Examining the Perceived Impact of ICT Adoption on Academic Workload and on Academic Productivity

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***Abstract*—In the twenty-first century, the rapid growth of information and communication technologies (ICTs) have brought remarkable societal changes. Nowadays, ICT is becoming increasingly important both in the everyday life and in the education system. It therefore makes sense to examine the impact of ICT adoption on the conduct of academic activities. The aim of this paper is precisely to examine the perceived impact of ICT adoption on academic workload and on academic productivity. This aim is achieved within a theoretical framework on the factors affecting academic productivity. This research was conducted as a questionnaire based survey of 103 academic staff drawn from four Higher Education Institutions in the KwaZulu-Natal province of South Africa. The survey data was analyzed in Statistical Package for the Social Sciences (SPSS) software using a quantitative approach. The results of this survey indicate that ICT adoption has no impact on teaching workload, or on research workload, or on administration workload. No evidence was found on the impact of ICT adoption on academic productivity. This research contributes to new evidence on the possible impact of ICT adoption on academic workload and on academic productivity.**

***Index Terms*—Academic activities, academic workload, academic productivity, ICT adoption.**

I. Introduction

Higher educational institutions are the only organizations focused on the dual core functions of knowledge creation, and knowledge transmission; through the processes of research and teaching [1]. These two core functions of teaching and research involve several activities that constitute academic workload. Academic workload can be described as the full spectrum of work commitments of an academic staff in an academic unit. It is commonly defined as time spent on professionally appropriate activities, or as duties assigned or completed by an academic staff [2]. It is worth mentioning that academic workload differs from academic productivity. Academic productivity is defined as the ratio of outputs to inputs, or benefits to costs, both for teaching, research, and community service activities [2]. Examples of academic productivity outputs include: publications produced in a year or a lifetime [2], pass rates in certification exams, and job placements of graduates [3].

Having in mind the role played by ICT (Information and Communication Technology) in changing different aspects of society, it will be interesting to examine how is ICT changing the world of higher education. ICT is strengthening the three traditional branches that make up the mission of higher education i.e. teaching, research, and administration [4]. For example, can ICT increase academic productivity? Does ICT make academic workload lighter?

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II. Research Problem

Heavy academic workloads are the most commonly cited reasons against academic productivity [5]. In fact, 80 percent of the academics sampled in a study conducted by [6] indicated that their workload had significantly expanded in recent years. References [7]-[8] also state that heavy workload decreases academic productivity, and increases staff turnover. Similarly, [9] states that increasing academic workload and administration cause low academic productivity. Similar findings are reported by an unnamed reviewer (Campus Review, 1999, pg. 5, cited in [15]) in a recent report on the Technical and Further Education (TAFE) sector in Australia.

III. Aim and Objectives

The aim of this paper is to examine the impact of ICT adoption on academic workload and on research productivity. This aim is achieved through the following objectives: to identify the types of ICT tools used for academic activities; to measure academic workload both in terms of teaching, research, and administration; and to measure research productivity. The scope of this research is reduced to research productivity instead of being concerned with academics is usually associated with research rather than with teaching or with community service.

IV. Theoretical Framework

This research is grounded within the theoretical framework proposed by [10] on academic research productivity. According to this research framework, academic productivity has three dimensions or characteristics: staff individual characteristics, institutional characteristics, and leadership characteristics. Staff Individual characteristics include: socialization, motivation, content knowledge, basic and advanced research skills, simultaneous projects, autonomy & commitment, orientation, work habits; Institutional characteristics include: resources, rewards, sufficient work time, clear coordinating goals, size/experience/expertise, mentoring, culture,

communication, research emphasis, recruitment & selection, positive, group climate, communication with professional networks, assertive participative governance, brokered opportunity structure, decentralized organization; and finally leadership characteristics include: highly regarded, able scholar, research oriented, uses assertive-participative style, fulfills critical roles (manager, fund-raiser, keeps goals visible).

V. Literature Overview

Academic productivity factors will be classified in this review into two groups: non-ICT related factors and ICT related factors.

A. Non-ICT Related Factors

Non-ICT related factors include: workload [6], [11], job insecurity [12]-[13], inadequate salary [16]-[17], occupational stress [5], [18], recognition [11], [19].

Work overload: According to a questionnaire based survey was conducted on academic staff, the majority of academics feel that their workload had increased and had become more stressful in recent years [6]. The same methodology was used by [11] and it was found that academics face difficulties to complete any task properly due to work overload, and increasing workload is a major source of stress for academics.

Job insecurity: A survey of academics from the Kyambogo University in Uganda [12], based on theories proposed by [13] and by [14], found that job insecurity among academic staff demotivates them to achieve institutional objectives. A questionnaire based survey was also conducted on academics by [13] and it was found that job insecurity among academic staff leads to attitudinal reactions-intentions to quit, reduced commitment, and reduced satisfaction.

Inadequate salary: A questionnaire based survey was conducted by [16] and it was found that academics with high salaries have less work tasks compared to academics with lower salaries. The same methodology was used by [17] and it was found that salary appears as a significant determinant of research productivity.

Occupational stress: A study was conducted in a questionnaire based survey by [5] and it revealed that two-third of academics find their work stressful, that stress causes lower work productivity, and high job turnover. The same methodology was used by [18] and it was found that higher levels of stress in higher education are associated with lower levels of commitment.

Recognition: Recognition is another academic productivity factor found in existing research. This is confirmed by survey studies conducted by [11] and by [19].

B. ICT Related Factors

ICT related factors include: lack of time for ICT [20]-[21], lack of ICT training and skills [22].

Lack of time for ICT: A study conducted by [20] in the form of a questionnaire based survey found that academic lack the time to learn how to use ICT. Another study with the same methodology found that lack of time for ICT is judged by academics to be the main obstacle against academic productivity in higher education [21].

Lack of ICT training and skills: Existing literature shows that lack of ICT training and skills is another productivity factors. This is confirmed by a study of 26 education systems which found that lack of ICT training and skills by academics are perceived to be a major obstacle for attaining institutions goals [22].

VI. Research Design

The objective of this research is achieved through the analysis of data from a questionnaire based survey using a sample of 103 academic staff from institutions of higher learning in the KwaZulu-Natal (KZN) province of South Africa. The KZN province has four universities and all the four universities were included in the research. The sample of the survey was constructed to ensure that all computing academic departments (information technology, computer science, computer engineering, information systems, and software engineering) from these universities were part of the survey. On the other hand, one department was randomly selected from each faculty of the three smallest universities, and two departments were randomly selected from the largest university. Half of the sample came from the largest university, and the remaining sample came from the three smallest universities with an equal distribution. For each of the three smallest universities, the sample was constructed to represent 60% of staff with a bachelor degree, 30% of staff with a masters' degree and 10% of staff with a doctorate degree. But in the case of the largest university, the sample was constructed to represent 50% of staff with a masters' degree and 50% of staff with a doctorate degree. Sometimes these proportions were slightly changed due to staff unavailability. The distribution of the questionnaire and its collection were done through face to face meetings with staff members.

A. Research Variables

The research variables of this study are: the demographics of academics, their research productivity, their ICT adoption, and their workload. Each questionnaire's section represented a research variable. The questionnaire's sections on ICT adoption and on workload consisted of Likert scale items respectively on search engines tools, social networks tools, etc, and on class preparation, students' supervision, curriculum development, etc. Likert scale workload items measured staff perceptions on the weight of their workload in terms of the number of hours that they usually spend per day for lecturing, for research, and for administration. The questionnaire's section on research productivity consisted of items such as the number of masters' students' graduates produced by staff, the number of publications produced by staff, internal publications, etc. The questionnaire's section on demographics of academics consisted of items such as their designation, gender, highest qualification, internet access at home, etc.

B. Data Analysis

The completion of the questionnaire by the respondents yielded research data that was analyzed using the Statistical

Package for the Social Sciences (SPSS) 20.0 software package. Data was first analyzed for reliability and validity. Then, a number of statistical tests, specifically descriptive and inferential tests were performed. Variables that failed the reliability tests were further analyzed using descriptive statistics to identify which of the items had enough variations. The following inferential statistical tests were also used to test correlations on one hand between Likert-scale based research variables, and on the other hand between these Likert-scale based variables and the demographic attributes: pearson's correlation, regression analysis, ANOVA, and ANCOVA. All the tests were done with a confidence level of 95%.

TABLE I: RELIABILITY TABLE FOR THE RESEARCH VARIABLES

Research Variable	Questionnaire Item	Cronbach's Alpha (α)
ICT adoption	C3+C4+C6+C7+C8+C9	.731

TABLE II: RESEARCH PRODUCTIVITY VARIABLES

Descriptive Statistics				
	N	Mean	Std. Deviation	Percentage (%) (***Zero's***)
Item B1	103	.25	.622	82.5%
Item B2	103	.05	.293	97.1%
Item B3	103	.23	.581	83.5%
Item B4	103	.15	.406	87.4%
Item B5	***103***	***1.21***	***1.570***	***45.6%***
Item B6	103	.19	.578	86.4%
Item B7	103	.15	.617	91.3%
Item B8	***103***	***.46***	***.838***	***71.8%***
Item B9	103	.17	.445	86.4%
Item B10	103	.09	.346	93.2%
Valid N (listwise)	103			

VII. RESEARCH RESULTS

Reliability and validity tests results are first presented in this section, followed by descriptive and inferential statistical tests results.

A. *Data Reliability and Validity*

Table I shows that the data collected for the ICT adoption section passed the reliability and validity tests for six of its items (Cronbach's Alpha (α) value > 0.731). The research productivity section and the workload weight section did not pass the reliability test. In fact, the descriptive analysis of these two sections revealed that there were a very high proportion of zero values for most of their items (Table II). According to Table II, only item B5 and item B8 show enough variations for their data to be considered by this study. These two items were therefore split into two different research variables to represent research productivity, number of conference publications and number of internal publications. Similarly, the three items of the workload weight variable were split into three variables: teaching workload weight, research workload weight, and administration workload weight.

It is worth noting that perceived teaching workload was ultimately measured by multiplying the number of teaching hours declared by staff by their perceived weight of these hours (1=very light; 2=light; 3=normal; 4=heavy; 5=very heavy). The same multiplication was performed for the research workload variable and for the administration workload variable. The idea behind this multiplication was inspired by existing work conducted by [23] on academic workload.

B. *Descriptive Statistics*

1) *Demographics*

Table III gives an idea on the demographic profile of the academic staff surveyed by this research. Interesting results from these demographic statistics are: a vast majority (78.6%) of staff hold a permanent position; almost half (40.8%) of them have many years of experience (13 year and over) in academia; and almost all staff (92.2%) has internet access at home.

TABLE III: DEMOGRAPHICS TABLE

Designation	Jnr. Lect (15.5%)	Lect. (47.6%)	Snr. Lec/Asso. Dir (25.2%)	Asso. Prof. (8.7%)		Prof. (2.9%)
Gender	Female (40.8%)	Male (59.2%)				
Highest qualification	<Masters (24.3%)	Masters (43.7%)	Doctorate (32%)			
Age	20-30 yrs (13.6%)	31-40 yrs (35.9%)	41-50 yrs (27.2%)		51 yrs and over (23.3%)	
Academic experience	1-3 yrs (16.5%)	4-6 yrs (17.5%)	7-9 yrs (13.6%)	10-12 yrs (11.7%)	13yrs and over (40.8%)	
Faculty	Science (31.1%)	Arts & Humanities (19.4%)	Health Science (16.5%)	Mangt./ Commer./ Law (24.3%)	Computing (4.9%)	Edu. (3.9%)
University	A (27.2%)	B (10.7%)	C (46.6%)	D (15.5%)		
Employment status	Permanent (78.6%)	Long term contract (9.7%)	Short term contract (11.7%)			
Highest level of courses taught	Undergra-	Post-grad-				

	duate (42.7%)	uate (57.3%)		
Internet access at home	None (7.8%)	Cell-phone (10.7%)	Laptop/ Computer (57.3%)	Cell-phone /Laptop/ Computer (24.3%)

2) Research productivity, ICT adoption, and workload weight

Table IV gives an overview of the state of ICT adoption as perceived by the participants of this study, as well as on their perceptions on their research productivity and on the weight of their workload. Interesting results from Table IV are: ICT adoption is high among academics (mean of 18.6990 out of 30), they are twice more involved in teaching (mean of 10.7782) than in research (mean of 9.6722), and thrice more than in administration (mean of 6.6262). Moreover, the research productivity of academics is very low (mean of 1.2136 conference publications per year, and mean of 0.4563 internal publications per year).

TABLE IV: DESCRIPTIVE STATISTICS FOR LIKERT-SCALE BASED RESEARCH VARIABLES

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Variance
C	103	21.00	7.00	28.00	18.6990	23.860
D1	103	40.00	.00	40.00	10.7782	54.713
D2	103	50.00	.00	50.00	9.6722	92.991
D3	103	30.00	.00	30.00	6.6262	32.636
B5	103	9.00	.00	9.00	1.2136	2.464
B8	103	3.00	.00	3.00	.4563	.702
Valid N (listwise)	103					

*Var: Research variable for Table IV
C: ICT adoption
D1: Teaching workload
D2: Research workload
D3: Administration and community service workload
B5: Conference publications
B8: Internal publications

C. Inferential Statistics

One way ANOVA tests results are presented by Table V, Table VI, Table VII, Table VIII, Table IX, and Table X. Pearson's correlation tests results are presented by Table XI, and regression analysis tests results are presented by Table XII. Finally, ANCOVA tests results are presented by Table XIII.

1) Analysis of variance (ANOVA)

According to Table IX, staff number of conference publications is affected by the level at which these staff are teaching. No other correlation was found between staff demographics on one hand; and on the other hand, their teaching workload weight, their research workload weight, their administration workload weight, and their internal publications.

TABLE V: ANOVA TEST OF BETWEEN SUBJECT (WHEN DEPENDENT VARIABLE IS ICT ADOPTION)

Tests of Between-Subjects Effects					
Dependent Variable: ICT adoption					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	907.264[a]	28	32.402	1.571	.064
Intercept	3240.068	1	3240.068	157.078	.000
Designation	29.077	4	7.269	.352	.842
Gender	15.894	1	15.894	.771	.383
Highest qualification	66.051	2	33.025	1.601	.209
Age	78.504	3	26.168	1.269	.291
Academic experience	186.431	4	46.608	2.260	.071
Faculty	95.311	5	19.062	.924	.470
University	80.056	3	26.685	1.294	.283
Employment status	17.999	2	8.999	.436	.648
Highest level of courses taught	17.837	1	17.837	.865	.355
Internet access at home	70.891	3	23.630	1.146	.336
Error	1526.406	74	20.627		
Total	38448.000	103			
Corrected Total	2433.670	102			
a. R Squared = .373 (Adjusted R Squared = .135)					

TABLE VI: ANOVA TEST OF BETWEEN SUBJECT (WHEN DEPENDENT VARIABLE IS TEACHING WORKLOAD)

Tests of Between-Subjects Effects					
Dependent Variable: Teaching_Total_Score					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1501.703[a]	28	53.632	.973	.516
Intercept	1354.368	1	1354.368	24.571	.000
Designation	127.356	4	31.839	.578	.680
Gender	125.616	1	125.616	2.279	.135
Highest_qualification	4.791	2	2.395	.043	.957
Age	121.102	3	40.367	.732	.536
Academic_experience	218.089	4	54.522	.989	.419
Faculty	349.850	5	69.970	1.269	.286
University	370.944	3	123.648	2.243	.090
Employment_status	55.571	2	27.785	.504	.606
Highest_level_of_courses_taught	2.705	1	2.705	.049	.825
Internet_access_at_home	61.968	3	20.656	.375	.771
Error	4078.991	74	55.121		
Total	17546.063	103			
Corrected Total	5580.693	102			
a. R Squared = .269 (Adjusted R Squared = -.007)					

TABLE VII: ANOVA TEST OF BETWEEN SUBJECT (WHEN DEPENDENT VARIABLE IS RESEARCH WORKLOAD)

Tests of Between-Subjects Effects					
Dependent Variable: Research workload					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3649.578[a]	28	130.342	1.653	.045
Intercept	697.704	1	697.704	8.848	.004
Designation	122.921	4	30.730	.390	.815
Gender	24.351	1	24.351	.309	.580
Highest qualification	303.914	2	151.957	1.927	.153
Age	332.566	3	110.855	1.406	.248
Academic experience	150.917	4	37.729	.478	.751
Faculty	290.787	5	58.157	.737	.598
University	267.573	3	89.191	1.131	.342
Employment status	219.637	2	109.818	1.393	.255
Highest level of courses taught	98.898	1	98.898	1.254	.266
Internet access at home	238.322	3	79.441	1.007	.394
Error	5835.494	74	78.858		
Total	19120.938	103			
Corrected Total	9485.072	102			
a. R Squared = .385 (Adjusted R Squared = .152)					

TABLE VIII: ANOVA TEST OF BETWEEN SUBJECT (WHEN DEPENDENT VARIABLE IS ADMINISTRATION AND COMMUNITY SERVICE)

Tests of Between-Subjects Effects					
Dependent Variable: Administration and community service workload					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1407.544[a]	28	50.269	1.936	.013
Intercept	110.730	1	110.730	4.265	.042
Designation	132.175	4	33.044	1.273	.288
Gender	3.687	1	3.687	.142	.707
Highest qualification	63.663	2	31.832	1.226	.299
Age	65.710	3	21.903	.844	.474
Academic experience	169.048	4	42.262	1.628	.176
Faculty	290.037	5	58.007	2.234	.060
University	37.227	3	12.409	.478	.699
Employment status	15.724	2	7.862	.303	.740
Highest level of courses taught	10.396	1	10.396	.400	.529
Internet access at home	165.332	3	55.111	2.123	.105
Error	1921.316	74	25.964		
Total	7851.250	103			
Corrected Total	3328.859	102			
a. R Squared = .423 (Adjusted R Squared = .204)					

TABLE IX: ANOVA TEST OF BETWEEN SUBJECT (WHEN DEPENDENT VARIABLE IS CONFERENCE PUBLICATIONS)

Tests of Between-Subjects Effects					
Dependent Variable: Conference publications					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	125.864[a]	28	4.495	2.652	.000
Intercept	36.998	1	36.998	21.827	.000

Designation	11.897	4	2.974	1.755	.147
Gender	2.806	1	2.806	1.655	.202
Highest qualification	3.829	2	1.915	1.130	.329
Age	12.796	3	4.265	2.516	.065
Academic experience	9.894	4	2.473	1.459	.223
Faculty	7.321	5	1.464	.864	.510
University	.602	3	.201	.118	.949
Employment status	.368	2	.184	.109	.897
Highest level of courses taught	11.179	1	11.179	6.595	.012
Internet access at home	10.700	3	3.567	2.104	.107
Error	125.437	74	1.695		
Total	403.000	103			
Corrected Total	251.301	102			
a. R Squared = .501 (Adjusted R Squared = .312)					

TABLE X: ANOVA TEST OF BETWEEN SUBJECT (WHEN DEPENDENT VARIABLE IS INTERNAL PUBLICATIONS)

Tests of Between-Subjects Effects					
Dependent Variable: Internal publications					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	21.809[a]	28	.779	1.159	.302
Intercept	.304	1	.304	.452	.504
Designation	1.337	4	.334	.497	.738
Gender	.588	1	.588	.875	.353
Highest qualification	1.242	2	.621	.924	.402
Age	1.101	3	.367	.546	.652
Academic experience	2.278	4	.569	.847	.500
Faculty	2.671	5	.534	.795	.557
University	1.335	3	.445	.662	.578
Employment status	.262	2	.131	.195	.823
Highest level of courses taught	.571	1	.571	.849	.360
Internet access at home	.714	3	.238	.354	.786
Error	49.745	74	.672		
Total	93.000	103			
Corrected Total	71.553	102			
a. R Squared = .305 (Adjusted R Squared = .042)					

TABLE XI: PEARSON'S CORRELATION ANALYSIS OF THE RESEARCH VARIABLES

Correlations							
		ICT Total Score	Internal Total Score	Conference Total Score	Administration Total Score	Research Total Score	Teaching Total Score
ICT_Total_Score	Pearson Correlation	1	-.021	-.039	.023	-.016	.168
	Sig. (2-tailed)		.832	.697	.819	.870	.090
	N	103	103	103	103	103	103
Internal_Total_Score	Pearson Correlation	-.021	1	**.380****	.220*	.213*	-.076
	Sig. (2-tailed)	.832		.000	.025	.031	.443
	N	103	103	103	103	103	103
Conference_Total_Score	Pearson Correlation	-.039	**.380****	1	.070	**.321****	-.087
	Sig. (2-tailed)	.697	.000		.484	.001	.382
	N	103	103	103	103	103	103
Administration_Total_Score	Pearson Correlation	.023	.220*	.070	1	.086	-.076
	Sig. (2-tailed)	.819	.025	.484		.386	.447
	N	103	103	103	103	103	103
Research_Total_Score	Pearson Correlation	-.016	.213*	**.321****	.086	1	-.171
	Sig. (2-tailed)	.870	.031	.001	.386		.085

	N	103	103	103	103	103	103
Teaching_Total_Score	Pearson Correlation	.168	-.076	-.087	-.076	-.171	1
	Sig. (2-tailed)	.090	.443	.382	.447	.085	
	N	103	103	103	103	103	103
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

2) Pearson's correlation test

According to Table XI, internal publications are associated with conference publications (significant at 99% (p=0.000)); and there is an association between conference publications and research workload weight (significant at 99% (p=0.000)). ICT adoption, Administration, Teaching workload was not found to be associated with any other variable in this study.

3) Regression analysis

Regression analysis was performed to determine the coefficients of the following linear equation between the variables found as being linked by the Pearson's correlation tests.

$$CP = (0.612 * IP) + (0.041 * RWW) + 0.539 \qquad (1)$$

CP: Conference publications
IP: Internal publications
RWW: Research workload weight

According to the Equation (1), internal publications heavily contribute to empowering staff to towards publishing in conferences.

4) Univariate analysis of variance (ANCOVA)

According to the ANCOVA results described by Table XIII, internal publications are the only factor that co-interacts with the level at which an academic staff teaches, towards influencing research productivity (measured in terms of conference publications).

TABLE XII: REGRESSION'S COEFFICIENT TABLE

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.539	.203		2.650	.009	.136	.943
	ReasearchTotal_Score	.041	.015	.251	2.751	.007	.011	.070
	Internal_Total_Score	.612	.171	.327	3.578	.001	.273	.951
a. Dependent Variable: Conference_Total_Score								

TABLE XIII: ANCOVA FOR THE CONFERENCE PUBLICATIONS AND HIGHEST LEVEL OF COURSES TAUGHT

Tests of Between-Subjects Effects					
Dependent Variable: Conference_Total					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	69.338[a]	6	11.556	6.097	.000
Intercept	3.108	1	3.108	1.640	.203
ICT_Total	.018	1	.018	.010	.922
Teaching_W_L_Total	.002	1	.002	.001	.973
Research_W_L_Total	6.168	1	6.168	3.254	.074
Admin_W_L_Total	.307	1	.307	.162	.688
Internal_Total	15.878	1	15.878	8.377	.005
Highest_level_of_courses_taught	17.515	1	17.515	9.240	.003
Error	181.963	96	1.895		
Total	403.000	103			
Corrected Total	251.301	102			
a. R Squared = .276 (Adjusted R Squared = .231)					

VIII. DISCUSSION

The main findings of this study are:

1) A vast majority of staff hold a permanent position; almost half of them have many years of experience in academia; and almost all staff has internet access at home.
2) ICT adoption is high among academics, they are twice more involved in teaching than in research, and thrice more than in administration. Moreover, the research productivity of academics is very low.
3) Staff number of conference publications is affected by the level at which they are teaching. No other correlation was found between staff demographics on one hand; and on the other hand, their teaching workload weight, their research workload weight, their administration workload weight, and their internal publications.
4) Research productivity (when measured in terms of conference publications) depends heavily on the number of internal publications compared to research workload.
5) Internal publications are the only factor that co-interacts

with the level at which an academic staff teaches, towards influencing research productivity (measured in terms of conference publications.

The above findings all seem in line with the initial hypothesis of this study except for the fact that ICT adoption was not found to lighten academic workload either in terms of teaching or research or community service. This seems in line with the findings from [20]-[22] pointing to inadequate ICT training among academic staff. There is a need for more ICT training among academics in other for ICT adoption to meaningfully impact on heavy workloads and on academic productivity both in terms of research, teaching, and community service.

IX. Conclusion

The results of this paper have possible implications towards the improvement of the general acceptance of ICT by academic staff in reducing their academic workload and increasing their academic productivity. The limitations of this study are mainly related to the fact that its results are based on the analysis of perceptions and not on experimental data. However, most of its research findings are supported by existing literature, and plausible explanations can be made where they are not.

Ideas for future research from this paper include examining how ICT can be used by academics towards the improvement of their academic productivity.

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