

## Research versus Teaching Satisfaction and Research Productivity

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**ABSTRACT** In this study, an exploratory quantitative cross-sectional research design is applied in a study of a large South African university to test theory that relates research productivity to different dimensions of satisfaction, or dissatisfaction. Findings suggest that individuals who derive their primary job satisfaction from teaching are less research productive than individuals that derive their primary job satisfaction from research. Differences between types of satisfaction and their relationships with research productivity are explored further. Recommendations are provided on the basis of the findings.

### INTRODUCTION

South Africa is currently rated fifth lowest out of a hundred and forty-four countries for the quality of its education system (World Economic Forum 2012). However, it is rated fifteenth in the world for the quality of its university Management, or Business, Schools (World Economic Forum 2012). Within an increasingly globalised context, the regional Southern African University, as an educational institution, plays a role in meeting the diverse needs of a range of societal stakeholders (Beckmann and Prinsloo 2009).

A fundamental tension, however, exists for the contemporary university, which is tasked with satisfying the needs of different stakeholders (Del Rey 2000); universities need to reconcile two potentially conflicting roles; teaching versus research (Hattie and Marsh 1996; Grant 2014) in order to meet these diverse needs. These fundamentally important, and different, work roles have historically dominated, and continue to dominate, university work (Hattie and Marsh 1996; Del Rey 2000; Grant 2014).

The tension between these two roles is reflected in contemporary discussions in various forums, which stress the need to concurrently satisfy both of these roles whilst acknowledging the tension present in such a task (Buller 2012; Grant 2014); particularly as universities are also globally rated on the basis of their research

productivity (Carpenter 2011; Saideman 2011), and academics are under ever-increasing pressure to produce academic publications (Ashford 2013).

Notwithstanding the need for universities to be ‘everything for everyone’ in a context of competition for funds or contributions from students and also for research funding (Gautier and Wauthy 2007), the ranking of Universities is typically premised upon research output, and the extent to which a University meets a society’s knowledge needs through this output (Carpenter 2011).

Treating research and teaching as homogeneous tasks, however, violates a core principle of organisational psychology; that tasks should be grouped together in relation to the specific skill sets of individuals (Grant 2014). Much literature suggests that there little underlying commonality between teaching and research as work roles (Grant 2014). Faculty members typically “find themselves balancing multiple roles within and outside of their organisations, often leading to role ambiguity; dealing with stress and conflict that result from unclear responsibilities and expectations” (Brazeau and Woodward 2012:1). South Africa is currently faced with relatively high rates of attrition, or turnover in the sector (Samuel and Chipunza 2013). Recent research stresses that intrinsic aspects of an academic’s engagement with work, including values, can potentially influence their research productivity (Callaghan 2014). Research into the intrinsic differences between academics in this context that relate to their primary job satisfac-

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tion and the implications of this for teaching versus research work roles is therefore considered to be particularly important in this context.

In a context where academics are typically required to undertake increasing teaching loads and at the same time are increasingly under pressure of performance management systems to produce research, it is argued that costs may be associated with policies that do not take into account the relative satisfaction an academic has toward either teaching or research and the relationships between these and research productivity. In the absence of such literature, this study seeks to investigate the research productivity of academics that derive their primary job satisfaction from teaching, research or administration in the context of a large South African higher education institution.

### The Research Problem

A university's ability to meet societal needs through research output is dependent upon its performance; this in turn is dependent upon the motivation, satisfaction, and job performance of the individuals that comprise it (Judge et al. 2001; Samuel and Chipunza 2013).

A large body of theory including seminal theory (Scott 1966; Herzberg 1968; Hackman and Oldham 1976; Organ 1988; Chen et al. 2011) has been found to predict a positive and significant relationship between job satisfaction and job performance, according to certain loci, or dimensions of satisfaction. Meta-analysis findings have also provided evidence of the positive and significant relationship between job satisfaction and job performance (Judge et al. 2001).

More specifically, job satisfaction is a critically important aspect of the management of productivity due its relationship with employee turnover, or the loss of staff from organisations (Mobley 1977; Aydogdu and Asikgil 2011; Delobelle et al. 2011). The consequence of dissatisfaction of academic staff is not typically limited to the loss of such highly skilled individuals from institutions, but can also result in the exodus of such individuals to other countries. The loss of highly skilled individuals out of the region and into the globalised university system also reduces local economic growth and results in a "reduction in a nation's capacity to develop as a 'knowledge society' and therefore compete in the global economy" (HSRC 2012: 1). This loss

to society also "constitutes a major loss of investment in terms of the education and training of its highly skilled professionals" (HSRC 2012: 1). Work dissatisfaction does not only contribute to lower institutional performance (and lower levels of research output in the case of the University) through the exit of staff, but can also cause withdrawal of effort in pursuit of organisational objectives (Organ 1988, 1997).

It is argued that if academics are dissatisfied then this is associated with a cost which can be borne by the individual, the institution, and potentially the broader society itself. Importantly, such a cost is also expected to result in lower levels of research productivity. This research therefore investigates the research output relationships around specific loci of satisfaction in the context of a large South African research-oriented university. Four measures of research productivity are included in the analysis; (i) Thompson Reuters Institute of Science Index (ISI) or Proquest International Bibliography of the Social Sciences (IBSS) accredited journal article publications, (ii) South African Department of Higher Education (DOE) accredited journal article publications, (iii) conference proceedings publications and (iv) conference presentations. Findings are used to provide recommendations for further research, and for the management of research productivity. The specific focus of the research is introduced further as follows.

The problem addressed by this research is the lack of knowledge of the relationships between satisfaction and research productivity; and more specifically the relationships between individuals that derive their primary job satisfaction from teaching versus from research, and research productivity. It is argued that this knowledge can contribute understandings that can improve research productivity. This research, then, contributes to the literature and attempts to provide insights into how the research productivity process can be more effectively managed. This knowledge, in turn, is expected to contribute to a reduction in the human cost involved in the management of these two, potentially conflicting, aspects of University work (teaching and research).

### Objective

The objective of the research is therefore: - To test theory that relates research productivi-

ty, as a dimension of job performance, to differences between individuals that derive their work satisfaction primarily from either teaching or from research, termed a Teaching Locus of Satisfaction (TLS) in the former instance, and a Research Locus of Satisfaction (RLS) in the case of the latter.

From this objective, the following research question is derived:

- ♦ What is the relationship between the two Loci of Satisfaction (Teaching and Research) and research productivity?

Using an associative empirical cross-sectional research design, this research aims to provide insight into the answering of this research question. Theory and empirical findings that relate to the tested relationships are introduced as follows, and hypotheses are derived.

### **The Literature: Theory and Hypotheses**

Seminal psychological and human resources management theory predicts the importance of satisfaction in job performance. Satisfaction is related to individual work performance through a mechanism predicted by Organisational Citizenship Behaviour (OCB) theory (Organ 1997). OCB, or effort that goes beyond that which is compensated by the organisation, is withdrawn if an individual is dissatisfied with aspects of work (Organ 1988). This mechanism can also be taken to work at a group level (Organ 1997). Dissatisfaction, then, is expected to potentially reduce such 'extra-role' behaviour.

According to Herzberg's Two-Factor theory, motivation and satisfaction are typically associated with factors that provide intrinsic payoffs to individuals (for example; recognition), termed 'motivator factors' (Herzberg 1968). In contrast, extrinsic rewards are typically regarded as 'hygiene factors', or factors peripheral to intrinsic motivation, which cannot motivate individuals as effectively as such intrinsic factors (Herzberg 1968). The implication of Herzberg's theory (1968) is that intrinsic factors are at the heart of individual motivation.

According to Hackman and Oldham (1976), it is the intrinsic meaning of work that provides intrinsic payoffs to individuals. This intrinsic meaning is primarily related to motivation and work satisfaction (Hackman and Oldham 1976). Meta-analysis findings have found support for the relationship between job satisfaction and

job performance, on the basis of over 312 different samples ( $n=54417$ ), with a mean true correlation of .30 across these samples (Judge et al. 2001).

Person-organisation and person-job fit, however, have also been found to influence the relationship between satisfaction and job performance (Erdogan and Bauer 2005). According to the scarcity model of the relationship between teaching and research, role conflict dominates in contexts where scarcity of time, energy and commitment is present together with the need for these to be allocated to different roles (Moore 1963). The fit between an individual and their role as a teacher or a researcher may also relate to satisfaction and job performance.

According to the predictions of the scarcity model, the relationship between teaching performance and research performance is expected to be negative. The types of investments individuals make in teaching are also fundamentally different from those of research (Fox 1992). Other research has been found to contest the scarcity model, as in certain cases individuals with teaching, research and administration roles have also been found to be more productive than academics with fewer roles (Hattie and Marsh 1996). The conventional wisdom model also contests the scarcity model, and posits that research enables academics to be better teachers; and not less effective in teaching (Hattie and Marsh 1996). Another model that contests the scarcity model is the 'g' model, which argues that individuals with high levels of ability in one area typically have an underlying cognitive strength, which can be applied in both teaching and research (Hattie and Marsh 1996). Certain values are associated with both good teaching and good research, such as high commitment (in the form of perseverance, dedication and hard work); creativity (in the form of imagination, originality and inventiveness); investigativeness; and critical analysis (Hattie and Marsh 1996). Despite commonalities which may exist between good teachers and researchers there may, however, be moderators to this relationship such as commitment and time that "mediate the relationship and may cause the relationship" to be negative (Hattie and Marsh 1996: 512). It is argued in this paper that individuals that derive their primary work satisfaction from different Loci of Satisfaction will differ in their investment of time and energy applied to an activity. Overall, according

to their meta-analysis of the literature, Hattie and Marsh (1996) stress that satisfaction was found to be more important than potential rewards for performance in both teaching and research. Satisfaction therefore dominated the extrinsic aspect of these relationships (Hattie and Marsh 1996). From the above literature, Hypothesis a and b are offered; *Hypothesis a.: There is a significant association between a Teaching Locus of Satisfaction and research productivity, and Hypothesis b.: There is a significant association between a Research Locus of Satisfaction and research productivity.*

In other words, individuals who derive their primary job satisfaction from research will differ in their research productivity from individuals who derive their primary job satisfaction from teaching. The same would be expected for individuals who derive their primary job satisfaction from administration.

In order to understand the potential influence of specific loci of satisfaction on research productivity, further literature was reviewed. Other individual and biographical factors have been found to be related to either teaching or research as a work role. The research productivity literature has been found to support the link between *experience* of research and increased research productivity over time (Hattie and Marsh 1996). Other conceptions within the literature challenge the scarcity model, or, alternatively, support it. According to the different enterprises model, teaching is fundamentally different from research according to the activities associated with each (Hattie and Marsh 1996); experience in one will not be expected to influence performance in another. The differential personality model predicts that differences in *personality* between individuals provide a better fit with either teaching or research (Hattie and Marsh 1996). If positive affectivity and negative affectivity typically act as a proxy for the 'big five' personality factors of extraversion and neuroticism, respectively (Watson et al. 1988), then differences in these factors might relate to research productivity in different ways for individuals with different Loci of Satisfaction. In contrast to the differential personality model, the unrelated personality model suggests that differences between the personalities of teachers and researchers are orthogonal (Hattie and Marsh 1996). According to this theory, teachers are "liberal, sociable, showing leadership, extro-

verted, low in anxiety, objective, supportive, nonauthoritarian, not defensive, intelligent, and aesthetically sensitive" yet researchers are "striving to create order, independence, achievement orientation, and dominance" (Hattie and Marsh 1996: 514). Further, according to this theory teachers and researchers both show leadership, but differ primarily in supportiveness, as researchers are expected to be less supportive (Hattie and Marsh 1996). However, according to the divergent reward system model the conflicting roles of teaching and research are associated with different expectations and obligations that are underpinned by different institutional reward systems (Hattie and Marsh 1996). According to the predictions of this model, the relationships that exist around research productivity and teaching might reflect the remuneration and informal rewards systems of such institutions. The implication of this model is that such conflicting roles can be managed. Differences between individuals with different Loci of Satisfaction can also be associated with other intrinsic factors, and other factors associated with job performance might also reflect differences in individual loci of satisfaction.

Meta-analysis findings have provided evidence of significant associations between *self-efficacy* and measures of work performance (Stajkovic and Luthans 1998). Evidence also exists that supports the notion that financial incentives can be effective in motivating higher levels of research productivity (Hales et al. 2005). Evidence has also been found to support the use of intrinsic motivating factors such as professional awards and recognition to enhance commitment to research productivity (Young 2005). The expectations of managers may create a 'self-fulfilling prophecy' akin to the influence of teachers upon learners discovered by Rosenthal and Jacobson (1968). The implication of this body of theory and empirical findings is that research productivity can be managed, as long as the intrinsic mechanisms that underlie work performance are known, and are aligned with the process.

*Age* has been found to be positively associated with higher levels of commitment in certain work contexts (De Clerq and Ruis 2007). *Age* has been found to typically form a u-shape of satisfaction along a range of loci over age (Blanchflower and Oswald 2008; Kellenberg and Loscocco 1983); and to generally be positively

associated with life satisfaction (Ardelt 1997). Differences in biographical or contextual factors might shape or be related to a different typology of individual Loci of Satisfaction; this might influence the fit between an individual and the organisation (person-organisation fit) or between an individual and the job (person-job fit) (Erdogan and Bauer 2005).

According to Activation theory, an individual has a unique activation level which, if mismatched to tasks, will cause dissatisfaction (Scott 1966). If certain types of research work, for example, are relatively less stimulating than other work, certain individuals are expected to be better matched for such work than others (Scott 1966). Activation is typically associated with performance in the form of an inverted 'u' shape, with the middle ranges representing optimal performance. This is a physiological aspect of work that is manifested in affective states (Scott 1966), which might differ between individuals, or be reflected in tested relationships.

A range of factors are also evident in the literature that relate to research productivity that may plausibly differ in their influence on different forms of research productivity because of differences in Satisfaction Loci of Satisfaction. An example is *gender*. Journal authorship has been found, in certain cases, to be dominated by male authors (Rachal et al. 2008). Differences in publishing rates by gender have also been found in academic contexts (Rothausen-Vange et al. 2005). Male academics have, in other contexts, also been found to spend less time on teaching and more time on research than female academics (Barbezat 2006).

Interconnectivity between researchers, in different forms, is also expected to be associated with higher levels of research productivity (Swan 2007). *Networks between individuals*, such as ties to a home country have been found to increase an individual's access to resources (Shapiro and Sokol 1982; Wilson and Martin 1982; Light 1984; Coleman 1988), which might also enable research productivity through such academic networks. Exposure to practitioner communities and *membership of professional associations* might offer certain skills that might enable research productivity (Crane et al. 2009). *Marriage and dependent children* might reflect the presence of family-to-work spillovers that might constrain job performance (Eagle et al. 1997; Dilworth 2004; Dilworth and Kingsbury

2005). Collaboration with colleagues and also with masters or doctoral students, or through *supervision*, has been found to be significantly associated with higher levels of research productivity (Hara et al. 2003). Whether teaching and research are related has an implication for the management of such research productivity. The bureaucratic funding model suggests that if teaching and research are not related then teachers and researchers should be rewarded each for their different strengths separately (Hattie and Marsh 1996). In the literature certain researchers have claimed that curricula could be tailored better for student needs if they were not bound to research (Hattie and Marsh 1996). On the basis of the above literature, a range of other variables were included in the study for the purpose of providing further insight into the analysis. Having provided an overview of the literature that relates to potential relationships between variables to be tested, and having derived hypotheses from the literature, the research methodology applied in this research is now considered.

## METHODOLOGY

This research applied an exploratory descriptive research design. The research was located within the positivist epistemological paradigm and the scientific method was applied; empirical statistical tests used to test hypotheses (Burrell and Morgan 1979).

### Sampling Method

A purposive comprehensive sampling method was applied. All academic staff across the institution were sampled. However, refusals were respected. Questionnaires were distributed by research assistants across the institution. The surveys were distributed within pre-addressed sealable envelopes that used the internal mail system to return to a central collection point. Anonymity was ensured in this manner. Reliability was enhanced through the use of a standardised research protocol, where all methods were applied in a consistent manner, so as not to introduce extraneous variance into the process.

### Data Collection

Of a population of about 1300 full-time as well as part-time academic staff, two hundred and twenty-five usable responses were obtained,

with a response rate of about seventeen percent. A sample size calculation indicated that the sample size was appropriate to test associations at the five percent level of significance. Due to the non-responses, which were expected in such a context, the method is taken to be equivalent to convenience sampling, as ethical considerations were applied and refusals were unconditionally respected. The instrument was piloted before administration. Scales were developed according to the principles of validity and were tested for reliability.

Internationally accredited journal articles were measured as Thomson Reuters Institute for Scientific Information (ISI) and Proquest International Bibliography of the Social Sciences (IBSS) indexed journal articles. Locally accredited journal articles were measured as South African Department of Higher Education (SA-DOHET) accredited journal article publications. Total journal articles were taken to include both of these categories. Conference proceedings were measured as papers that were published in a conference's proceedings. Conference presentations were measured as presentations at peer-reviewed academic conferences. Book published were measured as completed books published, and book chapters were measured as that. In all of these categories, output that was accepted for publication was also included. Job satisfaction was measured using Likert-type items. These were derived from the Minnesota Satisfaction Questionnaire scales (Muchinsky 1983; Arvey et al. 1989); three items were used ( $\text{Alpha} = .859$ ). The satisfaction with teaching, research and administration items were also broadly derived from the Minnesota Satisfaction Questionnaire scales (Arvey et al. 1989). Years as a researcher was sampled as the number of years an individual had worked as a researcher. The self-efficacy scales were derived from Bandura's (2006) scales, designed to sample self-efficacy relating to an overall index of self-efficacy relating to research, comprised of measures of self-efficacy relating to (i) ISI/IBSS accredited journal article publication, (ii) DOHET journal article publication, (iii) conference proceedings publication, (iv) conference presentations, (v) the use of quantitative methods and (vi) the use of qualitative methods. Age was measured in years. Gender was operationalised as a binary variable. Membership of professional associations was also measured as a binary variable. A binary vari-

able was included that measured an individual's preference for quantitative methods over qualitative methods. Marriage status and having English as a home language were measured as binary variables. Dependent children were measured as the number of children an individual was currently supporting in their household.

Job Satisfaction was found to return a Cronbach Alpha value of .859. The measures of Satisfaction Loci of Satisfaction were found to return Cronbach Alpha values of .79 for Research Locus of Satisfaction and .743 for Teaching Locus of Satisfaction when measured against the measure of satisfaction with research versus teaching. This measure was included in order to test the reliability of these items. Ethics clearance and permissions from the human resources department of the university were obtained. In line with ethical principles, anonymity was guaranteed to respondents.

### Description of the Sample

Females comprised 53% of the sample (Table 1). A little over half (52%) of the sample had English as their first language and 56% of the sample were of South African origin. The mean age of an academic in the sample was 40.67 years. Individuals were found to have relatively lower levels of self-efficacy related to the use of quantitative research methods than qualitative research methods. Individuals were found to be relatively more satisfied with research and teaching than with administration.

### Data Analysis

The data were checked for accuracy of data entry; for missing values; and for the degree of fit with regard to their distributions and the assumptions of the bivariate and multivariate techniques included in the research design. Bivariate scatterplots were checked for points associated with relatively high leverage, high discrepancy and high influence (Tabachnik and Fidel 2007). Univariate data was checked for normality, and skewness and kurtosis values were examined. Kolmogorov-Smirnov and Shapiro-Wilk tests were performed on the univariate data in order to check for non-normality. Normal probability-probability (P-P) and quartile-quartile (Q-Q) plots were run and checked for deviations from normality. Bivariate scatter plots were

**Table 1: Descriptive statistics: Entire sample**

<i>Variable</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. deviation</i>
Job satisfaction	225	3	21	15.07	4.025
Satisfaction teaching	225	1	7	4.24	1.583
Satisfaction administration	225	1	7	2.23	1.529
Satisfaction research	225	1	7	4.87	1.552
Total self-efficacy research	225	80	600	425.25	106.358
Self-efficacy DOE journals	225	0	100	74.29	25.177
Self-efficacy DOE ISI IBSS	225	0	100	71.87	25.157
Self-efficacy proceedings	225	0	100	76.39	23.813
Self-efficacy presentations	225	0	100	81.50	21.383
Self-efficacy quantitative	225	0	100	49.88	33.404
Self-efficacy qualitative	225	0	100	71.33	27.471
Age	225	22	72	40.67	10.555
Gender 1=male#	225	0	1	.47	
Years as a researcher	225	.00	48.00	10.1989	8.84216
Professional associations#	225	0	1	.81	
Preference for quantitative methods=1#	225	.0	9.0	.456	.7213
Married#	225	0	1	.57	
Dependent children	224	0	7	1.09	1.279
RSA origin#	225	0	1	.56	
English#	225	0	1	.52	.501

*Notes:* #a binary variable. The mean represents the proportion within the sample.

checked for the assumption of linearity between variables, and for the presence of heteroscedasticity. Data were also checked with to ensure that they met the assumptions of the multivariate tests applied. On the basis of the univariate analysis, parametric tests of bivariate relationships were performed using tests of Pearson's *r*. However, to ensure the integrity of the results, the bivariate associations were tested using two further non-parametric tests, using Spearman's Rho measures and also Kendal's Tau tests. The latter were included due to the presence of ties within the data (Tabachnik and Fidel 2007). These nonparametric tests were used to check the process, and are not reported here.

In the case of correlations of binary items with continuous items, Pearson point biserial correlations were used (Field 2005). In this manner, a robust analysis of the bivariate relationships allowed for insight into the net, or zero-order relationships, between tested variables.

The sample was split into two groups differentiated by locus of satisfaction: respondents with a Research Locus of Satisfaction (*n*=129) and a Teaching Locus of Satisfaction (*n*=94). For the purposes of the split, scores on these Likert-type scale items were dichotomised, and the mid-point was not included. For the purposes of further insight, a further split was applied, and a hybrid category was also removed from

these groups for further testing. This split, however, was not considered to be part of the primary analysis process, but was used for further analysis on the basis of the initial findings. Certain limitations of the research are outlined as follows.

## RESULTS

The variable that measured a preference for research versus teaching was found to be negatively associated with satisfaction with teaching, or a Satisfaction Locus of Satisfaction ( $-.593; p < .0001$ ) and positively associated with satisfaction with research, or a Research Locus of Satisfaction ( $.657; p < .0001$ ). These two Loci of Satisfaction seem to represent separate and oppositional clusters of the sample. An Administration Locus of Satisfaction (not tested in the hypotheses, but tested for the purposes of further insight in order to provide contrast with the other loci) was not found to be significantly associated with a preference for either research or teaching. Individuals with a Teaching Locus of Satisfaction were found to comprise 41.8% of the sample, and individuals with a Research Locus of Satisfaction were found to comprise 57% of the sample.

When hybrid types (individuals with high scores in both teaching and research Loci of

Satisfaction) were removed, 52 respondents out of the entire sample, or 23% of the sample fell into this category. These individuals were categorised as hybrids, or individuals with both a Research Locus of Satisfaction and a Teaching Locus of Satisfaction. The results are reported and discussed as follows.

## DISCUSSION

The reporting of the results and the discussion of the research findings is undertaken as follows. In each section, for the purposes of clarity, the tested hypothesis is used as the section heading.

*Null-hypothesis a.: There is no significant association between a Teaching Locus of Satisfaction and research productivity.* Individuals with a Teaching Locus of Satisfaction are found to have significantly lower levels of publications of locally accredited journal articles, internationally accredited journal articles, total journal articles, conference proceedings and book chapters. These individuals were also found to have presented fewer conference papers. On the basis of these significant associations, the null hypothesis was rejected and the alternative hypothesis was accepted. No association was found between a Teaching Locus of Satisfaction and the publication of books. These findings are found to support seminal theory

(Scott 1966; Herzberg 1968; Hackman and Oldham 1976; Organ 1988) and meta-analysis evidence (Judge et al. 2001) from different contexts that predicts a negative relationship between dissatisfaction and performance. This result also supports literature that suggests that time investments in teaching may be negatively associated with research productivity (Hattie and Marsh 1996; Grant 2014). It is possible that this negative relationship between satisfaction with teaching and research productivity reflects the negative impact of multiple roles (Brazeau and Woodward 2012), particularly in the South African context (Rabe and Rugunanan 2011). The descriptive statistics for the sub-sample of individuals with a Teaching Locus of Control are reported in Table 2.

Although a Teaching Locus of Satisfaction is found to be negatively associated with almost all of the tested measures of research productivity, it is also found to be negatively associated with satisfaction for research. This supports the notion that these two roles may conflict (Buller 2012). These findings may support the notion that role conflict exists between teacher and researcher roles. Role conflict between teaching and research is predicted by the scarcity model (Moore 1963; Fox 1992; Hattie and Marsh 1996). The scarcity model predicts that satisfaction with either the teacher or the researcher role is not necessarily compatible with

**Table 2: Descriptive statistics teaching locus of satisfaction**

Variable	N	Minimum	Maximum	Mean	Std. deviation
Job satisfaction	95	3	21	14.57	4.633
Satisfaction with teaching	95	4	7	5.74	.802
Satisfaction with administration	95	1	7	2.46	1.681
Satisfaction with research	95	1	7	4.43	1.499
Self-efficacy research	95	80	600	381.57	104.585
Self-efficacy DOE publication	95	0	100	67.26	22.417
Self-efficacy ISI/IBSS publication	95	0	100	62.58	24.699
Self-efficacy proceedings	95	0	100	68.77	25.389
Self-efficacy presentations	95	0	100	75.49	23.081
Self-efficacy statistical analysis	95	0	100	42.33	31.139
Self-efficacy qualitative analysis	95	0	100	65.14	27.169
Age	95	22	66	39.87	11.507
Gender 1=male#	95	0	1	.36	.482
Years as a researcher	95	.00	40.00	8.7579	7.71082
Professional associations#	95	0	1	.78	.417
Preference for quantitative methods=1#	95	.0	1.0	.363	.4342
Married#	95	0	1	.58	.496
Dependent children	94	0	7	1.10	1.368
RSA origin#	95	0	1	.60	.492
English#	95	0	1	.57	.498

Notes: #a binary variable. The mean represents the proportion within the sample.



the performance of the other role. Scarcities of time, or resources, are at the heart of such role conflict according to Moore (1963). Despite previous meta-analysis findings that have contested the notion of the scarcity model, and have found the teaching role to be complementary to the research role (Hattie and Marsh 1996), in this context role conflict between these roles cannot be excluded. The descriptive statistics for the sub-sample of individuals with a Research Locus of Satisfaction are reported below, in Table 3.

These results also challenge the predictions of the divergent reward system model; that relationships around teaching and research will reflect the structure of incentives, or rewards associated with each of these roles (Hattie and Marsh 1996). If human resources systems do prioritise research over teaching in terms of promotions, and therefore remuneration, then it would be expected that motivations, and satisfaction, would be primarily aligned with the research role (Hattie and Marsh 1996). However, satisfaction with teaching seems to be relatively robust to this prioritisation of research as a dominant precondition for promotions. Certain commentators have suggested that rewriting tenure and promotion procedures to include a 'teaching track' and a 'research track' to solve the tension between teaching and research may not go far enough; a focus on student outcomes might

offer better results (Buller 2012). According to these results, however, the solution to this tension might be to ensure that there is alignment between individual intrinsic satisfaction and their primary roles in universities. In the South African context where certain universities have tried to dismantle the 'teaching track', it is strongly argued that this is a step backwards, as it does not acknowledge the fundamental constraints to productivity posed by intrinsic forces within individuals.

It is argued that intrinsic satisfaction loci might enable individuals to be robust to systems of remuneration that fail to take into account the individual intrinsic job satisfaction of individual academics. Further, it is suggested that role conflict (between teaching and research) might be reduced only if the intrinsic satisfaction of such individuals is taken into account in the process.

For the purposes of further analysis, binary variables were created for (i) individuals with hybrid loci of satisfaction, or individuals that scored over the midpoint of the scale (4) for both teaching satisfaction and research satisfaction; for (ii) individuals with a teaching-only Locus of Satisfaction, where those with a satisfaction with research were removed from this sub-sample; and (iii) individuals with a research-only Locus of Satisfaction, representing individuals with high research satisfaction only. The descriptive

**Table 3: Descriptive statistics research locus of satisfaction**

<i>Variable</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. deviation</i>
Job satisfaction	130	3	21	15.65	3.714
Satisfaction with teaching	130	1	7	3.90	1.569
Satisfaction with administration	130	1	6	2.14	1.424
Satisfaction with research	130	3	7	5.92	.807
Self-efficacy research	130	80	600	444.10	102.106
Self-efficacy DOE publication	130	0	100	75.85	26.400
Self-efficacy ISI/IBSS publication	130	0	100	77.23	22.731
Self-efficacy proceedings	130	0	100	78.77	23.477
Self-efficacy presentations	130	0	100	82.38	21.765
Self-efficacy statistical analysis	130	0	100	54.44	33.822
Self-efficacy qualitative analysis	130	0	100	75.43	24.981
Age	130	22	72	39.88	10.400
Gender 1=male#	130	0	1	.51	.502
Years as a researcher	130	.50	48.00	10.7462	9.40564
Professional associations#	130	0	1	.81	.396
Preference for quantitative methods=1#	130	.0	1.0	.450	.4526
Married#	130	0	1	.52	.501
Dependent children	129	0	7	.97	1.299
RSA origin#	130	0	1	.55	.499
English#	130	0	1	.52	.501

*Notes:* #a binary variable. The mean represents the proportion within the sample.

statistics for the sub-sample of individuals with a Hybrid Locus of Control are reported in Table 4.

Surprisingly, hybrid satisfaction individuals were found to have significantly fewer international journal article publications and fewer conference proceedings publications. All of the other measures of research output, except for book chapter publication, were found to be weakly (at just within the ten percent level of significance) and negatively associated with the hybrid category item. The correlations for Teaching Locus of Satisfaction with research productivity are reported in Table 5.

Teaching-only satisfied individuals were found to have presented at significantly fewer conferences and to have published significantly fewer book chapters than the rest of the cohort. Of concern, however, is the possibility that teaching-only satisfied individuals present less conference papers, because conference papers

may be the 'first step' in the process of becoming more research productive. The correlations for Research Locus of Satisfaction with research productivity are reported in Table 6.

Interestingly, these results may suggest that deriving one's primary job satisfaction from both teaching as well as research (together- the hybrid category) may also contribute to lower levels of research productivity; most importantly in terms of ISI/IBSS accredited journal article publication and also conference presentations. The correlations for Administration Locus of Satisfaction with research productivity are reported in Table 7.

Although it is not possible to ascribe causality on the basis of statistical results, further investigation of the data was undertaken in order to understand these relationships. Because individuals with a research-only locus of satisfaction were found to be more research produc-

**Table 4: Descriptive statistics hybrid both teaching and research locus of satisfaction**

<i>Variable</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. deviation</i>
Job satisfaction	52	3	21	15.44	4.084
Satisfaction with teaching	52	4	7	5.48	.700
Satisfaction with administration	52	1	6	2.44	1.577
Satisfaction with research	52	3	7	5.48	.779
Self-efficacy research	52	80	600	401.54	105.967
Self-efficacy DOE publication	52	0	100	68.94	24.078
Self-efficacy ISI/IBSS publication	52	0	100	69.52	24.580
Self-efficacy proceedings	52	0	100	71.92	25.880
Self-efficacy presentations	52	0	100	76.73	22.878
Self-efficacy statistical analysis	52	0	100	44.52	33.007
Self-efficacy qualitative analysis	52	0	100	69.90	25.059
Age	52	22	66	36.71	10.141
Gender 1=male#	52	0	1	.40	.495
Years as a researcher	52	.50	40.00	8.6250	7.42536
Professional associations#	52	0	1	.75	.437
Preference for quantitative methods=1#	52	.0	1.0	.375	.4524
Married#	52	0	1	.48	.505
Dependent children	51	0	7	.86	1.357
RSA origin#	52	0	1	.58	.499
English#	52	0	1	.50	.505

Notes: #a binary variable. The mean represents the proportion within the sample

**Table 5: Correlations for teaching locus of satisfaction**

<i>Variable</i>	<i>Bootstrapped 95% confidence interval</i>	<i>Coefficient/p-value</i>
DOE journal publications	-.308/-.067	-.190/p<.005
International publications	-.395/-.188	-.291/p<.0001
Total journal publications	-.401/-.195	-.285/p<.0001
Conference proceedings	-.357/-.141	-.251/p<.0001
Conference presentations	-.323/-.142	-.226/p<.001
Book publications	-.170/.139	.061/p<.376
Book chapter publications	-.260/-.061	-.150/p<.028

**Table 6: Correlations for research locus of satisfaction**

<i>Variable</i>	<i>Bootstrapped 95% confidence interval</i>	<i>Coefficient/p-value</i>
DOE Journal publications	.051/.056	.159/p<.02
International publications	.121/.290	.210/p<.002
Total journal publications	.131/.303	.217/p<.001
Conference proceedings	-.074/.233	.083/p<.227
Conference presentations	.069/.272	.166/p<.015
Book publications	-.149/.191	-.069/p<.315
Book chapter publications	-.01/.228	.098/p<.152

*Notes:* Significant coefficients and p values are highlighted in bold

**Table 7: Correlations for administration locus of satisfaction**

<i>Variable</i>	<i>Bootstrapped 95% confidence interval</i>	<i>Coefficient/p-value</i>
DOE journal publications	-.131/.049	-.05/p<.466
International publications	-.131/.075	-.03/p<.665
Total journal publications	-.132/.057	-.042/p<.537
Conference proceedings	-.058/.253	.104/p<.129
Conference presentations	-.150/.08	-.049/p<.473
Book publications	-.104/.165	-.047/p<.491
Book chapter publications	-.165/.041	-.081/p<.234

tive across all of the categories of research output except for book chapters and book publications, it is tentatively suggested that these results offer support for the scarcity model of Moore (1963). If this is so, then policies premised on the homogeneity of academic staff might not be optimal. If all academic staff are treated identically by performance management systems, this might entail a cost in terms of lower overall research productivity. Further research is suggested in order to establish which specific causal relationships are at work here. The Pearson biserial correlation results for the associations between research productivity and Hybrid type, Teaching Locus of Satisfaction type (only) and Research Locus of Satisfaction type (only) are shown in Table 8.

Also interesting are the results that, of the three groups, only individuals with a teaching-only Locus of Satisfaction are found to report

being dissatisfied with the financial incentives available for research. This result might suggest that financial incentives may be important to individuals that derive their satisfaction from teaching and not research.

The 'g' model predicts a synergistic relationship between teaching and research because individuals can have abilities that underlie both activities (Hattie and Marsh 1996). However, this model does not seem to be supported by these results. It is possible that the satisfaction of an individual for either teaching or research, or both, might dominate the influence of innate abilities that may span both teaching and research. It is beyond the scope of this research, however, to investigate the causal structure underlying these relationships. Nevertheless, it is argued that these results provide insight that further research can build on.

**Table 8: Pearson biserial correlations: Hybrid, teaching satisfaction only and research satisfaction only with research productivity**

<i>Type of research output</i>	<i>Hybrid</i>	<i>Teaching only</i>	<i>Research only</i>
DOE journal publication	-.129 <sup>^</sup>		.190 <sup>**</sup>
ISI and IBSS journal publication	-.134 <sup>*</sup>	-.170 <sup>^</sup>	.324 <sup>**</sup>
Conference proceedings	-.153 <sup>*</sup>		.224 <sup>**</sup>
Conference presentations	-.122 <sup>^</sup>	-.145 <sup>*</sup>	.217 <sup>**</sup>
Book publication	.111 <sup>^</sup>		
Book chapters publication		-.135 <sup>*</sup>	

Further analysis of the associations between a range of contextual factors and each of these groups was undertaken in order to gain more insight into these results. Table 9 shows the relationships between the range of contextual factors tested for their associations with the three orientations (hybrid, teaching-only satisfied individuals, and research-only satisfied individuals).

As can be seen from Table 9, individuals with a Teaching-only Locus of Satisfaction are found to have significantly lower levels of self-efficacy associated with: DOE journal article publication, ISI/IBSS journal article publication, conference proceedings publication, conference presentation, statistical analysis and qualitative analysis. In contrast, individuals with a Research-only Locus of Satisfaction are found to have significantly higher levels of self-efficacy associated with all of the same measures, except for conference presentation. These results suggest that individuals that derive their primary satisfaction from teaching versus research may differ in their endowments of self-efficacy.

Self-efficacy that relates to a specific activity can influence the extent to which people invest time and energy in such an activity, and how long they persevere with the task (Bandura 2006:309). Self-efficacy associated with a particular task or activity is therefore associated with performance in such a task (Bandura 2006). The

significance of self-efficacy in its association with research productivity reflects empirical evidence from other contexts, including meta-analyses (Stajkovic and Luthans 1998) that have found positive associations between self-efficacy and performance. It is recommended that institutions encourage team based learning in this context (Mahembe and Engelbrecht 2014).

Interestingly, no significant self-efficacy associations are found for hybrid types. These results suggest that some effect dominates the low research productivity of hybrid academics that exists over and above the effect of self-efficacy. It is suggested that this lower level of research may be associated with more intense role conflict; which is predicted by the scarcity model (Hattie and Marsh 1996).

Teaching-only satisfied individuals seem to be less job-satisfied in this context. They might also possibly be more robust to the dissatisfaction with administration work experienced by research-only satisfied staff. Interestingly, hybrid types may be younger while teacher-only types are older. This suggests another explanation for the lower research productivity of hybrid academics; that they may have had less experience doing research work.

On the basis of these results, it is recommended that: (i) training and development is provided that focuses on the commonalities present between teaching and research, such as at the

**Table 9: Pearson biserial correlations: Hybrid locus of satisfaction, teaching satisfaction only and research satisfaction only**

<i>Variable</i>	<i>Hybrid</i>	<i>Teaching only</i>	<i>Research only</i>
Job satisfaction		-.190**	.135*
Research versus teaching	-.133*	-.581**	.566**
Satisfaction with teaching	.431**	-	
Satisfaction with research	.216**	-	
Satisfaction with administration			-.148*
Satisfaction with financial incentives research		-.146*	
DOE publication self-efficacy	-.117^	-.166*	.177**
ISI/IBSS publication self-efficacy		-.331**	.305**
Conference proceeding publication self-efficacy		-.228**	.202**
Conference presentation self-efficacy	-.122^	-.166*	.129^
Statistical analysis self-efficacy		-.154*	.252**
Qualitative analysis self-efficacy		-.213**	.209**
Postgraduate teaching self-efficacy	-.164*		.197**
Age	-.206**	.147*	
Gender (female)#		8.56*	.145*
Total work experience	-.215**	.185**	
Experience as a researcher			.159*
Married#		.141*	
Dependent children		.117^	

*Notes:* #Chi Squared test was used here because both items are binary variables. ^p<.10; \*p<.05; \*\*p<.01

lower levels of postgraduate supervision; and (ii) interventions are undertaken that are aimed at increasing satisfaction with research activities for all staff. On the basis of these results it is also recommended that potential role conflict between teaching and research is addressed through applying the principle of comparative advantage (Smith 2003[1776]). Following Smith (2003[1776]), specialised division of labour is significantly more efficient in producing outputs. According to Smith's (2003[1776]) predictions, work-load models can be more effectively designed and implemented on the basis of comparative advantage; in this case premised specifically on differences in job satisfaction loci.

On the basis of these findings, and following Smith's (2003[1776]) logic, it is suggested that teacher-satisfied individuals be given more hours of work that they prefer (teaching) with less time associated for work they do not prefer. Similarly, research-satisfied individuals might be allocated more hours of work that they prefer (research) and less hours of work that they do not. It is argued that workload models that differ significantly in time allocations for teachers versus researchers might be necessary in a context where societal demands for training might conflict with demands for research output. In this way the teaching loads of more productive researchers may be reduced and the net research outputs of academic units might increase significantly.

A tutor track is a career path of academics that is associated with more of a teaching-focus than a research-focus. For this track promotions and requirements for tenure are related more with teaching outcomes than research outcomes. It is recommended that the 'tutor' track be strengthened, in order to better accommodate individuals with a preference for teaching. This is not to say that teachers should perform no research, but that the research requirements for their work are less onerous. Similarly, they should be supported to produce research that is specifically focused, and tailored, to what interests them, such as teaching. The commonalities between teaching and research should be more effectively exploited, because this takes advantage of their specific satisfaction loci. It is argued that by strengthening or implementing a 'tutor' track, high volumes of teaching can be undertaken whilst freeing up highly productive researchers to do more research.

*Null-hypothesis b.: There is no significant association between a Research Locus of Satisfaction and research productivity.* According to the bivariate analysis, a Research Locus of Satisfaction is found to be significantly and positively associated with all of the measures of research productivity except conference proceedings publications, book publications and the publication of book chapters. This result supports the relationship predicted by the literature; that satisfaction with research is expected to contribute to time spent at research tasks. There is no fundamental tension present here (Buller 2012). The null-hypothesis was rejected on account of these significant associations.

On the basis of these results, further research is recommended, such as qualitative research that might uncover the causal mechanisms that underlie these results. If research productivity is differentiated by intrinsic job satisfaction loci, then it is recommended that human resources management systems focus more extensively upon the intrinsic rewards or intrinsic aspects of incentivising research productivity, particularly because evidence in other contexts has been found to support the notion that such incentives are effective in increasing research output in academic contexts (Hales et al. 2005).

An Administration Locus of Satisfaction is not found to be significantly associated with any of the measures of research productivity. According to the MLR analysis, individuals with an Administration Locus of Satisfaction are found to have significantly lower levels of research self-efficacy and are also found to be more likely to not be of South African origin. The enjoyment of administration might also result in an individual allocating more time and resources toward administrative tasks. The research output literature suggests that time investments in research can be the strongest predictor of research output (Toews and Yazedjian 2007). The implication of this is perhaps that research productivity is particularly sensitive to time investments in tasks other than research production.

## CONCLUSION

It is concluded that cohorts of academic staff may differ substantively according to intrinsic measures of their Loci of Satisfaction. It is argued that failure to re-design human resources

systems to take into account individual Loci of Satisfaction might lead to sub-optimal levels of research productivity. However, it is acknowledged that causal claims cannot be made on the basis of statistical testing, and further research is recommended in order to investigate the causal mechanisms that underlie the evidence of relationships found in this study. These conclusions are discussed together with recommendations for practice as follows.

### RECOMMENDATIONS

This research supports previous meta-analysis findings that indicate that satisfaction and intrinsic aspects dominate relationships between teaching and research. It is therefore recommended that these differences are taken into account in the HR structures of such institutions and that comparative advantage, in terms of job satisfaction matches, is used more effectively as a principle for managing research productivity.

It is therefore recommended that more research-productive individuals are allowed more time for research, and more teaching-satisfied individuals are allowed more time for teaching. By taking into account such fundamental differences in Satisfaction Loci between such individuals, it is argued that net research productivity will be increased. Research productivity might therefore be enhanced in this way through the reduction of role conflict. It is further argued that these relationships dominate the intrinsic landscape of research productivity; by not addressing this issue a cost may accrue to the individual and also the institution.

Evidence of the success of financial, or extrinsic, incentivisation of research productivity from other contexts suggests that remuneration structures can be effective in incentivising research output, but the results of this study suggest that intrinsic factors such as self-efficacy and satisfaction also need to be taken into account.

The attainment of higher levels of research productivity that results from teaching-satisfied staff should, on the basis of these results, be primarily focused initially upon conference presentations and DOE journal publication. Worryingly, experience as a researcher does not (at within the five percent level of significance) contribute to DOE article publication for individuals

that derive their primary job satisfaction from teaching.

On the basis of these findings, it is argued that the management of research productivity, therefore, should be structured around a 'ladder' of different levels of research productivity. The first rung of the ladder- conference presentations- should be the first goal of the process. The dominant influence of self-efficacy in these findings suggests that self-confidence and developmental learning may be important in this context. Hence, a ladder of progression in the difficulty of research work may be the most effective approach to developing research productivity in academic staff. By developing confidence at lower levels, staff can progress 'up the ladder'. Self-perceptions of competence of learners can be shaped by the expectations of others, such as teachers in the learning context. An implication of these results is that the subjective experience of such learning might be able to be managed. By supporting such staff and providing training, encouragement, and positive expectations, staff can move up through the rungs of the ladder, first by presenting at conferences, then by achieving the publication of these presented papers in the form of conference proceedings. These 'self-efficacy victories' can be used to develop confidence to submit publications to DOE accredited journals. After this, publication in ISI or IBSS accredited journals will follow. These results suggest that different structures of associations exist around each level of this 'ladder' of research progression. An implication of this is that research productivity cannot be approached as a homogeneous outcome. Overall, it is argued that these findings also contest 'managerialist' approaches to managing academic staff for research productivity that are based upon extrinsic, or 'carrot and stick' systems, and advance an alternative approach that is, instead, focused upon the intrinsic satisfaction structure of such different individuals.

### LIMITATIONS

Smaller significance values were expected across most tests than would have been expected in contexts with a more heterogeneous range of respondents. This range restriction was expected to be due to the selection process of academics in such institutions, where almost all

staff have attained higher degrees. To some extent, this process is expected to 'select out' a significant amount of variability that might be present in other working contexts. Nevertheless, the findings of this study are expected to generalise to other higher education contexts to the extent that other contexts are similar to this context. Another limitation is the cross-sectional nature of such research. A longitudinal perspective might offer more insight into the changes around satisfaction over time. Sample selection bias might have been introduced through self-selection; academics with more interest in research productivity might have been more likely to respond. Nevertheless, within these constraints it is argued that these findings are generalisable to other contexts to the extent that such contexts share similarities with this context.

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