Available online at https://asric.africa/engineering-sciences
ASRIC Journal on Engineering Sciences Vol.4(2)(2024) 26-30

Gender and Technology: The Role of TVET In Uplifting Traditional Knowledge and Technologies for Rural Women in Zimbabwe

Shelta Majowa

Harare Polytechnic, Division of Mechanical and Production Engineering
Box CY407 Causeway, Harare, Zimbabwe
shem50058@gmail.com, smajowa@hrepoly.ac.zw

Received 19 April 2024; revised 08 May 2024; accepted 10 June 2024

Abstract

The research unleashed the gap between gender and technological development that supports traditional technologies used by the rural women in Zimbabwe. Traditional technologies lag behind in terms of improvements though they preserve the Traditional Knowledge (TK) and folklore. The research explored the roles Technical and Vocational Education Training (TVET) plays in uplifting the traditional technologies used by woman in rural Zimbabwe. The sampled 5% rural girls who took up TVET education proved to be effective in designing products that enhances livelihood of rural women by identifying need through experience and exposure. The sampled process at an identified homestead has shown how rural women have accepted and adapted to the new technologies reducing the time taken in producing peanut butter from 8 hours to one and a half hours. The research concluded that thorough career guidance has to be provided for in the most marginalized rural schools, for rural girls to take their grassroots technologies up to TVET colleges and enhance them from their background knowledge. The curriculum must create signage between TVET colleges and the rural women so as to promote redesigning technologies previously developed by rural women either through attachments or recruitment of rural girls at TVET colleges.

Key words: Gender, Technology, Traditional Knowledge, Folklore, TVET

1. Introduction

Technical and Vocational Education Training (TVET) has become the cornerstone for livelihood improvement to Zimbabwean rural folks by promoting designing of cheaper equipment to the community. The TVET trained graduates joins the informal sector that specialises in their areas of study producing goods targeting mainly the rural people and this has been accepted as a way of identifying skills for entrepreneurship (Adams AV, 2009). This research explored on the role woman in TVET play in uplifting the traditional technologies used by woman in the rural Zimbabwe community. Women in rural areas are the main custodians of traditional knowledge due to their contributions towards the day to day running of the household chores. Among the TK's in Zimbabwe are the knowledge on agriculture, food preservation methods, food processing, medicine and decorative craft skills knowledge. Traditional knowledge (TK) has helped as the basis for problem identification for students in TVET colleges when identifying projects for their academic fulfilments. This ranges from civil and mechanical works in the traditional construction of rural kitchens, huts, fireplaces, charcoal stoves, maize shellers, peanut shellers, 'tsotso' stoves, solar vegetable driers, chili grinders, peanut butter making machines, enhanced manual 'sawer' for small grains (rapoko) and others. The few women in TVET education have proven to be effective in designing products that enhances livelihood of rural women through experience and exposure at the same time maintaining the Traditional Knowledge (TK). Rural women over time have devised methods of collecting, preserving and producing food in their households. This research focused on items and equipment made to ease the burden of food production, preparation and preservation in the daily life of a rural woman in Zimbabwe and Africa.

Methods, Techniques, Studied Material and Area Descriptions

Literature

Literature was awash with basic traditional knowledge that marks the identity of different cultures in Zimbabwe and how they have been enhanced with technology either to increase production or to improve quality. Traditionally women are groomed for the day to day running of the household leading them to devising the means of survival to ease the burden of the ever-increasing chores. The review by Zidny et al (2020) provides justification which includes views, aspects, and practices from indigenous communities into science teaching and learning so as to preserve TK. They further indicated that TK provides rich authentic contexts for learning. If this knowledge is incorporated in TVET education there is strong guide to TK preservation and improvement. The TK for food production and preservation all lies with the rural women who need not to be left out in the technological development of the improved machines and products. Literature in TVET talks on benefits of TVET to the community rather than the benefits of inclusion of the affected that is women in rural households. Women cook, harvest and source for daily food and prepare the recipes for each day making sure the food is properly preserved for future use. There is an indication that TVET trained graduates are mainly apprenticed in the informal sector like Magaba in Mbare high density area where they apply their technologies to produce goods (Wonder & Tensen 2017).

In Zimbabwe this informal sector is the sole supplier of appropriate technology tools and machines for the rural community. According to Ukwueze (2012), Nigerian vocational education training indicated that technical and vocational skills are those skills that utilize natural resources to satisfy humanity needs. This humanity needs satisfaction can be achieved by incorporating local talented or TVET trained graduates who are skilled to improve on the appropriate technologies being used by rural women. The talents can be obtained from those that grew up using the technology who are in this instance the rural girls who join TVET colleges. According to Saleh and Puteh (2017) assessment on graduates, quality and innovation ecosystems can be achieved through increased technological innovation skills among TVET graduates. If innovation is put into practice with the local people for the local people there is likely to be improvements in quality of the innovated products from traditional knowledge and application. Liu and Clayton (2016) identified that Partnership of China and New Zealand was due to the fact that vocational education was an acceptable outcome with opportunities. This was obtained after the establishment of exemplary TVET institutions to demonstrate best practice in TVET education (that is model polytechnics) through curriculum redesign. The redesign to cater for TK in technological development of rural women technologies can go a long way due to the diversity of these technologies among almost all the rural women in Zimbabwe and in Africa. A measure of their effectiveness has already been indicated in the research. The traditional training has been passed down to children through generations maintaining the myths associated on these different methods as a value and respect to the traditions, (Heisnam et al 2019).

Preservation of harvested grains for future use in the rural kitchen is mainly cantered on sun drying which takes long and lack protection from the outside environment as indicated on the research on post-harvest technologies, methods in India. This indication shows the need for a better design to protect the food from contamination but not doing away with the method of drying the food and grains as a preservative method. National goals rally behind maintaining traditional knowledges and passing on to future generations without distortion. The knowledge that rural girls possess with regards to methods used in the rural community have been ignored. Designers produce what they can, without considering the real challenges faced by rural women. The traditional knowledge need to be used to benefit the community by acting local and thinking global (McManis 2003). Researches are mainly on the benefit of TVET education on general aspects without considering rural women who promotes traditional knowledge and folklore. Studies carried out were concerned with TVET education collaboration with the industry and to satisfy the industry labour needs forgetting the silent rural woman and Traditional Knowledge passed on through generations.

Methods and Techniques

Female mechanical engineering students with rural background were sampled from 3 TVET institutions and these make up 5% of the enrolment. The identified students were assessed on the type of projects they designed and intended to design based on their background knowledge. A homestead that has adopted the new technology was conveniently sampled as a pilot to assess the effects of new technology on the traditional knowledge and folklore. The designed machines sampled were peanut 'shellers', peanut butter making machines, vegetable driers, chilli grinders and grain silos.

The research conveniently sampled peanut butter processing equipment used at the sampled homestead to check the effects and adaptability of new technologies by rural women maintaining the product quality according to TK. The women were observed using the initial various traditional methods and then the effects of the said new technologies that are needed by women to prove the benefits of improved technologies. The test on peanut butter processing was timed and recorded. Interviews on the reasons for designs and the intentions were all clear based on experience and knowledge of how it is done. Observation methods were used to collect salient data on the effectiveness of the improved technology without distorting the traditional knowledge. The designs were assessed mainly based on the knowledge of how it is currently done and devising an improved method which is less cumbersome but coming up with the same product or maintaining the same values as before. An experiment was done to check on the difference in time for the production of peanut butter (based on 20 litter bucket)

Fig 1: Traditional manual shelling

Fig 2: Machine Shelling

Fig 3: Peanut butter crunching (kudzvura)

Fig 4: Manual peanut butter smoothing (kukuya)

Fig 5: Electric Peanut butter making machine

The research identified the differences in time frames of operation using the original traditional methods and using the new technologies. The experiment was done starting from peanut shelling, roasting, pounding and then grinding (Fig 1-5). This strategy was adopted to seek answers to the effectiveness of designed machines towards reducing the burden of a rural woman, also checking the influence of background to the designers when coming up with designs. 'Mabumbe' (a traditional meat ball relish substitute made from

pumpkin seeds which has high nutritional values) making was also demonstrated as well and a suitable machine is still to be designed basing on the knowledge from one of the TVET trained girl.

Results and Discussions

The research unleashes the gap between gender and technological development that supports traditional knowledge technologies used for survival by the rural women in Zimbabwe. From the 15 girls sampled from the TVET institutions only two had a design which was guided by the company and all the others had the intention to improve a rural woman's life.The female students' designs were centred on machines that ease the burden of a rural woman. For peanut butter making, it took 8 hours using the traditional methods. Production using peanut Sheller, roaster and peanut butter smoothing machine took 1hour 40 minutes. The designs are life changing to the women who have multiple house chores and they have adapted well to the use of machinery designed. The sampled homestead which adopted 4 of these new designs has become a role model to the community and hiring out the machine services to the other community members who now have extra hours for other activities indicating acceptance of the new designs. The peanut butter had no difference and the taste remained the same. The 'mabumbe' recipe was delicious and but the process was draining to the woman, and a need was identified for a processing machine. Improved methods of production and preservation does not distort the traditional knowledge, it only increases the production levels and reduces time. TVET trained female graduates in the informal sector manufacture tools and equipment improving appropriate technology that has been in use in the rural areas for centuries. This has helped maintain traditional knowledge through better, improved equipment and tools that maintains and shorten the production processes. This reinforces cultural values of Zimbabwe through the continual use of traditional ways of doing things at an improved level. These emerging technologies are maintaining conformity to traditional processes without distorting the cultural basis. The adapted designs serve the purposes.

Conclusions

The Government of Zimbabwe must adopt involvement by participation of rural women so as to produce designs which will be adopted and accepted by rural women maintaining their TK. The solution is to promote these technologies which are prevalent mostly with women who traditionally run the day to day household chores. This can be achieved by incorporating female TVET students in promoting appropriate technology through redesigning equipment for sustainability from traditional knowledge developed by women. The study also recommends the introduction of TVET centres in rural areas and recruitment of more women in the technical courses for them to design from experience to ease the burden of women as exemplary centres to boost technological development for TK. There is also need to attach students in the rural households to observe the traditional knowledges so as to find ways of maintaining the traditional knowledges without distorting them. This can allow for products produced from traditional knowledge to be monetised through geographical indication (GI) and registration for identification to the outside communities and countries. Most of these TK's apply to the greater part of the African continent as one nation which will make it an African achievement. The knowledge on how to satisfy the actual need of women in the rural set up cannot be explored without involvement of the affected who are mainly women.

List of symbols

TVET	Technical and vocational education training
GI	Geographical indications
TK	Traditional knowledge
IP	Intellectual Property

Acknowledgment(s)

Acknowledgement goes to Marihwi family in Zvimba rural, for step by step demonstrations on food preparation using Traditional Knowledge at their homestead.

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