EXPLORING STATISTICS INSTRUCTORS' COMPETENCIES: IMPLICATIONS FOR TRAINING MODELS TO IMPACT QUALITY TEACHING-LEARNING

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Abstract: **One of the critical factors that has been debated and argued over the years concerns Statistics Educators. Studies reveal that the Statistics educators' teaching quality in institutions of higher learning today leaves much to be desired. There is a need for competent Statistics Instructors whose quality of teaching will impact greatly on the quality of learning. This study explored the competencies and the suggested trainings/seminars of the 97 Statistics Instructors from the 59 Higher Education Institutions (HEIs) in Eastern Visayas, Philippines that would serve as relevant input in proposing Training Model to enhance Instructors' competence and support success in teaching and learning in Statistics. To ensure that more in-depth information is obtained on the insights of different groups of respondents regarding their perspectives on Statistics Instructors' competencies, data triangulation was considered in this study involving the Deans, Statistics Instructors and Students who took up Basic Statistics. This study employed comparative-correlational research design and the research data were collected utilizing well-validated questionnaire in measuring competencies along teaching strategy, classroom management and organization skills, communication skills, professional practice, and working relation. On the other hand, well-validated 65-item achievement test was used to measure Statistics Instructors' competency along mastery of the subject. Salient findings show that most of the Instructors are non-Statistics majors. Though they possess considerable competence along teaching strategies, classroom management/organization, communication skills, professional skills and working relation, but they have low mastery in Statistics and have not attended adequate trainings. Among other variables, number of relevant in-service trainings attended by Instructors posted a significant association with their mastery in Statistics. Analyzing the results of this study, the following are the proposed Trainings that will instigate advancement in enhancing teaching-learning in Statistics: Data Management, Statistical Analysis and Interpretation Using SPSS; Effective Use of MS Excel and MS Powerpoint for Statistical Reports; Administration of Surveys and FGDs with Qualitative Data Analysis; Effective Statistical Presentation Skills; Descriptive and Inferential Statistics; Basic Statistics for Research; Fundamental Tools in Statistics; Statistics for Monitoring and Evaluation; Experimental Designs; and Teaching Strategies in Teaching Statistics.**

Keywords: **Competencies, Quality Teaching-Learning, Training Models.**

1. INTRODUCTION

Statistics is very relevant and of great importance since it advances useful data on the various behavioral trends found in the society. At present, statistics is a reliable means of describing and interpreting accurately the values of economic, political, social, psychological, biological, physical and almost all fields of endeavor (David, 2008).

Statistics education research over the last decade has pointed out the development of Statistical literacy and interpretive skills as a universally recognized goal of instruction (Rumsey, 2002: 211; 2002: 199). Consequently, reform movements in teaching statistics have given increasing attention to the development of Statistical thinking and reasoning as important skills encompassing Statistical literacy.

These reform movements have implications for both the Statistics curriculum and the professional development and preparation of teachers. Chance (1997: 189) argues that as the emphasis of instructional goals in Statistics courses change favoring Statistical literacy skills over procedural calculations, there is a need for instructors to accompany these new goals with more authentic assessment techniques to evaluate progress towards these goals. Statistics majors are trained to be competent in their Statistical reasoning and mastery of Statistics subject through experiencing firsthand the process of data collection and data exploration; data collection and production; utilizing the appropriate statistical summaries; knowing how conclusions can be drawn and supported; and utilizing statistical software.

Mandating that teachers meet the minimum requirements to be considered highly qualified is a first step toward ensuring teacher effectiveness and competence (Goe, 2007). It is recognized that in effective Statistics teaching-learning, competence and other capabilities are required from instructors, including mastery of the subject, strategies, difficulties, and potential errors. Instructors should also be able to organize the teaching, design learning tasks, use adequate resources, and understand the factors that condition the teaching and learning processes (Ponte, 2008).

But at present, there are only very few active higher education institutions (HEIs) in the Philippines offering degree programs in Statistics. According to Albece (2011), the real situation today is that, there is only a gradual increase in number of Statistics graduates but there is even a faster growth of the demand for professionally trained Statisticians as well. There are generally few graduates in various Statistics programs in the country and are not enough to supply the increasing demand. Thus, while the faculty should be the backbone of any statistics program, it is also the most vulnerable element in successfully implementing a Statistics program at the higher education level.

As a result, Statistics subject in other courses is taught by non-Statistics majors. As reported by Tabunda (2006) from a survey done by the Commission on Higher Education (CHED) in 2001, only a little over 5% of the survey respondents consisting 1,073 faculty teaching statistics in 484 higher education institutions in the country have a degree in Statistics.

This dearth of Statistics majors in the teaching force is echoed in a case study conducted among 44 Statistics teachers who participated in regional statistical literacy seminar for college Statistics teachers in Region VII (Central Visayas) held in 2005. It was revealed that of these 44 participants, the majority (62%) of teachers' undergraduate background was in mathematics, the remaining 38% had their majors in the natural sciences, engineering and psychology and none had a bachelor's degree in Statistics. The findings from a series of focus group discussions with these teachers revealed that the majority focused on the development of computational and problem-solving skills, and none of them, mentioned the development of Statistical literacy and reasoning skills as the main goal of instruction (Reston et al., 2006).

The concern on Statistical competence among Statistics instructors who are non-Statistics majors becomes a great issue today. Several studies have established that mathematics teachers frequently lack specific training and preparation in Statistics education (Batanero et al., and 2004). At the tertiary level, Cobb (1993) provides considerable evidence that only a comparatively small fraction of introductory college Statistics sections are taught by Statisticians or teachers with substantial and recent competence and training in the subject. Most college Statistics courses are taught in mathematics departments by teachers of mathematics with minimal Statistics background. Cobb further claims that of all subjects taught as often as statistics, surely no other subject is so often taught by faculty with so little formal training in the subject.

Thus, unless the instructors majored in Statistics, mathematics and related disciplines, the three-unit introductory college Statistics course is the first and only encounter with statistics as a formal subject for most graduates in the Philippines. The course is generally regarded as part of the mathematics requirement of baccalaureate degree programs. Within the limitations of a three-unit one-semester introductory Statistics course in the midst of a continuously expanding statistical knowledge-base, instructors may be entering classes that have lagged behind the technological advances of this information age (Cobb, 1993).

As with any area in education, the quality of teaching offered to students depends heavily on the continuing professional development of teachers, that is, their in-service training and preparation in order to cope with the demands and challenges of this information age. Consequently, there is a need for more competent Statistics teachers, whose quality of teaching will impact heavily on the quality of learning in the classroom, hence, an urgent necessity to provide in-service professional training in Statistics to these instructors (Resto, 2006).

In view of the realities stated on the situation of Statistics instructors, their competencies need to be examined. These competencies include mastery of the subject, teaching strategy, classroom management and organization skills, communication skills, professional practice, and working relation.

It is in the light of the above notion that the researcher considered it apt to explore on the competencies of the Statistics instructors of HEIs in Eastern Visayas in helping them enhance and strengthen their competencies by coming up with a proposed faculty training model.

2. LITERATURE REVIEW

The line that states *"competent teacher affects eternity"* reflects the vital role of teachers toward student-learning. This line is in connection with Shulman's concept of teacher knowledge and teacher competencies (1986). This concept states that:

> *"the teacher needs not only understand that something is so, the teacher must further understand, why it is so, on what grounds its warrant can be asserted, and under what circumstances one's belief in its justification can be weakened or denied. Moreover, it is expected that the teacher to understand why a particular topic is particularly central to a discipline whereas another may be somewhat peripheral."*

As viewed in this concept, teacher knowledge and competence are the ability to do something well, measured against a standard, especially ability acquired through experience or training.

Likewise, Niess (2005) describes the outcomes for a teacher preparation program as follows: "(1) an overarching conception of what it means to teach a particular subject integrating technology in the learning; (2) knowledge of instructional strategies and representations for teaching particular topics with technology; (3) knowledge of students' understandings, thinking, and learning with technology in a particular subject; (4) knowledge of curriculum and curriculum materials that integrate technology with learning in the subject area".

One of the best assurances for stimulating a constructive educational system is to have schools run by instructors who have vigorous impulses toward change and progress. Instructors are themselves leaders and managers; therefore, Statistics instructors must possess the skills of a classroom leader as well as sociological and psychological needs of students and other people with whom these instructors are working with.

The above striking concepts simply relate that an instructor is basically regarded as the forerunner of the curriculum, and thus, efforts geared towards improvement of the quality of statistics education rely heavily upon efforts to improve the quality of instructor, instructor training and preparation and competence.

The effect of mastery of the subject matter on teacher effectiveness:

For a quality Statistics instruction to occur, competent instructors play a relevant role in achieving this. According to Darling-Hammond (2000), subject-matter knowledge has often been found to be an important factor in teacher effectiveness. However, its relationship to teaching performance is curvilinear: it exerts a positive effect up to a threshold level and then tapers off in influence. Measures of pedagogical knowledge including knowledge of learning, teaching methods and curriculum have more often been found to influence teaching performance, and frequently these factors exert even stronger effects than subject matter knowledge.

Ferguson (1991) studied teachers' results on a license test measuring pedagogical skills as well as subject knowledge. They related the result to student achievement and found these variables to be more powerful than class size and school size. Teacher competence could, after controlling for students' social background, explain the difference in level of achievement between black and white students. Elliot (1998) noted in a longitudinal study that well-qualified teachers had a significant influence on high school students' achievement in mathematics and science. In this study teacher

qualification was measured by education, experience and teaching methods. Evertson, Hawley & Zlotnik (1985) compared well-educated teachers with less educated teachers. The results showed achievement gains for students with well-educated teachers. They also showed that achievement was related to teachers' knowledge of the subjects taught. In a study involving 7000 students Wenglinsky (2000) found that the quality of the teaching force has a comparable impact on students' test scores as socioeconomic status.

Shulman (1986) introduced the phrase "pedagogical content knowledge" and sparked a whole new wave of scholarly articles on teachers' knowledge of their subject matter and the importance of this knowledge for successful teaching. In Shulman's theoretical framework, teachers need to master two types of knowledge: (a) content, also known as "deep" knowledge of the subject itself, and (b) knowledge of the curricular development.

Darling-Hammond (1999) investigated students' test results in reading and mathematics. In the study 44 states with 65 000 teachers were included. The data comprised several variables indicating teacher competence, such as certification and experience. A number of other variables were included in the study such as education policy, demographics, student characteristics and school characteristics. Controlling for student background, teacher certificate and subject matter knowledge were shown to correlate with students' test results and to have great explanatory power.

Other measures of teacher competence:

Kayani, Morris, Azhar and Kayani(2011)says that Professional development through intensive, in-service training can greatly enhance the capacity of universities /colleges teachers in operationalizing the innovative concept of teaching learning process.

Several studies have found a positive relationship between teacher experience and student achievement (e.g., Murnane & Philips, 1981; Klitgaard & Hall, 1974). This relationship is not simple and linear however. According to Darling-Hammond (1999), teachers with less than three years' experience are less efficient than are colleagues with more experience. After five years the additional contribution weakens. Andrew and Schwab (1995) noted that inexperienced teachers from lengthy teacher education programs can be as efficient as experienced teachers. Teachers' age may also be of importance for effectiveness but this variable is of course highly correlated with experience.

Some evidences indicate that teacher in-service training may be positively related to student achievement. Angrist and Lavy (1998) have reported considerable gains. Wiley and Yoon (1995) also found positive effects of inservice training in California. Wenglinsky (2000) observed certain types of in-service training, such as working with different student populations and higher order thinking, to be related to students' test results.

Teaching strategy is an expression of the educator's individuality in relation to stated philosophy and program objectives and is being given much attention in today's educational program. Additionally an educator's teaching style is reflected in one's methodology of teaching and in class organization and management (Prashnig, 2001).

Another relevant competence needed by an instructor is in connection with classroom management and organization skills. Effective teachers create focused and nurturing classrooms that result in increased student learning (Marzano et al., 2003; Shellard & Protheroe, 2000). These teachers teach and rehearse rules and procedures with students, anticipate students' needs, possess a plan to orient new students, and offer clear instructions to students (McLeod et al., 2003; Emmer et al., 1980). They use a minimum number of rules to ensure safety and productive interaction in the classroom, and they rely on routines to maintain a smoothly running classroom (McLeod et al. 2003). In fact, it has been noted that classroom management skills are essential in a classroom for a teacher to get anything done (Brophy & Evertson, 1976). In some ways, classroom management is like salt in a recipe; when it is present it is not noticed, but when it is missing, diners will ask for it.

Communication is another important competence needed by an instructor. Communication, like decision-making, is a general function of a manager as it pervades all other basic functions of a leader. Simply defined, communicating is the process by which ideas are transmitted to others for the purpose of affecting a desired result (Franco, 1993).

Teaching becomes a profession when teachers practice with a common knowledge base and apply their knowledge to effective practice (Wise & Leibbrand, 1993). Professional practice, based on an accepted knowledge base and state of the art pedagogy, lies at the heart of educational reform. Professional teachers must ". . . be capable of profound reflection on

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practice, competent to enter into dialogue of the practice they know and the theory or literature they read; able to engage in . . . interpretation and critique with colleagues and with children; and able to observe, document, and analyze their own practice and experience, and take that analysis into the white-hot cauldron of public forums and public accountability" (Socketed, 1996).

In teaching for effective learning, the teacher is concerned with attitudes, appreciations and values. A primary goal of such teaching is that of developing proper and positive attitudes and appreciations towards Mathematics and Statistics (Bloom, 1976: 336).

Talbert (2001) have convincingly demonstrated, collegiality greatly impacts teachers' morale, happiness, and satisfaction. A collegial school environment is one in which teachers are able to work well with other teachers; work well with administrators; manage positive relationship with others, including teachers, administrators, parents, and students; and match their educational strengths and preferences with an appropriate school.

It must be taken into consideration the very fact of coming up with rigorous training for instructors and that is the rising trend of importance of statistics, yet only few are Statistics graduates in the Philippines. In view of this, competencies of instructors handling statistics subjects need be considered in order to reinforce them.

As with any area in education, the quality of teaching offered to students depends heavily on the competence of teachers and their continuing professional development, that is, their in-service training and preparation in order to cope with the demands and challenges of this information age.

3. METHODOLOGY

This section presents the study design and discusses research design, instrumentation, and validation of the instrument, sampling procedure, data gathering procedure, and the statistical treatment of data.

This study employed the descriptive research design with triangulation method. Triangulation is a strategy for increasing the validity of evaluation and findings in research (Seasmin & Rahman, 2012), mainly to avoid biases in the measurement, sampling, and procedure thereof. In this study, triangulation was considered as the most appropriate approach in determining the Statistics Instructors' competencies as perceived by the Deans, Students, and Statistics Instructors themselves.

The main respondents of this study were 97 Statistics Instructors from the 59 participating HEIS in Eastern Visayas. Moreover, 64 Deans as direct superiors of the Statistics Instructors and 384 students who took up Basic/Introductory Statistics during the first semester of school year 2011-2012 were included in the study.

Table 1: The Sampling Frame of the Study

HEIs	Number of Instructors	Number of Students	Percent
ABE INTERNATIONAL COLLEGE OF BUSINESS AND ECONOMICS	2	3	0.74
ABUYOG COMMUNITY COLLEGE	2	6	1.48
ACLC COLLEGE OF ORMOC	1	3	0.66
ACLC COLLEGE OF TACLOBAN	2	6	1.52
AMA COMPUTER COLLEGE TACLOBAN CAMPUS	2	4	1.17
ASIA COLLEGE OF ADVANCED STUDIES IN ARTS, SCIENCES AND TECHNOLOGY	1	3	0.90
ASIAN DEVELOPMENT FOUNDATION COLLEGE	3	9	2.24
BATO INSTITUTE OF SCIENCE AND TECHNOLOGY	1	4	0.92
CHRIST THE KING COLLEGE OF CALBAYOG	2	9	2.25
COLEGIO DE LA SALLE FONDATION DE TACLOBAN	1	3	0.82
OLEGIO DE LAS NAVAS	1	4	0.94

COLEGIO DE SAN JUAN SAMAR	1	3	0.82
COLEGIO DE SAN LORENZO RUIZ DE MANILA	1	4	0.92
EAST PACIFIC COMPUTER COLLEGE	1	4	1.06
EASTERN SAMAR STATE UNIVERSITY	6	17	4.46
EASTERN VISAYAS CENTRAL COLLEGES	2	4	1.08
EASTERN VISAYAS STATE UNIVERSITY	2	22	5.63
FRANCISCAN COLLEGE OF THE IMMACULATE CONCEPCION	3	6	1.52
GLOBAL SCHOOL FOR TECHNOLOGICAL STUDIES	1	4	0.92
HOLY CROSS COLLEGE OF CARIGARA	1	4	0.93
HOLY INFANT COLLEGE	1	4	1.08
HOLY SPIRIT COLLEGE FOUNDATION IN LEYTE	1	4	0.92
HOLY VIRGIN OF SALVACION FOUNDATION COLLEGE	1	4	0.94
JE MOMDEJAR COMPUTER COLLEGE	1	3	0.80
JOSE NAVARRO POLYTECHNIC COLLEGE	1	3	0.91
LEYTE COLLEGES	2	5	1.38
LEYTE NORMAL UNIVERSITY	2	15	4.24
LEYTE POLYTECHNIC COLLEGE	1	4	0.95
LEYTE SCHOOL OF PROFESSIONALS	1	4	0.94
MAASIN CITY COLLEGE	1	4	0.93
MLG COLLEGE OF LEARNING	1	3	0.80
NAVAL STATE UNIVERSITY	4	19	5.14
NORTHERN LEYTE COLLEGE	1	4	0.94
NORTHERN SAMAR COLLEGES	1	4	0.92
NORTHWEST SAMAR STATE UNIVERSITY	3	16	4.34
OUR LADY OF MERCY COLLEGE	1	4	0.92
PALOMPON INSTITUTE OF TECHNOLOGY	3	18	4.83
SAINT FRANCIS COLLEGE	1	4	0.94
SAINT JAMES COLLEGE OF PADRE BURGOS	1	4	1.09
SAINT JOSEPH COLLEGE	1	4	0.92
SAINT MARY'S COLLEGE OF BORONGAN	1	4	1.08
SAINT MICHAEL COLLEGE	1	4	1.09
SAINT PAUL'S SCHOOL OF BUSINESS AND LAW	1	8	1.97
SAINT PETER'S COLLEGE OF ORMOC	1	4	0.92
SAINT THOMAS AQUINAS COLLEGE	1	5	1.28
SAMAR STATE UNIVERSITY	8	14	3.70
SAN LORENZO RUIZ COLLEGE OF ORMOC, INC.	1	5	1.30
SOUTHERN LEYTE STATE UNIVERSITY	2	19	5.16
ST. SCHOLASTICA'S COLLEGE OF TACLOBAN	1	5	1.39
ST. VINCENT DE PAUL COLLEGE SEMINARY	1	1	0.18
STI COLLEGE OF ORMOC	1	4	0.92
STI COLLEGE OF TACLOBAN	1	5	1.8
STO. NIÑO COLLEGE OF ORMOC	1	3	0.82
THE COLLEGE OF MAASIN	1	3	0.85
UNIVERSITY OF EASTERN PHILIPPINES	3	19	5.24
UP VISAYAS - TACLOBAN COLLEGE	1	4	1.11
VISAYAS CHRISTIAN INSTITUTE OF TECHNOLOGY	1	3	0.82
VISAYAS STATE UNIVERSITY	3	19	5.29
WESTERN LEYTE COLLEGE OF ORMOC	2	3	0.82

To ascertain the total number of the HEIs in Eastern Visayas, the researcher sought records from the Regional Commission on Higher Education (CHED). The researcher wrote letters and communicated with the presidents/heads of these identified schools and got information on the number of Statistics instructors, deans and students. Total enumeration was used to identify the Instructors and Deans while stratified random sampling was employed in selecting the student-respondents.

The researcher-made questionnaire for the Statistics Instructors consisted of three parts: 1) Demographic Information, 2) Perceived Competencies in five-point Likert-type scale (1=not competent, 2=slightly competent, 3=moderately competent, 4=much competent, 5=very much competent), and 3) Suggested Trainings/Seminars/Workshops. Correspondingly, the questionnaire for the Deans and Students was on their Perceived Competencies of the Statistics Instructors. The result showed a high reliable result with r value at 0.834.

A well-validated achievement test was designed to measure the mastery of Statistics instructor along Statistics. The first draft of the test was composed of 75 items which were constructed based on the Table of Specification prepared. All the main topics covered in Statistics were included. After the validation of the instrument, this decreased down to 65 items.

This test posted reliability with the aid of Kuder-Richardson Formula 20 with a statistical value of $r_{xx} = 0.82$. The data were analyzed using SPSS version 19 with the following statistical tools: frequency count, percentage, mean, standard deviation, weighted mean, and ANOVA, Pearson product moment correlation and Spearman rho.

4. RESULTS

This part encloses presentation, analysis and interpretation of the data in accordance with the questions specified in this study. This includes the following: 1) profile of the Statistics instructor-respondents; 2) competency level of Statistics instructors along mastery of the subject based on their scores in the achievement test; 3) competency level of Statistics instructors along a) teaching strategy; b) classroom management and organization skills; c) communication skills; d) professional practice; and e) working relation as perceived by the Statistics instructors themselves, students and deans respondents; and 4) extent of Statistics instructors' implementation of the objectives of Statistics subject.

Demographic Profile:

On the average, the Statistics instructors were 34 years old. Majority of the Statistics instructors (50.52 %) were females. Furthermore, most of them were married (60.82%).

Result showed that on the average, the family income of the Statistics instructors per month was Php 21, 316.49 with a standard deviation of Php 14, 852.85.

As to the faculty-respondents' educational background, most of the Statistics instructors in HEIs, that is 49 out of 97 or 50.52 % majored BSEd Mathematics. Meanwhile, only six or 6.19% were major in BSStatistics and they were all connected to SUCs. As regards to the highest educational attainment, most of the Statistics instructors of HEIs did not pursue doctoral studies, that is, 41 respondents or 42.27%.

The average length of experience in teaching Statistics among the respondents was 5.71 years with standard deviation of 5.76 years. Meanwhile for the general subject, the average length of teaching experience was 3.73 years with standard deviation of 4.70 years.

Most of the instructors teaching Statistics, that is 76.29 percent, were Instructor 1. On the average, reflected on Table 2 is the data on the number of relevant in-service trainings attended by the Statistics instructors was 5 with a standard deviation of 5.

Table 2: Relevant in-service trainings attended by the statistics instructors

Number of Trainings	Frequency of Instructors	Percent
20	3	3.09
19	1	1.03
16	2	2.06

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15	5	5.15
12	2	2.06
10	4	4.12
9	2	2.06
8	2	2.06
6	8	8.25
5	3	3.09
4	9	9.28
3	4	4.12
2	9	9.28
1	24	24.74
0	19	19.59
Total	**97**	**100.00**
Mean	**5 trainings**	**-**
SD	**5 trainings**	**-**

The average latest performance rating of the Statistics instructors turned out to be 8.44 with standard deviation of 0.30 rated as "Very Satisfactory" while the average number of teaching loads they handled was 6.67 with standard deviation of 1.30.

On the whole, the average number of research experiences and applications of instructors in HEIs for the national level was 0.09 and standard deviation of 0.46 while the average number of research experiences and applications of instructors in HEIs for the international level was 0.23 and standard deviation of 0.70.

As to the competence of the SUCs Statistics instructors on the mastery of the subject, Table 3 shows that their average achievement was 39 with a standard deviation of 8.87 and was depicted as "low mastery" while the average performance of the instructors in private colleges was 24 with a standard deviation of 5.95 which was considered to be "very low mastery" in statistics. Generally, the mastery of the subject among the instructors in HEIs was "low mastery" with an average score of 39.71 and 10.44 standard deviation.

Table 3: Statistics instructors' mastery of the subject

Score	SUCS	Private	Total	Percent
59 above	1	-	1	1.03
50 – 58	3	-	3	3.09
41 – 49	10	1	11	11.34
32 – 40	15	5	20	20.62
Below 32	6	52	58	59.79
No answer	2	2	4	4.12
Total	**37**	**60**	**97**	**100.00**
Mean	**39**	**24**	**39.71**	
SD	**8.87**	**5.95**	**10.44**	

Legend:

Score	Description	
59 above	Very High Mastery	(VHM)
50 – 58	High Mastery	(HM)
41 – 49	Average Mastery	(AM)
32 – 40	Low Mastery	(LM)
Below 32	Very Low Mastery	(VLM)

As regards to the Statistics instructors' competence along teaching strategy, Statistics instructors in HEIs considered themselves as much competent along teaching strategy which revealed a general weighted average of 3.89. Similarly, the students and deans considered the Statistics instructors to be "much competent" along teaching strategy based on the result of 3.57 for the average rating of the students and 3.97 average rating given by the deans.

Relative to the Statistics instructors' competency along classroom management and organization, the instructor themselves believed that they are "much competent" in classroom management and organization skills as revealed by the average rating of 4.06.

Moreover, the findings denote that on the average, the students consider their Statistics instructors to be "much competent" based from the general average rating of 4.02. Likewise, the dean believed that Statistics instructors are much competent along classroom management and organization skills as reflected by an overall rating of 4.10.

Along Statistics instructors' competence in communication skills, Statistics instructors considered themselves to be "much competent" based on the general weighted average of 3.85. The students and the deans had the same perception on the competence of the Statistics instructor along communication skills. They considered them "much competent" with grand means of 3.69 and 3.88, respectively.

In terms of the Statistics instructors' competency along professional practice, the Statistics instructors were considered "much competent" by the Statistics instructors themselves, students and the deans as reflected by the general weighted average rating of 4.00, 3.83, and 4.31 respectively. Regarding Statistics instructors' competency along working relation, the three groups of respondents assessed the Statistics instructors as "much competent" along working relation. This was revealed on these numerical ratings by the Statistics instructors themselves, students and deans: 4.26, 4.02 and 4.45 respectively.

Comparison of perceptions of the three groups of respondents relative to the statistics instructors competencies:

In the comparison of the perceptions on the competencies of the Statistics instructors along teaching strategy, all the three groups of respondents gave the same qualitative ratings of "much competent". However, they differed in the quantities derived. Statistics instructors and deans gave higher numerical ratings compared with the students' rating. Their corresponding rating were: Statistics instructor - 3.89, students – 3.57, deans – 3.97.

In the comparison of the perceptions of the three groups of respondents on the competencies of the Statistics instructors along classroom management and organization skills, the ANOVA resulted to the acceptance of the hypothesis. This meant that the instructors, students and deans viewed the competence of the Statistics instructors along classroom management and organization skills at the same level. The instructors, students and deans have the same view on the competence of the Statistics instructors along communication skills at the same level.

The three groups of respondents rated Instructors' competencies along professional practice differently. The deans gave the highest mean value of 4.31, followed by the Statistics instructors with a mean value of 4.00 while the students gave the lowest general mean of 3.83. In the comparison of the perceptions on the competencies of the Statistics instructors along working relation, all the three groups of respondents gave the same qualitative ratings of "much competent".

The result showed significant differences among the perceptions of the three groups of respondents relative to the competencies of statistics instructors in HEIs along working relation" was rejected. The deans gave the highest mean value of 4.45, followed by the Statistics instructors with a mean value of 4.26 while the students gave the lowest general mean of 4.02.2

The result revealed that all of the three pairs of respondents differed in their numerical ratings. The deans gave the highest mean value of 4.01, followed by the Statistics instructors with a mean value of 3.90, while the students gave the lowest general mean of 3.57.

Relationship between the competency levels of the statistics instructors and the different variates:

Table 4a: Relationship between statistics instructors' competency and their profile

Instructors' Profile	Evaluation		
	Mastery of the Subject	Teaching Strategy	Classroom Management and Organization Skills
Age	Significant	Significant	Not Significant
Sex	Not Significant	Not Significant	Not Significant
Civil Status	Significant	Not Significant	Not Significant
Average Monthly Income	Significant	Significant	Significant
Educational Attainment	Significant	Significant	Significant
Length of Teaching Experience			
Statistics Subject	Significant	Significant	Significant
General Subjects	Significant	Significant	Significant
Academic Rank	Significant	Significant	Significant
Relevant In-service Trainings	Significant	Significant	Significant
Latest Performance Rating	Significant	Significant	Significant
Teaching Loads	Significant	Significant	Significant
Professional Development & Achievement	Significant	Significant	Significant
Research Experience & Application	Significant	Significant	Significant

Table 4a reflects that Statistics instructors' competency along mastery of the subject was significantly related to their age, civil status, average monthly income, educational attainment, length of teaching experience, academic rank, relevant in-service trainings attended, teaching loads, professional development and achievement, and research experience. On the other hand, age, average monthly income, educational attainment, length of teaching experience, academic rank, relevant in-service trainings attended, teaching loads, professional development and achievement, and research experience had significant relationship with Statistics instructors' competency along teaching strategy.

Statistics instructors' average monthly income, educational attainment, length of teaching experience, academic rank, relevant in-service trainings attended, teaching loads, professional development and achievement, and research experience were significantly associated with their competency along classroom management and organization skills.

Table 4b: Relationship between statistics instructors' competency and their profile

Instructors' Profile	Evaluation		
	Communication Skills	Professional Practice	Working Relation
Age	Significant	Not Significant	Not Significant
Sex	Not Significant	Significant	Not Significant
Civil Status	Not Significant	Not Significant	Not Significant
Average Monthly Income	Significant	Significant	Significant
Educational Attainment	Significant	Significant	Significant
Length of Teaching Experience			
Statistics Subject	Significant	Significant	Significant

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General Subjects	Significant	Significant	Significant
Academic Rank	Significant	Significant	Significant
Relevant In-service Trainings	Significant	Significant	Significant
Latest Performance Rating	Significant	Significant	Significant
Teaching Loads	Significant	Significant	Significant
Professional Development & Achievement	Significant	Significant	Significant
Research Experience & Application	Significant	Significant	Significant

Statistics instructors' age, average monthly income, educational attainment, length of teaching experience, academic rank, relevant in-service trainings attended, teaching loads, professional development and achievement, and research experience were significantly correlated with their competency along communication skills.

Statistics instructors' sex, average monthly income, educational attainment, length of teaching experience, academic rank, relevant in-service trainings attended, teaching loads, professional development and achievement, and research experience had significant relationship with their competency along professional practice.

Statistics instructors' average monthly income, educational attainment, length of teaching experience, academic rank, relevant in-service trainings attended, teaching loads, professional development and achievement, and research experience were significantly related with their competency along working relation.

Table 5: Suggested trainings/seminars/workshops by the statistics instructors

Suggested Trainings/Seminars/Workshops	Frequency
1. Seminar-Workshop in the Use of Statistical Software for Data Analysis	28
2. Training-Workshop on the Statistical Tools used in Research	10
3. Seminar-Workshop on Parametric and Non-Parametric Statistics	5
4. Seminar-Workshop for Enhancing Teaching Strategies in Statistics	20
5. Seminar on Descriptive and Inferential Statistics	11
6. Seminar-Workshop for Social Science Research	9
7. Seminar on Sampling Techniques and Procedures	6
8. Seminar on Probability for Engineers	1
9. Seminar-Workshop in Conducting Research	14
10. Seminar in Regression and Correlation Analyses	2
11. Statistical Exhibit	1

There were 11 trainings/seminars/workshops suggested by the Statistics instructors in HEIs of Region VIII. Among the identified trainings/seminars/workshops, the highest frequency, that is 28, accrued in this suggestion: "Seminar-Workshop in the Use of Statistical Software for Data Analysis". The suggested seminars/workshops with the next highest frequency from 20 respondents was: "Seminar-Workshop for Enhancing Teaching Strategies in Statistics". Moreover, the following were the reflected result: 14 Statistics instructors felt the need of the "Seminar-Workshop in Conducting Research", 11 instructors suggested for the conduct of "Seminar on Descriptive and Inferential Statistics", 10 suggested the "Training-Workshop of the Statistical Tools used in Research", 9 wished to attend   "Seminar-Workshop for Social Science Research", 6 suggested "Seminar on Sampling Techniques and Procedures", 5 suggested for the conduct of a "Seminar-Workshop of Parametric and Non-Parametric Statistics", 2 suggested a "Seminar in Regression and Correlation Analyses", 1 suggested for a "Seminar on Probability for Engineers", and 1 Statistics instructor suggested for the conduct of "Statistical Exhibit".

In view that the Statistics instructors were generally rated "much competent" by themselves, students and deans, their lowest scores in certain areas served as the basis for framing a training program for enhancement. In addition, the suggested trainings/seminars/workshops by the Statistics instructors were also considered in designing the enhancement training program. This training program could help them strengthen their competencies as well as those instructors who had not acquired yet these competencies.

5. DISCUSSION AND CONCLUSIONS

The instructors in HEIs of Region VIII handling the Basic/Introductory Statistics subject were typically in the age of 34.76 years; mostly females and were married. Their average family income per month was Php21, 316.49; most of them majored BSEd Mathematics while majority did not pursue post graduate studies; hence some of them specifically from SUCs were not qualified for a permanent position. It is significant to note that master's degree is one of the requirements for a permanent position especially in SUCs. Moreover, Statistics teaching in HEIs is authored mostly by teachers with no advanced degrees in statistics and sometimes no undergraduate statistics degrees as well.

The typical Statistics instructors had acquired 5.71 years in teaching Basic/Introductory Statistics subject, spent 3.73 years in teaching general subjects and most of them were Instructor 1. Based on the number of trainings attended, they did not have attended adequate trainings that are vital in upgrading themselves on the latest and modern trends in teaching statistics.

Moreover, the Statistics instructors had "Very Satisfactory" performance rating, and handled 6.67 teaching loads during the first semester of the school year 2011-2012.

The Statistics instructors had very few professional developments and achievements and should exert more effort on their work for them to be more competitive, satisfied and productive. Correspondingly, they had very few research experience and application. Statistics instructors should expose themselves in doing research to relate statistical concepts more specifically to practice and application.

Conversely, Statistics instructors had low mastery in Statistics subject and as a consequence therefore, had very little or insufficient to teach. The Statistics instructors themselves, students, and deans believed that Statistics instructors were "much competent" along with their: a) teaching strategy, b) classroom management and organization skills, c) communication skills, d) professional practice, and e) working relation.

There were significant differences among the perceptions of the Statistics instructors themselves, students and deans relative to the competencies of statistics instructors in HEIs along teaching strategy, professional practice and working relation. Deans gave the highest rating, followed by the Statistics instructors and the lowest rating was given by the students. Considering that students are the direct clients and beneficiaries of learning, their rating reflect so much of the performance and competency of their instructors.

The Statistics instructors, students, and deans assessed the Statistics instructors to have "fully implemented" the objectives of the Statistics subject.

There were significant differences among the perceptions of the Statistics instructors themselves, students and deans relative to the extent of implementation of the objectives of Statistics. Deans gave the highest rating, followed by the Statistics and the lowest rating was given by the students.

The trainings/seminars/workshops suggested by the Statistics instructors in HEIs of Region VIII were: 1) Seminar-Workshop in the Use of Statistical Software for Data Analysis, 2) Seminar-Workshop for Enhancing Teaching Strategies in Statistics, 3) Seminar-Workshop in Conducting Research 4) Seminar on Descriptive and Inferential Statistics, 5) Training-Workshop of the Statistical Tools used in Research, 6) Seminar-Workshop for Social Science Research, 7) Seminar on Sampling Techniques and Procedures, 8) Seminar-Workshop of Parametric and Non-Parametric Statistics, 9) Seminar in Regression and Correlation Analyses, 10) Seminar on Probability for Engineers, and 11) Statistical Exhibit.

Statistics instructors in HEIs of Region VIII need to undergo training program to strengthen their competencies and enhance their capabilities to help improve school performance.

Considering that majority of the Statistics instructors did not pursue graduate studies and were not even qualified for a permanent position especially in SUCs, they must be required and advised to enroll in graduate program to obtain masteral and/or doctoral degree most preferably related to Statistics. Instructors matter most in terms of the quality of education and that they must be qualified in teaching Statistics.

To upgrade Statistics instructors with the latest and modern trends in teaching Statistics and in order for them to improve competencies, they must undergo training programs for continuous professional development.

The Statistics instructors should be encouraged and motivated to maintain or even improve their performance. HEIs administrators should set up motivational rewards for instructors.

Statistics instructors should enrich themselves by conducting professional development and achievement and research experiences/ applications. HEIs administrators should enforce policy that will encourage and motivate instructors to do research and motivational rewards for professional development and achievement.

Statistics instructors need to enrich themselves in order for them to be competent in the mastery of Statistics subject. They should engage themselves in reflective practice to develop their professional knowledge by pursuing relevant graduate/ post-graduate courses; attending special courses relevant to statistics; participating in relevant in-service activities such as trainings, seminars, etc; subscribing and reading professional books and magazines; sharing or discussing educational article/professional book review in a meeting; engaging in research and extension activities, and the like.

The most frequently used analytical variables when attempting to explain why some teachers are more effective and competent than others is mastery of subject matter (Byrne, 1983:22).

The Statistics instructors should be encouraged and motivated to maintain or improve their competencies along with those of higher ratings. However, they should improve their competencies along the following: they should create opportunities for extensive contribution of students and inculcating in them the importance of research and extension, they should help learners to reflect on their response to different learning strategies and to maximize their own learning potential and enhance students' desire and interest to learn more about statistics; they should involve students to active participation in classroom activity, experiment or a survey or a computer simulation which allows students to have some experience of the practical difficulties of obtaining data and of interpreting data in the light of the problems of obtaining it; and they should explain the application of statistics to decision-making for community needs, resources and goals to improve the quality of life.

The Statistics instructors should prepare all statistics instructional materials, such as handouts, and keep learning tools including bulletin boards up-to-date, and spreadsheet software. Likewise, they should create new opportunities for individuals to work together, breaking down barriers that may get in the way of effective team-working.

School officials/administrators of HEIs in Region VIII should provide necessary equipments such as computer, Statistical software and other apparatus that may cater Statistics teaching-learning activities.

The Statistics instructors should explain the lesson clearly and easily understood by the students. They should explain extremely complex problems in simplified terms for every student to understand and ask questions which develop students' thinking skills and uses variety of questions pertaining to knowledge, comprehension, synthesis, evaluation and application. In addition, they should use Statistics terms appropriately and correctly, translate relationships, trends and patterns of data into symbols, diagrams, tables and graphs and vice-versa, and use simple models to describe/ interpret data/observation.

In order to be more competent, Statistics instructors should expose students to experience firsthand process of data collection and data exploration, discuss how data are produced, how and why appropriate statistical summaries are selected and how conclusions can be drawn and supported, and they should also discourage a purely lecture type basic statistics course, in favor of one with hours of laboratory.

The HEIs administrators should motivate instructors to maintain and improve the extent in the implementation of the Statistics subject objective for them to be more competent.

A proposed training program may be adopted to upgrade and update Statistics instructors' competence.

A similar study may be conducted giving emphasis on other related factors; including the external campuses as respondents; and using other measures in assessing Statistics instructors' competency such as actual class observation with the expert observers to rate the instructors.

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