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## Indigenous knowledge transfer and acquisition by fishers of Kigungu landing site on Lake Victoria (Uganda)

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### Abstract

This study describes the pedagogical principles, modes of learning and gender roles in the fishing vocation at Kigungu. Data were collected using participant observation and standardized interview guide from twenty one fishers and eight women. The study aimed to find out the fishers indigenous knowledge contents and how such knowledge is preserved and passed on to the next generation. Findings revealed that fishers who were only male learnt gear construction, fishing, boating, weather, safety at sea, while women provided auxiliary services and employment to fishers. Teachers of the vocation were relatives and the fishers joined the vocation at early ages from ten years. Learning was by doing, physical demonstration and verbal instructions from skills masters. The present study highlighted contributions that local fishers “curricular “could make to improve the training of vocational fisheries scientist in formal institutions. Further investigation on whether living close to urban dwellings and absence of elderly fishers could limit the transfer of indigenous knowledge among fisher is recommended.

**Keywords:** Indigenous knowledge science, vocational education, learning, ethno-ichthyologic, fishers

### 1. Introduction

Lake Victoria, with maximum depth of 84m and surface area of 68,000 km<sup>2</sup> [1] is shared by three East Africa countries of Uganda (43%), Kenya (6%) and Tanzania (51%). It is located within the latitudes 0°30' N and 3°12' S, and longitudes 31° 37' E and 34° 53'E [2]. The lake is characterized by multi species fishery dominated in the catches by a non-native Nile Perch (*Lates niloticus*, Linnaeus 1758), followed by Nile Tilapia (*Oreochromis niloticus*, Linnaeus 1758) and the cyprinid, *Rastrienobola argentea*.

In an attempt to understand the context of this study, one must first define indigenous knowledge systems (IKS) in fisheries management and training. The term “indigenous” includes; “originated and produced, growing, living, or occurring naturally in a particular region or environment”. It is variably taken to mean local science, people’s science, traditional knowledge, and ethno-science [3]. In the present study, it is used to mean “the local knowledge that is unique to a given culture or society which accumulates over generations of living in a particular environment that enable the community to achieve stable livelihoods in their environment”. Presently the fishing industry in Ugandan is dominated by traditionally trained fishermen. Fishers have a track of ethnic belonging with common languages and traditional practices save for the few who migrated and got adapted and assimilated into the local fishing systems.

#### 1.1 Situated learning theory

The present research is guided by “situated learning” theory of Jean Lave that; the unintended learning occurs by virtue of ones participation in an activity authentic to a culture of a particular community. One major key to situated learning is social interaction where a learner acquires certain beliefs and behaviors by virtue of getting involved in a “community of practice” [4]. As a newcomer moves from the periphery to the center of this community as novice, and through active engagement within the culture, he / she become an expert with time. The fisher’s community have an identity (i.e. Fishing) defined by a shared domain of interest. A person needs to be situated in a family or in a community which practices certain skills to address their problems.

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The present study extended the situated learning theory and merged it with the principle of social partnership advanced by Billet and Seddon<sup>[5]</sup>, to provide information on indigenous knowledge custodians, practices and the pedagogy of the system that can be transformative to improve the present training of fisheries students.

## 1.2 Objectives of the Study

This study aimed at finding out the knowledge contents, the teachers of the fishing vocation and how training was conducted. It also looked at the gender characteristics in the fishing community (i.e. their age, ethnicity and roles in fishing). Very little published information existed if any at all, about the indigenous knowledge systems of the Ugandan fishing communities of Lake Victoria<sup>[6]</sup>.

## 2. Materials and Methods

The present research was carried out at Kigungu fishing village in Entebbe (Uganda) along the shore of Lake Victoria from June to December 2010. The landing is between latitudes 0° 02' 00'' and 0° 02' 15'' North and longitudes 32° 25' 05'' and 32° 25' 25'' East, just adjacent to Entebbe International Airport. According to Ssebuyira<sup>[7]</sup>, Father Lourdel Maperera and Brother Amans (Catholic missionaries) arrived in Ugandan through Lake Victoria and first landed at Kigungu in February 1879. This is an indication that Kigungu landing site though a small growing town is an old fishing village, one of the reasons why it attracted this study.

The study employed qualitative research methods. Data were collected on the one part through standardized interviews and on the other through participant observation. The interview method was used because of its advantages described by Lozada, *et al.*<sup>[8]</sup>. Twenty one adult male (from 18 years old) fishers and eight adult landing site women were sampled for the study. The study used respondents of 18 years and above because someone younger than 18, according to the Ugandan Constitution<sup>[9]</sup> is considered a child and is not legally allowed to practice a vocation.

Female respondents were interviewed to triangulate the information given by male fishers. There was no register for women at the landing. All women interviewed at least processed fish in one way or another. The choice of which woman to interview was based on the activity in progress as the researcher came across them one at a time. Hotel operators, fish smokers, fresh fish mongers and bar operators were among the female respondents.

The lists of target male respondents on the landing register were picked. A random sampling technique as described by Crawley<sup>[10]</sup> was adopted and modified to pick 25 fishermen from the register. They were then contacted in advance (through their association chairperson) to schedule respective individual interview. The nature of research and objectives was briefly explained to each interviewee before requesting for his/ her consent to be interviewed. The interview questions covered but were not limited to the teaching and learning of the indigenous knowledge of fisheries and the role of women in fishing. Questions about teaching and learning the art of fishing, were administered to key fishers who had been in fishing for over Five to Ten years. I expected such fishers to be informative and with good knowledge of fishing experience on Lake Victoria. All these questions were asked as uniformly as possible to every interviewed fisher, who was allowed ample time to answer.

Participant observation involved watching and listening to the

skills master as they went about their routine tasks of mounting, rigging, repairing fishing nets or hooks with the help of a learner at the landing. The researcher also accompanied three randomly<sup>1</sup> sampled master fishers on three different fishing expeditions to the fishing grounds to observe the art and of science of traditional fishing in action. Where necessary relevant questions on particular observational interests were asked and much attention was paid to the fishing net gear setting and retrieval from the water.

With this procedure, the present study aimed to gather collective quantitative ethno-ecological information that was analyzed quantitatively.

## 2.1 Data Preparation and Analysis

The qualitative data gathered from the present study were analyzed thematically. Common records of ideas which appeared across the data were then grouped into response themes and aligned to particular research question. The percentage response frequencies were calculated from the total responses of all fishermen, according to Silvano *et al.*<sup>[11]</sup>.

## 2.2 Data Analysis

Data were analyzed using the software "HyperResearch version 2.8.3 to code the themes and generate frequency of occurrences of each theme<sup>2</sup>. Thematic data from Hyperresearch were then exported into SPSS version 17, a program with a capacity to analyze both qualitative and quantitative data (one way ANOVA). Frequency of themes was analyzed descriptively in SPSS. Multiple and different responses for the same question (e.g. learnt fishing techniques from both father and friends) which were given by a fisher were treated independently since they did not influence each other.

## 3. Results and Discussions

In this section, the findings of this study are presented and discussed together with the analysis.

### 3.1 Demographic Characteristics and Roles in Fisheries

The demographic data gathered from the respondents comprised of the gender, age, ethnic background and formal education characteristics. Generally most of the fishers were within the youth age bracket of 20-30 years with exception of only four fishers in the 36 to 40 year age bracket. Fishers with age ranges of 20 to 25 and 26 to 30 years contributed the highest frequency of eight each. There was only one respondent in the age bracket of 31 to 35 years. Female were relatively older than male (Mean age = 28.69 and 30.38 years respectively). However, there was no significant difference between the ages of male fishers and female who provided auxiliary services (ANOVA,  $p = 0.230$ ).

It is not surprising that the multicultural fisheries was dominated by the Baganda tribe, probably because they are the native tribe in the region<sup>[12]</sup>. Similar findings were also reported by Fergene<sup>[13]</sup> on the Ijebu tribe who were native and dominated that fishing community of Lagos state. The diversity in ethnic communities of fishers at Kigungu could be attributed to the migratory nature of fishermen in search

1 From the 50 fishers sampled, a similar procedure will be followed to pick the five fishers to be accompanied to the fishing grounds.

2 A theme in this study is "One single word or group of words" which stands for the various words given by several respondents in response to particular question.

for fish bumper harvest<sup>[14]</sup>. Seasonal fish movement is believed to cause fishermen migration<sup>[13, 15, & 17]</sup>, while others may migrate to developed landings to improve on their standards of living. Kigungu being a relatively developed modern landing site could have attracted some fishers with the preceding reasons. The fact that indigenous knowledge is culturally specific and locally bound could explain why the ethnic diversity reported here did not enrich the indigenous knowledge base at Kigungu. It is also possible that the migrant fishers who settled at Kigungu detached themselves from their sending community and associated practices<sup>[17]</sup>. This study also revealed a strange finding; that the supposedly expected elders of and above 40 years were missing in the fisher community. Nirmale, *et al.*<sup>[18]</sup> studied fisher folk community of Maharashtra in Mumbai (India) and reported that most of the fishers belonged to the middle age (youth) category within the 20-30 years age bracket. Ochiewo, *et al.*<sup>[19]</sup> also found that 88% of the most economically active fishers of southern coast of Kenya were between the age bracket of 19- 40 years. It is most likely therefore true that

active fishers are always the youth. This could be due to the energy and alertness associated with this youthful age brackets<sup>[4]</sup>. Finfish fishery exploitation has been characterized by both young and old fishers<sup>[19]</sup>; however, the present finding could indicate a change in the fishing pattern. During the present study, it was witnessed that fishers go deep offshore in search for fish and to comply with the legal requirements. This change in fishing ground from near inshore to far offshore could have deterred the old fishers in the mainland from fishing. This could also have implication on the transfer of indigenous fisher's knowledge since the elders whom Diamond<sup>[20]</sup> described as our "library" are excluded from active fishing.

### 3.2 Roles of women in fishing

The Data for the findings presented here were gathered from both male and female respondents. The present study did not find any woman involved in active fishing activity (Fig 1). Male fishers however recognized the importance of women in supporting fishing activity.

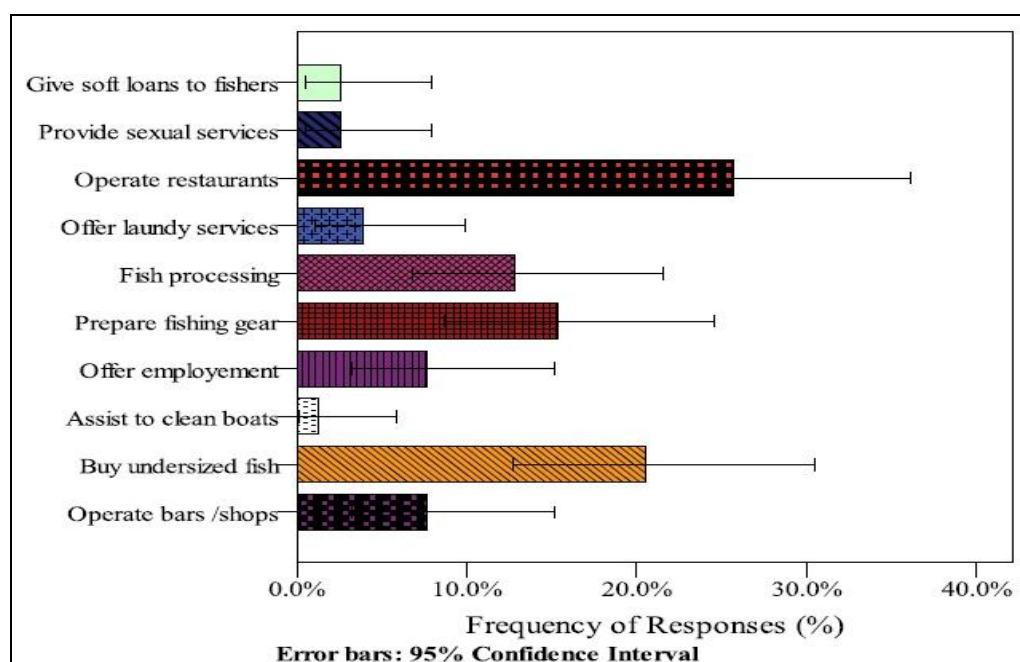


Fig 1: Different Roles Played By Women in Supporting Fishing Activities at Kigungu Landing Site.

Women were generally involved in operation of eating houses / restaurants which ranked highest by 25.6%, followed by purchase of undersized fish (20.5%), preparation of fishing gears (15.4%) and fish processing (12.8%). Few women who owned fishing boats employed (7.7%) casual male fishers to do the job. Operation of bars and drinking houses accounted for 7.7% and all other activities ranked below 5% with women's participation in cleaning boats tailing with 1.3%.

A section of respondents (03%) stated that some women provided sexual services to male fishers. Only one female fish smoker confessed to provide the service whenever she had no alternative source of income. The complex demands on women's labor and time imposed by Socio-economic dynamics diversified their roles although the gender based household division of labor appears not to have changed. A similar finding that women dominated post capture processes was reported by Baio<sup>[21]</sup> in Sierra Leone, Touray<sup>[22]</sup> in Gambia and Williams<sup>[23]</sup> in Nigeria.

According to Yemaya<sup>[24]</sup> women's role revolves around household chores and remain unnoticed in most fishing

communities. In the present study, they did not directly fish, but played pivotal roles in fishing. Fishing expedition is a demanding job in terms of time and energy. Women therefore provided helping hands to prepare food, process fish, market it and probably purchase more fishing inputs. This finding could suggest that fishing can never be profitable and economically sustainable and enjoyable without the participation of women as auxiliary service providers.

### 3.3 Transfer and Acquisition of Indigenous Knowledge

This study revealed that 57% of the fishers joined the vocation at teenage ages of 10 to 18 years, while 33% joined during their early youth (19 to 25 years) and 10% were in their transition to adult hood (26 to 30 Years). Fishers acquired fishing techniques through male teachers which comprised of the fathers (4%), brother (4%), the uncles (18%) and the friends which contributed the highest percentage (64%) of teachers. There was no mentioning of any feminine knowledge transmitters. However, gender wise family division of labor seemed to have had much influence on who

transferred knowledge. Like male fishers learnt from fellow male skill masters, some women stated that they learnt fish processing business through their sisters or aunties with whom they lived. One can conclude that fishing knowledge is passed on to the learner at quite an early age. In a similar ethno-botanical knowledge transmission by Lozada *et al.* [8], majority of their respondents had learned about medicinal and edible plants in their childhood. They [8] also found that the youngest informants (18-30) had the lowest levels of knowledge in all categories. Probably the success of

indigenous knowledge transmission is based on this early age training “syndrome” which enables one to build a lifelong expertise with aging.

### 3.4 Learning Contents

Fishing gear construction and maintenance (35%) dominated the learning contents followed by fishing techniques (31%). Fishing gear included fish traps, seine nets, fish nets, fish hooks, lamps & boats, Figure 2.

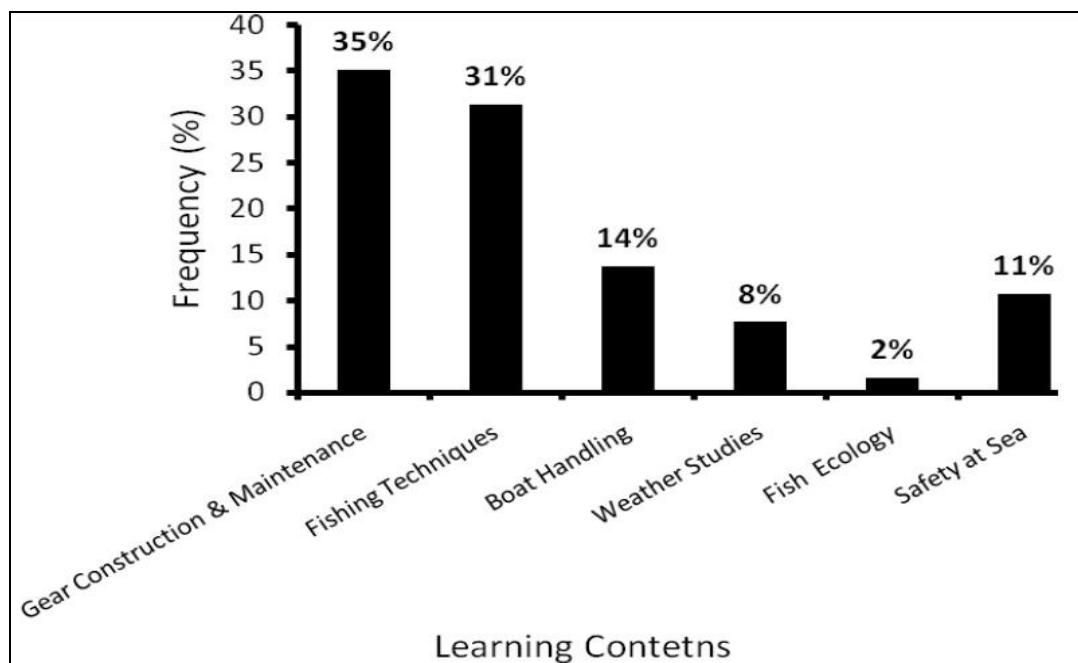


Fig 2: Various Course Units Studied in the Indigenous Fisheries Vocation.

Other modules taught and learnt in the vocation included Boat handling, weather studies, fish ecology and safety at sea. Safety at sea embraced locating position at sea, determining water depth, underwater rocks, swimming, good relations at sea with fellow fishers and keeping watch of accidents. Similarly, boat handling included boat maintenance, engine mounting, steering, and engine trouble shooting. This is a very rich “curriculum” contents which seemed to have been designed to prepare one for life skills and survival in the waters in their struggle to earn a living from the water resources. Gear construction and fishing techniques ranked highest probably as pillars of the learning contents in the fishing vocation. This content cuts across the indigenous and formal fisheries training curricular; much as the modes of transfer may differ.

Surprisingly, the fishers of Kigungu learnt fishing gear construction, but during data collection for the present study, no traditional gear was seen in use. This could suggest that machine made fishing gear is replacing the traditional gear which some fisheries regulations regards it as destructive and illegal. The eco-hydrological nature of the lake may have also deterred deployment of traditional fishing gears, especially those used in shallow sheltered bays [25].

### 3.5 Modes of Knowledge Transfer

All cases encountered revealed that knowledge transfer and acquisition involved a close association of learners with their instructors (skills masters). Knowledge was passed onto the learner by verbal instructions which were not written. The skills masters who were very close friends or biological

relatives would perform an activity in the presence of and together with the learner. An Alur fisher had this<sup>3</sup> to say about how he learnt the skills. In this way the young recruits learnt the skills of the vocation. Learning was by doing and on the job. Unlike in formal education, the learners did not pay any money however, when asked, one fisher equated the value of the work he would do during the learning process to fees. Most of the fishers interviewed had trained at least another fisher.

The present study discovered that fishers also did end of course “graduation”. The process involved taking the new fishers in a boat with cooked food deep in to the lake. The new fishers then wore the skull of a big Nile Perch (*Lates niloticus*, Linnaeus 1758) on their necks (as necklaces) while holding the saucepan containing hot sauce on their right hand and hot potato, “matoke” (Local Banana) or cassava on the left as they sung (“*enyanja yandetela okuvuba*” repeatedly, literally translated as “The lake caused me to come fishing”) while drumming as they danced in the boat. There after the grandaunt seeps a little water from the boat and the ceremony ends. This ceremony could have motivated and inspired more recruit into fishing.

3 13 ‘I used to stay with my uncle, he was a fisherman. He would send me to bring “pisu” (braiding needles) and “tol milo” (Nylon) to repair the cast net; “Hold this end, and please watch carefully what I am doing, tomorrow you will repair this net alone, you will tie it on that granary; one day he cautioned me. One holiday, I begun to accompany him to the water and I learnt to row the boat while he casts the net in the water and I just got myself casting the net too” (One of the respondent at Kigungu landing site).

Lozada *et al.* [8], Nwonwu [26], Ryan *et al.* [27], Dhal [28] and Pfeiffer & Butz. [29] also found similar results that cultural knowledge transmitters were vertical within kin lineage. Women and men have separate relationship with biodiversity and therefore it is not surprising that particular gender dominance in knowledge transmission is linked to the kind of vocation. Important to IKS is that, the teachers should be actors and not facilitators [30]. This could suggest the disparity in gender dominance in knowledge transmission between the present study and those of Lozada *et al.* [8]. Msuya [31] coined this mode of knowledge transfer as “deliberate instruction”, where parents teach the children, craftsmen instruct apprentices, and adolescent undergo initiation rites. These findings could suggest that the vertical transmission of knowledge has something to do with preservation and custody of knowledge among close ethnic family lines, such that IK knowledge practitioners who have no children are most likely to pass on with their knowledge, a wisdom gone forever [31]. Indigenous learning by doing and participant observation aids the process of knowledge remembering and retention, a precondition for learning [32]. Further, new fishers seemed to find more meaning in what they learnt as the outcomes and benefits were immediate<sup>4</sup>, therefore they put much interest in what shaped their lives as adult fishers.

#### 4. Conclusion

The present study revealed that the multi-cultural fishers of Kigungu were dominated by Ugandan youths of Baganda ethnic tribe and none was older than 40 years. Fishing was generally men’s work while women, in addition to processing and marketing fish rendered auxiliary services to the fishers and some employed the male fishers on their personal boats. Fisher recruits joined the fishing vocations at early ages and none started fishing. Learning was by doing initially through peripheral active integration within a particular community. Knowledge and skills transmitters were dominated by male friends and relatives. Fishers learnt the art of fishing using modern gear. No traditional fishing gear was found at the landing site. Much as the indigenous knowledge provides immediate source of livelihood, its weakness however, is that, as civilization and economic development progresses and more and more people get formally educated, fewer people will want to engage in fishing because of its tedious nature. Production learning approach could be borrowed to motivate formal vocational skills training.

#### 5. Recommendations

This study revealed a modular, kind of gainful production learning by the fishers. It therefore recommends adoption of such modes of pedagogy to improve skills mastery and retention of learners in formal vocational training centers. Where possible, students learning fishing vocations should commute from homes to benefit from integration of the day to day indigenous lifelong learning experienced from homes and communities around them. This could dis-alienate them from the local resource and resource use. It would also be interesting if investigative studies were done to identify the reasons for non-existence of traditional fishing gear and elderly fishers (above 40 years) and the relationship between the two and urban dwelling.

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<sup>4</sup> Proceeds from sale of fish caught during their training

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