educators may choose to use blogs, online chat, video conferencing, website development, Wikis and several other features of these social media platforms to improve their skills.[18] After completing the assessment and gap analysis, a learning plan is created to bring the incumbent to a level of accepted proficiency.

The learning plan is tailored at the individual level across a multi-channel learning process to include experiential, online, and classroom learning venues. In developing competence-based education, it is essential that structural attention is paid to competence development of teachers and school managers. The teacher is supposed to switch from the role of an expert, transferring knowledge to a coaching role, guiding students' learning processes. Students are supposed to take responsibility for their own learning, whereas the teacher used to be in charge. This requires a totally different attitude from both parties, perhaps even a paradigm shift. Achieving this challenge is all too easily forgotten by policy-makers, talking about implementing competence-based education.[19] These experiences have played a noteworthy, albeit as a matter of fact not restrictive, in the reincarnation of competence thinking in education. Acknowledgment has been developing of the requirement for training to be aimed at creating abilities, and not exactly at getting a confirmation; the accentuation must be on abilities and not on capabilities.

V. METHODOLOGY OF STUDY

Competence based instruction was started in the United States, where Gerald Grant led a huge report into capability based instruction. The skill development developed out of dissatisfaction with projects in the post-optional instruction framework. Numerous schools and colleges offered programs that had no unmistakable destinations as for what the understudies were really being prepared to do or be[20].

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The purpose of this study was to investigate the understanding of the students related to knowledge and skill based competencies, skills and their preference among a set of different subjects in their mechanical engineering degree course. This test is employed to ensure the generalizability of the findings to the population. There were mainly two sets of research questions for this study.

(a)- General overview

(b) - Knowledge sharing based on interest.

Multicultural competence constitutes a unique category of awareness, knowledge, and skills necessary for effective student affairs work. These competencies may assist student affairs practitioners in creating multicultural sensitive and affirming campuses [21]. Tests have appeared by enabling learners to investigate their very own interests as a method for learning they naturally turned out to be progressively connected with and apply a big effort in their learning. It has an immediate connect to the equivalent mental marvel that intrigues us. Furthermore, much the same as on account of being interested, premium involves colossal focal points with regards to learning. Learners invest more energy investigating the point and for the most part participate in increasingly complex assignments, they gain a superior impression of conceptual ideas, more clear reasoning, further understanding and simpler memory.

These are instances of what great perspectives is connected among premium and learning. All these need to be analyzed to find a way forward to become innovative, creative and high quality producers of goods and services which could be able to penetrate the global market rivals. Unless there is a way tangible to compete in global market with finished products there is no way to survive in the world economic growth. The data was collected using the google forms and speeded through the internal e-learning tools e.g. moodle & blackboard and also through social media tool as whatsapp and emails.

VI. RESULT ANALYSIS

The analysis of data that was collected for this study consisted of inferential statistics is as shown in table 2 and 3 below. Based on the answers given in the completed surveys, the investigators found that majority of students appeared to agree that the general awareness or possession of information, facts, ideas, truths, or principles can be classified as “knowledge based competency and the ability to do something well, usually gained through training or experience be classified as skill based competency. 87.2% of the students referred Personalized, Competency-Based Learning as the quality learning & education. The discoveries show how pioneers recognize the fitting strategies for correspondence so as to improve the nature of their working environment. They use demonstrating and use individual models coordinated at making a standard of magnificence for people around them to pursue. Besides, they endeavor to portray the foundation data and subtleties of the message. The students showed a strong inclination of combination of both approaches and willing to adopt Personalized, Competency-Based learning to improve their skills.

Table 2- Overall statistics of students who answered the survey

Particular	Categories	Response Record
What gender are you	Male	79.5%
	Female	20.5%
How old are you	Less than 20	0%
	20 to 30	97.4%
	Above 30	2.6%
Do you have a job (sponsored)	Yes	30.8%
	No	69.2%
The time demands for class attendance	Less than 2 hours per week	2.6%
	Between 2 and 5 hours per week	53.8%
	Between 5 and 10 hours per week	7.7%
	Between 10 and 15 hours per week	7.7%
	More than 15 hours per week	28.2%
Are you familiar with the term “skill based competency”	Yes	71.8%
	No	28.2%
Are you familiar with the term “knowledge based competency”	Yes	71.8%
	No	28.2%
Can the ability to do something well, usually gained through training or experience be classified as “skill based competency”?	Yes	97.4%
	No	2.6%
Can the ability to do something well, usually gained through training or experience be classified as “knowledge based competency”?	Yes	35.9%
	No	64.1%

Table 3- Experience and knowledge sharing based statistics of students who answered the survey-

How would you classify the Exit Level Outcome of the following courses, in terms of “Skill Based Competency” and “Knowledge Based Competency”?	Skill Based Competency	30.8%
	Knowledge Based Competency	5.1%
	Both	64.1%
Thermodynamics	Skill Based Competency	5.1%
	Knowledge Based Competency	66.7%
	Both	28.2%
Engineering mathematics	Skill based competency	5.1%
	Knowledge Based Competency	69.2%
	Both	25.6%
Fluid mechanics Dynamics	Skill based competency	5.1%
	Knowledge Based Competency	53.8%
	Both	41%
Statistics Engineering Materials	Skill Based Competency	7.7%
	Knowledge Based Competency	66.7%

	Both	25.6%
Manufacturing	Skill Based Competency	12.8%
	Knowledge Based Competency	15.4%
	Both	71.8%
Machine Component Design	Skill based competency	12.8%
	Knowledge Based Competency	30.8%
	Both	56.4%
Which option would you prefer in quality learning	Traditional Education	12.8%
	Personalized, Competency-Based Learning	87.2%

VII. CONCLUSION

This study provides better knowledge about the learning skills of academic leaders, which may also provide new insights for a more meaningful relationship between course developers and the academic leaders. The extent to which the role of teachers and students changes can easily be overlooked when competence-based education is implemented[22]. The teacher is supposed to switch from the role of an expert, transferring knowledge to a coaching role, guiding students' learning processes. Students are supposed to take responsibility for their own learning, whereas the teacher used to be in charge. This requires a totally different attitude from both parties, perhaps even a paradigm shift. Achieving this challenge is all too easily forgotten by policy-makers, talking about implementing competence-based education. The first step to grasp the knowledge is proper understanding followed by skill based approach. There is phrase saying; "A hungry man can never be productive due to lack of energy". The first thing is since the weather is continuing to be dry year after another, what steps to be taken to produce enough food (quality). The second stage is since we have been training personnel for many years but still there is no creativity of production and services the country can offer to other neighboring countries and abroad, we need to research on where a style of educational change is needed. Also look if the appropriate technological transfer has been applied. The relationship between the knowledge gap and the skills productivity is an agenda that could be investigated by further studies.

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