Effects of Pre-service Teacher Learning and Student Teaching on Teacher Education

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The purposes of this research were to investigate and examine the effects of pre-service teacher learning and student teaching on teacher education. Three hundred and ten out of 349 intentionally selected participants responded to a two-dimensional survey. The gender, nationality, marital status, age, and academic year had no significant effects, but pre-service teacher learning (71%) and student teaching (75%) had significant influential effects on teacher education. In two academic majors (English education and geology education), pre-service teacher learning, student teaching, and teacher education had significant influential effects. In light of our results, the discussion addresses the influential effects found in this research compared to previous research findings and makes recommendations both for administrators in the University's teacher-education programs and for future research intended to improve the quality of teacher-education programs through the development of and/or improvements to pre-service teacher learning and student teaching as complementary components of teacher education.

Introduction

Teacher education is strongly influenced by both pre-service teacher learning (Education) and student teaching (Training). Education and training complement one another, aiming to provide knowledge acquisition and skills for pre-service teachers; therefore, they are essential for providing teacher education (Cruinckshank & Metcalf, 1994). Education and training are the most significant and necessary educational components of teacher-education programs (American

Association of Colleges for Teacher Education [AACTE], 2010). Prior research (i.e., Brown, Lee, & Collins, 2014; Anderson & Stillman, 2013; Caires, Almeida, & Vieira, 2012; Fan Tang, 2004) has investigated the relationship between pre-service teacher learning and student teaching. However, unanswered questions remain about what and how student teaching contributes to pre-service teachers' development (Anderson & Stillman, 2013; Thomas & Beauchamp, 2011). Therefore, much evidence remains to be investigated and examined about the influential effects of both pre-service teacher learning and student teaching on teacher education.

The purposes of this research are two-fold. First, this study investigates teacher education with respect to the degree of and differences in pre-service teacher learning (education) and student teaching (training). Second, it aims to isolate the variable that most strongly influences teacher education.

Effects of Education and Training on Teacher Education: An Overview

Increased scrutiny of pre-service teacher learning and student teaching has increased pressure on teacher education (Wiens, 2012). In addition, high demand for in-service teachers has forced teacher-education programs to examine new ways to produce teachers both faster and more economically (Darling-Hammond, 2006; Zeichner, 2006). This requires teacher-education programs to simultaneously develop three knowledge areas: (1) knowledge of the subject matter and curriculum; (2) knowledge of learners' development; and (3) knowledge of teaching methodologies (Darling-Hammond & Bransford, 2005). In addition, teacher-education programs should focus on providing pre-service teachers with coherent and integrated coursework, extensive clinical experiences closely linked to their course work, and numerous opportunities to observe and practice in schools that have

strong professional-development relationships with a university partner (Eifler, Potthoff & Dinsmore, 2004).

Pre-service teacher learning, as an initial component of teacher education, focuses on education, which is the knowledge of how to do something (Cruinckshank & Metcalf, 1994), and provides pre-service teachers with opportunities to obtain both knowledge and skills. Therefore, it is difficult to isolate what teacher-education programs contribute to pre-service teacher learning (Wiens, 2012). In addition, pre-service teachers' learning is affected by their student-teaching practices and experiences (Fan Tang, 2004; Koh & Choi, 2014; Caires, Almeida, & Vieira, 2012). Other research (i.e., Hegender, 2010; Segers, Martens, & van den Bossche, 2008) has examined approaches to pre-service teacher learning to fully understand what influences such teachers' work during the third year of their teacher-education programs—a pivotal time in the transition to real-world employment. Additionally, teacher-education programs should include an examination of how systematically and intentionally teach pre-service teachers the skills needed to learn from practices such as behavior modification, interaction analysis, microteaching, simulation, and reflective teaching (Cruinckshank & Metcalf, 1994); to continue to learn from actual teaching practice (Hiebert, Morris, Berk, & Jansen, 2007); and to analyze their teaching performance (Chung & van Es, 2014). For teachers to effectively learn from their teaching, they must possess not only a high level of subject-matter knowledge but also the analytical skills required to identify the cause-effect relationship between their teaching and student learning in the classroom. Subject-matter competency enables pre-service teachers to break down complex ideas in ways that make those ideas more accessible to students. In addition, well-developed analytical skills allow pre-service teachers to establish learning goals for students, to assess whether those goals are met during

instruction, to develop hypotheses about their success or failure to achieve those goals, and to use those hypotheses to revise their lessons (Hiebert, Morris, Berk, & Jansen, 2007). These analytical skills should be taught systematically and strategically, and teachers should be provided with multiple opportunities to practice them (Hiebert, Morris, Berk, & Jansen, 2007; Taylor & Pettit, 2007). To obtain these skills, pre-service teachers need not only more clinical practice but also more opportunities to interact with in-service teachers (Zeichner, 2006).

Student teaching, the final component of teacher education, focuses on training, which is the knowledge of knowing how to do something (Cruinckshank & Metcalf, 1994), prepares pre-service teachers to teach in schools by giving them intense training on aspects of teaching in real classrooms (Farrell, 2008), and confirms both the importance and the positive effects of the teachers' training (Brown, Lee, & Collins, 2014). The majority of teacher-education programs not only support and reinforce the importance of student teaching for contributing to pre-service teacher learning (Koç, 2012) but also ensure that pre-service teachers' productive learning experiences cultivate strength and richness in their teaching skills and repertoire along with an appropriate mix of challenge and support in the student-teaching context (Fan Tang, 2004). Therefore, student-teaching practices play a determinant role in pre-service teachers' initial education and the early development of their teaching career, in which learning and progress is made through student teaching (Caires, Almeida, & Vieira, 2012; Caires & Almeida, 2005). Pre-service teachers practice their teaching skills during student teaching, which provides them with more responsibility for learning, designing and implementing curricular activities (Brown, Lee, & Collins, 2014). In addition, the student-teaching experience provides pre-service teachers with opportunities for personal and professional

growth at various grade levels and in various content areas, along with an opportunity to evaluate and reflect on their own teaching abilities and skills (Brown, Lee, & Collins, 2014). Therefore, pre-service teachers need to know how to assess and evaluate pupils' behavior, plan instruction, conduct instruction, analyze and reflect on their teaching, develop positive pupil self-conceptions, problem solve, manage and control the classroom, perform administrative skills, and serve as teacher educators (Cruinckshank & Metcalf, 1994). Thus, pre-service teachers develop a sense of efficacy through their teaching practice (Khoury-Kassabri, 2012; Brown, Lee, & Collins, 2014).

Methods

Participants

Three hundred and forty-nine pre-service teachers were intentionally selected to participate in this study. Three hundred and ten (88.8%) responded by the end of the spring semester of the 2014-2015 academic year. The participants were both female (N=285, 91.9%) and male (N=25, 8.1%). Their ages varied from 20-22 years (N=154, 49.7%), 23-25 years (N=130, 41.9), and 26 years and above (N=26, 8.4%). Each participant had majored in one of 8 different academic majors (i.e., social studies education, Islamic studies education, Arabic education, kindergarten education, English education, geology education, chemistry education, and mathematics education). Each had attended one of thirteen different sections of a seminar subject-education course offered by the curriculum and instruction department in the college of education at Kuwait's first established public university. This seminar subject-education course is a pre-graduation requirement and must be taken after the completion of a student-teaching experience in one of Kuwait's public schools. The specific subject-education seminars that the participants attended were as follows: 84

(27.1%) in social studies education, 72 (23.2%) in Islamic studies education, 54 (17.4%) in Arabic education, 47 (15.2%) in kindergarten education, 29 (9.4) in English education, 11 (3.5%) in geology education, 10 (3.2%) in chemistry education, and 3 (1.0%) in mathematics education. The participants were trained for 3 to 3.5 years by professional faculty members in the college of education. Participants were also supervised during their one-semester student-teaching experience by two teaching experts, an assigned faculty member from the college of education and a qualified mentor-teacher who worked in a public school.

Instrument

A survey consisting of 20 items divided into two dimensions was developed to focus on those two dimensions. The first dimension included 11 items that focused on the pre-service teacher learning (education) by examining aspects of the participants' knowledge related to subject matter and curriculum, learner development, and teaching methodology. Some representative items from the first dimension are as follows: *"I know the steps necessary to effectively teach the subjects in my education major*" and *"I possess a good knowledge of topics in my education major that sufficiently qualify me to teach students."* The second dimension included the other 9 items, which focused on student teaching (training) by examining other aspects of the skills related to student-teaching performance and its outcomes in the schools. Some representative items from the second dimension include the following: *"Improvements in the scores of the students are due to my use of the most effective manners of teaching"* and *"Student achievement is directly related to the effectiveness of the student teacher in teaching the subject of the lesson."* The survey was originally written in Arabic, the formal learning language in Kuwait's teacher-education programs and the country overall, and was used for other purposes in this research. Both the validity and reliability of the survey were assessed.

First, a face and content validity step was performed: (1) the survey was given to five university professors specializing in education, and their suggested changes were implemented; and (2) a construct validity for the survey used a pilot study consisting of 20 pre-service teachers who were randomly selected and that indicated a significant Pearson correlation ($a>0.01$) between each of the two dimensions and the overall survey. Second, the reliability of the survey was tested using (1) a Cronbach's Alpha of 0.74; and (2) a Spearman-Brown Coefficient of 0.581 using a Split-half test. Finally, each of the items in the survey was measured along a six-point Likert scale (from *strongly disagree* to *strongly agree*).

Procedure

A survey was distributed, collected and sealed in an envelope by the research assistant when the pre-service teachers attended their seminar subject-education classes at the college of education. The survey was administered two weeks before the end of the spring semester of the 2014-2015 academic year. All of the seminar classes took place in the afternoon, after the pre-service teachers had finished the school day. The data from the survey were coded and analyzed using several statistical tests (correlation, frequency-percent, standard deviation, means, independent samples, one-way analysis of variance (ANOVA), two-way ANOVA, least significant difference (LSD), and partial Eta squared) using SPSS version 20.0 (IBM Corp Armonk, NY, USA).

Results

This research examines the relationship, differences, and effects of five independent variables (gender, nationality, marital status, age, and academic year) and three dependent variables (pre-service teacher learning, student teaching, and teacher education).

First, Table 1 presents the descriptive statistics, which indicate the overall means (M=4.33) for all 20 items in both the first and second dimensions of the survey. The overall mean (M=4.46, SD=0.65) for all of the items (12-20) in the second dimension (reflecting student teaching) was higher than the overall mean (M=4.22, SD=0.05) for all of the items (1-11) in the first dimension, reflecting pre-service teacher learning. In addition, the lowest mean (2.69) in the survey was item 9. This indicates that student teaching was more effective than pre-service teacher learning on the teacher education in this research study. Moreover, the results show that four items (10, 1, 11, and 2) had higher means, between 5.00-5.22. In addition, item 20 had the highest mean (5.02) among the items for the second dimension of the survey.

Second, the similarity results, shown in Table 2, found in all eight academic majors However, there were two academic majors—English education and geology education—with higher means than the other academic majors for all three of the dependent variables (pre-service teacher learning, student teaching, and teacher education).

Third, the differences in the independent variables, such as gender, nationality, marital status, age, and academic year, were not significant ($p>0.05$), as shown in Table 3. However, a one-way ANOVA test used for the pre-service teachers' academic majors indicated significant differences. In general, the results showed that the F value was not significant ($p>0.05$) in either dimension (pre-service teacher learning or student teaching) of the survey; moreover, it was not significant for teacher education. This indicated that there were no differences found in the pre-service teachers' majors, even between the two academic majors (English education and geology education) that had higher means than the other academic majors.

Table 1. Means and Standard Deviations for All Items in the Survey

Dimensions		No.	Means (M)	Standard Deviation (SD)
First	Pre-service Teacher Learning (Education)	1	5.06*	1.06
		2	5.00*	1.41
		3	4.92	1.12
		4	2.83	1.32
		5	3.90	1.54
		6	4.92	1.04
		7	4.01	1.28
		8	3.17	1.70
		9	2.69	1.53
		10	5.22*	1.00
		11	5.00*	0.95
		Overall	4.22	0.50
Second	Student Teaching (Training)	12	4.97	0.97
		13	4.37	1.26
		14	4.90	1.07
		15	3.20	1.45
		16	4.79	1.14
		17	4.30	1.24
		18	4.24	1.24
		19	4.65	1.05
		20	5.02*	1.07
		Overall	4.46	0.65
Overall for Two Dimensions			4.33	0.46

** indicates higher means.*

Table 2. Means and Standard Deviations for Pre-service Teacher Learning, Student Teaching, and Teacher Education According to Academic Major

Major	No.	Pre-service Teacher Learning		Student Teaching		Teacher Education	
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Social Studies Education	84	46.80	5.56	39.04	6.41	85.83	10.06
Islamic Education	72	45.57	6.46	40.39	5.52	85.96	9.25
Arabic Education	54	46.69	5.38	39.31	5.35	86.00	8.60
Kindergarten Education	47	45.15	5.09	40.30	6.30	85.45	9.88
English Education	29	48.48	4.22	42.86	5.23	91.34	7.64
Geology Education	11	47.64	2.54	42.82	4.49	90.45	4.95
Chemistry Education	10	46.80	5.67	40.50	6.17	87.30	7.92
Math Education	3	46.33	7.51	38.67	0.58	85.00	8.00
Total	310	46.43	5.54	40.13	5.88	86.55	9.25

Table 3. One-Way ANOVA Results (F) for Pre-service Teaching Learning, Student Teaching, and Teacher Education

		Sum of Squares	Df	Mean Square	F	Sig.
Pre-service Teacher Learning	Between Groups	284.92	7	40.70	1.33	0.234
	Within Groups	9,214.87	302	30.51		
	Total	9,499.79	309			
Student Teaching	Between Groups	446.36	7	63.77	1.88	0.072
	Within Groups	10,229.73	302	33.87		
	Total	10,676.09	309			
Teacher Education	Between Groups	989.14	7	141.31	1.68	0.114
	Within Groups	25,463.54	302	84.32		
	Total	26,452.67	309			

Third, the differences in the independent variables, such as gender, nationality, marital status, age, and academic year, were not significant ($p>0.05$), as shown in Table 3. However, a one-way ANOVA test used for the pre-service teachers' academic majors indicated significant differences. In general, the results showed that the F value was not significant ($p>0.05$) in either dimension (pre-service teacher learning or student teaching) of the survey; moreover, it was not significant for teacher education. This indicated that there were no differences found in the pre-service teachers' majors, even between the two academic majors (English education and geology education) that had higher means than the other academic majors.

Fourth, the effects of pre-service teacher learning and academic majors on teacher education were evaluated using a two-way ANOVA. The results, which are shown in Table 4, indicate that significant effects ($p<0.01$) were found for pre-service teacher learning on teacher education. Neither academic majors nor their interaction with pre-service teacher learning had an effect on teacher education, indicated by an F value that was not significant ($p>0.05$). Specifically, the Eta squared test results indicated that the overall effect of pre-service teacher learning on teacher education was 71%, but no effects were found ($p>0.05$) for academic majors on overall teacher education. This means that no effects were found for pre-service teacher learning or academic majors on teacher education ($p>0.05$).

Table 4. Two-Way ANOVA for the Influence of Both Pre-service Teacher Learning and Academic Majors on Teacher Education

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4558.121[a]	111	41.06	1.33	0.042	0.427
Intercept	109748.88	1	109748.88	3551.88	0.000	0.947
Pre-service Teacher Learning	2185.93	32	68.31	2.21	0.001	0.263
Academic Majors	340.08	7	48.58	1.57	0.146	0.053
Pre-service Teacher Learning * Academic Majors	1730.30	72	24.03	0.78	0.891	0.220
Error	6117.97	198	30.90			
Total	509801.00	310				
Corrected Total	10676.09	309				

Table 5. Two-Way ANOVA Results of Effects and Interaction between Student Teaching and Academic Majors on Teacher Education

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	21256.271[a]	118	180.14	6.62	.000	.804
Intercept	579222.04	1	579222.04	21290.00	.000	.991
Student Teaching	15871.99	31	512.00	18.82	.000	.753
Academic Majors	170.82	7	24.40	0.90	.510	.032
Student Teaching* Academic Majors	2048.98	80	25.61	0.94	.615	.283
Error	5196.40	191	27.21			
Total	2348719.00	310				
Corrected Total	26452.67	309				

Fifth, the effects of student teaching and academic majors on teacher education were measured using a two-way ANOVA. The results, which are shown in Table 5, indicate that significant effects ($p<0.01$) were found for student teaching on teacher education. Neither the academic major nor the interaction of that major with student teaching was found to have an effect on teacher education, as indicated by an F value that was not significant ($p>0.05$). Specifically, the Eta squared test results indicated that the overall effect of student teaching on teacher education was 75, but no effects were found ($p>0.05$) for the academic majors on teacher education. This means that no effects were found for student teaching or academic majors on teacher education ($p>0.05$).

Discussion and Conclusion

This research investigated the degree of and differences in pre-service teacher learning (education) and student teaching (training) in teacher education, and examined them to determine the most influential dependent variables affecting teacher education.

In general, the results illustrated significant influential effects for pre-service teacher learning (71%) and student teaching (75%) on teacher-education programs. This indicated that pre-service teachers benefited from student teaching (training) more than pre-service teacher learning (education), thus confirming and supporting previous research. More specifically, the results for each of the two dependent variables—i.e., pre-service teacher learning (such as the education in teacher-education programs) and student teaching (such as training in schools)—are discussed below.

On the one hand, the results of the pre-service teacher learning (education) showed that such learning is important for teacher-education programs. Specifically, 4 out of 11 (i.e., 10, 1, 11, 2) items had the highest means of all of the items in the entire first dimension of the survey. The

results of this research indicated the importance of that education for developing knowledge and skills in certain areas for pre-service teachers, which has been both confirmed and supported by previous research. For instance, item 10 ("*I always welcome my students with questions on the subject of the lesson in the classroom*" *(M=5.22, SD=1.00)*) emphasized that addressing students' questions in the classroom significantly influenced pre-service teachers' learning. This both confirmed and supported previous research findings that indicated the importance of both gaining knowledge and responding to students' questions during instruction (Darling-Hammond & Bransford, 2005) to learners' development. Item 1 ("*I always employ the best teaching methods learned in my education major to teach subjects in the classroom*" *(M=5.06, SD=1.06)*) emphasized employing teaching methods that significantly affected the pre-service teachers' learning. This both confirmed and supported previous research findings that emphasized employing teaching methods that have been effectively developed through not only knowledge of the subject matter, curriculum, and teaching methodology, but also the strength and richness of the teaching (Fan Tang, 2004; Darling-Hammond & Bransford, 2005; Hiebert, Morris, Berk, & Jansen, 2007; Taylor & Pettit, 2007; Chung & van Es 2014; Koh & Choi, 2014). Item 11 ("*I know what I have to do to gain students' attention to the subject of the lesson in the classroom*" *(M=5.00, SD=0.95)*) emphasized that keeping students' attention during instruction was significantly influenced by the pre-service teachers' learning. This confirmed and supported previous research findings showing that teachers' specific skills related to student behaviors developed as a result of the knowledge of the subject matter, curriculum, teaching methodology and behavior modification (Cruinckshank & Metcalf, 1994; Darling-Hammond & Bransford, 2005). Item 2 ("*I have the confidence to teach my students as my colleagues do in the field of student teaching*" *(M=5.00,*

SD=1.41)) emphasized being confident in one's teaching, which was influenced by pre-service learning of teaching skills. This finding both confirmed and supported other previous research findings that revealed that confidence in teaching students developed in the following ways: (1) gaining necessary skills and knowledge of the subject matter curriculum, teaching methodology; (2) confronting appropriate challenges; (3) receiving support for both student teaching and clinical practices such as microteaching until reaching an acceptable level of performance; and (4) obtaining opportunities to interact with both experts and colleagues (Cruinckshank & Metcalf, 1994; Fan Tang 2004; Darling-Hammond & Bransford, 2005; Zeichner, 2006).

Conversely, other results related to student teaching (training) were much more important than the previous results on the pre-service teacher learning, such as the results represented in item 20, the item with the highest mean of the 9 items in the second dimension of the survey. Item 20 ("*Students show more interest as a result of the performance of the student teacher*" *(M=5.02, SD=1.07)*) emphasized that the outcomes of student teaching performance developed through training on knowing how to do something was related to the knowledge and skills gained in practice. This confirmed and supported previous research findings that pointed out the significant effects of teaching experiences on pre-service teachers, including a reasonable sense of professional identity, the choice of a good career, the ability to positively affect students in the classrooms, and the opportunity to reflect on their own teaching abilities and skills (Cruinckshank & Metcalf, 1994; Caires & Almeida, 2005; Hiebert, Morris, Berk, & Jansen, 2007; Caires, Almeida, & Vieira, 2012; Khoury-Kassabri, 2012; Brown, Lee, & Collins, 2014).

In conclusion, this research highlighted several important results, particularly the influential effects of student

teaching over the course of a single one semester, that should be considered for developing future teacher-education programs at the university. Because these results primarily relate to two components of teacher education—i.e., education and training—some recommendations are provided. First, because student teaching had more significant influential effects than pre-service teacher learning on teacher education, more training practice should be provided to pre-service teachers during their initial academic courses offered in teacher-education programs. This would allow pre-service teachers to practice teaching more in the college of education and learn from such teaching experiences before conducting their student teaching in the schools. Second, we recommend establishing a laboratory teaching experience as part of the education component of teacher-education programs, thus enabling pre-service teachers to learn and obtain the most needed knowledge and skills through clinical practices such as simulation, microteaching, and reflective teaching. Third, we recommend developing a collaboration program between teacher-education programs and schools for enhancing the relationships, training, and work between the university supervisors and mentor teachers in the schools, thus benefitting pre-service teachers during their preparation in teacher-education programs. Finally, future research should investigate the effects of increasing training practices during initial education, in which pre-service teacher learning takes action and measure its influences on the quality of both pre-service teachers' development and teacher-education programs.

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