

A Needs Assessment Survey on Teacher Readiness of Science Pre-Service Teachers: Towards a Contextualized Student Teaching Enhancement Program (STEP)

Darryl Roy T. Montebon
Philippine Normal University
Philippines

Abstract. This research aims to evaluate the level of need of the pre-service teachers in different areas to design a contextualized student teacher enhancement program. The respondents of this research are the one hundred thirteen ($N=113$) science pre-service students taking up field study courses at the Institute of Teaching and Learning of the Philippine Normal University. A qualitative research design was utilized in this study. A journal analysis procedure was also done to determine the student perception in different areas asked in the survey questionnaire. The survey results showed that pre-service teachers have a moderate level of need in seven out of ten items in the survey ($M \geq 2.0$). The level of need of the pre-service teacher does not significantly vary when categorized per major ($p \geq 0.05$ at sig. 0.05) except on the teaching strategy ($X^2(2) = 12.453$, $p = 0.02$) area. When grouped per gender, the mean ranks do not significantly vary on the different areas being surveyed ($p \geq 0.05$ at sig. 0.05). Respondents also revealed that they need to improve themselves to possess good teacher qualities. Thus, it is recommended that a contextualized student teaching enhancement program be implemented to help the pre-service teachers with their needs.

Keywords: Needs Assessment; Pre-Service Teacher Education; Contextualized Student Teaching Enhancement Program; Pre-service Teacher Training

1. INTRODUCTION

The Philippine Normal University has been assigned as the National Center for Teacher Education in the Philippines (R.A. 9647). Thus, it is the institution's responsibility to produce quality and excellent teachers. The present curriculum for the bachelor's degree program in the Philippines include Field Study (FS) courses that enable students to relate the theories and concepts they learned in their professional education courses with real classroom experiences. In these courses, pre-service teachers are exposed to various teaching experiences such as

designing effective instructional materials, conducting demonstration teachings, and making valid and reliable assessment tools.

To ensure that pre-service teachers experience the desired trainings in the Philippine Normal University, the Institute for Teaching and Learning (ITL) is tasked to design innovations that will help equip the pre-service teachers with concept, skills, and attitude to become an excellent teacher. Prior to deployment to public schools where they will have their formal immersion of the learning environment, known as off campus practice teaching, ITL serves as the avenue for baseline experiences. It is in ITL that pre-service teachers begin to observe, experience, and explore the teaching profession. A university supervisor is assigned to make sure that pre-service teachers get the necessary training and experiences in the classroom before they get deployed to public schools. In some cases, their university supervisor in the field study, are also the ones that supervise them in their off-campus trainings.

The results of this research can be a baseline data for designing a program that will help pre-service teachers be prepared for the challenges of the newly implemented K12 Curriculum. It is also the aim of this research to provide meaningful learning experiences for pre-service teachers by exposing them to a program designed for their specific needs. Thus, such programmed is contextualized. The results of this research can also be utilized by other teacher training institutions to create a similar training that of the STEP or even adapt it.

2. REVIEW OF RELATED LITERATURE

Education programs in the Philippines offer professional courses that discuss theories of learning, educational technologies and teaching strategies. In terms of the respective discipline in science, rigid concept based courses are offered. The Philippine Normal University offers a variety of science major courses such as General Science, Biology, Chemistry and Physics. Each majorship program is designed for pre-service teachers to be developed in the content knowledge of their respective disciplines. Moreover, to prepare them with the theories, techniques, and strategies in teaching science, different professional courses are also offered. These professional and major courses are designed to reinforce each other to help pre-service teachers as they prepare to become professional teachers. However, these courses are not sufficient to equip pre-service teachers for the field of work. According to Young, Grant, Montbriand, and Therriault (2001) applying theories into practice is a must. Thus, practice teaching courses are required. In this regard, practicum in teaching, known as *off campus training*, is a major requirement for the courses in the bachelor education.

The pre-service teaching trainings offer best experiences that promote professional development among pre-service teachers (Howitt, 2007; Lougrahn, Moulhall, and Berry 2008; as cited by Cheng, 2013). Exposing pre-service teachers to real classroom activities and allowing them to handle the class themselves are important experiences for teacher institutions to produce effective, excellent, and professional teachers. Student teaching experiences allow pre-service teachers to develop positive self-efficacy beliefs, instructional materials beliefs, and classroom management beliefs (Yilmaz and Cavas, 2008). Such positive beliefs on taking on the role of a teacher ensure the affectivity of a pre-service teacher when he or she becomes an in-service educator.

The call for teacher-training programs that are responsive to the growing diversity of learners is high. The 21st century learners need teachers who are not only experts in their own field but also are knowledgeable in other disciplines (Queensland College of Teachers, 2012). This claim has been supported by Cheng (2009) that the need in teacher education has shifted from effective movements toward the global movements. He described the paradigm shift to be waves of change from just merely delivering the content knowledge, to stakeholder satisfaction, multiple and sustainable development as change in the society arise. With these changes, university training must be able to prepare those who are going to be teachers. Teachers should be prepared to handle situations inside and outside the classroom that will effectively promote change and solve conflicts in the present times (Young, et. al, 2001). Moreover, teachers should not only be locally competitive but globally as well (Cheng, 2009).

While the practicum program is a good way of inducting pre-service teachers, it is imperative to look for alternative ways to prepare them. Craig, Kraft, and du Plessis (1998) suggested that research based programs should be done to address the call of the changing time. Thus, this research is set to explore ways to that will help science pre-service teachers in the Philippines respond to the K12 curriculum challenges.

Grossman et al (2009) described that a professional practice with the goal to develop expert practitioners should prepare a program that orchestrates understanding, skill, relationship and even the identity of the practitioner. In practicing a certain profession, it is not easy to identify the practice from the practitioner. With Grossman et al's (2009) idea in mind, it is essential to design a program that will help practitioners in their field of work. In this case, this research aims to design a program that will help pre-service teachers as they prepare themselves to become expert practitioners of education.

The aligned theoretical and pedagogical academic preparations in teacher education are thought to promote meaningful and worthwhile pre-service experiences (Ziechner, 2010; as cited by Cheng 2013). To identify the different factors that pre-service teachers really need, and support them with those needs can enhance the teacher education programs.

In the Philippines, curriculum change has drastically happened. The former Basic Education Curriculum has been made into Enhanced Basic Curriculum or the K12 Curriculum by virtue of the R.A. 10533. The new curriculum calls for the revision of teacher preparation in the universities. In effect, Teacher Education Institutions (TEI's) have to reconstruct their existing bachelors programs that will help meet the demands of the new curriculum. However, the science pre-service teachers which are still about to graduate are not prepared for it since their course works are designed for the old curriculum. Thus, enhancement programs are really needed.

As a response, the Institute of Teaching and Learning of Philippine Normal University initiated a Student Teacher Enhancement Program (STEP) that will help assist the outgoing pre-service teachers with their need in adjusting to the K12 program (Agustin, 2014). A seminar type training was done to deal on the different areas of the K12 like orientation on the new content standards, mode of instruction, and methods of assessment. The professors at the institute prepared lectures that will help pre-service teachers with the K12 challenges.

The participants in the program are the pre-service teachers who are in line for off campus pre-service training. Based on the evaluation, the STEP initiated by the ITL department was successful. Thus, this research serves as a follow up to the STEP program. It is deemed necessary that the STEP be conducted in field study pre-service teachers to help them not only in their practice teaching within the institute itself but also as they go out to take their formal off campus pre-service teaching.

2.1 Research Problems

In view of the literature reviewed, this research aims to design a contextualized STEP for the pre-service teachers to prepare them for the pre-service teaching program. Specifically, this research aims to achieve the following objectives:

1. Assess the readiness of science pre-service teachers in the different areas to be developed
2. Evaluate if teaching readiness varies by
 - a. Major or Specialization or,
 - b. Gender
3. Design a contextualized Student Teaching Enhancement Program(STEP) that will help science pre-service teachers with their needs based on the needs assessment survey

3. METHODOLOGIES

3.1 Demographics of the Respondents

The respondents of this research are the one hundred thirteen (N= 113) purposely chosen science pre-service students of the researcher taking up field study courses at the Institute of Teaching and Learning of the Philippine Normal University. The respondents are the pre-service teachers supervised by the researcher. Their ages range from 19 to 21 years old. Table 1 shows the demographics of the respondents.

Table 1
Demographics of Respondents

Majors	Male	Female	Total
Biology	8	35	43
Biology for Teachers	17	28	45
General Science	6	19	25
TOTAL			113

3.2 Research Design and Instruments

This research is qualitative in nature. It utilized survey and journal analysis method. To find out the level of need of the science pre-service teachers, a survey questionnaire adapted from the Teaching and Learning International Survey (TALIS) of the Organization for Economic Co-operation Economic and Development (OECD) was utilized. The survey contains questions that allow pre-service teachers to self-assess their level of need in the different areas given using a scale of 1 to 4, 1 as the lowest and 4 as the highest level of need. Upon subjecting to the reliability test, a Cronbach's Alpha coefficient of 0.878 was obtained.

To interpret the mean obtained in the different areas being surveyed, the following scale has been set:

Scale	Interpretation
0.1 to 1.0	No need at all
1.1 to 2.0	Low level of need
2.1 to 3.0	Moderate level of need
3.1 to 4.0	High Level of need

For the journaling method, pre-service teachers are allowed to write on their journal on the topic of *readiness to be a teacher*. They were encouraged to identify which aspect of teaching they need help the most. The survey was administered to the respondents after the general orientation in the field study course was held.

4. RESULTS AND DISCUSSION

4.1 Needs Assessment Survey Result

Table 2 shows the results of the analysis of the needs assessment survey of the respondents (N=113) in general.

Table 2
Survey Results on the Needs of Pre-service Teachers

Areas of Concern	Mean	SD
ICT	2.52	.94
Concept Readiness	2.83	.84
Communication w/ Students	2.86	.81
Standards	2.88	.71
Lesson Planning	2.91	.73
Classroom Management	2.95	.77
Assessment	3.00	.73
Teaching Strategies	3.13	.73
K12 Implementation	3.17	.83
Questioning Skills	3.18	.77

Note: respondents used 4 point Likert scale ranging 1 (no need) to 4 (high need)

The survey results showed that pre-service teachers have a moderate level of need in seven out of ten items in the survey ($M \geq 2.0$). When ranked, the areas that ranked low ($M \leq 2.91$) are ICT, Concept Readiness, and Communication with students, standards and lesson planning. Though it is still in the range of the moderate level of need, the item that scored the lowest mean is the integration of computer assisted instruction or ICT ($M=2.52$).

Upon the analysis of the data gathered in the survey questionnaire, it can be inferred that the area where most of the pre-service teachers have the highest level of need is the ability to facilitate classroom discussion using inquiry based instruction where questioning skills is a must ($M=3.18$). A number of forty one percent (41%) respondents have a moderate level of need and thirty eight (38 %) percent with a high level of need.

“The mode of instruction in the new K12 Program will be inquiry-based and the role of the teacher is merely a facilitator. Thus, a good questioning skill is really important. Such strategy will enable students to show their understanding and allow teachers to gauge their learning.” (Female, General Science Education)

The next area identified to be of high level of need is the implementation of the K12 program ($M = 3.17$). This area showed the most respondents that indicated a high level of need (40.7 %). The new K12 program has been an issue in the Philippine education system, particularly with the science teachers since science will no longer be taught by specific discipline for each year but will be an integration of all the sciences with the competencies arranged in a spiral progression.

“The K12 curriculum is my concern because when I get into the field, I must be flexible in teaching the different branches of science so I can execute the curriculum successfully. Therefore, I need to find ways to improve my concepts on the different branches of science and understand how they are related to each other.” (Female, Biology Education)

Another concern of the pre-service teachers is teaching strategies ($M=3.13$). Most of them are concerned on how to run a classroom and deliver their lessons to students with ease and appropriate methods of instruction (48.7% for moderate and 32.7% for high level of need). As a beginning teacher, it is understandable that such concern will really arise.

“I have a need to focus on learning different learning pedagogies to be used in my class. I believe that an effective teacher is one that promotes efficient teaching and learning process using appropriate methods and strategies.” (Female, General Science)

In the new K12 program, one of the major challenges is the way to assess students' learning. Aside from the paper and pen test, authentic assessment is encouraged. Further, a new way of classifying test items through KPUP was introduced (DepEd order 73 s. 2012). Maximo (2014) in his blog described KPUP as various levels of assessment. KPUP stands for Knowledge, Process, Understanding, and Performance/Product. Each level of assessment has a corresponding percentage to allocate its distribution in the evaluation material prepared.

One factor to a successful teaching and learning process is classroom management, and the key to it would be pedagogical and content knowledge. Jann Joseph (2010) in her research reiterated that pedagogical methods and concepts should be linked to produce a science teacher with high self-efficacy. Teachers with high self-efficacy can stand in front of the classroom with confidence since he/she has the determination to overcome classroom challenges. The respondents also realized such importance of the classroom management skills as shown in the results of the survey ($M=2.95$).

Upon the analysis of all the journals written by the respondents, a great number of them are concerned with one area that is not part of the survey instrument which is the way to carry themselves as a teacher (65 %, $N=113$). Most of them are not confident standing in front of the class and facilitate classroom discussion due to several reasons. Their anxieties vary from the way they look, dress up, and speak English.

“Self-confidence is one of my personal issues. Though I mastered the topic to be discussed, I still stutter due to nervousness”. (Male, General Science)

“Honestly, I have a problem communicating with a large group of people. It’s not easy for me to talk in front of people I don’t know because I am scared to commit mistakes and be judged by others.” (Female, Biology)

4.2 Mean Comparisons on Major and Gender

The data has been subjected using Kolmogorov Smirnov Test to find out if the scores are normally distributed or not. Upon the analysis, all factors have recorded below the significance level ($p \leq 0.000$ at sig = 0.05) for both gender and major differences. This means that the scores are not normally distributed, thus a nonparametric test should be utilized to compare the means based on majorship and gender, and in this case, Kruskal Wallis was utilized.

Table 3

Kruskal Wallis Test for Majorship

	Standards	Assessment	Classroom Management	Concept Readiness	Lesson Planning	K12 Implementation	Teaching Strategies	Communication w/ Students	Questioning Skills	ICT
Chi-Square	1.975	1.058	.263	2.381	1.900	2.183	12.453	1.570	.235	.144
df	2	2	2	2	2	2	2	2	2	2
Asym p. Sig.	.373	.589	.877	.304	.387	.336	.002	.456	.889	.930

*Note: Grouping Variable: Major

The Kruskal Wallis test of the respondents as categorized per major shows that nine out of ten factors show no significant differences ($p \geq 0.05$ at sig. 0.05) except on the teaching strategy ($X^2(2) = 12.453$, $p = 0.02$) area. Among the different majors, general science has the highest mean rank of 75.10 compared to biology education majors ($M=48.84$) and biology for teachers ($M=54.74$).

This difference in teaching strategy may have been a result of having the general science majors observe the teacher-researcher in the classroom longer than the other two other majors. Also, the said difference may have been the result of course content difference. Biology majors are more concern with the different teaching strategy on the different branches of science since most of their content courses are focused on biology when compared with the General Science majors who are exposed to the different branches of science. Thus, they recorded a lesser need for teaching strategies.

Table 4
Kruskal Wallis Test for Gender

	Standards	Assessment	Classroom Management	Concept Readiness	Lesson Planning	K12 Implementation	Teaching Strategies	Communication w/ Students	Questioning Skills	ICT
Chi-Square	3.264	1.383	.703	7.612	1.269	.010	.996	.236	2.697	2.333
df	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.071	.240	.402	.006	.260	.920	.318	.627	.101	.127

*Note: Grouping: Gender

The Kruskal Wallis test for gender revealed that there are no significant differences on the different areas being surveyed ($p \geq 0.05$ at sig. 0.05). The differences in mean ranks do not necessarily vary from each other.

5. CONCLUSION

Based on the data gathered and its analysis, it can be concluded that pre-service teachers have a moderate to high level of need to the different items asked in the survey. The area with the highest level of need is the ability to facilitate classroom discussion using inquiry based instruction ($M=3.18$), while the area with the lowest level of need is the integration of computer assisted instruction or ICT ($M=2.52$).

The level of need of the pre-service teacher does not significantly vary when categorized per major ($p \geq 0.05$ at sig. 0.05) except on the teaching strategy ($X^2(2) = 12.453$, $p = 0.02$) area. When grouped by gender, the mean ranks do not significantly differ on the different areas being surveyed ($p \geq 0.05$ at sig. 0.05). Respondents also revealed that they need to improve themselves to possess the qualities of a teacher.

5.1 Contextualized Student Teaching Enhancement Program (Context-STEP)

Based on the results of the needs assessment survey, pre-service teachers manifested that they have high to moderate levels of needs on the different areas asked in the survey. Such concerns are assumed to affect their performance in the practice teaching program. Thus, it is the aim of this research to address such concerns.

To do so, this research adapts the STEP to be implemented on pre-service teachers who are in their field study courses. The field study courses allow pre-service teachers to practice their teaching skills in the classroom such as lesson planning, facilitating learning, and conducting evaluations.

In the original STEP program, a seminar type was utilized. In the proposed contextualized STEP, there will be an incorporation of coaching before demonstration, observations during demo, critiquing the plan and its implementation, and assistance in preparing assessment materials.

Their application of the concepts, strategies, methods and insights gained in the contextualized STEP will be evaluated during class observations and output processing. Continuous monitoring will be done to check on how pre-service are

doing as they apply their learnings from the contextualized STEP. Below is a program outline on how the contextualized STEP will be implemented. Among the ten categories in the survey only the five areas that recorded the highest level of need were considered since the time that the pre-service teachers will spend with the institute is limited. It is necessary for the designed program to be accomplished on time. Further, some areas were clustered since they are integrated with each other naturally.

Area	Objective	Method
K12 Implementation	<ul style="list-style-type: none"> Familiarize oneself with different features of the K12 program 	<ul style="list-style-type: none"> Seminar Workshop Curriculum analysis Teacher interviews Class observations
Teacher Personality Teaching Strategies Classroom Management Questioning Skills	<ul style="list-style-type: none"> Enhance teacher personality skills Identify effective teaching strategies Facilitate the class using principles of good classroom management Ask effective questions that will promote inquiry on students 	<ul style="list-style-type: none"> Seminar Workshop Lesson planning Simulation of demonstration Class demonstration Critiquing of demonstration
Assessment	<ul style="list-style-type: none"> Prepare valid assessment tools 	<ul style="list-style-type: none"> Seminar Workshop Output processing Item analysis

To evaluate if the objectives of the program are met, the pre-service teachers will be subjected to a teaching achievement test. The questions will be taken from the areas included in the contextualized STEP. Open ended questions will also be provided to analyze how the program affected them.

REFERENCES

- Agustin, M. (2014). *Student Teaching Enhancement Program 2014 Guidelines*. Institute of Teaching and Learning, Philippine Normal University.
- An investigation of best practice in evidence-based assessment within preservice teacher education programs and other professions*. (Queensland College of Teachers) 2012. Retrieved from <http://www.qct.edu.au/PDF/PSU/BestPpracticeEvidenceBasedAssessmentPre-serviceReacherEdPrograms.PDF>
- Aypay, A. (2009) Teachers Evaluation of Their Pre-Service Teacher Training. *Educational Sciences: Theory & Practice*. pp. 113-1121. Retrieved from

- <https://www.edam.com.tr/kuyeb/pdf/en/158ed1df960f59116fd2b27d2e9b66ceENTAM.pdf>
- Cheng, E. C. (2013). Enhancing the Quality of Pre-service Teachers' Learning in Teaching Practicum. Retrieved from http://nevelestudomany.elte.hu/downloads/2013/nevelestudomany_2013_1_6-16.pdf
- Cheng, Y. (2008). Paradigm Shift in Pre-Service Teacher Education: Implications for Innovations and Practice. *Innovative Practices in Pre-Service Teacher Education an Asia-Pacific Perspective*. Retrieved from <https://www.google.com.ph/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCkQFjAB&url=https%3A%2F%2F>
- Craig, H.J., Kraft, R. J., du Plessis, J., (1998) *Teacher Development Making and Impact*, Retrieved from http://people.umass.edu/educ870/teacher_education/Documents/Craig-book.pdf
- Grossman, P., Compton, C., Igra, D., Ronfeldt, E., Shahan, E., Williamson, P. (2009) Teaching Practice: A Cross Professional Perspective. *Teachers College Record*. Vol. 111. No. 9. pp. 2055-2100. Retrieved from <https://cset.stanford.edu/sites/default/files/files/documents/publications/Grossman-TeachingPracticeACross-ProfessionalPerspective.pdf>
- Joseph, Jann (2010) Does Intention Matter? Assessing the Science Teaching Efficacy Beliefs of Pre-service Teachers as Compared to the General Student Population. *Electronic Journal of Science Education*, Vol. 14 No. 1, 2-14. Retrieved from <http://ejse.southwestern.edu/article/download/7332/5620>
- Maximo, A (February 7, 2014) Grade Conscious. *The Construct*. Retrieved from <http://www.alexmaximo.com/deped-k-12-qpup-grading-assessment/>
- McCawley, P. (2009). Methods for Conducting Educational Needs Assessment Guidelines for Cooperative Extension System Personals. Retrieved from <http://www.cals.uidaho.edu/edcomm/pdf/BUL/BUL0870.pdf>
- Teacher Questionnaire. (n.d.) *OECD Teaching and Learning International Survey* Retrieved January 10, 2015 from <http://www.oecd.org/edu/school/43081350.pdf>
- Survey Analysis Guidelines* (n.d.) Retrieved January 4, 2015 from http://plus50.aacc.nche.edu/documents/publications/6_SurveyAnalysis.pdf
- Yılmaz, H. and Çavaş, P. H. (2008). The Effect of the Teaching Practice on Pre-service Elementary Teachers' Science Teaching Efficacy and Classroom Management Beliefs *Eurasia Journal of Mathematics, Science & Technology Education*, 4(1), 45-54. Retrieved from http://ejmste.com/v4n1/Eurasia_v4n1_Yilmaz_Cavas.pdf
- Young, E., Grant, P., Montbriand, C., Therriault (2001). Educating Pre-Service Teachers, The State of Affairs. Retrieved from <http://www.learningpt.org/pdfs/literacy/preservice.pdf>