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Predictors of Teacher Educators' Research Productivity

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Abstract: This study examined the relationship between teacher educators' research productivity (RP) and their background and professional characteristics, attitudes, motives, obstacles and time devoted to research. The sample included 161 teacher educators from four teacher education colleges in Israel. The findings indicate the significance of five variables for predicting RP: academic degree, rank, administrative position, desire to develop new knowledge and learn from research findings and perceived insufficient research competence and self-confidence. These variables account for 37.2% of the variance in RP. The results from this study provide useful information for teacher education institutions and policy makers regarding variables significantly related to RP. These variables should be addressed when recruiting teacher educators, assigning administrative duties and designing professional development programs, particularly for new career faculty.

Introduction

Historically, teacher education colleges were established as teaching institutions with an emphasis on teaching rather than on research. In the last two decades, reforms introduced into these institutions have included a research focus as well, and the role of teacher educators as researchers has gained noticeable attention in the literature (Borg & Alshumaimeri, 2012).

The importance of research in higher education institutions is attributed to two main factors. First is the notion that research improves teaching (Middaugh, 2000) and contributes to continuous professional development (Livingston, McCall & Morgado, 2009). Thus, advancing research capability as a way of strengthening teacher education communities is viewed as a key factor in enhancing the quality of student and teacher learning (Arreman, 2008; Lunenberg, Ponte, & van De Ven, 2007). Second, research productivity (RP) has become the iconic indicator for institutional prestige as one of the vital resources required by higher education institutions for maintaining operation and facilitating development and growth**.** In higher education institutions, particularly in the US and Europe, publication records are an important factor in faculty performance evaluations, research grant awards, salary decisions and promotion, which allow faculty members to move through the academic pipelines (Ming, 2010)

In Israel, where this study was conducted, research authorities and committees have been established in teacher education colleges to encourage research by teacher educators. However, the efforts and resources invested for this purpose have not always been productive, and the content and level of the research conducted are still being debated (Yogev & Yogev, 2006). Therefore, investigating the factors that may be affecting teacher educators' RP is vital, and this was the focus of the current study.

Research Productivity

There is no single definition for RP, and various criteria have been applied for categorizing the wide array of research outputs (Abramo, D'Angelo, & Costa, 2010; Sridhar et al., 2010). However, the number of publications in peer-reviewed academic journals and scholarly books typically defines RP (Sridhar, Dias, & Sequeira, 2010).

When assessing RP, researchers typically assign different weights to different outputs, taking into consideration type of publication (Sridhar, et al., 2010), a number of authors (Lissoni, Mairesse, Montobbio, & Pezzoni, 2011) and field of research. The Health Science Appointment, Promotion, and Tenure Committee (HLS/APT Committee, 2000) at the State University of New York proposed comprehensive guidelines for assigning weights to scholarly outputs. This committee suggested assigning five points to peer-reviewed articles, books and monographs in national/international journals; three points to peer-reviewed presentations, published presentations in national/international conferences, peer-reviewed chapters in published books, edited books and articles in regional, state, or local journals, and authorship of successful grant proposals; and one point to peer-reviewed presentations in regional, state or local conferences, development and publication of media or software materials in peer-reviewed journals, authorship of unsuccessful grant proposals and other types of scholarly output.

Generally, RP has been measured by a composite indicator obtained by totaling the number of various types of finished research output during a defined period weighted according to one of the known weighting methods (Sax, Hagedorn, Arredondo, & DiCrisi, 2002). Given that RP tends to be negatively skewed, Fox (1992) suggested computing RP with the following formula, in which only published and accepted articles are taken into account:

RP = 1 + log (number of published articles + number of accepted articles + 0.5)

A logarithmic term is used to normalize the skewed distribution of RP. This becomes necessary, as a small number of faculty members produces a large number of papers, and many publish only a few or none at all. The addition of 0.5 (equivalent to half an article) avoids quantifying the log of zero and thus allows for those with no articles published or accepted for publication. Unity as a constant is added to avoid negative scores and their inconvenience for statistical interpretation.

Personal Background Characteristics and Research Productivity

Numerous studies, mostly conducted in research universities, have sought to determine the factors related to RP (Bland, Center, Finstad, Risbey, & Staples, 2006; Hancock, Baum, & Breuning, 2013). Various factors were found to be potentially relevant, including personal & professional characteristics as well as personality and contextual variables.

Three personal background characteristics were examined in the current study: gender, age, and academic degree.

Gender. Findings from studies, primarily conducted in university contexts, have indicated significant gender differences in terms of RP, in favour of men (Eloy, et al., 2013; Nygaard, 2015). Women's disadvantage was attributed to factors that may negatively affect women's scholarly productivity, which is important, and often critical, for staying on an academic career path. These factors are typically sorted into three categories. First, an institutional climate that is unfriendly to women impedes their integration in professional networks. Consequently, compared to their male counterparts, women tend to be less motivated or enjoy fewer opportunities to be productive scholarly, have less access to resources or assistance in their research and have less support and encouragement from colleagues (e.g., Kyvik & Teigen's, 1996).

Second, the dual pressure of building a family while attempting to get tenure often interrupts women's research careers because of childbirth and increased child caring responsibilities (Prozesky, 2008). Yet, the effect of having children on women's RP is disputed among researchers, and different studies have led to diverse conclusions. For example, Cole and Zuckerman (1984) concluded that women with children publish more than childless women, inferring that women's lower productivity cannot be attributed to maternal responsibilities. Likewise, inequality in household responsibilities was not seen as a factor in the time allocated to research and scholarly productivity (e.g., Hancock, et al., 2013).

Third, a restrictive research culture that disregards gendered topics (e.g., Williams and Ceci, 2012) can make it difficult for women to achieve research resources and foster collaboration, especially in departments dominated by men. There may also be certain external barriers impeding women's ability to publish. Women may face greater obstacles in publishing in traditional outlets because their research often challenges existing paradigms. Moreover, women, compared to men, tend to be less persistent in their efforts to get their articles accepted (Suitor, Mecom, & Feld 2001).

Research has also revealed that when controlling for variables associated with publishing, such as rank, number of years since receiving one's Ph.D., type of academic setting, discipline, department and amount of time spent conducting research, the gender gap in publishing closed considerably and even disappeared entirely when the focus was on a certain period of publication (e.g. Nakhaie, 2002).

*Age***.** Several studies have indicated that publishing activity varies by age (Rauber & Ursprung, 2007). Some researchers have in particular explored the possibility that the individual's scientific productivity follows a life cycle: productivity increases when the scientist is young, peaks around middle age and subsequently declines (Lissoni, et al., 2011). Kyvik and Teigen (1996), who found that the average productivity is highest in the 40–49-year-old age group, provided empirical evidence supporting this contention. This pattern of a relationship between age and productivity holds true for both genders.

Another body of research (Kotrlik, Bartlett, Higgins, & Williams, 2002) has indicated that age and RP are not related, while, according to others (Wichia, Wongwanich, & Bowarnkitiwong, 2009), this relationship might be context-dependent, whereby age tends to affect RP in one culture but not in another.

Academic degree. In teacher education institutions in many countries, including Israel, until recently, a considerable proportion of teacher educators have only master's degrees. In a rare study of the effect on research output of having a Ph.D., Fox and Milbourne (1999) reported that academic economists without a Ph.D. were less likely to be engaged in research (83% had no publications). Similarly, teacher educators with Ph.D. degrees are expected to be more research-skilled and productive than those with only master's degrees. Furthermore, since teacher educators without a Ph.D. are usually on non-tenure tracks, they tend to have limited access to research resources.

Professional Background Characteristics and Research Productivity

College teaching experience. Kotrlik, et al. (2002) found that work experience is a significant determinant of RP in terms of quantity and quality. Experience in college teaching allows exposure to contemporary empirical and theoretical literature and to findings regarding issues relevant to teacher educators. Besides the research skills they tend to possess, experienced teacher educators are more likely to have the know-how for acquiring assistance and resources (Hedjazi & Behravan, 2011). Therefore, it is reasonable to assume that, when

controlling for other factors, such as academic degree, tenure status, and rank, experienced teacher educators are more research productive than their less experienced peers.

Tenure status. Tenured teacher educators tend to be more active in research compared to non-tenured colleagues (Ducharme, 1996). Findings from studies outside education could provide an explanation for this assertion. For example, studies on temporary workers in knowledge-based occupations have revealed that a lack of authority and job security can hinder productivity. Furthermore, it has been shown that temporary workers have limited connections to their employers and to opportunities to network with colleagues—both considered essential for organizational innovation (Barley & Kunda, 2004).

Similarly, it can be assumed that non-tenured teacher educators are likely to have limited connections with the institution's authorities and with their tenured colleagues. They are also likely to have lower degrees and ranks, which presumably results in non-existent or limited research activity due to lacking research skills or self-confidence. Likewise, they face difficulties in obtaining resources and incentives, which are mostly earmarked for tenured and higher-ranking faculty members.

Rank. Although different criteria are usually employed, systems for assigning faculty to different rank levels exist in all higher education institutions. In teacher education colleges, where this study was conducted, a ranking system with six levels (teacher, senior teacher, lecturer, senior lecturer, associate professor and full professor) is common.

In several studies, rank was found to be related to RP (D'Amico, Vermigli, & Canetto, 2011; Hesli & Lee, 2011). D'Amico, et al. (2011) found that full professors published more in local outlets than assistant professors but not more than associate professors, while full professors published more in international outlets than both assistant and associate professors. Full professors were found to be more involved in networks known to promote publications and more likely to have research resources that facilitate publishing. Furthermore, they are more likely to be awarded external grants, which are regarded as one of the best predictors of productivity (Lee & Bozeman, 2005). Teacher educators in higher ranks were, likewise, found to be more active in research and to publish more articles in professional journals than their lower-ranking peers (Ducharme, 1996).

In other studies, however, rank had no influence on faculty RP when other relevant variables were taken into consideration. In some studies (e.g., Leahey, 2006), it was even found that as rank increased, productivity decreased. This may indicate that once worries about tenure or achieving high rank are removed, the motivation of senior faculty members to publish decreases due to the few rewards they are offered for high productivity. It may also indicate that the increased management and administrative responsibilities that those with higher academic rank usually have distracted them from research activity.

Administrative position. Faculty members engage in instruction, research, administration, consultation and community service. It has been shown that an increase in the rate of production in any of these areas may be at the expense of others (Sridhar Dias & Sequeira 2010). Nuqni and Cruze (2012) argued that faculty members with administrative duties could not devote the desired amount of time to their research. Some researchers found a positive relationship between academic position and RP (Sax, et al., 2002), while others (e.g., Korlik, et al., 2002) found no relationship between these two variables. Furthermore, the academic position was seen as a significant factor affecting RP in Thai but not in Western culture (Wichian, et al., 2009). In a study among Italian faculty members, however, Hesli, et al. (2011) found that the more faculty members chair committees and supervise students, the more they publish within a defined period due to the assistance they receive from the graduate students they supervise.

Personality Characteristics and Research Productivity

Attitudes towards research. According to the theory of planned/reasoned behaviour (Ajzen, 2001), positive attitudes towards certain behaviours determine the intention to perform these behaviours. Although intention does not always translate into action (Silver, 2009), positive attitudes can be viewed as a prerequisite for teacher educators' intentions to conduct research.

Although attitude is one of the most researched constructs, only very few studies have focused on attitudes towards educational research. In one study, Krokfors, et al. (2011) examined the attitudes of Finnish teacher educators towards research-based teacher education. Their findings demonstrated that teacher educators appreciated the research-based approach to which their university was committed, yet they were skeptical regarding the degree of success in transmitting this vision to student teachers.

Attitudes towards conducting research and using research findings have caught attention outside of education, such as in medicine and nursing. For example, Robinson and Gould (2000), who examined attitudes towards conducting research and using research findings among 249 general physicians, found that they viewed research as important and as having a direct effect on their performance.

Motives. Teacher educators may engage in research due to either intrinsic or extrinsic motives or both. Intrinsic motives include seeing research as a vehicle for professional development, through which knowledge about teacher education and practice is expanded, critical and reflective thinking is developed (e.g., Inset, 2005) and teaching is enhanced to the benefit of the students. Another intrinsic motive concerns contribution to the educational institution where research findings can be utilized to guide decision making and change. Practicing research can also be motivated by the desire to develop knowledge about teaching and teacher education (Cochran-Smith, 2005).

Extrinsic motives or incentives play a substantial role in the extent to which teacher educators actively engage in research. For example, Gneezy, Meier, and Rey-Biel (2011) noted that monetary incentives have two kinds of effects: the standard direct price effect, which makes the incentivized behaviour more attractive, and an indirect psychological effect. Opponents, however, contend that financial incentives reduce employees' self-determination and intrinsic motivation (Eisenberger, & Cameron, 1998) by directing their behaviour externally (e.g., Deci & Ryan 1985), encouraging them to focus narrowly on a task and take few risks (Kohn, 1993). Besides financial incentives, rewards for promoting RP may include greater research time, promotional opportunities, enhanced facilities, internships within the community and sabbatical leave.

Obstacles. Challenges related to increasing research besides major obstructions to active involvement in research practice were the focus of several studies. Researchers (e.g., Hazelkorn, 2008; Shariatmadari & Mahdi, 2012) have specified three types of obstacles: insufficient development of the institution (e.g., deprived resources and infrastructure); insufficient research capacity and capability (e.g., institutions which are traditionally not resourced for research and academic staff often lacking necessary prerequisite skills and knowledge); and inappropriate or underdeveloped organization, management, and support structures (e.g., blurred research culture and unclear institutional research policy). A well-defined research culture is regarded as critical for fostering research motivation and commitment among faculty members. Indeed, many higher education institutions, particularly teacher education colleges, face challenges establishing a research culture, because many of their faculty were originally hired as teachers rather than researchers (Hazelkorn, 2004).

The existence of one obstacle or more makes conducting research a difficult task. Skoie (2000) referred to this difficulty by stating: "squeezing research out of people and departments that have no training, aptitude or inclination inevitably generates tensions" (p. 417).

Time Devoted to Research

Time for research is a major issue for all faculty members in higher education, as they must simultaneously handle teaching and service responsibilities (Toews & Yazedjian, 2007). Researchers have found that devoting sufficient time for research is associated with greater RP (Bland et al., 2006), while insufficient time during the academic year is the greatest impediment to RP, followed by a heavy teaching load (Santo, Engstrom, Reetz, Schweinnle, & Reed, 2009). Sharobeam and Howard (2002) surveyed mathematics and science faculty members primarily at undergraduate institutions and found that most research was done during the summer vacation and other holiday periods and that less than 15% of these faculty members received release time for grant preparation. These findings could explain the limited RP of many instructors in these institutions. Ma and Runyon (2004), who reported similar findings, suggested that faculty collaboration on developing instructional resources could free time for research, especially among new faculty members.

The purpose of the current study was to examine the extent to which personal (gender, age and education), professional (college teaching experience, tenure, rank and administrative position), personality (attitudes and motives) and contextual variables (obstacles and time constraints) are predictive of RP.

Context of the Study

In Israel, elementary and middle school teachers are prepared in 21 teacher education colleges outside the university system. In these colleges, the requirement to do research and publish is relatively new. Furthermore, at the time the research requirement was introduced to teacher education colleges, as a criterion for tenure and promotion, many teacher educators did not hold Ph.D. degrees. Interestingly, the research requirement was not paired with a reduction in the teaching load, which is twice that of the research universities. Thus, for teacher educators, who found themselves pulled in different directions (e.g., teaching, research, administrative duties), the requirement for involvement in research is not self-evident.

Method

Participants

The sample included 161 teacher educators from four teacher education colleges in Israel who volunteered to participate in the current study. Of the participants 66% were men, 68% were at least 41years old, 63% had more than 10 years of experience in college teaching, 62% had a Ph.D. degree, 26% taught in more than one institution, 63% were tenured, 31% held an administrative position and only 2% were associate or full professors. The sample was representative of the teacher education population at the time of data collection, in terms of gender, age, academic degrees, tenure status and academic rank.

Instrument and Variables

Data were collected using a six-part questionnaire that was specifically developed for the purpose of this study. Part 1 included six items aimed at measuring the volume of participants' RP (sample item: How many research papers have you published in refereed journals in the last two years?). The alpha reliability coefficient corresponding to the RP indicators is acceptable (.72).

The volume of RP was calculated using a combination of Fox's (1992) formula and the weights proposed in HLS/APT (2000) guidelines. More specifically, the RP score was computed as follows:

RP = 1 + log [3(number of research projects as principal researcher) + 3(number of research projects as co-researcher) + 5(number of refereed articles published) + 5(number of books published) + 3(number of chapters in edited books) + 3 (number of refereed presentations) + 0.5].

Responses to the items in parts 2-4 were measured on a six-point Likert scale, where *1* indicated *not at all* while *6* was *to a great extent*.

Part 2 included three items aimed at measuring teacher educators' attitudes towards research (sample item: I support conducting research in my college). Factor analysis with principal axis factoring (PAF) indicated that all three variables loaded significantly on the same factor, accounting for 46.77% of the variance in the data. The alpha reliability coefficient for attitudes towards research is .72. The mean score of the participants' responses on the three items represented the score for attitudes.

Part 3 included 21 items intended to measure motives for engaging in research (sample item: I do research because I believe that good researchers are good teachers). Factor analysis with PAF and oblique rotation yielded four factors accounting for 56.42% of the variance in the motives data. These factors were referred to as "teaching improvement," "commitment to college policy and culture," "personal and professional development" and "knowledge development and learning from research findings." The alpha reliability coefficients for the motive dimensions ranged from .59 to .90.

Part 4 included 20 items aimed at measuring perceptions of obstacles to practicing research (sample item: I do not have sufficient knowledge to conduct academic research). Factor analysis with PAF and oblique rotation yielded three factors accounting for 57.36% of the variance in the obstacles data. These factors were termed "lack of resources and support," "insufficient competence and self-confidence" and "lack of time and interest". The alpha reliability coefficients of the data regarding the obstacles dimensions ranged from .60 to .85.

The reliability coefficients corresponding to the "knowledge development and learning from research finding" dimension of the motives for doing research and to the "lack of time or interest" dimension of obstacles to doing research were relatively low (less than .7). The fact that only three items measure each of these dimensions may explain the relatively low reliability. Given the conceptual importance of these two dimensions, they were retained in the analysis.

Part 5 included questions regarding the participants' background and professional characteristics. In Part 6, participants were asked to report the mean of weekly hours they devoted to research during the two years preceding data collection.

Findings

Descriptive Findings

Research productivity. Participants were asked about the number of research projects they had led or participated in as co-researcher and their number of publications (papers, books

and chapters in books and conference presentations) during the two years preceding data collection.

The results (Table 1) indicated that the distributions of participants' responses regarding their research output are negatively skewed. This is evident in the different values of the central tendency measures and in the considerable percentage of participants who had not been active in research in the examined period. Among those who had been active, a relatively large proportion had been involved in writing books and book chapters. Further investigation revealed that these were mostly handbooks and teaching materials rather than research publications.

Research activity	Mode	Mean	*SD*	% of zero research output
Principal researcher	2	2.37	2.22	21.9
Co- researcher	0	2.10	2.21	28.4
Papers published	0	2.38	2.41	23.3
Books published	0	0.69	1.51	68.1
Chapters in books	0	0.61	1.16	62.8
Presentations at conferences	2	3.11	2.96	21.2

Note. Range of responses 0–10.

Table 1 Modes, Means, and SDs for Research Outputs and the Percentage of Participants with Zero Research Output During the Two Years Prior to Data Collection (N = 161)

The means, *SD*s, number of items and reliability coefficients pertaining to the dimensions of attitude, motives, obstacles and number of weekly hours devoted to research are presented in Table 2.

Factor and items	Mean	*SD*	No. of items	Cronbach's α
Attitudes towards research	5.34	0.86	3	.72
Motives				
Teaching improvement	4.18	0.99	6	.88
Commitment to college policy and culture	4.03	1.05	6	.84
Personal and professional development	4.95	0.86	6	.90
Knowledge development and learning from research finding	3.69	1.06	3	.59
Obstacles				
Lack of resources and support	3.31	1.15	8	.85
Insufficient competence and self-confidence	2.10	1.02	5	.85
Lack of time and/or interest	2.97	1.15	3	.60

Table 2 Means and SDs, Number of Items and Cronbach's *α* for Attitudes, Motives and Obstacles (N = 161, scale=1-6)

The findings indicated that teacher educators' attitudes towards research tended to be strongly positive (mean = 5.34, scale 1–6). As can be seen in Table 2, participants rated all four dimensions of motives as medium to high. The most persuasive motive for conducting research was contribution to personal and professional development followed by teaching improvement, while knowledge development and learning from research findings was rated lowest. As to

obstacles, participants' rated all three dimensions as low to moderate. However, lack of resources was rated higher than the other two dimensions, while lacking research competence and self-confidence was rated lowest, indicating that only a few of the participants admitted lacking competence or self-confidence as obstacles for conducting research. On the average, participants devoted 8.00 weekly hours to research activity. The negatively skewed distribution of participants (*Mode* = 0 and *SD* = 9.48) in terms of time they devoted to research indicates that only few devoted much time while others did not devote any time during the examined period.

Prediction of Research Productivity

To examine the extent to which background and professional characteristics, attitudes, motives, obstacles and time devoted to research predict teacher educators' RP, a hierarchical multiple regression analysis was conducted. To keep the analysis and interpretation simple, all categorical variables with more than two categories were converted into dichotomies. The uneven distributions of participants across the categories of these variables justified this decision. In other words, the categorical variables - age, experience, academic degree, and rank - were recoded into two categories with values of 0 or 1. These variables along with the originally dichotomous variables are presented in Table 3.

Variables	Values	%
Personal characteristics		
Gender	0 = male	34.2
	1 = female	65.8
Age	0 = 40 years or less	32.5
	1 = more than 40 years	67.5
Academic degree	0 = M.A.	38.5
	1 = Ph.D.	61.5
Professional characteristics		
Experience	0 = 5 years or less	37.1
	1 = more than 5 years	62.9
Tenure status	0 = non-tenured	37.3
	1 = tenured	62.7
Rank	0 = teacher or senior teacher	48.7
	1 = lecturer, senior lecturer or professor	51.3
Administrative role	0 = no	69.5
	1 = yes	30.5

Note: Age was recorded into two categories, because the majority of participants were above 40 years old.

Table 3 Distribution of Participants According to Personal and Professional Characteristics

The bivariate correlations among the research variables used in the regression are presented in Appendix A. In general, the correlations among the predictor variables are low to medium. Diagnosis analysis for multi-collinearity using the variance inflation factor (VIF) values indicated this problem does not exist in the data. The correlations between the predictor variables and the RP are also relatively low, and only 11 of the 16 correlations are statistically significant.

The predictive variables were introduced into the hierarchical regression analysis in six clusters (six steps): (1) personal characteristics (gender, age and academic degree); (2)

professional characteristics (experience, tenure status, rank and administrative position); (3) mean score of the teacher educators' attitudes towards research; (4) mean scores on the four dimensions of motives; (5) mean scores on the three dimensions of obstacles and (6) mean of weekly hours devoted to research. The results from the hierarchical regression analysis results are described below.

The predictor variables together accounted for 44.2% of the variance in RP ($F = 5.420$, $p < .001$). Teacher educators' personal characteristics together accounted for 12.1% of the variance RP (model 1), but only the regression coefficient of academic degree was found to be statistically significant when controlling for gender and age ($\beta = 0.344$, $p < .001$). This finding indicated that teacher educators with doctoral degrees tended to be more research productive than their counterparts with master's degree.

The findings also showed (model 2) that teacher educators' professional characteristics contributed significantly ($F_{change} = 3.837$, $p < .001$) to predicting RP and together accounted for 12.4% of the variance beyond that predicted by personal characteristics. However, only the predictive contributions of tenure status and rank were found to be significant ($p < .01$, $\beta = .271$; and $p < .001$, $\beta = .207$, respectively). This finding revealed that tenured and higher-ranking teacher educators showed a larger volume of RP compared with non-tenured and lower-ranking colleagues.

Attitudes (model 3) contributed significantly ($F_{change} = 14.134$, $p < .001$) to predicting teacher educators' RP beyond their personal and professional characteristics and uniquely accounted for 10.1% of the variance in RP ($p < .001$, $\beta = .352$). Teacher educators with more positive attitudes reported higher levels of RP than those with less positive attitudes towards research. Once attitude was introduced into the model, the regression coefficient of tenure status became non-significant, while the contribution of administrative position became significant. This finding indicated that teacher educators with administrative positions are less research productive than those without administrative positions.

The contribution of all four dimensions of motives (model 4) to predicting RP was found to be statistically not significant ($F_{change} = 0.969$, $p = .429$) and together accounted for only 2.7% of the variance, beyond background and professional characteristics and attitude towards research.

The unique contribution of obstacles (model 5) beyond personal and professional characteristics, attitude and motives was found to be significant ($F_{change} = 4.612$, $p = .013$). The three dimensions of obstacles together accounted for 6.1% of the variance in RP beyond other predictors in the model. However, only the unique contribution of lacking research competence and self-confidence was found to be statistically significant ($p < .001$, $\beta = -.344$), whereby teacher educators who rated this obstacle higher tended to be less research productive. The unique contribution of "knowledge development and learning from research findings" as a motive for doing research became significant ($\beta = -.300$, $p < .01$; and $\beta = .240$, $p < .05$ respectively) once the dimensions of obstacles were introduced into the model.

The mean of weekly hours devoted to research was introduced as the sixth set of predictors (model 6). The contribution of this predictor beyond those already in model 5 was found to be not significant ($F_{change} = 1.096$, $p = .298$).

A parsimonious regression model with only the five predictors that had a significant unique contribution to predicting RP in model 6 was calculated using hierarchical multiple regression and the results are presented in Table 4. The findings indicated that academic degree, rank, administrative position, involvement in research due to a desire to develop new knowledge and learn from research findings, and perceiving insufficient competence and self-confidence as obstacles to doing research, together, accounted for 37.1% of the variance in RP. Teacher educators with higher degrees (Ph.D.), higher rank, no administrative position, higher ratings on the motive “knowledge development and learning from research findings” and lower

ratings on the obstacle "insufficient competence and self-confidence" tended to be more research productive than their counterparts. Based on the β values, the most important predictor of RP is the motive of knowledge development and learning from research findings followed conversely by the obstacle caused by lack of research competence and self-confidence.

Regression Model	Variable	*b*	SE_b	*β*	*t*	R^2	ΔR^2
1	*Personal characteristics*						
	Academic degree	0.259	0.076	.315	3.428***		
						.099**	.099**
2	*Personal characteristics*						
	Academic degree	0.217	0.076	.264	2.860**		
	*Professional characteristic*s						
	Rank	0.211	0.079	.267	2.677**		
	Administrative position	-0.027	0.083	-.033	-0.332		
						.161***	.062*
3	*Personal characteristics*						
	Academic degree	0.256	0.071	.310	3.597***		
	*Professional characteristic*s						
	Rank	0.198	0.073	.251	2.702**		
	Administrative position	-0.123	0.080	-.149	1.545		
	Motives						
	Knowledge development and learning from research	0.142	0.033	.372	4.238***		
						.285***	.123***
4	*Personal characteristics*						
	Academic degree	0.198	0.069	.240	2.881*		
	*Professional characteristic*s						
	Rank	0.226	0.069	.287	3.259**		
	Administrative position	-.169	0.076	-.204	-2.221*		
	Motives						
	Knowledge development and learning from research	0.135	0.032	.355	4.278***		
	Obstacles						
	Insufficient competence and self-confidence	-0.128	0.034	-.308	-3.756**		
						.371***	.086***

*p<.05, **p<.01, ***p<.001

Table 4 Hierarchical Regression Results: Values of b, SE_b, β, t , R^2 and ΔR^2 (significant coefficients)

Discussion

The results from the current study revealed that the distributions on all indicators of RP are negatively skewed, revealing that only a few of the participants were actively involved in research in the two years preceding data collection. This pattern characterizes RP in all the higher education institutions examined in previous research conducted in different countries, regardless of discipline or other characteristics such as gender or age (Cole, 2000).

In many countries, Israel included, differences exist between universities and teacher education colleges. At universities, a research record and active involvement in research are usually major requirements in the recruitment process, hence zero RP for two years is unacceptable, particularly before gaining tenure, and such faculty members are usually dismissed. In contrast, in teacher education colleges, many teacher educators are traditionally granted tenure without showing a research record; many of them continue, for various reasons,

to be inactive in research, although research output has recently become a major criterion for promotion.

Teacher educators' positive attitudes, the medium to high ratings they assigned to motives for conducting research and the low ratings the designated to obstacles to doing research did not always translate into increased RP. By controlling for the other variables, it was shown that of the 16 predictor variables, only five — academic degree, rank, administrative position, doing research due to a desire to develop knowledge and learning from research findings and not doing research due to insufficient competence and lacking self-confidence— contributed significantly to predicting the variance in RP. These five predictors also accounted for a substantial amount (37.2%) of the variance in RP.

Similar to the findings reported by Fox and Milbourne's (1999), in the current study teacher educators with a Ph.D tended to be more research productive than their counterparts with a master's degree. The relationship between academic degree and RP has not been explained in the existing literature; therefore, we based our interpretation of this finding on further analyses of our data. Compared to their colleagues with Ph.D. degrees, teacher educators with master's degrees tended to be less experienced and to rate their competence and self-confidence as insufficient. Thus, lacking experience (Kotrlik, et al., 2002) and research competence (Shariatmadari & Mahdi, 2012) can be seen to account for the difference between the two groups in RP.

The tendency of higher-ranking teacher educators to be more research productive than their lower ranking peers concurred with results from previous research (Hesli & Lee, 2011). Their greater productivity can be attributed to their disposition to be more involved in professional networks and to have more resources, research assistants and collaborators, all of which known to advance publishing (Lee & Bozeman, 2005).

The disadvantage of teacher educators with administrative positions in terms of RP coincides with previous research (Nuqui & Cruz, 2012). Administrative responsibilities may negatively affect research activities, because they reduce the time available for research. Yet, our findings contradict the findings from other studies indicating that administrative positions have no effect on RP (Korlik, et al., 2002) or that the more administrative duties faculty members have, the more they publish (Hesli, et al., 2011). This discrepancy might stem from the research context. Unlike the current study, Hesli, et al. (2011) conducted their research in a university context where instructors supervise graduate students who in turn perform many of the research activities and assist their supervisors in publications.

Our finding regarding knowledge development and learning from research findings as a motive for doing research can be explained by Cochran-Smith's (2005) assertion that involvement in research activities could be motivated by a desire to create knowledge about teaching and teacher education. The insignificant unique contribution to predicting the RP of the other motives does not mean they were deemed unimportant by teacher educators. The other three components of motives were in fact rated higher than the desire to develop knowledge and to learn from research findings, yet their contribution to predicting RP beyond the other variables turned out to be insignificant.

Despite claims that a clear research culture is critical for fostering research motivation and commitment among faculty (Hazelkorn, 2004), many teacher education colleges face challenges in their attempts to establish a clear research culture, because many of their faculty members were originally hired as teachers rather than researchers (Skoie, 2000). Support for this contention can be found in Shamai and Kfir’s (2002) conclusion that the dominant culture of Israeli teacher education colleges is not a culture of research. Although there has been some progress since their study, the teaching workload remains relatively heavy, research resources are scarce and college research policies are not well defined. It is, therefore, no wonder that the contribution of conducting research due to a commitment to the college policy and culture (both

are not well defined) to predicting RP was found to be non-significant, although it was highly rated.

Although rated lowest of the three dimensions of obstacles, only the unique contribution to predicting PR of insufficient competence and self-confidence was found to be significant. This finding is not at all surprising, because even when the appropriate resources, support, motivation and culture are provided, improper training, deficient research skills and lack of research confidence are likely to obstruct research endeavours and hence hold back RP.

The insignificant unique contribution of gender, attitudes and time devoted to research is consistent with the results from several studies, which showed that gender differences in RP diminish and even disappear when other variables are controlled (Nakhaie, 2002). Furthermore, positive attitudes do not always guarantee greater RP, because, as argued by Silver (2009), intention does not always translate into performance. Likewise, the amount of time devoted to research does not always predict RP, because it does not necessarily translate into more publications. Publishing can depend on a number of other factors, such as competence, talent, efficiency (Hancock, et al., 2013) and allocation of research time throughout the academic year relative to the summer months (Manchester & Barbezat, 2013).

The results of the current study pose some challenges for teacher education institutions and policy makers. First, if research record is considered important for advancing teaching and raising the institution's prestige besides being a criterion for promotion and resources allocation, the finding that academic degrees predict RP implies that holding a Ph.D. should be a prerequisite in the recruitment process. As to those already in the system, they should be incentivized and encouraged to attain a doctoral degree. Second, the finding that rank is predictive of RP challenges teacher education institutions to find ways to assist teacher educators attaining higher ranks. One way is to help them translate their positive attitudes towards research and their strong motives into RP. This can be done through in-service training programs, mentoring programs for new recruits and policies advancing the sensible use of academic research. Reducing administrative responsibilities can be another means for increasing RP. Another way includes reinforcing teacher educators' intrinsic motivation for doing research and strengthening their desire to contribute to knowledge development and to learning from research findings. Third, if teacher education institutions are to be successful in their attempts to establish well-defined research cultures and compete with universities for resources and prestige, it is critical to establish an institutional system, which aims to advance teacher educators' research competence and self-confidence.

Despite the interesting and important findings of the current study, their generalizability should be confirmed by further research. The fact that many of the books claimed by teacher educators as research output were handbooks and learning materials mandates applying caution when interpreting the findings of the current study. In future studies, a distinction should explicitly made between "research" and "non-research" outputs in order to gain cleaner picture of RP. Furthermore, only direct relationships with RP were examined; future research should also look into indirect relationships such as the effect of attitudes on RP through motives and obstacles. In addition, the contribution to predicting RP of additional variables, such as discipline and teaching load needs to also be explored.

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Appendix A

The Correlations Among the Research Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Background characteristics																
1. Gender	-															
2. Age	.069	-														
3. Academic degree	.210**	.105	-													
Professional characteristics																
4. Experience	-.001	.406***	.240**	-												
5. Tenure status	.161*	.140	.206*	.558***	-											
6. Rank	.253**	.008	.315***	.124	.185*	-										
7. Administrative role	.260**	-.064	.185*	.210**	.372***	.365***	-									
Personality characteristics																
8. Attitudes	.166*	-.130	.198*	.007	.210**	.195*	.367***	-								
Motives																
9. Teaching improvement	-.032	-.130	.075	-.090	.132	.248**	.129	.435***	-							
10. Commitment to college policy	-.053	-.019	.049	.168	-.048	.218**	.271**	.424***	.422***	-						
11. Personal and professional development	-.079	-.100	.066	-.126	-.095	.105	.146	.532***	.703***	.380***	-					
12. Knowledge development and learning from research	.034	-.127	.013	.078	.128	.167*	.262**	.514***	.464***	.522***	.382***	-				
Contextual characteristics																
Obstacles																
13. Lack of resources	-.058	.100	-.108	-.110	-.029	-.173*	-.159	-.298**	-.025	-.358***	-.140	-.155	-			
14. Insufficient competence and Self-confidence	-.179*	.162*	-.315***	.018	-.129	-.083	-.170*	-.395***	-.150	-.106	-.386***	-.116	.341***	-		
15 Lack of interest or time	.091	.147	-.004	.044	-.029	-.058	-.015	-.223**	-.221**	-.227**	-.355***	-.152	.468***	.395***	-	
16. Weekly research hours	.120	-.212**	.058	-.036	.166*	.161	.093	.362***	.215*	-.034	.252**	.116	-.150	-.248**	-.258**	-
17. Research productivity	.105	-.052	.342***	.110	.292**	.329***	.146	.413***	.225*	.309**	.207*	.344***	-.134	-.351***	-.130	.306**

*p<.05, ** p<.01, ***p<.001