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Student Teaching Enhancement Program (STEP) and Preservice Teachers' Teaching Efficacy in Science

Öğrenci Öğretim Geliştirme Programı ve Öğretmen Adaylarının Fen Bilgisi Öğretme Yeterliği

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Abstract

The present paper discusses the effect of the Student Teaching Enhancement Program (STEP) provided to science preservice teachers in a teacher education institute on their teaching efficacy. The STEP is a program that is designed to impact the areas that influence preservice teachers' teaching efficacy. Teaching efficacy is an important construct that should be enriched among teachers since the teachers' belief on their ability to teach significantly affects their performance in the classroom. The STEP has been conducted for a semester and a program evaluation came after. To determine the level of teaching efficacy of the participants they were asked to answer a teaching efficacy survey adopted from the Ohio State Teacher Efficacy Scale developed by Moran and Hoy (2001). The data collected has been subjected to descriptive statistical measures to determine the effect of STEP. Also, an inferential measure was done to compare if the said effects vary by gender and major. Implications of STEP on teacher education program were also discussed.

Key words: Student Teaching Enhancement Program (STEP), Innovation in Teacher Education, Teaching Efficacy, K12 Teacher Preparation

Öz

Bu çalışmada, bir öğretmen yetiştirme kurumunda fen bilgisi bölümündeki öğretmen adaylarına sağlanan Öğrenci Öğretim Geliştirme Programının (ÖÖGP), söz konusu öğretmen adaylarının öğretme yeterliğine olan etkisi ele alınmıştır. ÖÖGP, öğretmen adaylarının öğretme yeterliğini etkileyen alanlara yönelik olarak tasarlanmış bir programdır. Öğretmenlerin öğretme kabiliyetlerine olan inançları sınıftaki performanslarını önemli oranda etkilediği için öğretme yeterliği, öğretmenler arasında güçlendirilmesi gereken önemli bir yapıdır. ÖÖGP bir akademik dönem boyunca uygulanmıştır, ve sonrasında da program değerlendirme gerçekleştirilmiştir. Katılımcıların öğretme yeterlik düzeylerini belirlemek amacıyla, Moran ve Hoy (2001) tarafından geliştirilen Ohio Eyaleti Öğretmen Yeterlik Ölçeği'nden uyarlanan öğretme yeterlik anketi katılımcılara uygulanmıştır. Elde edilen veriler, ÖÖGP'nin etkisini belirlemek amacıyla betimleyici istatistiksel analizlere tabi tutulmuştur. Ayrıca, söz konusu etkilerin cinsiyete ve bölüme göre değişiklik gösterip göstermediğini görebilmek amacıyla çıkarımsal ölçümler de gerçekleştirilmiştir. Öğretmen yetiştirme programına yönelik ÖÖGP'den elde edilen çıkarımlar da çalışmada tartışılmıştır.

Anahtar kelimeler: Öğrenci Öğretim Geliştirme Programı (STEP) , Öğretmen Eğitimi , Öğretim Etkinliğinin , K12 Öğretmen Hazırlık Yenilik

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Introduction

The role of pre-service education is significant to a teacher (Cheng, 2013). The experiences that pre-service teachers have in universities should equip them for the real life classroom challenges (Lopes & Tormenta, 2010). Thus, it is imperative that teacher education institutions should innovate programs to help pre-service with their needs. With this idea in mind, the present research investigates the Student Teaching Enhancement (STEP) of the Institute of Teaching and Learning (ITL) of the Philippine Normal University (PNU) on teaching practices, beliefs, and attitudes of science pre-service teachers.

The STEP has been a long practice at the ITL but it has been revised by Montebon (2015) upon conducting a needs assessment survey on the science pre-service teachers. The revision was deemed necessary since the result of the survey showed that several factors have been pointed out by the science pre-service teachers. Cheng (2013) described in his paper that identifying factors for teacher-learning is essential to help improve efforts on teacher education. Yilmaz and Çavaş (2008) stressed that teacher education programs that bridges the gap between the theories in education and what do they really need in teaching must be designed.

This research is relevant to determine the effects of the STEP program on pre-service teachers' teaching efficacy. Upon doing so, recommendations whether to continue the STEP program can be realized. Also, this research seeks to contribute to the knowledge in teacher education by designing a model on enhancing preservice teachers' teaching skills. Other teacher education institutions may opt to adapt the STEP program when the results of the study are found to enhance pre-service teachers' teaching efficacy.

Review of Related Literature

Teacher Preparation

"Am I ready to teach?" is a question that most pre-service teachers ask. Yilmaz and Cavaz (2007) described that both inservice and pre-service teachers feel inadequate to teach science. Such hesitation may have been a result of the lack of connection between theories and practice. According to Lopes and Tormenta (2010) the professional identity of teachers

starts even before they enter the teacher education program and it develops over time as they progress in the program. Therefore, teacher education programs should prepare activities that are parallel with theories learned from professional education courses to make the experience meaningful (Zeichner, 2010 as cited by Cheng, 2008). Novice as they are, pre-service teachers need reinforcements that will surely support them as they prepare to become 'real' teachers in the classroom. This is important for them to cross the border from pre-service to in-service teaching. The said transition includes both physical and mental realms (MacGregor, 2009).

In a paper written by Lopes and Tormenta (2010) they said pre-service training contributes to their quest for the teacher identity that they would like to become. However, the said impact gets neutralized when exposed to the field of work. In their long interviews conducted, participants pointed out the 'shocks' that they have encountered. Pre-service teachers had to make adjustments to survive in the school culture. Thus, their preconceived teacher identity undergoes a series of reshaping upon encountering real life teaching process. With these results, Lopes and Tormenta (2010) inferred that the efforts of the universities to provide coursework and trainings gets 'wasted' in a certain sense. Thus, they suggested that trainings should be designed a notch higher than the traditional ones. Trainings should not be designed to be too academic but rather be delivered with relevance to the context of work.

Chapman and associates (n.d.) investigated the effect of a semestral-long seminar on preservice teachers. The result of their study showed that preservice teachers have performed better in their practice teaching compared to their colleagues. The seminar that Chapman and his associates (n.d.) is similar to the STEP referred in this research. Thus, a positive effect on preservice teachers' preparedness toward practice teaching because of an intervention is also expected. Such result is reinforced by the research done by Pendergast, Garvis and Keogh (2011) that undergraduate programs of preservice teachers influence their teaching efficacy. The passion of new teachers towards teaching is surprising since they still lack teaching experience. They hypothesized that the zest of new teachers in the field may have been due to their experiences in teaching practicum. Hence, the present research aims to further the teaching efficacy of the preservice teachers through the STEP program.

Moreover, in the study conducted by the Organizatin for Economic Co-operation and Development (OECD) in 2009, they suggested that teachers need professional development sessions that answers their perceived needs in the classroom. Such professional development activities may come in the form of seminars, workshops and even mentoring activities. The STEP considers these suggestions upon designing effective professional activities that will help preservice teachers.

Teaching Efficacy

The notion whether a teacher 'can do it' in the teaching learning process is described as teaching efficacy. Such definition has been derived from the theory of efficacy of Bandura (1977) which is the belief of a person to achieve a certain goal or accomplish certain tasks. Teaching efficacy is the measure of the teacher's belief that what they are exerting in their job matters in the student-learning (Joseph, 2010; Cheng, 2011). A teacher's sense of self-efficacy determines how successful will the teaching-learning process be. Teachers with high self-efficacy particularly towards science will deliver the lesson better than those with low self-efficacy.

There are different sources of teaching-efficacy (Bandura, 1977 as cited by Oh, 2010). First is the mastery experience. This factor has something to do with the pre-service teacher's experience in a classroom. A successful teaching activity enables a pre-service teacher's to develop high teaching efficacy. In contrast, a decrease in teaching-efficacy may develop if preservice teachers perceived that their teaching experience is a failure. Thus, cooperating teachers of pre-service teachers should ensure the readiness of the pre-service teachers before they stand in front of the class and manage learning instructions.

Another factor that influences teaching efficacy is vicarious experiences. These experiences are obtained from observing other people doing a particular task. It is evident that pre-service teachers assess their abilities by comparing themselves with the experts they are looking up to (Poulou, 2007 as cited by Oh, 2010). Therefore, it is essential that cooperating teachers during practicum should exhibit mastery in teaching profession in both content and pedagogy because it also enhances a pre-service teachers' self-efficacy.

Social or verbal persuasion is also a factor that affects teaching efficacy. These factors are combinations of different activities such as coursework, workshops, trainings, and even

cooperating teacher's feedback. A continuous system support that enriches the capabilities of pre-service teachers is needed to enhance their teaching-efficacy. Positive feedbacks from an after-demo or giving suggestions how they can improve their work enables teacher to assess their capabilities and think on ways how to improve. In doing so, pre-service teacher enhances their teaching-efficacy.

The last factor that affects the teaching efficacy of pre-service teachers is their physiological and/or emotional states. These factors guide a person on how to make sense of their physical and emotional reactions. Problems encountered by a person arose from the lack or poor perception of one's ability while happiness and satisfaction results from an accomplished task. These feeling of satisfaction and contentment can increase a teacher's sense of teaching efficacy.

Student Teaching Enhancement Program

Upon the review of different literatures, Montebon (2015) revised the Student Enhancement Program (STEP) that was being implemented at the PNU ITL. The existing STEP is a seminar-type program where speakers are being given a short period of time to discuss issues, trends, and strategies in education. Such method has been perceived by Montebon (2015) to be shallow in terms of the impact that it will leave on students. Hence, the revision of the program was made.

Also, the seminar-workshop has been designed upon the needs assessment survey that was also conducted by Montebon (2015) to ensure a responsive professional development program. The revised STEP includes different activities such as seminar workshop, lesson plan writing sessions, dry run and critiquing of demonstrations. These activities were carefully designed to impact the teaching efficacy of pre-service teachers (OECD, 2009). Figure 1 below shows the conceptual framework of this research.

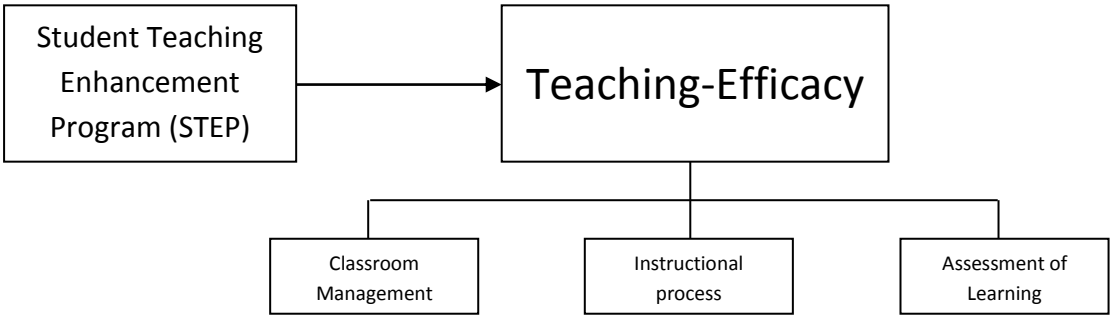

Figure 1. Conceptual Framework on the Effect of STEP to Teachig Efficacy

The conceptual framework shows the different constructs involved in this study. The STEP is a researcher designed program that hopes to positively affect pre-service teachers' sense of teaching-efficacy. In the present research, an innovative program called Student Teaching Enhancement Program (STEP) and its effect on pre-service teachers' teaching efficacy is being investigated. Areas in teaching efficacy that were specifically investigated are student engagement, instructional strategies, and classroom management.

Research Purpose

The present research has been conducted to determine the effect of Student Teaching Enhancement Program (STEP) revised by Montebon (2015) on preservice teachers' teaching efficacy. Specifically, this study aims to achieve the following objectives:

1. Determine the teaching efficacy of preservice teachers upon participating in the STEP program
2. Compare the teaching-efficacy of preservice teachers among
    a. gender
    b. and specialization/majorship.
3. Distinguish the teaching efficacy scale of pre-service teachers in terms of
    a. student engagement,
    b. instructional strategies
    c. and classroom management.

Methodology

Research Design and Respondents

This study employs a quantitative survey method research design. Out of the one hundred forty (140) pre-service teachers who attended the STEP, seventy (70) were randomly selected to be the respondents of this this study. Further demographics of the respondents are shown in Table 1 below.

Table 1. Demographics of the Respondent (N=70)

Grouping		Frequency	Percentage
Gender			
	Male	20	28.6
	Female	50	71.4
Major			
	General Science	18	25.7
	Biology for Secondary Education	21	30.0
	Biology for Teachers	31	44.3

Instrument

In the present research, the Ohio State Teacher Efficacy Scale developed by Moran and Hoy (2001) has been utilized. It includes 24 questions that generally ask how much can a teacher do in different teaching areas. The scale involves a nine-point scale where 1 means 'nothing' and 9 which is a 'great deal'. The scale involves three different subscales which are student engagement, instructional strategies, and classroom management. The Ohio State Teacher Efficacy Scale is a standardized scale thus it has been subjected to reliability and validity already. Moran and Hoy (2001) reported that the Cronbach Alpha coefficient of the test is 0.90 (engagement = 0.81, instruction = 0.86, and management = 0.86)

The Intervention (STEP)

The Student Teaching Enhancement Program (STEP) as revised by Author (2015) includes activities that were purposely designed to impact the teaching efficacy of preservice teachers. The program lasted about four months or one semester. Table 2 shows the program outline of STEP.

Table 2. Program Outline of STEP

Teaching Efficacy Area	Methods
Vicarious Experiences	• Teacher interviews • Class observations • Modelling
Mastery Experience	• Lesson planning lecture and workshops • Drafting and administering assessment tools • Simulation of demonstration(dry run) • Class demonstration • Extension Work

Verbal Persuasion	• Seminar • Workshop • Critiquing of demonstration • Output processing • Item analysis of assessment tools
Physiological and/or emotional states	• Journal Writing • Professional portfolio • Feedback system (oral and written)

Though the STEP program shows proven methods for teacher training, it is a program that allows preservice teachers to directly apply theories and principles of learning in the classroom because the participants are in their field study course at the institute and the that the researcher supervises them in their student teaching program. Thus, preservice teachers are able to test the theories and techniques that they have learned in a real classroom.

The seminar workshops conducted focused on the areas of concern that were manifested by the teachers on the needs assessment survey of Montebon (2015) which are K12 implementation, teacher personality, teaching strategies, classroom management, questioning skills and assessment. Though the manner of the seminar is academic, the workshops are contextualized. What they have learned during the lectures on the workshops were allowed to be implemented in their classroom experiences to let them realize the importance of the concepts that they learned in the seminar in their field of work. Various mentoring strategies were also conducted to help preservice teachers as they face the student and handle the class. A feedback system which includes the supervisor's observations on their work and other preservice teachers that observed them was done to help improve their performance as they do their classroom demonstrations.

Results

Teaching efficacy level of pre-service teachers

The Ohio State Teacher Efficacy Scale includes nine-point scale (1 as lowest, 9 as highest) and about twenty four items. Thus, the over-all scores of the respondents range from 24 to 216. To interpret the level of teaching efficacy of the preservice teachers upon participating in the STEP program, a range with corresponding interpretation is needed. In

this research, scores that range 1 to 72 means 'low teaching efficacy, 73 to 144 means 'average teaching efficacy' and scores 145 to 216 means 'high teaching efficacy'. Table 3 below shows the summary of teaching efficacy scores of respondents when grouped by gender, by majorship and the overall score in general.

Table 3. STEP respondents' mean scores (N=70)

Grouping		N	M	SD
Gender				
	Male	20	162.3	29.14
	Female	50	174.58	21.78
Major				
	General Science	18	176.00	16.60
	Biology for Secondary Education	21	178.48	20.49
	Biology for Teachers	31	163.19	28.83
OVERALL		70	171.07	24.53

From Table 3, it can be inferred that the respondents had a very high teaching efficacy due to their participation in the Student Teaching Enhancement Program (STEP). It can therefore be deduced that STEP is an effective program in helping preservice teachers improve their teaching efficacy. Samples of journal entries from participants of STEP are shown below.

"My experiences on STEP provided by our field study supervisor are all genuine. Everything is unpredictable, but real. Real school, real students, and real teaching experience. Thus, the experiences I had, prepared me to become a good teacher someday" - Male, Biology

"I find STEP very relevant to my program because it exposed me to real-life experiences and actual teaching environment that I will be facing someday. This is the first time that I have handled real high school students so in a way, it made me ready for the field." – Female, Biology for Teachers

"My experience in ITL as I participated in the STEP opened my eyes to 'who I would really be' and what would I be doing for the rest of my life. It has set a fire in my heart to teach and touch lives. It is such a wonderful experience." – Female, General Science

Upon the normality test using Kolmogorov-Smirnov it has been found out that scores when grouped per gender is not normally distributed. Thus, a nonparametric test (Mann

Whitney U Test) was utilized in comparing the scores per gender. On the other hand, the Kolmogorov-Smirnov test of normality on majorship revealed that scores among different majorship is normally distributed. Hence, ANOVA was utilized to compare scores according to majorship.

Table 4 below shows the result of the comparison of scores among gender through Mann Whitney U test.

Table 4. Mann-Whitney U test for gender

	Gender	N	Mean Rank	Mann-Whitney U	Asymp. Sig. (2-tailed)
Teaching Efficacy Score	Male	20	28.48	395.5	0.68
	Female	50	38.31		

Note. p=0.5

The data analysis above showed that females who participated had a higher mean rank (M=38.2) than males (M=28.48). However, the Mann-Whitney U test revealed that such difference is not significant (U=395.5, p=0.68). It means that the scores for teaching efficacy do not necessarily vary when compared by gender. Both males and females who participated on STEP had the same teaching efficacy. Such result agrees with other researches that a teachers' teaching efficacy is not affected by gender (Ghaith & Shaaban, 1999; Moran & and Hoy, 2002; Wilson et al., 2004; as cited by Karrimvand, 2011).

Another comparison among scores that was made is by majorship. The result of the ANOVA test is shown in Table 5.

Table 5. ANOVA test for majorship

Gender	Sum of Squares	df	Mean square	F	Sig.
Between groups	3512.57	2	1756.28	3.095	0.52
Within groups	38024.08	67	567.52		

Note. p=0.5

The ANOVA results showed that there is no significant difference in the teaching-efficacy scores of pre-service teachers who participated in STEP (p=0.52). Further test revealed that when compared against each other, still no significant difference was observed. For general science & biology majors a sig. value of 0.944 was obtained; for general science and biology for teachers a sig. value of 0.173 was recorded; and lastly, the comparison

between majors of biology and biology for teachers obtained a sig. value of 0.67. These results indicate that the effect of the STEP does not significantly vary among different majors. Though of different concentrations, it can be deduced that the STEP still enabled them to develop a high teaching efficacy.

The not significant results of the mean comparison by gender and majorship may have due to the equal opportunities that were given to all the participants of the STEP. The planning and distribution of the tasks upon implementing the program has been participated by all the preservice teachers handled by the researcher. Everybody was able to attend the seminar workshops, dry-run their demonstration and even facilitate assessment of learning.

Improvement on teaching efficacy of preservice teachers

The areas on teaching efficacy where students improved were determined by comparing the average mean scores obtained from the survey. The specific teaching areas investigated are student engagement, instructional strategies, and classroom management. The descriptive statistics for the said areas are shown in Table 6.

Table 6. Descriptive statistics on teaching efficacy

TEACHING EFFICACY ITEMS	M	SD
Student Engagement		
How much can you do to get through to the most difficult students?	6.97	1.57
How much can you do to help your students think critically?	7.60	1.37
How much can you do to motivate students who show low interest in school work?	7.57	1.45
How much can you do to get students to believe they can do well in school work?	7.91	1.37
How much can you do to help your students' value learning?	7.74	1.41
How much can you do to foster student creativity?	7.54	1.45
How much can you do to improve the understanding of a student who is failing?	7.66	1.05
How much can you assist families in helping their children do well in school?	7.20	1.25
Total	7.53	1.36
Instructional strategies		
How well can you respond to difficult questions from your students?	7.20	1.22
How much can you gauge student comprehension of what you have taught?	7.57	1.14
To what extent can you craft good questions for your students?	7.37	1.16
How much can you do to adjust your lessons to the proper level for individual students?	7.54	1.11
How much can you use a variety of assessment strategies?	7.37	1.32
To what extent can you provide an alternative explanation or an example when students are confused?	7.54	1.03
How well can you implement alternative strategies in your classroom?	7.46	1.11
How well can you provide appropriate challenges for very capable students?	7.37	1.34
Total	7.43	1.18

Classroom management		
How much can you do to control disruptive behavior in the classroom?	7.26	1.55
To what extent can you make your expectations clear about student behavior?	7.43	1.33
How well can you establish routines to keep activities running smoothly?	7.57	1.35
How much can you do to get children to follow classroom rules?	7.80	1.25
How much can you do to calm a student who is disruptive or noisy?	7.29	1.29
How well can you establish a classroom management system with each group of students?	7.34	1.36
How well can you keep a few problem students form ruining an entire lesson?	7.40	1.11
How well can you respond to defiant students?	7.12	1.02
Total	7.40	1.28

The teaching efficacy scale allowed preservice teachers to rate how much they can do about the different items asked in a scale of 1 to 9. A response of 1 means that preservice teachers think they 'could not do anything' about the questions asked while 9 means they can do a 'great deal' of it. Thus, responses closer to 9 mean a high teaching efficacy while responses closer to 1 mean low teaching efficacy. From the means on the different items in the teaching efficacy scale, it can be deduced that pre-service teachers perceived they can do quite a bit on the different tasks asked of a teacher (M>7.0). The said category of response is second to the highest which is a great deal. Though the general response did not meet the highest category still it can be considered 'high'. Thus, indeed STEP enabled preservice teachers to have a high teaching efficacy.

> *"A perfect output is not made one time only but it takes a series of preparation, corrections, and revisions. I believe that every activity we had during the STEP that we participated was not done solely for having my grades completed but I trust that this experience can help me become an effective teacher someday. I am not only thankful for having a corrected output but for the values I gained from the experience. It was such a challenging work to produce a well crafted lesson plan, facilitate a good classroom demonstration, and even provide students with appropriate assessment. I can describe my experience in STEP to be analogous with that of a pencil. Unless you sharpen it for the first time, it could never serve its function which is to write. The STEP is like a sharpener and I am a pencil. The STEP sharpened me to serve my purpose which is to teach. The next time I'll face teaching challenges I know I am confident and equipped. I believe I am ready and I believe I can do it!" – Male, Biology*

Looking at the different areas on teaching efficacy, the area that obtained the highest overall mean score is student engagement (M=7.53, SD=1.36). Preservice teachers reported that the STEP enabled them to experience and enhance the area of motivating students.

Perhaps such result is due to the perception of preservice teachers that their students have been active and participative in their demonstration. Student enthusiasm towards the activities provided by the teacher may have been due to careful planning and practice of instruction that are part of the activities in STEP.

The area on instructional strategy is also high (M=7.43, SD=1.18). This means that STEP enriched the preservice teachers teaching pedagogies. It also enhanced their ability to facilitate classroom discussion through inquiry. The dry-run sessions of teaching demonstrations exposed preservice teachers to different areas to be improved in each other making them aware of their strengths and weaknesses.

"As a future teacher, I'm very thankful that our professor provided a coaching time (dry-run of demonstration) for us because I was able to correct the things to improve on my lesson plan and the way I delivered the lesson" – Female, Biology

It is inevitable for a preservice teacher to find hard the area of classroom management. It takes time before one could master the art of classroom management. As the data presents, though it can still be considered high, the classroom management area obtained the lowest mean average (M=7.40, SD=1.28) among three area being studied. Though the STEP program provided preservice teachers with techniques on how to deal with students a one-time-experience only may have not prepared them well.

Discussion and Conclusion

Upon the analysis of the data, it can be concluded that the Student Teaching Enhancement Program (STEP) enables preservice teachers develop a high teaching efficacy. The said high teaching efficacy of preservice teachers does not necessarily vary among gender and majorship. Moreover, among the different areas in the teaching efficacy scale survey, the area that garnered the highest average mean score is the student motivation followed by instructional strategies and classroom management respectively.

The present research implies that the STEP is an essential experience to preservice teachers. In the STEP program, preservice teachers where taught with concepts and pedagogies that they immediately need as they have their practice teaching. STEP is a program that enables preservice teachers to plan, execute, and reflect on their practice. The

feedbacks given by the cooperating as well as their colleagues, gave them a sense of fulfillment that what they are doing as they prepare to become 'real' teachers matter. Therefore, the results of this study agree with that of the research of OECD (2009) that professional development activities that considers 'what teachers really need' in the classroom can effectively enhance their teaching skills. However, it is hoped that the effects of the STEP on preservice teachers' perceived ability will not get dissolved once they enter the real world of teaching in the classroom as other programs described by Lopes and Tormenta (2010).

The experiences that preservice teachers had during the STEP prepared them for the challenge that they will face as they have their formal off-campus training or even when they become inservice practitioners which is the curriculum change. While the inservice teachers are struggling to adjust with the new K12 program in the Philippines, the preservice teachers who participated in the STEP are prepared for it in a certain way. Thus, participation in STEP could imply a better set of teachers someday. Such hypothesis is derived with the result of that of the work of Watson (2006) that seminar workshops or trainings impact teachers teaching efficacy in long term sense. His claim is based on his evaluation of the professional development program participated by inservice teachers about the integration of techonology in teaching. STEP is also a form of a professional development program for teachers. Thus, the same long term effect of a professsional program is predicted through this study.

Lastly, the results of this study showed that a program that is developed in the context of work really help preservice teachers. Lopes & Tormenta (2010) described that preservice teachers perceived that their university trainings did not help them when they are already in the field as inservice teachers. This study hopes that preservice teachers would not have the same notion.

Recommendations

With the results on this present research, it is strongly recommended that professional development program like STEP be experienced by other preservice educators as well. To further improve the program, it is suggested that a follow up research on the

participants of the STEP when they get into the field as inservice educators must be done. For future research, it is recommended how STEP affects teaching motivation.

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