Research Training and Support: Institutional Impact on Publications

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ABSTRACT

The objective of this study was to identify and describe the Aksum University (AKU) faculty's training and support needs for academic research as a basis of improvement in the productivity of academic research publications. The stratified random sample was 51 faculties from five of the six colleges in Aksum University representing 16.3% of the on-campus teaching faculties. The hypotheses of the study were: (a) training in data analysis and research paper writing is needed; (b) faculties know how to do research design and methodology; (c) faculties need internet access; (d) research training does not impacts teaching; and (e) there are no qualified faculties at AKU for research training. Two Principle Component Analysis factors related to these hypotheses were described as a training factor TFAC1(I need training in data analysis and research report writing) and a support factor TFAC2 (Internet access is essential and research class would not interfere with teaching).

Keywords: Training, Support, Research, Publications, University

INTRODUCTION

The strategic plans for the seventeen new universities in Ethiopia and other public universities in such countries as China (Ng & Li, 2000), the United Kingdom (Tapper, & Salter, 2004), and the U.S. (Tierney, 1999) have driven administrators (Clarke, 2004) to achieve their objectives for recognition and their national funding niche through emphasize of academic research productivity. Since world-wide academic ranking methodologies invariably place a significant emphasis on faculty research productivity, university leaders and mobile faculty members are constantly seeking to enhance their personal and institutional research profiles (Tien & Blackburn, 1996). Over the last decade, Ethiopian university policies have been put in place to establish better university-government linkages to facilitate economic research supporting national policy decisions. Universities are strongly encouraged to provide research for economic and environmental leadership to grow Ethiopia's emerging global economy.

Factors influencing faculty's research productivity have been studied for decades (Lotka, 1926). There are a number of factors such as scholarship (Arora & Gambardella, 1996), age and life cycle (Diamond, 1984), research activity performance of department (Hogan, 1981), scientific collaboration (Modrego, 1998), quality of training or individual's abilities and skills (Anderson, 1989; Buchmueller, 1999) and faculty motivation and incentives (Monroe & Kumar, 2011b) have all shown a significant relation to academic research productivity.

Additional research (Szymanski, et al., 2007) demonstrated that research training environments (RTE) are associated with increased scholarly productivity, especially for early career professionals. The researcher-practitioner RTE model and internship RTE model were found to be the most effective in fostering research interests and productivity.

Dora Marinova (2008) documented that government changes in the research funding methods for universities in Australia that used quantitative indicators such as citations dramatically increased research productivity. One of the unexpected consequences of the university funding change was the trend to centralize research activities on the campuses to optimize overall university research funding and productivity. In summary, the original productive research universities became increasingly more productive.

Hadhjinicola and Soteriou (2005) identified salary raises and promotions as the most important factor in the research productivity. Secondly, they found that researcher's affiliation with a research center significantly affected the total number of articles published and the number of articles that appeared in elite journals. A related administrative policy finding showed that external funding for research activities (i.e. research centers) on real-world problems promoted higher research productivity. Further, enhanced library facilities (specifically internet search engines) and the presence of doctoral students were both driving force behind research productivity and research quality.

Chen, Gupta and Hoshower (2006) utilized expectancy theory to identify key factors that motivated business faculty to conduct research. Faculty members who attributed high importance to both intrinsic and extrinsic rewards from research productivity exhibited significantly higher research outputs. Additionally, untenured faculty members were motivated by extrinsic rewards. Tenured faculty members were motivated by intrinsic rewards. Overall, research productivity was positively correlated with tenure status and the percentage of time allocated to research activities and years in academic employment was negatively correlated with research productivity. Further, there was no relationship between research productivity and academic discipline and gender.

In the process of obtaining and disseminating knowledge, numerous personal characteristics impact faculty research productivity. The strength and confidence of the faculty were confirmed as necessary for high levels of research productivity (Bland et al., 2002). However, a study by Abramo ,D'Angelo and D'Costa (2008) on the effects of internal and external collaboration on research productivity found no clear evidence of a correlation between extramural collaboration and overall productivity of academic research organizations.

Training is expected to develop and strengthen the skills and knowledge of the faculty which enables them to take up the challenging research activities. Training builds self-confidence in the minds of faculty (Subrahmanian, 2010). Training is the process whereby people learn the skills, knowledge, attitude and behavior needed to perform their job effectively. No educational organization can ignore the training and development (doctorial program) needs of faculties in research productivity (Subrahmanian, 2010). Research training is a process that takes place during a faculties' entire professional life. Research and publication activity can also be understood as a means of training in itself (Carlson, 1995; Martin, 1983; Irvine, 1980).

On the contrary, Pagey (1981) found most organizations allocate very little of their budget for the training. Their reasoning was that the effectiveness of training had very little value added to the organization outcomes.

University faculties are the primary actors in research production systems and ultimately, it is their skill and knowledge that influence the production of academic research and publications. This study should be of interest to research directors, college deans, and other academic leaders engaged in the formulation of institutional research training policies and procedures that will strengthen the scholarly performance and contributions of faculties.

The objectives of this study at Aksum University (AKU) were to identify and measure the faculties' perceived training and support needs for conducting academic research and creating research publications.

On the basis of the literature review and an AKU organizational environmental analysis, the following research hypotheses were developed:

- training in data analysis and research publication writing is needed;
- faculties know how to do research design and methodology;
- faculties need internet access;
- research training will not impact classroom teaching time and
- there are no qualified faculties at AKU to provide comprehensive research training.

PROBLEM STATEMENT

Ethiopia is one of the largest and most rapidly developing nations in Africa and conversely, the lowest per-capita income in Sub-Saharan Africa. One of Ethiopia's primary strategies to mitigate the negative impact of globalization was to rapidly expand access to education. This national education initiative required a significant commitment to teacher recruiting and training to assure the continued eradication of the nation's poverty. In 2009 approximately 23% of the United Nations Development Program (UNDP) annual capital infusion was allocated to accomplishing the Ethiopian Education Millennium Development Goals (MDGs) (UNDP, 2010).

Commencing in 2006, thirteen new Ethiopian Universities were opened that more than doubled the number of higher education graduates in 2009. An additional four new higher education campuses were opened in fall 2011 bringing the total number of Ethiopian Universities to thirty. The total enrollments in Ethiopian post-secondary education is planned to expand from

264,000 in 2008-2009 academic year to 467,000 in the 2014-2015 academic year. (FDRE, 2010a). The following excerpt from the UNDP MDG (2010) report illuminates the global education challenges:

> Many MDG Country Reports raised concerns about teacher quality. For example, as primary education becomes mandatory, the demand for teachers rises, leaving governments with the unpleasant choice between increasing student-teacher ratios or hiring less-qualified teachers, at least until a larger supply of certified educators graduates. The Ethiopia country report observes; "A second challenge [following regional disparities] relates to the trade-offs between the substantial success in raising the level of enrolment and the quality of education," (pg. 23).

In 2005 the Federal Democratic Republic of Ethiopia Ministry of Education (MoE) (FDRE MoE, 2005) established a National Higher Education Program Action Plan III of conducting and publishing faculty academic research activities for all institutions of higher education. Each institution was required to implement an operational strategic plan for faculty research publications in support of the National initiative. Since 2006, faculties at AKU and other new Ethiopian universities have received considerable pressure to conduct academic research with only limited results. Consequently, frustration and anxiety about research publications remained high for both the faculties and the administrators.

From a 10 year Google Scholar search it was determined that more than 80% of the academic publications in Ethiopia are from four well established universities. Further, thirty five of the thirty nine Ethiopian academic journals were published in Addis Ababa (Library of Congress Overseas Office, 2010).

The research questions for this paper were:

1. At what level are the faculties' perceived research training and support needs being met at AKU?
2. What actions should be taken to mitigate the faculties' perceived research training deficiencies as a basis for improvement of research productivity?
3. What actions should be taken to mitigate the faculties' perceived research support needs as a basis for improvement of research productivity?
4. What organizational changes should be implemented to facilitate faculty research activities?
5. What employment changes should be implemented to improve the faculties' commitment to Ethiopian higher education?
6. What employment changes should be implemented to improve the faculties' commitment to research productivity in Ethiopian higher education?

METHODOLOGY

Research Design

A non-experimental cross sectional design by academic discipline within the target population was used with five non-equivalent groups with multiple replications to reduce non-random self-selection bias. This design used a hypothesized expectation based on the pretest instrument and random interviews of pretest respondents. The design was situational and implementable. Problems in measurement and database construction were adjusted to improve the quality of the responses, to eliminate irrelevant variables and to improve the construct and

internal validity of the data. Efforts were made to obtain appropriate cross-sections of the population groups through repeated individual solicitations of responses.

Study Population

This study was conducted with the target population of the 2011-2012 on-campus teaching faculties at AKU. The 313 faculty study population was selected on the basis of the proximity and accessibility of the campus to the researchers and the newness of the educational institution and its faculties. Open-ended comments from respondents reflected their appreciation of the research study in anticipation of changes that may occur to facilitate the implementation of the strategic research and publication objectives at AKU.

Sampling Method and Sample Statistics

Approximately 10 to 25 questionnaires were randomly distributed to faculties in each of the five Colleges on the main campus, depending on the size of the staff. The College of Agriculture located in the city of Shire, 65 kilometers from the main campus, was excluded from the sampling. Collection of the completed questionnaires was tedious; however, through repeated personal requests a sample size of 51 questionnaires were obtained. The final sample represented 16.3% of the target population which is statistically adequate to assure the internal validity of the findings. The number of responses from each of the colleges and the total number of faculties in each are shown in Table 1.

TABLE 1 Data Collection by College

College	# Responses	% Responses	# in Pop.	Resp % Tot Pop.
Business & Economics	15	29.4	66	22.7
Engineering & Technology	6	11.8	70	8.6
Natural & Comp. Science	10	19.6	85	11.8
Social Science & Language	15	29.4	81	18.5
Health Sciences	5	9.8	11	4.5
Agriculture	0	0	0	0.0
TOTALS	51	100 %	313	16.3 %

The demographics of the respondents are shown in Table 2. It should be noted that the respondents' median age is twenty six and their median years in education is two. Almost half of the respondents (47.1%) were bachelors degree qualified, thirty one percent had Masters degree and 9.8 percent had Doctorate degrees.

TABLE 2 Demographics of Respondents

Variable	N	Statistics		
Age	51	Mean = (27.0) 72.5%	Median = (26) 58.8%	21 to 29 = (42) 82.4%
Gender	51	Male = (44) 86.3 %	Female = (4) 7.8%	missing = (3) 5.9%
Birth Nation	51	Ethiopia = (47) 92.2%	India = (4) 7.8%	
Yrs. AKU	51	Mean = 2.12	Median = 2	1 & 2 yrs. = (42) 82.4%

Yrs. In Educ.	51	Mean = 3.75	Median = 2	1 to 4 yrs. = (42) 82.4%
Credits	51	Mean/Median = 10	0 to 9 credits = 41.2%	0 to 12 credits = 88.2%
Highest Deg.	51	Bachelors = (24) 47.1%	Masters = (16) 31.4%	Doctorate = (5) 9.8%

Sampling Instrument

A pilot instrument was developed based on interviews and administrative presentations on the academic research strategic objective of the AKU. The pilot instrument was completed by fifteen College of Business and Economics full-time faculties. Analysis of the responses documented numerous misunderstandings of English survey questions by an Amharic and Tigray native language community. Elimination of confusing questions and rewording of other questions was completed with the assistance of native language speakers. The statements were randomly alternated between positive and negative to reduce the possibility of respondent responses on only one of the five Likert item scales. Demographic data was collected for each respondent relative to significant pretest determined independent variables. The quality of the data was validated by checking the logical consistency of the responses to the positive and negative statements. Individual responses were logically linked to the research question under investigation. It was determined that the respondents were highly motivated and provided thoughtful responses. One respondent questionnaire was eliminated from the sample due to consistent selection of a single Likert scale value. The data collection instrument is shown Figure 1.

Statistical Procedures for Data Analysis

The researchers used non-parametric statistical methods to determine the initial results of the research study (Corder & Foreman, 2009). Statistical analysis was accomplished using the SPSS statistical package as the primary driver. Spearman correlations were used to investigate the relationships of the ten research training and support variables. The Wilcoxon Signed Rank test for a single sample was used to determine the significant difference of each research statement median from the Likert five point scale median = 3. In the data analysis phases the negatively worded question responses were re-coded as a positive response.

FIGURE 1: Training and Support For Academic Research

Please ☑ check the appropriate response (1 to 5 or NA) for each question!							
Q. #	**Training and Support Questions**	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Not Applic.**
T1	An academic research training class would be helpful to me.	□1	□2	□3	□4	□5	□NA
T2	Internet access is essential for doing academic research	□1	□2	□3	□4	□5	□NA
T3	AKU provides sufficient training on academic research methodology.	□1	□2	□3	□4	□5	□NA
T4+	Academic research class will not detract from my teaching.	□1	□2	□3	□4	□5	□NA
T5+	I need training in academic research design.	□1	□2	□3	□4	□5	□NA
T6+	Writing a research paper in English not difficult.	□1	□2	□3	□4	□5	□NA
T7	I need training in the data analysis methods in academic research.	□1	□2	□3	□4	□5	□NA
T8	I need training on how to write an academic research paper.	□1	□2	□3	□4	□5	□NA
T9+	I know how to get started on an academic research project.	□1	□2	□3	□4	□5	□NA
T10	There are no qualified faculties to teach academic research methods.	□1	□2	□3	□4	□5	□NA
(+) Original questions restated here as positive							

Analysis of the construct validity of the Likert scale responses used Spearman correlations for each of the variables with the observation total scores (Packer, 2004). Variables that had a correlation coefficient less than .4 were eliminated from the Principle Component Analysis (PCA) analysis. Variables T3, T5+ and T9+ were eliminated due to not significant ($p > .05$) and correlation coefficients less than .4 with total score. Table 3 shows the distribution of responses.

TABLE 3 Variable Descriptive Statistics

Variable	Mean[a]	Med[b]	Sig.[b]	Variance	#SD[c]	#D[c]	#N[c]	#A[c]	#SA[c]	N
T1	4.52	5	.001	.294			1	22	28	51
T2	4.88	5	.001	.106				6	45	51
T3	2.06	2	.001	1.06	17	20	10	2	2	51
T4+	3.88	4	.001	.906		6	8	23	14	51
T5+	3.78	4	.001	1.17	3	5	3	29	11	51
T6+	4.16	4	.001	.815	1	3	2	26	19	51
T7	4.12	4	.001	.856	2	2	1	29	17	51
T8	3.82	4	.001	1.47	5	3	3	25	15	51
T9+	3.63	4	.002	1.40	5	4	6	26	10	51
T10	3.22	3	.178	1.33	3	13	12	16	7	51
(+) Recoded as positive										

The internal validity of the seven remaining training and support variables was verified using Cronback's Alpha (Cronbach, 1951) and resulted in an acceptable alpha of .75.

Principle Component Analysis (PCA) with Varimax rotation was used to consolidate the remaining seven variables. Although PCA is a parametric procedure, numerous research papers over many years confirmed that the PCA is a very robust analysis and violation the underlying normality assumption did not provide incorrect answers (Norman, 2010; Carifio & Perla, 2008; Darlington, 1966; Pearson, 1931). The seven training and support variables were found not to be normally distributed using the statistical goodness-of-fit tests Anderson-Darling and Kolmogorov-Smirnov.

RESULTS

Descriptive Statistics and Significance Tests

Table 3 also shows the summary descriptive statistics for the original ten variables measuring faculties' training and support needs for academic research. The One sample Wilcoxon Signs Rank Test (Null: Median/Mean = 3) hypotheses test for each variable are noted. The responses for all negatively worded questions for variables T4+, T5+, T6+, T9+ were re-coded to a positive response on the five-point Likert scale (Brendl & Higgins, 1996).

The variable T3 (AKU provides sufficient training in research methodology), was scored as Disagreed or Strongly Disagreed by the respondents with a significant ($p < .05$) median = 2 and mean = 2.06. Although the variable was eliminated from the PCA analysis by total score correlation and significance, it provided a clear indication that this is an area that needs improvement for research training at AKU.

The variable T5+ (I understand research design steps), was scored as Agreed by respondents with a significant median = 4 and mean = 3.78. Although the variable was eliminated from the PCA analyses by total score correlation and significance, it provided an indication that research design was not a training issue.

The variable T9+(I know how to get started on an academic research project), was scored as Agreed by respondents with a significant median = 4 and mean = 3.63. Although the variable was eliminated from the PCA analyses by total score correlation and significance, it provided an indication that starting a research project was not a training issue.

T1 - T10 and Demographic variables Spearman ρ Correlations

The significant (p <.05) Spearman ρ correlation matrix for T1 - T10 variables related to the respondent demographic variables is shown in Table 4. The five training and support variable's T5+, T6+, T8, T9+ and T10 correlations with the demographic variables Male and Highest Degree were not readily explainable.

TABLE 4 Spearman ρ Correlations T1 - T10 with Demographic variables

Variable	Demographic Variable	Corr. Coef. ρ	Significance
T6+	Male	-.384	.005
T9+	Male	-.305	.030
T5+	Highest Degree	.304	.038
T8	Highest Degree	-.306	.029
T9+	Highest Degree	.406	.003
T10	Highest Degree	-.276	.050

(a) Missing values were replaced with the mean of the variable.
(b) One sample Wilcoxon Signs Rank Test (Null: Median > 3 or <3; one tail test)
(c) SD=Strongly Disagree; D=Disagree; N=Neutral; A=Agree; SA=Strongly Agree

The significant (p < .05) Spearman correlation matrix for demographic variables is shown in Table 5. The logical relationships between the variables were obvious. The number of credit hours taught decreases with a higher educational degree because Master's level faculties are utilized in academic leadership positions which reduce their teaching responsibilities.

TABLE 5 Spearman ρ Correlations between Demographic variables

Demo. Variable	Demo. Variable	Corr. Coef. rho	Significance
Age	Years in Educ.	.384	.005
Age	Highest Degree	.527	.001
Years in Educ.	Highest Degree	.456	.001
Yrs. At AKU	Years in Educ.	.574	.001
Credits	Highest Degree	-.459	.001

Principle Components Factor Analysis

PCA with Varimax rotation was used to reduce the seven variables relating to training and support needs for academic research (Darlington, 1966; Norusis, 2004). The use of PCA with Likert Scale data limitations were considered (Allen & Seaman, 2007; Clason & Dormody, 1993; Colman, Norris & Preston, 1997; Dawes, 2008; Lubke & Muthen, 2009; McCall, 2001) and based on evidence from the data analysis the researchers judged the application to be appropriate. The two factors constructed by PCA explained 51% of the variance by sums of squared loadings. The results of the complete PCA are shown in Tables 6 through Table 8 and Figure 2 and Figure 3.

TABLE 6 Factor Components and Variance Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.237	31.950	31.950	2.237	31.950	31.950	2.029	28.982	28.982
2	1.328	18.976	50.927	1.328	18.976	50.927	1.536	21.944	50.927
3	.952	13.602	64.528						
4	.848	12.120	76.648						
5	.793	11.330	87.978						
6	.489	6.979	94.958						
7	.353	5.042	100.000						

Extraction Method: Principal Component Analysis.

Figure 2 is Cattell's scree plot (Cattell, 1966) of the components shown as the X axis and the corresponding eigenvalues as the Y axis. Where the decrease in eigenvalues flattens and the curve makes an elbow, Cattell's scree test says to not consider further components after the one starting the elbow. An eigenvalue of 1.0 was used for the selection of two components.

FIGURE 2 Cattell's Scree Plot

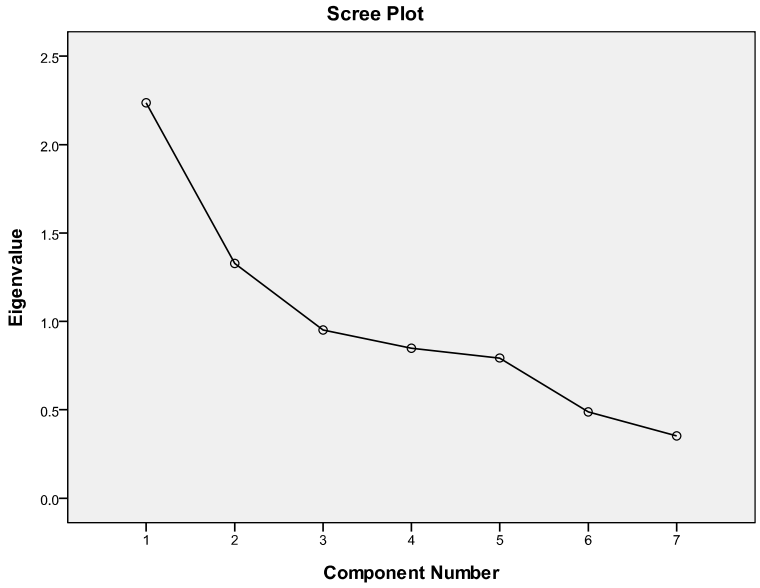

Figure 3, Component Plot in Rotated Space, shows each of the seven variables included in the two factors selected in this analysis. Significant correlation between the seven variables in the PCA procedure made identification of an appropriate models challenging. The two factors selected were on the basis of a training factor TFAC1 and a support factor TFAC2 with two shared variables T1and T10. The training factor TFAC1 variables T7, T8, T1, and T10 are well clustered. The support factor TFAC2 variables T2, T4+, T6+, T1, T10 are also well clustered.

FIGURE 3 Component Plot in Rotated Space

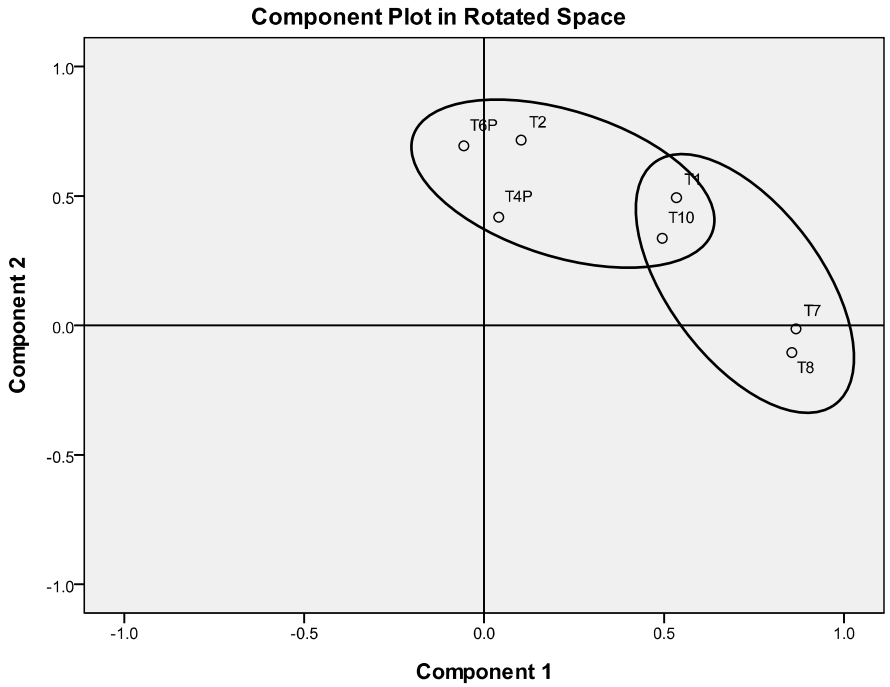

Table 7 shows the Variable Loadings (correlations) for each factor after rotation. An arbitrary rule-of-thumb for level of correlation significance for primary variable loadings in a factor should be .7 or higher to confirm that about half of the variance in the variable (r^2 = .49) is being explained by the factor. This rule was violated by variable T4+ in factor TFAC2.

TABLE 7 Factor Variable Loadings

Rotated Component Matrix[a]		
	Component	
	1	2
T1	.534	.494
T2	.103	.716
T4P	.041	.418
T6P	-.056	.693
T7	.867	-.013
T8	.855	-.105
T10	.495	.337

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Factor Models, Correlations and Test of significance

Table 8 shows the standardized component factor scores which are used as coefficients for the variables in resulting factor models. The factor definitions TFAC1 and TFAC2 demonstrate the factor mathematical models, their means, medians and the test of significance against an implied neutral Likert scale median = 3. It should be noted that variables T1 (A research training class would be helpful) and T10 (There are no qualified faculty to teach research methods), are present in both factors. Their factor model coefficients were smaller than desirable but closely related in magnitude for both factors indicating they are shared variables across both factors.

TABLE 8 Standardized Variable Scores by Factor

Standardized Component Score Coefficient Matrix

		Component	
	Question	1	2
T7	I need training in the data analysis methods in academic research.	.450	-.120
T8	I need training on how to write an academic research paper.	.456	-.181
T1	An academic research training class would be helpful to me.	.213	.268
T10	There are no qualified faculties to teach academic research methods.	.213	.166
T2	Internet access is essential for doing academic research	-.039	.475
T4+	Attending an academic research class would enhance my teaching.	-.033	.280
T6+	Writing a research paper in English not difficult.	-.118	.481
T1	An academic research training class would be helpful to me.	.213	.268
T10	There are no qualified faculties to teach academic research methods.	.213	.166

(+) Recoded question to be positive
Extraction Method: Principal Component Analysis.
Rotation Method: Equamax with Kaiser Normalization.

TFAC1 Training Factor 1 (Variables T7, T8, T1, T10)

Training Factor Description: I need training in data analysis and research report writing. Research training would be helpful; however, qualified faculty is a question.

Observation Values = .213*T1-.039*T2-.033*T4P-.118*T6P +.450*T7+.456*T8 +.213*T10
Factor mean = 4.43
Factor median = 4.5
Factor Median Test Value =.213*3 -.039*3 -.033*3 -.118*3 +.450*3+.456*3 +.213*3 = 3.43
Median test conclusion: 4.5 > 3.43 (Strongly Agree)

TFAC2Support Factor 2 (Variables T2, T4+, T6+, T1, T10)

Support Factor Description: Internet access is essential and research class would not interfere with teaching. Research training would be helpful; however qualified faculty is a question.
Observation Value = .268*T1 +.475*T2 +.280*T4P +.481*T6P -.120*T7 -.180*T8 +.166*T10
Factor mean = 5.98
Factor median = 6.19
Factor Median Test Value = .268*3 +.475*3 +.280*3 +.481*3 -.120*3 -.180*3 +.166*3 = 4.11
Median test conclusion: 6.19 > 4.11 (Strongly Agree)

In Table 9 the factor medians were tested against the factor test median calculated by assigning a median value = 3 for each of the variables included in the factor. The One-Sample Wilcoxon Signs Rank Test (Null: Median >3; one tail test) nonparametric statistical was used. The two factor median calculations were significantly (p<.001) highly than the test median values.

TABLE 9 Summary of Factor tests of significance

Factor	Mean	Median	Test Md.[b]	Sig.[a]	N	Indication
TFAC1	4.43	4.50	3.43	.001	51	S. Agree
TFAC2	5.98	6.19	4.11	.001	51	S. Agree
(a) One-Sample Wilcoxon Signs Rank Test (Null: Median >test median (b) Factor Test Median (all variables = 3)						

Training and Support Factors Related To Demographic Variables

Table 10 shows the spearman ρ correlation analysis for TFAC1 and TFAC2 and the demographic variables. Only three significant (p<.10) relationships were found. TFAC1, I need training in data analysis and research report writing, was significantly related to total credits taught ρ = .281 (p =.097) and highest degree ρ = -.348 (p = .012). The TFAC1 finding was consistent with previous demographic variable relationships of total credits taught being highly negatively correlated with highest degree. TFAC2, Internet access is essential and research class would not interfere with teaching, was significantly related to male ρ = -.248 (p = .080). The TFAC2 correlation with male is not readily explainable.

TABLE 10 Correlations Training and Support Factors and Demographic Variables

Training Factors & Demographic Correlations			
Training Factors	Demographic Variables	Corr.[a]	Sig. P =
TFAC1	Credits	.281	.097
TFAC1	Highest Degree	-.348	.012
TFAC2	Male	-.248	.080
(a)Spearman ρ			

Respondent Comments

The twenty respondents' comments to the open ended question at the end of the survey instrument are summarized for training and support in Table 11. A recurring theme was the need for research methodology and writing training. Even though the respondents in aggregate were overwhelmingly positive about research there was some discouragement expressed that colleagues were not supportive of participation in research activities and thought it was a waste of time. The AKU respondents' comments implied that there was resistance to academic research activities at a subliminal level. Intellectual curiosity was not a universal behavior of the AKU faculties.

TABLE 11 Respondent Comments on Training

R&D group should organize workshop and training for AKU staff on how to conduct, analyze, and write research reports.
Faculty needs training on how to find the research problem or area/field of research.
Faculties want recognition in the University and want some training on Research Methods.
Training on Research Methods.
Training on Research Methods and Less Responsibility.
Collaboration with national & international institution is necessary for training.
Good if university will provide an opportunity for academic research training.
Wants to become a researcher and he wants training.

Training and Support Factor Correlations With Attitude And Incentive Factors

A parallel study of this same population at AKU identified and described the faculty's attitudes towards research as a basis of improvement in academic research publication productivity (Monroe & Kumar, 2011a). The hypothesis for this study was that the faculty's attitudes about academic research publications were negative in new universities. The empirical analysis found highly positive faculty's attitudes for all aspects of academic research process. The three principle component factors are described as: AFAC1, academic research is positive for me; AFAC2, reading research is enjoyable and research helps build the institution's reputation; and AFAC3, a research team experience is positive and will make me work harder.

A additional parallel study of this same population at AKU identify and describe the faculty's incentives and motivations for academic research as a basis of improvement in academic research publication productivity (Monroe & Kumar, 2011b). The hypothesis for this study was that new universities faculty's incentives and motivations for academic research publications were negative. The empirical analysis found that the respondents perceived numerous personal incentives and motivations for academic research activities but generally they were not any present at AKU. The three principle component factors were described as: IFAC1, AKU career, teaching skills, research presentations and job description are positive motivators; IFAC2, using academic time and financial rewards are not incentives; and IFAC3, collaboration with peers is a positive incentive and motivator.

Table 12 shows the correlation relationships between training and support factors and the research attitude and incentive factors identified in previous studies of this same population. The

support factor TFAC2, Internet access is essential and research class would not interfere with teaching, and the incentive factor IFAC1, AKU career, teaching skills, research presentations and job description are positive motivators, were significantly correlated at $\rho = .331$ ($p = .018$). The support factor TFAC2 was also correlated with the attitude factors AFAC1, academic research is positive for me, at $\rho = .234$ ($p = .098$) and AFAC2, reading research is enjoyable and research helps build the institutions' reputation, at $\rho = .251$ ($p = .075$). The consistency of these correlations supported the internal validity of the data.

TABLE 12 Correlations, Training, Attitudes and Incentives Factors

Training, Incentives and Attitudes Factor Correlations			
Training Factors	Attitude & Incentive Factors	Corr.[a]	Sig. p=
TFAC2	IFAC1	.331	.018
TFAC2	AFAC1	.234	.098
TFAC2	AFAC2	.251	.075
(a) Spearman ρ			

DISCUSSION

Faculty Training and Support for Academic Research

The objective of this study was to understand how to facilitate faculty research productivity through training and support activities in a newly established university. The instrument used in this study was constructed through an iterative process that included expressed faculty opinions from: (a) a University wide research training lecture, (b) a College of Business research training session, (c) faculty informal personal interviews and (d) the researchers' experiences on the University campus in efforts to facilitate faculty research teams. The culmination of these activities resulted in the pilot survey instrument and the finalized survey instrument.

This research study significantly confirmed these hypotheses at the variable and factor levels. These findings are summarized as; (a) there is not sufficient research methodology training at AKU; (b) research design and starting a research project are not training issues; (c) training is needed in data analysis and research paper writing; and (d) internet access is essential and a research class would not interfere with teaching.

Consolidation of the seven study training and support variables using PCA indicated that two factors significantly confirmed the study hypotheses. The training factor TFAC1, I need training in data analysis and research report writing, indicated that the faculties are not confident in these two areas of research methodology. The support factor TFAC2. Internet access is essential and research class would not interfere with teaching, indicates a need for improvement in internet access and teaching load is not an issue for research. The variables T1 and T10 were common to both of these factors indicating generally the faculties perceive they need research training and qualified faculty for teaching research is questionable.

Of the 21 written questionnaire open-ended comments, eight specifically mentioned a need for training and support relative to research activities. The faculties relative inexperience

(majority are bachelors level qualified) and related inexperience in academia (median = 2 years) exacerbates their need for training and support in research activities.

Nowick (2008) identified a potentially confounding factor for this study relating to academic research publication productivity. Results from this study are consistent with Lotka's law (1926), which states that a relatively few scholars contribute disproportionately to the body of scientific literature. Full professors make up 25% of the total U.S. faculty (Almanac, 2007). In this study, full professors were found to author 46% of open access journal articles and 63% of for-free journal articles.

Other bibliometric studies for Africa confirmed that this relationship of rank to academic research publications is present in Ethiopia (Schamp & Schmid; & Mugabushaka, 2008). However, these studies did not include the influence important impact of faculty's perceived training and support needs on academic research productivity. Additional research about this confounding factor is beyond the scope of this study but is a fertile field for further exploration of research publication capacity building in new academic environments with scarce resources and a limited pool of qualified faculties.

The empirical indications of the faculty's perceived needs for training and support in academic research activities provides significant direction for University administration's emphasis in activities to facilitate the faculties research activities. Faculties' inactivity in academic research projects can be attributed to a lack of training in academic research methodologies.

Additional research is needed to replicate this study at other new institutions of higher education in Ethiopia and other rapidly expanding higher education systems worldwide. Confirmation of the research training and support needs in rapidly expanding higher education systems in transitioning nations is needed to provide administrative direction for research.

Additional data are necessary to confirm the extrapolation of these results to other higher education systems worldwide.

RECOMMENDATIONS

The economic and human resource challenges of high growth tertiary education in Ethiopia and other developing nations are daunting. The shortage of qualified teachers, the limit of infrastructure and the fiscal budget for sustaining growth and support of education are globally endemic. The following recommendations are applicable to AKU and may also be applicable to other new Universities in Ethiopia.

1. Recruit and hire more Masters and Doctorial faculty as teaching staff, not administrators.
2. Make research training by a qualified academic professional a condition of employment for all University faculties.
3. Make research publications part of the annual faculty evaluation process and an expectation of employment renewal.
4. Provide monetary rewards such as accelerated promotion, department research budget, and one-time stipend for successful research project completion and publication.
5. Provide non-monetary rewards such as campus recognition, funding for Ethiopian conference presentation, reduced teaching load and annual distinguished researcher award for successful research project completion and publication.
6. Establish an AKU research center, funded by government and private sector grants, for faculties' financial and professional assistance to conducting and publishing research.

7. Implement a research evaluation regime to measure the effectives of research efforts.
8. Provide internet service for all faculties through campus facilities and/or individual wireless access (CDMA).
9. Facilitate new faculty research-team formation and mentoring with experienced researcher-publisher faculty.
10. Mentor new faculty to encourage commitment to teaching as a first choice career (reduce faculty turnover) and research productivity as a rewarding activity.

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