Comparative Analysis on the Performance of Experts and Knowledge Extensionists in Effective Transfer of Knowledge in Higher Institutions of Learning in Nigeria

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Abstract
The paper assessed and compared the performance of knowledge extensionists vis-à-vis the experts as well as amongst themselves for effective knowledge transfer in higher institutions of learning. Secondary data on student's performance in end of semester examination on courses taught by both categories of lecturers was obtained from the examination records of various departments and units of Waziri Umaru Federal polytechnic Birnin kebbi. The Mann-Whitney U test and the Kolmogorov Smirnov test for difference were used for testing the hypotheses formulated. Findings showed that all of the hypotheses tested for the Mann-Whitney U test were supported except extensionists vs. extensionists with respect to background. This meant there was an observable difference in the performance of the students when the extensionist was of the course background and when he was not. For the Kolmogorov-Smirnov tests, the results showed that the sets of hypotheses tested were all supported except extensionists vs. extensionists with respect to experience. This suggested that students taught by extensionists without much experience tends towards lower scores in their examination than those taught by more experienced extensionists. In the light of our findings, it is recommended that attention should be focused on lecturers experience and background when recruiting academic staff in our higher institutions of learning in order to ensure effective knowledge transfer to students.

Keywords: Knowledge management, Knowledge transfer, Knowledge extensionists, Higher education and High institutions of learning

Background to the Study
Knowledge Management (KM) is inevitably challenging and important concept in Higher Learning Institutions (HLI) in which it emphasizes on ways to recognize and achieve knowledge assets. In the current higher learning institutions, research is the key for knowledge creation and knowledge dissemination. The higher learning institutions are no longer just providing knowledge to the students, but also manage and blend together the existing knowledge as references for the next generation.

Higher education is learning that is provided by universities, vocational universities, polytechnics, monotechnics, degree colleges, arts colleges, technical and medical colleges, and other institutions that award academic degrees and diplomas. Higher education is normally

taken to include undergraduate and postgraduate education, as well as vocational education and training. Colleges and universities are the main institutions that provide higher education. Higher education includes teaching, research and social services activities of universities, and within the realm of teaching, it includes both the undergraduate level and postgraduate level. Higher education is very important to national economies, both as a significant industry in its own right, and as a source of trained and educated personnel for the rest of the economy.

In the knowledge-based economy, higher education improves human resources. Through education learners gain knowledge that improves individuals' professional development and capability (Alavi and Leidner, 2001). Liao (2004) states that in light of the knowledge-based economy and new competitive dynamics, educational institutions must combine speed and knowledge to improve quality, responsiveness, and competence and can lead to competitive advantage for educational institutions.

In organizational learning, knowledge transfer is the process by which knowledge moves from a source to a recipient, i.e. from a sender to a receiver, so it is very important to business performance and competitive advantage in organizations (Nonaka, 2000; Szulanski, 1996; Argote et al., 2000; Ko et al., 2005). Knowledge, which exists in two primary forms: explicit and tacit, can transfer from one form to another in the knowledge creation process (Liao, 2004).

The nature of knowledge transfer in higher education is to improve the abilities and skills of learners as related to professional application. This process is based on the interaction between teacher and student (Alavi and Leidner, 2001; Simon and Soliman, 2003). Alvarez et al. (2004) state that learning is related to training performance, training performance is related to transfer performance, and transfer performance is related to results. As a knowledge source in higher education institutions, a highly effective teacher transfers knowledge successfully to students. However, knowledge-, motivation-, and communication-related factors concerning both teacher and student also have been shown to affect knowledge transfer (Ko et al., 2005). Teaching effectiveness is concerned with the transfer process and shows that some kinds of learning experiences result in effective memory but poor transfer while others produce effective memory plus positive transfer (Simon and Soliman, 2003).

Statement of the Problem

Economic and social developments are increasingly driven by the advancement and application of Knowledge. But the potential of higher education systems in many developing countries to provide qualitative and effective knowledge to attain such developments are thwarted by long standing problems of finance, efficiency, equity, quality and governance. Efforts to expand enrollments and improve educational quality are severely constrained by growing shortages of qualified academic staff. For example, between 1997 and 1999, the numbers of academic staff in the federal universities in Nigeria declined by 12% even as enrollments expanded by 13%. Long term brain drain in the face of rising enrollments, has left the federal university system with only 48% of its estimated staffing needs filled. Staffing scarcity is most acute in engineering, science and business disciplines. Shortfalls are estimated at 73% in engineering, 62% in medicine, 58% in

administration, and 53% in sciences. In contrast, no staffing shortages exist in the disciplinary areas of arts and education (NUC2002 in William *et al*).

Adeyemi (2000) Reports on a study which evaluated enrollment trends with the available academic manpower in Nigerian universities. Findings indicated that projections of student enrollment expected to increase by 5 per cent annually, far outpace projected numbers of academic staff available. Ephraim (2004) found that Nigerian public institutions have high enrollments without enough qualified instructors. As a result, staff/student ratios have worsened to the detriment of student learning and academic research.

Feng *et al*, (2009) made the first attempt to introduce and acknowledge the unique role of an extensionist in the knowledge transfer process in expert system application to Agriculture. This implies that the role of the Extensionist in Knowledge transfer is a recent development and present an interesting direction for further research in other areas of knowledge transfer as in the case of higher education in Nigeria since the intermediary role of the extensionists really exist. As the demand for the intensive involvement of experts in KT increases in higher institutions of learning, coupled with the fact that we have insufficient number of such experts in the higher education sector, the role of the Knowledge extensionists in many of our higher institutions of learning remain relevant in order to bridge the gap created by this imbalance. Yeldu (2013) found that the role of the knowledge extensionists really exist in our higher institutions of learning and is very relevant in order to bridge the gap created by inadequate and in efficient manpower in most areas of study.

Objectives of the study

The aim of this study is to investigate selective cases where knowledge transfer took place between lecturers (both experts & extensionists) and students in order to compare and evaluate the effectiveness of the two categories of lecturers in knowledge transfer. To achieve this, the following objectives are formulated:

I.   To determine if there is significant difference in the performance of experts in knowledge transfer with respect to experience, background and qualification

ii.   To determine if there is significant difference in the performance of extenstionists in knowledge transfer with respect to experience, background and qualification

To determine if there is significant difference in the performance of experts and extensionists in knowledge transfer with respect to experience, background and qualifications.

Theoretical Background

Knowledge management has been widely accepted and implemented in organizations and knowledge is recognized as the most important resource of organizations (Alvesson and Karreman, 2001; Minu, 2003; Nahapiet and Ghoshal, 1998; Spender and Grant, 1996) in Teresa et al (2008). Manipulating knowledge creation, knowledge storing, knowledge sharing, and knowledge application helps organizations gain competitive advantage (Nonaka et al., 1994, 1995, 2000; Argote et al., 2000). Recently, researchers have expanded studies of knowledge management into the domain of higher education. In the context of educational institutions, sharing knowledge is paramount to the existence of an educational institution (Liao, 2004).

Extending from knowledge transfer between sources and recipients, the study of Ko et al. (2005) shows that there are three knowledge factors: knowledge-related factors, motivation-related factors, and communication-related factors that influence the transfer of knowledge from source to recipient.

Knowledge Transfer

The process of knowledge transfer - or what some authors refer to as knowledge transformation, knowledge distribution, knowledge dissemination, knowledge sharing , knowledge conversions (Sveiby, 2001, Nonaka and Takeuchi, 1995) or "best-practice" (Szulanski, 2003) - is a very complex one. It is an interaction between knowledge receiver and provider. In the most common sense, it can be understood as the process of passing on knowledge from one unit (e.g. individual, group, department, division) to another. However, for the purpose of this research, the term has to be narrowed down. Within the scope of this study, knowledge transfer is perceived as "the process by which knowledge moves from a source to a recipient and is readily applied by the recipient" that is, from a teacher to a student.

Knowledge Extensionist

The word "extension" is derived from an educational development in England during the 19th century, when Oxford University and Cambridge University attempted to serve the rapid expansion of educational needs of society. It was called "university extension". In the early 20th century, the word extension was applied to describe the transfer of knowledge and technology to serve the needs of rural development by American land-grant universities (Jones & Garforth, 1997). The actors engaged in facilitating the knowledge extension were termed "extensionists". In the early literature, the role of the extensionist was reported to transfer the knowledge and skills originally in a social network, but more recently has been adopted in the agricultural sector. According to Nagel, (1997), the name "extensionist" is drawn from previous literature on educational and agricultural extension, which defines the "extension" as the organized exchange of information and the purposive transfer of skills. This study therefore upheld the early literature meaning of the extensionist and therefore considers any person involved in transferring knowledge to students in any higher institution of learning without having the minimum requirement to teach such students. They are needed to act as intermediaries to bridge the gap of inadequate manpower in our higher institutions of learning.

Feng *et al*, (2009) made the first attempt to introduce and acknowledge the unique role of an extensionist in the knowledge transfer process in expert system application to Agriculture. This implies that the role of the Extensionist in Knowledge transfer is a recent development and present an interesting direction for further research in other areas of knowledge transfer as in the case of higher education in Nigeria since the intermediary role of the extensionists really exist. As the demand for the intensive involvement of experts in KT increases in higher institutions of learning, coupled with the fact that we have insufficient number of such experts in the higher education sector, the role of the Knowledge extensionists in many of our higher institutions of learning remain relevant in order to bridge the gap created by this imbalance.

Yeldu (2013) developed a conceptual model of knowledge transfer in higher education in Nigeria incorporating the role of knowledge extensionist and hence an improvement to Ko et al (2005).

Research Methodology

The purpose of the research design is to test the effectiveness of knowledge transfer between teachers (both experts and extensionists) and students. Data for this study was collected as secondary data from the examination records of various courses from different departments and units of Waziri Umaru Federal Polytechnic Birnin kebbi on student's performance in end of semester examination on courses taught by both categories of lecturers. Although there are a large number of higher institutions of learning across the country where the role of the extensionists exist and therefore suitable to investigate, the data required for the various factors involved in this study may not be readily available and therefore difficult to obtain. For that reason this study is limited to only Waziri Umaru Federal Polytechnic Birnin kebbi.

The study compared student's performance in the selected courses at end of Semester's examinations under the following broad categories:

i. expert vs. extensionist with respect to qualifications
ii. expert vs. extensionist with respect to experience
iii. expert vs. extensionist with respect to background of the teachers
iv. extensionist vs. extensionist with respect to qualification
v. extensionist vs. extensionist with respect to experience
vi. extensionist vs. extensionist with respect to background of the teachers

Research Hypotheses

The research hypotheses tested are:

1. H_o: there is no significant difference between the performance of students under experts and extensionists in terms of qualification

   H_o': there is no significant difference between the performance of students under experts and extensionists in terms of experience.

   H_o'': there is no significant difference between the performance of students under experts and extensionists in terms of background of the teachers.

2. H_o: there is no significant difference between the performances of students under extensionists in terms of qualification of the teachers.

   H_o': there is no significant difference between the performances of students under extensionists in terms of experience.

H_o'': there is no significant difference between the performance of students under extensionists in terms of background of the teachers.

3. H_o: there is no significant difference between the performance of students under experts and extensionists in terms of qualification of the teachers.

H_o': there is no significant difference between the performance of students under experts and extensionists in terms of experience.

$H_o^{''}$: there is no significant difference between the performance of students under experts and extensionists in terms of background of the teachers.

4. H_o: there is no significant difference between the performances of students under extensionists in terms of qualification of the teachers.

    $H_o^{'}$: there is no significant difference between the performances of students under extensionists in terms of experience.

    $H_o^{''}$: there is no significant difference between the performance of students under extensionists in terms of background of the teachers.

The secondary data that was obtained was analyzed using two non-parametric statistical tests:

i.   The Mann-Whitney U Test
ii. The Kolmogorov-Smirnov Test for Differences

This is because the non- parametric methods make fewer assumptions about the population from which they are drawn and therefore have a high probability of rejecting the null hypothesis when it is false

The Man-Whitney U Test

This is a test designed for two samples of data that can be ranked. The test looks, not on the actual values of the data, but only on the ranks of the data (William, 1980).

To use the test, combine the two samples, ranking all the observations by score from lowest to highest.

Let n_1 be the number of observations in the 1st sample

Let n_2 be the number of observations in the 2nd sample

Let R_1 be the sum of the ranks in the 1st sample

The null hypothesis is that the two samples are drawn from the population, so that the expected value of the mean of the ranks from the two samples would be equal. To test H_o define the statistic

$$U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \dots\dots\dots\dots\dots\dots(1)$$

It can be shown that the expected value of U, under the assumption of the null hypothesis, is

$$E(U) = \frac{n_1 n_2}{2} \dots\dots\dots\dots\dots\dots\dots(2)$$

and the standard deviation of U is

$$\sigma_U = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}} \dots\dots\dots\dots\dots\dots\dots(3)$$

When n_1 and n_2 are greater than 10, the sampling distribution of U is approximately normal. You can therefore test H_o using the standard normal variable

$$z = \frac{U - E(U)}{\sigma_U}$$

If two observations have equal values, they will share the same rank. In the case of tied ranks, each observation should be given a rank equal to the mean of the ranks that are shared by the tied values.

The Kolmogorov-Smirnov Test for Differences
This test compares two independent samples, but it is also able to detect not only differences in average but differences in dispersion between the two samples as well (William, 1980).

The Kolmogorov-Smirnov test compares the cumulative frequency distributions of two independent samples. To run the test, record the cumulative frequency distribution of each sample, using the same class intervals for each sample. Let

$$S_1(X) = \frac{K_1}{n_1}$$

where K_1 is the number of observations in the first sample less than or equal to each class X, and n_1 is the number in the sample; and let

$$S_2(X) = \frac{K_2}{n_2}$$

where K_2 is the number of observations in the second sample less than or equal to each X, and n_2 is the number in the second sample.
For each class, compute the difference

$$S_1(X) - S_2(X)$$

Let the minimum of these differences be

$$D = \text{maximum}[S_1(X) - S_2(X)]$$

The null hypothesis is that there is no difference between the two populations. The alternative hypothesis is the one sided alternative that the first sample tends toward lower values than the second sample. According to the null hypothesis, the statistic

$$\frac{4 D^2 n_1 n_2}{n_1 + n_2}$$

is distributed approximately as with 2 degrees of freedom. If the value of this statistic is greater than or equal to the critical value of as designated in the table, you can reject Ho at the designated level of significance. This is a one tailed test; rejection Ho means that you assert that the first sample has a lower average, or lower extreme values, than the second sample.

The test statistic is only approximately distributed as, though the approximation gets better as the sample sizes get larger.

For convenience, and accuracy, a statistical software MINITAB for windows was used for the Mann-whiteney tests to determine if there was any significant difference between the students' performances.

In view of the above, students' performance in end of semester examination were used as a yard stick in measuring effectiveness of Knowledge transfer based on the general assumption that if the transfer is effective, student's performance will tend to be high in terms of grades obtained and vice versa. The set of hypotheses were tested at the 5% level of significance.

Data Analysis and Results

The Mann-Whitney Test results

1. Expert vs. Extensionists with respect to qualification

Expert N_1 = 40   Median =   44.000
Extensionist N_2 = 62   Median =   43.500
Point estimate for Exp-Ext is   4.000
95.0 Percent CI for Exp-Ext is (-1.000, 14.001)
W = 2232.5
Test of Exp = Ext vs. Exp not = Ext is significant at 0.2384
The test is significant at 0.2375 (adjusted for ties)
Cannot reject at alpha = 0.05

2. Expert vs. Extensionist with respect to experience

Expert N_1 = 43   Median =   44.00
Extensionist N_2 = 34   Median =   43.00
Point estimate for Exp-Ext is   1.50
95.1 Percent CI for Exp-Ext is (-3.00, 5.00)
W = 1753.0
Test of Exp = Ext vs. Exp not = Ext is significant at 0.4386
The test is significant at 0.4370 (adjusted for ties)
Cannot reject at alpha = 0.05

3. Expert vs. Extensionist with respect to background of the teacher

Expert N_1 = 11   Median =   55.00
Extensionist N_2 = 7   Median =   46.00
Point estimate for Exp-Ext is   6.00
95.4 Percent CI for Exp-Ext is (-6.01, 22.00)
W = 117.5
Test of Exp = Ext vs. Exp not = Ext is significant at 0.2576
The test is significant at 0.2561 (adjusted for ties)
Cannot reject at alpha = 0.05

4. Extensionist vs. Extensionist with respect to qualification

Extensionist $N_1 = 15$ Median =   40.00
Extensionist $N_2 = 20$ Median =   43.50
Point estimate for ETA1-ETA2 is   -4.00
95.3 Percent CI for ETA1-ETA2 is (-7.00, 5.00)
W = 237.0
Test of ETA1 = ETA2 vs. ETA1 not = ETA2 is significant at 0.2787
The test is significant at 0.2773 (adjusted for ties)
Cannot reject at alpha = 0.05

5. Extensionist vs. Extensionist with respect to Experience

Extensionist $N_1 = 32$ Median =   47.000
Extensionist $N_2 = 33$ Median =   53.000
Point estimate for ETA1-ETA2 is   -4.000
95.0 Percent CI for ETA1-ETA2 is (-9.999, 1.002)
W = 937.0
Test of ETA1 = ETA2 vs. ETA1 not = ETA2 is significant at 0.1200
The test is significant at 0.1195 (adjusted for ties)
Cannot reject at alpha = 0.05

6. Extensionist vs. Extensionist with respect to background

Extensionist $N_1 = 32$ Median =   49.000
Extensionist $N_2 = 27$ Median =   41.000
Point estimate for ETA1-ETA2 is   5.000
95.1 Percent CI for ETA1-ETA2 is (2.002, 9.003)
W = 1179.0
Test of ETA1 = ETA2 vs. ETA1 not = ETA2 is significant at 0.0009
The test is significant at 0.0008 (adjusted for Ties)

The Kolmogorov Smirnov Test for Difference Results
Table 4.4: Experts vs. Extensionists with respect to qualification

Scores	Expert			Extensionist			
X	f_1	K_1	$S_1(X)$	f_2	K_2	$S_2(X)$	$S_1(X)-S_2(X)$
A	1	1	0.0476	1	1	0.0435	0.0041
AB	3	4	0.1905	4	5	0.2174	-0.0269
B	3	7	0.3333	1	6	0.2609	0.0724
BC	2	9	0.4286	2	8	0.3478	0.0808
C	4	13	0.6191	3	11	0.4783	0.1408
CD	2	15	0.71 43	2	13	0.5652	0.1491
D	3	18	0.8571	1	14	0.6087	0.2484
E	3	21	1.0000	7	21	0.9130	0.0870
F	0	21	1.0000	2	23	1.0000	0.0000

$n_1 = 21, \quad n_2 = 23$

$$S_1(X) = \frac{K_1}{n_1}, \qquad S_2(X) = \frac{K_2}{n_2}$$

$$D = Maximum \left[S_1(X) - S_2(X) \right] = 0.2484$$

$$\chi^2 = \frac{4D^2 n_1 n_2}{n_1 + n_2} = \frac{4(0.2484)^2(21)(23)}{21 + 23} = 2.7092$$

From table, the critical value of χ^2 for 2 degrees of freedom at the 0.05 level of significance is 5.99. Accept H_0.

Table 4.5: Experts vs. extensionists with respect to experience

X	f_1	K_1	$S_1(X)$	f_2	K_2	$S_2(X)$	$S_1(X)-S_2(X)$
A	1	1	0.01961	1	1	0.0185	-0.0011
AB	2	3	0.0588	2	3	0.0556	0.0032
B	3	6	0.1177	2	5	0.0926	0.0251
BC	5	11	0.2157	2	7	0.1293	0.0864
C	3	14	0.2745	5	12	0.2222	0.0523
CD	10	24	0.4706	8	20	0.3704	0.1002
D	4	28	0.5490	12	32	0.5926	-0.0436
E	18	46	0.9019	12	44	0.8148	0.0871
F	5	51	1.0000	10	54	1.000	0.0000

$n_1 = 51, \quad n_2 = 54$

$$S_1(X) = \frac{K_1}{n_1}, \qquad S_2(X) = \frac{K_2}{n_2}$$

$$D = Maximum \left[S_1(X) - S_2(X) \right] = 0.1002$$

$$\chi^2 = \frac{4D^2 n_1 n_2}{n_1 + n_2} = \frac{4(0.1002)^2(51)(54)}{51 + 54} = 1.0544$$

From table, the critical value of χ^2 for 2 degrees of freedom at the 0.05 level of significance is 5.99. Accept H_0.

Table 4.6: Expert vs. Extensionist with respect to background

Scores	Expert			Extensionist			
X	f_1	K_1	$S_1(X)$	f_2	K_2	$S_2(X)$	$S(X)_1$-$S_2(X)$
A	1	1	0.0196	3	3	0.0880	-0.0684
AB	2	3	0.0588	0	3	0.0880	-0.0292
B	3	6	0.1177	1	4	0.1177	0.0000
BC	5	11	0.2157	2	6	0.1765	0.0392
C	3	14	0.2745	4	10	0.2941	-0.0196
CD	10	24	0.4706	5	15	0.4411	0.0295
D	4	28	0.5490	6	21	0.6177	-0.0687
E	18	46	0.9019	10	31	0.9118	-0.0099
F	5	51	1.0000	3	34	1.0000	0.0000

$n_1 = 51, \quad n_2 = 34$

$$S_1(X) = \frac{K_1}{n_1}, \quad S_2(X) = \frac{K_2}{n_2}$$

$$D = Maximum [S_1(X) - S_2(X)] = 0.0392$$

$$\chi^2 = \frac{4D^2 n_1 n_2}{n_1 + n_2} = \frac{4(0.0392)^2(51)(34)}{51 + 34} = 0.1254$$

From table, the critical value of χ^2 for 2 degrees of freedom at the 0.05 level of significance is 5.99. Accept H_0.

Table 4.7: Extensionist vs. Extensionist with respect to qualification

Scores	Extentionist$_1$			Extensionist$_2$			
X	f_1	K_1	$S_1(X)$	f_2	K_2	$S_2(X)$	$S_1(X)$-$S_2(X)$
A	4	4	0.1026	2	2	0.0513	0.0513
AB	2	6	0.1538	2	4	0.1026	0.0512
B	6	12	0.3077	1	5	0.1282	0.1795
BC	3	15	0.3846	6	11	0.2821	0.1025
C	6	21	0.5385	8	19	0.4871	0.0514
CD	9	30	0.7692	4	23	0.5897	0.1795
D	5	35	0.8974	9	32	0.8205	0.0769
E	4	39	1.0000	7	39	1.0000	0.0000
F	0	39	1.0000	0	39	1.0000	0.0000

$n_1 = 39, \quad n_2 = 39$

$$S_1(X) = \frac{K_1}{n_1}, \quad S_2(X) = \frac{K_2}{n_2}$$

$$D = Maximum [S_1(X) - S_2(X)] = 0.1795$$

$$\chi^2 = \frac{4D^2 n_1 n_2}{n_1 + n_2} = \frac{4(0.1795)^2(39)(39)}{39 + 39} = 2.5136$$

From table, the critical value of χ^2 for 2 degrees of freedom at the 0.05 level of significance is 5.99. Accept H_0.

Table 4.8: Extensionist vs. Extensionist with respect to experience

Scores	Expertensionist$_1$			Extensionist$_2$			
X	f_1	K_1	$S_1(X)$	f_2	K_2	$S_2(X)$	$S_1(X)$-$S_2(X)$
A	1	1	0.0303	2	2	0.0625	-0.0322
AB	1	2	0.0606	1	3	0.0938	-0.0332
B	2	4	0.1212	1	4	0.1250	-0.0038
BC	7	11	0.3333	1	5	0.1563	0.1770
C	2	13	0.3939	2	7	0.2188	0.1751
CD	12	25	0.7576	2	9	0.2813	0.4763
D	6	31	0.9394	6	15	0.4688	0.4706
E	2	33	1.0000	10	25	0.7813	0.2187
F	0	33	1.0000	7	32	1.0000	0.0000

$$n_1 = 33, \quad n_2 = 32$$

$$S_1(X) = \frac{K_1}{n_1}, \quad S_2(X) = \frac{K_2}{n_2}$$

$$D = Maximum \left[S_1(X) - S_2(X) \right] = 0.4763$$

$$\chi^2 = \frac{4D^2 n_1 n_2}{n_1 + n_2} = \frac{4(0.4763)^2(33)(32)}{33 + 32} = 14.7434$$

From table, the critical value of χ^2 for 2 degrees of freedom at the 0.05 level of significance is 5.99. Reject H_0.

Table 4.9: Extensionist vs. Extensionist with respect to background

Scores	Expertensionist$_1$			Extensionist$_2$			
X	f_1	K_1	$S_1(X)$	f_2	K_2	$S_2(X)$	$S_1(X)$-$S_2(X)$
A	2	2	0.0308	3	3	0.0484	-0.0176
AB	4	6	0.0923	3	6	0.0968	-0.0045
B	3	9	0.1385	1	7	0.1129	0.0256
BC	6	15	0.2308	5	12	0.1935	0.0373
C	5	20	0.3077	5	17	0.2742	0.0335
CD	11	31	0.4769	10	27	0.4355	0.0414
D	11	42	0.6462	11	38	0.6129	0.0333
E	9	51	0.7846	14	52	0.8387	-0.0541
F	14	65	1.0000	10	62	1.0000	0.0000

$$n_1 = 65, \quad n_2 = 62$$

$$S_1(X) = \frac{K_1}{n_1}, \qquad S_2(X) = \frac{K_2}{n_2}$$

$$D = Maximum \ [S_1(X) - S_2(X)] = 0.0373$$

$$\chi^2 = \frac{4D^2 n_1 n_2}{n_1 + n_2} = \frac{4(0.0373)^2(65)(62)}{65+62} = 0.1766$$

From table, the critical value of χ^2 for 2 degrees of freedom at the 0.05 level of significance is 5.99. Accept H_0.

Discussion of results

The results obtained from the Mann-Whitney tests using MINITAB showed that all of the hypotheses for the sets of data were supported except category 6 (extensionists vs. extensionists with respect to background). This meant there was an observable difference in the performance of the students when the extensionist was of the course background and when he was not.

For the Kolmogorov-Smirnov tests, the results showed that the set of hypotheses tested were all supported except category 5(extensionists vs. extensionists with respect to experience).

For the test comparing experts and extensionists with respect to qualification, the calculated value for was 2.7092 while the table value was 5.99 which led to the acceptance of the null hypothesis. Similarly, for the test comparing experts and extensionists with respect to experience, the calculated value was obtained as 1.0544 while from table at 5% level of significance the value was 5.99 which also led to the acceptance of the null hypothesis. The same can also be said about the test comparing experts and extensionists with respect to background of the teachers. The calculated value was obtained as 0.1254 while the table value was obtained as 5.99 which also led to the acceptance of the null hypothesis.

For the other test comparing extensionists with respect to qualification, value calculated was obtained as 2.5136 while the table value was 5.99 which resulted in accepting the null hypothesis. But for the test comparing extensionists with respect to experience, the calculated value was 14.7434 whereas the table value was 5.99 which led to the rejection of the null hypothesis. This suggested that students taught by extensionists without much experience tends towards lower scores in their examination than those taught by more experienced extensionists.

Finally for the test comparing extensionists with respect to background, value calculated was found to be 0.1766 and the table value was found as 5.99 which also led to the acceptance of the null hypothesis

Conclusion and Recommendation

The empirical and comparative study adopted in this paper shows the relevance and role of the knowledge extensionists in our higher institutions of learning to bridge the gap created by inadequate and in efficient manpower in most areas of study. Since results obtained indicated no significance difference between the effectiveness of transfer between the two categories of lecturers it can be concluded that the role of the knowledge extensionists is relevant in our higher institutions of learning. In the light of our findings, it is recommended that attention should be focused on lecturers experience and background when recruiting academic staff in our higher institutions of learning in order to ensure effective knowledge transfer to students.

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