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The test and the use of man's education is that he finds pleasure in the exercise of his mind..

Jacques Martin Barzun

RESEARCH Journal

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CORRELATION OF THE BS CRIMINOLOGY STUDENTS' PERFORMANCE IN THE MOCK BOARD EXAMINATION AND THEIR READING COMPREHENSION SKILLS

by
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ABSTRACT

This study investigated the relationship of reading comprehension skills and performance in the mock board exams of the University of Baguio School of Criminal Justice and Public Safety. Reviewees who were enrolled under the UB Review Center during the second semester of SY 2011-2012 were the respondents of the study. This study made use of the descriptive and ex-post facto methods to analyze gathered data. Findings of this study show that there is a positive substantial relationship between the respondents' reading comprehension and their score in the mock board. However, considering the levels of reading comprehension, the literal and creative levels were found to have almost negligible to definite but low relationship with the mock board exam while the inferential and critical levels have a positive substantial relationship with the respondents' score in the mock board exam.

Key words: Reading comprehension, board exam, reading skills, correlation of board exam and reading

I. BACKGROUND OF THE STUDY

Learning is defined as a change in behavior or performance as a consequence of experience (Zulueta & Maglaya, 2004). One of the major avenues where learning transpires is in the academe where students are taught and are trained for the development of their various faculties of learning. All experiences that are acquired by the students from school should, therefore, contribute to their holistic development. According to Zulueta and Maglaya (2004), the results of learning are acquisition of knowledge and information, desirable habits and skills and attitudes and appreciation.

One of the challenges that graduates need to hurdle is a series of tests that would evaluate the amount of learning they have acquired from their education. One of these tests is the National Board Examinations. According to Oriondo and Antonio (1984), testing is a technique of obtaining information needed for evaluation purposes, by which through it, the knowledge of the graduates on their particular field is measured.

In the University of Baguio (UB), nine (9) courses are considered board courses since the graduates are required to take and pass the National Board Examination before they could legitimately work professionally. Among these board courses is the School of Criminal Justice and Public Safety (SCJPS) that is continuously striving to attain its aim of producing graduates who will not only pass the board exams but also to be the top board passers. The dean of SCJPS, as one of the researchers, said that the school aims at a 100 percent passing rate and a slot in the top ten board passers. For this reason, he is doing his best in looking into the possible factors affecting the performance of the graduates' ratings in the board exam and coming up with ways and means on how to address such.

Teachers have hypothesized several contributory factors affecting the performance of the Criminology students, as well as the other board takers in the university, in the national board examinations. Among the identified factors, poor reading comprehension skills of the test-takers are considered to be the major cause why students flunk in the exam. This claim corresponds to an online article by Agudon, as cited by Kho (2004), saying that low reading comprehension has been cited as one of the factors that contributed to the poor performance of students in achievement tests. However, an action research conducted about whether or not poor reading skills might be affecting student test scores in areas other than English contradicts this claim. The results show that the lack of improvements in test scores for students who received the accommodated testing administration does not necessarily imply that students are not hindered in their performance on exams in subjects other than English by poor reading skills (Shaffren, 2007).

It is in this light that the researchers were inspired to find out if reading comprehension affects the SCJPS graduates' board exam results. This study intends to determine the specific reading skill needed to be improved among the students that might also contribute to the improvement of their board examination performance.

Specifically, this research aimed to answer the following problems:

1. What is the level of performance of the UB SCJPS reviewees along the four sub-skills of reading comprehension and in the mock board exam?

2. Which among the levels of reading skills are evident in the mock board test items?

3. What is the strength and direction of correlation between the students' performance in the reading test and the mock board exam?

II. METHODOLOGY

This study used a descriptive-correlation method. Thirty-four UB BS Criminology graduates who took the mock board exam in the UB Review Center (UBRC) during the School Year 2011-2012 participated in the study. All of them were asked to complete the mock examination and reading comprehension test within the specified time. Answer sheets with incomplete answers were excluded from the analysis.

The reading comprehension test used in the study was adapted from Lydio (2005), who tested the test for reliability and validity. The second tool used was the two sets of questionnaire prepared by the UBRC for the Mock Board Examination.

Data were processed through scores, categories, coding, and tabulation based on the research problems identified. Scores, frequency counts and proportions were the main descriptive measures used in problems 1 and 2, while the Pearson product-moment correlation was used in problem 3. The following scale was used to interpret scores obtained for the sub-skills in the reading test and for the mockboard examinations.

Distribution of scores for the sub-skills in the reading test	Distribution of scores for the Mockboard Exam	Verbal Interpretation
17-20	81-100	Outstanding
13-16	61-80	Very Satisfactory
9-12	41-60	Satisfactory
5-8	21-40	Fair
0-4	0-20	Poor

III. RESULTS AND FINDINGS

Level of Performance of the UB Board Reviewees in the Reading Test and Mock Board

Literal level is the rudimentary reading level of comprehension. At this level, the reader is expected to identify the basic details, follow instructions, and understand specific rules and orders (Bernardez, 2007). It basically tests the memory of the reader if he is able to recall details and information that he has read from a text. In a reading test, information questions that start with Who, Where, What, When are usually asked. If the reader did not totally understand the reading text, apparently, he will not be able to answer even the simple information question.

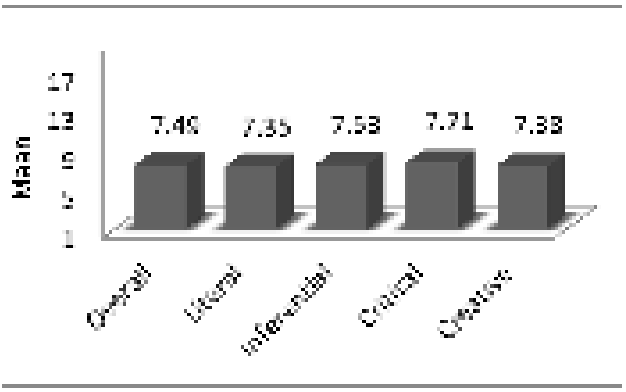

Figure 1. presents the mean scores of the reviewees in the four levels of reading comprehension.

The fair result of the reading comprehension test of the SCJPS reviewees in the literal level implies that the respondents need more mastery of the basic skills in reading comprehension. Some of these are: (1) identifying and remembering significant details or facts, (2) following accurately specific written or printed instructions, and (3) following the sequence and relationship of ideas (Villamin, Diaz, Talens, & Santos, 2001). The result is parallel with Lydio's (2005) findings about the competence of freshman students of a state university in the literal level which was also interpreted as fair.

The reading comprehension test given to the respondents contains 20 questions at the literal level which are divided into four sub-skills such

as, context clues, synonyms, structural analysis, and identifying significant detail. These are skills that the respondents need to master before progressing to the next level. Basically, all these skills would point out to vocabulary skills. As a reading strategy, this is referred to as word attack or word recognition skills. Tonjes and Zintz (1987) mentioned that the mature reader quickly uses more than one strategy to unlock an unknown word, whereas poor readers, on the other hand, often rely on a single word attack strategy. With the result of this study, the respondents do not possess the necessarily skills to be called mature readers.

Grounded in figure 1, there is a fair level of comprehension of the respondents in the inferential level. As quoted by Villamin et al. (2001), Krantz and Kimmelman claimed that putting details together and sensing relationships that are not explicitly expressed but merely implied by the author are the sub-skills of inferring. This involves making logical conclusions from given or proven facts. In the reading comprehension test administered to the reviewees, the 20 items were categorized under inferential level of comprehension with the following sub-skills: making inferences, predicting outcomes, determining meaning of relationships, and forming conclusions or generalizations. Since the respondents were found to be incompetent in the literal level, it must be understood that they were not also able to comprehend the whole passage. In this regard, the study shows that the respondents lack the mastery of these analytical skills which are important in any academic tasks. It is therefore important to note that these reading (thinking) skills must be given emphasis in their education.

The third level of reading comprehension is the critical level rated as fair in this study. Making judgments is the center of the critical reading skill. A well-known reading expert, Dr. Francis Triggs, says, "Critical reading requires a contribution by both the author and the reader and an interplay which usually results in a new understanding" (Adams & Patterson, 2010). This skill tests both the person's understanding of the text and his existing knowledge about the world. Generally, the low score obtained by the reviewee-respondents in this level indicates that they have insufficient background and knowledge about the world, which is an important factor in inferring.

Background information or knowledge of the reading material refers to the reader's existing knowledge about human condition, social issues, and other topics about other fields of knowledge which are basically

acquired when one is a wide reader. In reading, this is called the schemata, a set of background information or existing knowledge and experiences that may be related to a reading matter.

The fourth and the highest level of reading comprehension is the creative level, which entails related skills such as identifying character traits, determining tone/mode and developing new insights/perspective. This study reveals that the respondents' level of comprehension in the creative level is fair. This level could have been challenging to the respondents since creative level involves skills that involve internalizing the emotional experience embedded, reasoning, judging, and creating. This is supported by Gates, as cited by Fries (1963), that reading is not just a mental activity; it involves dynamic and emotional processes where the reader does more than understand and contemplate—his emotions are stirred, his attitudes and purposes are modified; indeed, his innermost being is involved.

The fair performance of the respondents in the creative level implies that their reading style is still superficial and the enrichment from reading is not yet heightened. There is a great need for students to widen the scope of their schemata to become sensitive readers and to get the most from their reading.

In general, this study presupposes that the respondents performed fairly in all levels of comprehension is due to their non-mastery of the literal skills, particularly, vocabulary (word-attack skills), and structural analysis. Though, this is considered as the lowest level of comprehension, the skills under it can be considered complex since they require complicated process before one can gain mastery. In Goddell's Skills Ladder Mode and the Reading Ability Level Model by Duffy, Sherman, and Roehler as presented by Villamin, et al. (2001), word recognition, which may be broken down into basic sight words and phonetic analysis, should first be learned adequately before a reader embarks on learning vocabulary attack skills. More than simple word recognition, understanding the meaning of these words (vocabulary skills) is imperative to comprehension.

Performance Level of the Respondents in the Mock Board Exam

Figure 2 presents the level of performance of the 34 who took the two sets of the Mock Board Examination for Criminology. The level of performance in the mock board exam for the two sets is interpreted as satisfactory (M = 47.19, SD = 7.72).

Looking at the respondents' individual mean scores, the highest mean score of 59.5 is far below the passing rate (85%) in the real board examination. Although there could be several factors that affected the mock board result, it can be inferred that the test takers were not able to apply the things that they should have learned during the review period.

In the study of Natividad and Dulipas (2006), several factors were presented as contributory to the reviewees' test results. These are giving of review materials late; inadequate textbooks in library; lack of reference books; materials are not updated; and outlines and handouts are inadequate. Moreover, the same study found that the reviewees regarded the lack of support of the reviewers in supplying review materials as a very serious problem. Other moderately serious problems are non-maximization of review hours, subjects are not fully covered or discussed, and lack of expertise of the reviewers. On the other hand, the unpreparedness of the reviewees, inadequate time management and poor concentration were perceived as very serious problems. Between the reviewees' and reviewers' attitudes, the study concluded that the former was perceived by the respondents as more serious contributory factors to mock board test results. Whether or not these same factors had contributed to the low performance of the reviewees in the mock board exam in one way or the other, there is evidence that the reviewees lack familiarity on the topics and issues presented in the test.

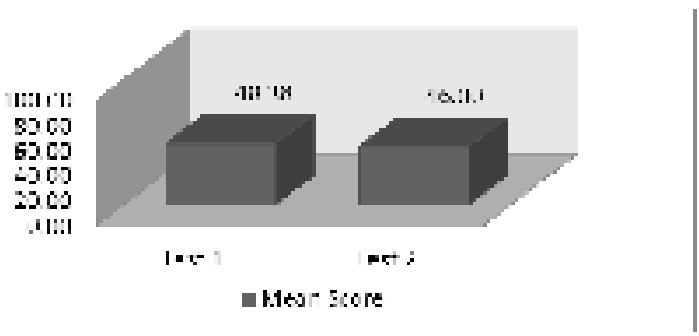

Figure 2. Mock Board Test Scores for Test 1 and Test 2

Many other researchers have explored student characteristics that contribute to academic success. Kirby, Winston and Santiesteban (2005) focused on impatience that influences students' own academic performance. The study of Hijazi and Naqvi (2006) reveals that more study hours are not significant as far as students' performance is concerned.

In a recent study of attention, several educationally useful and measurable constructs have been discovered, such as sustained, voluntary attention. Wittrock and Baker (1991) quoted Peterson and Swing, "In some contexts, attention has been shown to correlate more highly with achievement than time does on task."

Keeping in view all of the variables discussed by different studies, the test-takers' performance in academic tests are indeed influenced by many factors. However, it is the test-takers' attitude and characteristics that have more important roles in such endeavors because having success at school goes beyond intelligence. As David (2012) wrote, a student has potential to earn good grades but does poorly because of bad study habits or disinterest. Several studies also show that specific factors contribute to such problems. However, if these problems contributing to low grades will be identified and addressed accordingly, a student may be put back on the path to academic success.

This is to say that among all the factors that may affect the reviewees' exam result, their strategies on how to retain and recall input data is the most important since these inputs are useful in all levels of questioning in the test.

Levels of Reading Skills Evident in the Mock Board Test Items

Utilizing the levels of reading comprehension in evaluating the levels of the questions in the mock board exam, figure 3 presents that 175 (87.5%) items were identified as literal level (Set A = 90%, Set B = 85%); twenty items (10%) were identified as inferential (Set A = 7%, Set B = 13%); and only five (2.5%) were identified as critical level (Set A = 3%, Set B = 2%). No item in the sets of question was categorized under the creative level.

In the principles of test construction, all cognitive levels must be addressed in the exam. Questions must be at least distributed among the levels of cognition in order to stimulate the higher order thinking skills of the test-takers. Since the mock board exam is a way to prepare the examinees for the real board exams, it is important for them to be exposed to the different levels of questioning. Whether this is really the nature of Criminology board exams or a flaw in the preparation of the test material, evaluating the level of difficulty of the questions is still necessary. Lindley

(1993) explains that through the art of thoughtful questioning, teachers can extract not only factual information, but aid learners in connecting concepts, making inferences, increasing awareness, encouraging creative and imaginative thought, aiding critical thinking processes, and generally helping learners explore deeper levels of knowing, thinking, and understanding.

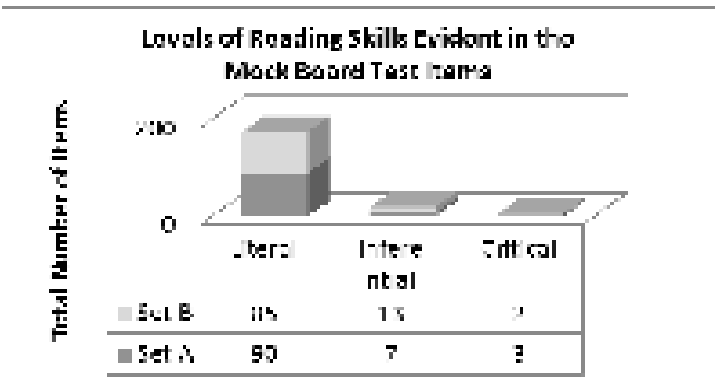

Figure 3. Levels of Reading skills in the mock board test

Out of the 34 respondents, only 49.17% got correct answers for the literal level; 43.21% for the inferential level; and only 33.82% for the critical.

Specifically, the inferential level of comprehension is employed only to 13 items in the mock board exam wherein only 43.21% of the reviewees obtained the correct answers. The inferential level, as applied to the mock board exam, entails skills in making conclusions using some principles and theories acquired during the students' college days and is reinforced by the review conducted by the UBRC. A low score in the inferential level would mean that the reviewees could have not gained enough theories and principles which they can use in some given situations. This assumption has reference to the schema theory discussed in the previous pages that background knowledge improves comprehension and academic success of students. This does not disregard the possibility that their inferring skills or their innate capacity to analyze a situation contributes to the respondents' low score.

The literal level, which constitutes 85% of the mock board exam, is the second highest in terms of the number of correct answers gained by

the reviewees. However, it has to be noted that there were only 49.17% out of the 34 respondents who got the correct answers. It can be assumed that due to the low scores of the respondents in the literal level, most especially their memory skill, their performance in this level is also poor. Among the specific skills under the literal level, recalling information and details need to be developed more. If the Criminology Board Exam is structured in this manner, then the reviewees must really have to develop more strategies in enhancing their memory skills. On the other hand, it must be taken into account that in this level, input is very important. In this study, the researchers considered three-fold inputs that could have affected the respondents' scores. These are the input from content teachers, input from students' extended reading, and input from the lecturers while enrolled in the review course. Lack of input, coupled with memory lag, and poor study skills will surely result to failure. On the contrary, the interplay of the inputs, excellent memory and study skills will lead to a favorable result of any sort of exams.

The critical level of comprehension of the respondents in the mock board exam was seen as the lowest among the three levels. The result of the reading comprehension test shows that the reviewees' strongest level, though, not that satisfactory, is the critical level. One probable reason that can explain the result is the proximity of the input material from where information is taken in the reading comprehension test.

Strength and Direction of Correlation Between the Students' Performance in the Reading Test and Mock Board Exam

The correlation was found to be not statistically significant between literal level score and mock board exam score, $r(21) = 0.079$, $p = 0.732$ and between creative level score and mock board exam, $r(21) = 0.255$, $p < 0.264$, indicating that these variables are not linearly related but positive in direction. This means that literal and creative skills in the reading comprehension may not necessarily influence the mock board exam results.

The literal level mean score of the respondents in the reading comprehension test is the lowest among the four levels. In the mock board exam, literal level questions make up 85% of all the question items. Since almost all items in the mock board exam are classified as literal, having a strong foundation on Criminology—wherein they would just have to remember details from their classroom discussions in college, lectures in

the review sessions, or content books they could have read— it is more likely that the respondents should have obtained higher results in both reading comprehension test and mock board exam. On the contrary, the respondents got low results in both exams.

The findings can be explained further by examining the nature of reading comprehension test and mock board exam. Test-takers of the reading comprehension are understood to employ the bottom-up process or what we call the text-based approach in reading wherein information is lifted directly from a particular source text. Text-based reading begins with letters on a page that the reader must distinguish and organize as words, sentences and meaningful paragraphs. Gough's arguments (as cited by Arronof & Miller, 2001) posit that theories that stress bottom-up processing focus on how readers extract information from the printed page, claiming that readers deal with letters and words in a relatively complete and systematic fashion. When test-takers are confronted with questions in the literal level in a reading comprehension test, they can easily go back to the passage and look for the information to answer the question. This can definitely not be done in a board exam or any kind of comprehensive test.

Mock board exams are understood to employ more the top-down reading process wherein the uptake of information is guided by an individual's prior knowledge and expectations. Theories of Goodman (1970) and Smith (1973) that stress top-down processing hold that readers form hypotheses about which words they will encounter and take in only just enough visual information to test their hypotheses. This strategy is much relevant in taking exams because the test-takers will have to extract information, not from the material on hand, but from his background about the subject matter—background or lessons that they had learned some time ago. This explains why the findings show insignificant relation between the literal level of the reading comprehension and the performance of the respondents in the mock board exam.

Creative level of reading comprehension was also found to have insignificant correlation with the mock board exam result. In reading comprehension, this level usually tests the capability of the readers for self-actualization and in moral or ethical decision-making. Although this is seen as an important skill that any person should develop, it can be inferred that in the nature of Criminology Board Examinations, this skill may not be the most important consideration. As shown in the previous findings, creative level of questioning was disregarded in the board exam.

There were very few items in the test questionnaire that require inferring and critical skills that were found to have significant relation with the mock board test result. This finding means that among the four levels of comprehension, it is the inferential and critical levels of comprehension that have influence on the mock board exam. Unlike the specific skills in literal and creative levels that cannot generally be applied in the mock board exam, the inferential skills (making inferences or conclusions by applying learned theories and principles) and the critical skills (making judgments by analyzing a situation) are very much applicable in Criminology Board Exams. Although, it has to be understood, again, that background knowledge, especially on theories and principles, is a crucial factor in these levels. It can further be construed from the findings that when these two levels of reading skills will be fully developed; there is a greater chance for test takers to pass an examination incorporating questions at these levels.
Overall, the findings of this study clearly presents that the most important influence in improving the scores in the mock board of the test-takers from the SCJPS is attributed to having strong background and foundation about their course, since it has been found out that in all levels of questions involved in the test, it is the background information (schemata) stored in their long memory term that is quite necessary.

IV. CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the following conclusions were drawn:

The SCJPS graduates who were enrolled in the review course conducted by UBRC during the second semester of SY 2011-2012 were fair on their reading comprehension skills under the literal, inferential, critical and creative levels.

The reading comprehension skills such as word attack skills, analysis and evaluation will help the test-takers in deciphering the task being asked in each item of the exam. The structure of the mock board exam, however, stresses the fact that between reading comprehension skills and having a strong background knowledge about the subject matter, it is the latter that is proven to be of great help in comprehensive exams such as board exams.

In the light of the findings of this study, the following recommendations were formulated:

1. Teachers in the content areas must try to provide comprehensive

and relevant information to the students since it is the background knowledge of the SCJPS reviewee-respondents about the subject matter they are being tested on that is necessary in obtaining excellent ratings in the board exams, reading comprehension skills being the secondary consideration, taking into account the nature and the structure of the test.

2. Content area reading programs shall be established, not only for criminology students, but to all board courses, targeting particularly students with low reading comprehension skills in inferring and critical levels.

3. Content teachers shall see to it that they are providing students with enough background information about the different areas in their specialization since the schemata of the reviewees were found to be weak that contributed to the low performance of the reviewees in the mock board test.

4. All teachers shall give more activities that may enhance the higher order thinking skills of students, most especially, those under inferring and critical levels in order for the students to hurdle academic examinations whether these are simply classroom testing, or local or international tests.

5. Program chairs, heads, and all those who are responsible for curriculum and syllabi development shall carefully select subjects and topics, methodology and materials to be included in the students' course for a better preparation for board exams. Also, a closer monitoring of teachers' instructional materials and course content in the board courses is recommended for a better quality assurance of our graduates.

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ARSENIC, CADMIUM AND LEAD LEVELS IN BREAST MILK OF VOLUNTEER MOTHERS IN BAGUIO CITY,PHILIPPINES

by
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Riza A. Magbitang, BSChem

ABSTRACT

Breast milk is the primary source of nutrition for infants and the practice of breastfeeding is highly promoted all over the world. But this important source of nutrients may also be the pathway of exposure for infants to unwanted contaminants like arsenic (As), cadmium (Cd) and lead (Pb) due to maternal excretion. Analyses of the trace contaminants in the breast milk samples from volunteer mothers in Baguio City, Philippines was done using an optimized method based on microwave digestion as the mineralization step prior to metal-selective detection by inductively coupled plasma mass spectrometry (ICPMS). The method was validated against a certified reference material (spiked skim milk powder) and by standard addition. The breast milk samples analyzed showed a range of concentration for As: from below method detection limit (MDL) to 12.02 µg L-1 (mean value of 3.04 µg L-1); for Cd: from below MDL to 0.70 µg L-1 (mean value of 0.11 µg L-1); and for Pb: from below MDL to 20.04 µg L-1 (mean value of 1.93 µg L-1). These concentrations, except the determined As values, were below the reported values in other countries and the reported values by the World Health Organization. Correlation analysis showed that there was a moderate but significant correlation between levels of Cd and Pb indicating that lactating mothers with high levels of Cd also had high levels of Pb. Although the levels of As, Cd and Pb in breast milk samples from volunteer mothers are low compared to reported levels from other parts of the world, the presence of these elements in the samples indicates that there is a need for a wider study to ascertain which may be possible sources for these contaminants, especially in lactating women.

Key words: Breast milk, metal contamination, arsenic, cadmium, lead, ICPMS

I. BACKGROUND OF THE STUDY

Breast milk is still the major source of nutrition for infants even with increasing preference for breast milk substitutes (Landrigan, Sonawane, Mattison, McCally & Garj, 2002; Kosanovic, Adem, Jokanovic & Adbulrazzaq, 2008). The use of breast milk is advocated over other alternatives because of superior nutritional and gestational characteristics. Aside from the necessary nutrients that infants derive from milk, the infants may also be exposed to contaminants passed through the milk from their mothers (Landrigan et al., 2002; Ursinyova & Masanova, 2005; D'Ilio, Petrucci, D'Amato, Di Gregorio, Senofonte, & Violante, 2008). A lot of literature materials have tackled how exposure of the mothers, as a consequence of occupation, lifestyle or the environment, can be released through the milk because it can be a pathway of maternal excretion of toxicants. Various contaminants have been detected in breast milk including pesticides and metal contaminants (D'Ilio et al., 2008; Kosanovic et al., 2008; Bentum, Sackitey, Tuffuor, Essumang, Koranteng-Addo, & Owusu-Ansah, 2010; García-Esquinas, Pérez-Gómez, Antonio Fernández, Pérez-Meixeira, De Paz, Iriso,… Aragonés, 2011). Among all possible contaminants, the presence of elements like arsenic (As), cadmium (Cd) and lead (Pb) in breast milk is a health priority because the exposure happens during the development period of the lactating children wherein they are most susceptible to the effects of these contaminants (Ursinyova & Masanova, 2005; Liu, Wang, Song & Wuc, 2010; Örün, SongülYalçın, Aykut, Orhan, KoçMorgil, Yurdakök & Uzun, 2011).

Lead has often been called the leading environmental health threat to children. It is a metal which is accumulated in the organism via inhalation or ingestion. It is toxic to the developing brain, and at high levels results in numerous poisoning symptoms. In addition, at the low doses common today in many countries, lead has subtle effects on neurological functions, including learning, memory, and attention span. It is widely accepted that exposure during the early stages poses risk for the health and functional activities of infants which may impair the cognitive and behavioral development of children (Dorea & Donangelo, 2011).

Arsenic is a ubiquitous element which is commonly released to the environment via geothermal weathering and indiscriminate use and disposal of arsenic-containing materials such as semiconductors, pesticides and herbicides. Exposure to As may lead to adverse health effects including skin lesions and damages to internal organs which

may eventually develop to bladder, lung and skin cancers (Tseng, 2009; McClintock, Chen, Bundschuh, Oliver, Navoni, Olmos,... & Parvez, 2011).

Exposure to Cd is mainly through food, both seafood and plant-derived, and via tobacco smoke (Kippler, Hossain, Lindh, Moore, Kabir, Vahter & Broberg, 2012). The major problem with cadmium is brought by its capability to induce the synthesis of metallothionein and affect the brain development in infants. Reports have also suggested that Cd might increase the risk of premature delivery (García-Esquinas et al., 2011) and induces oxidative stress (Llanos & Ronco, 2009; Kippler et al., 2012).

Research Objectives

The extent of children's exposure to toxic metals is not well documented in the Philippines. Although there have been several reports in the past, the data is still limited. One report dealt on the analysis of toxic heavy metals in infant formula (Cruz, Din, Feri, Balaoing, Gonzalez, Navidad,... & Winter, 2009). Another study was reported by Ostrea, Morales, Ngoumgna, Prescilla, Tan, Hernandez, & Manlapaz (2002) where exposure to environmental toxins was assessed through the use of meconium and this study only focused on volunteers from the National Capital Region (NCR). It was deemed that estimation of the toxic metals in the breast milk of breastfeeding mothers from other areas in the Philippines would be beneficial to evaluate if there are significant levels of these metals and hence assess the toxic metal exposure of infants. Baguio City was chosen due to less impact of industrial input and less mobility of the respondents compared to the NCR.

Specifically, the main aim of this study was to determine the level of As, Cd and Pb in breast milk of volunteer mothers from the adopted barangays of the University of Baguio (Purok Teachers Village of Sto. Tomas Proper and Purok Magsaysay, Loakan Proper); mothers at Purok 17 located near Irisan dumpsite; and mothers living or working at the central business district (CBD). The results for the analysis of As, Cd and Pb in breast milk samples from volunteer mothers in Baguio City were discussed with respect to lifestyle and demographic status. The analyses were carried out using simple mineralization procedure using microwave-assisted acid digestion prior to element detection using inductively coupled plasma mass spectrometry (ICPMS).

Research Problems/Questions

This study was guided by the following research questions:

1. What is the level of arsenic, lead and cadmium in breast milk samples?
   1.1. Are there significant differences in the level of heavy metals in the samples according to
      a. mother's age at birth of child?
      b. duration of lactation, in months?
      c. mother's residential area?
      d. smoking habits?

   Ho: There are no significant differences in the level of heavy metals in the samples according to mother's age at birth of child, duration of lactation, mother's residential area and mother's smoking habits.

2. What is the relationship between the level of arsenic, cadmium and lead and mother's dietary intake?

II. METHODOLOGY

Study Area and Subjects

The study was conducted in Baguio City, Philippines, a thriving city located approximately 250 km north of Manila, the capital city of the Philippines. Baguio City is a landlocked city in the Province of Benguet and it covers an area of 49 km^2 which is enclosed in a perimeter of 30 km. The city is situated in a plateau that rises to an elevation of 1,400 m and is home to about 300,000 people according to the 2007 Census of the Population (National Statistics Office of the Philippines). A total of 47 volunteer mothers participated in the study. All of them filled a questionnaire to provide details including occupation, years of stay in their respective residential area, source of water, smoking habits, reproductive history, and typical dietary intake. The study was reviewed and approved by the Ethical Committee of the University of Baguio. The purpose of the study was explicitly explained to the volunteers before a written consent was obtained from them.

The mean maternal age (± SD) was 26 (± 6) with the minimum of 17 and maximum of 42 years. Eleven (23.4%) of the mothers were breastfeeding their first babies during the sample collection. Nineteen

(40.4%) of the mothers have delivered two babies while seventeen (36.2%) have three to five children. All of the mothers were fortunate not to experience miscarriage. Seven (14.9%) of the mothers are working while most (40 mothers, 85.1%) are stay-at-home parents. Seventeen of the participants (36.2%) have been living on their current location for less than 10 years, while thirty (63.8%) have spent more than 10 years on their residences. Out of 47 participants, 4 mothers (8.5%) are smokers while 43 (91.5%) are non-smokers. However, 30 of these non-smokers are exposed to second-hand smoke from other members of their household making the total of those exposed to smoking reach 34 (72.3%). Seven (14.9%) of the participants take their water from artesian wells, five (10.6%) drink water directly from the tap, and thirty-five (74.5%) buy their drinking water from water purifying stations. In the Philippines, most of the water used for drinking is derived from rivers, wells and streams, and the primary choice of disinfection is via chlorination. However, the number of water purifying stations all over the country had increased significantly in the last five years. For most of the volunteers, the diet is composed mainly of rice, vegetables, bread, poultry meat and products; the consumption of fish and other seafood are occasional due to the location of the city which hinders easy access to these food types.

Sample Collection and Preparation

Milk samples were collected by manual suckling and the mothers provided 10 ml of milk directly into pre-cleaned polyethylene tubes. The samples were immediately stored at 4°C and were kept at this condition during transport to the laboratory. Triplicate aliquots of the samples were subjected to the mineralization procedure previously optimized using microwave digestion as the mineralization step. The optimized parameters were as follows: 0.5 ml of sample was digested with 2 mL nitric acid (Merck, Darmstadt, Germany) and 6.0 ml of ultrapure water (prepared using a Barnstead system, 18.2 M cm resistivity, Thermo Fisher Scientific, Selangor Darul Ehsan, Malaysia) at 1000 W for a period of 45 min. A Multiwave 3000 microwave digestion system (Anton Paar, Graz, Austria) fitted with a 16-position rotor for high digestion performance was used for the complete mineralization of the samples. The digestion program employed was as follows: the system was ramped to 600 W for 5 min, kept at this condition for 5 min, ramped to 1000 W for 5 min and held at this condition for another 20 min, before allowing the system to cool. After digestion, the digests were transferred to 15 ml polyethylene containers and the volume was adjusted to 10 ml using ultrapure water.

Analytical Method

The digests were analyzed for the trace element content using an Agilent 7500cx ICPMS (Agilent Technologies, Germany) equipped with a MicroMist glass concentric nebulizer, nickel sampling and skimmer cones, and an integrated autosampler (I-AS with type A vials, 89 x 6 mL capacity). The analysis was performed using standard mode and the optimum conditions typically used for the analyses are as follows: Rf power = 1550 W, carrier gas flow rate = 0.85 L min^{-1}, make-up gas flow rate = 0.25 L min^{-1}, nebulizer pump operated at 0.01 rps, sampling depth at 8.0 mm and the spray chamber was kept at 2.0°C. The quantification was performed against an external calibration curve prepared from stock standards of As, Cd and Pb. The use of internal standards were also incorporated by introducing a solution containing germanium (Ge, 1 mg kg^{-1}), indium (In, 10 mg kg^{-1}) and rhenium (Re, 10 mg kg^{-1}) via a peristaltic pump. Single-element standards of As, Cd, Pb and Re with concentrations equivalent to 10,000 ± 30 µg mL^{-1}, and In and Ge with concentrations equivalent to 1,000 ± 3 µg mL-1 were purchased from CPI International (Santa Rosa, CA, USA). The monitored masses were m/z ratios at 75, 111 and 208 for the target analytes As, Cd and Pb, respectively. The internal standards were monitored at m/z = 74 for Ge, m/z = 115 for In, and m/z = 185 for Re.

The correlation coefficients calculated were 0.999 for all analytes within the range of 0.01 to 1000 µg kg^{-1} of the calibration solutions. The estimated detection limits were calculated by analyzing seven replicates of solutions containing 1 µg kg^{-1} of each of the analytes and the values are summarized in Table 1. The determined standard deviation of the measurements were then multiplied with the student's t-value (n = 7; Student's t-value = 3.143); Ripp, 1996). For the validation of the method, a certified reference material BCR 150 (triplicate aliquots weighing 0.5 g weighed to the nearest 0.1 mg) of the certified reference material spiked skim milk powder (obtained from the European Commission, Joint Research Center, Institute for Reference Materials and Measurements, EC-JRC-IRMM, Geel, Belgium) was subjected to the mineralization procedure and subsequently analyzed using ICPMS. Further validation was carried out by spiking one breast milk sample with different concentrations (1.0, 5.0 and 15.0 µg kg^{-1}) of the element standards. During ICPMS analysis, the instrument drift was monitored by analyzing repeatedly the calibration standard containing 1.0 µg kg^{-1} of As, Cd and Pb throughout the ICPMS analysis sequence. The calculated RSD for the drift standards were less than 2% for all target analytes (n = 7).

III. RESULTS AND DISCUSSION

The analysis of metals and metalloids in breast milk gives an assessment of the infant's exposure to these contaminants and also the metal/loid burden of the mothers. Breast milk is a good biological sample for several purposes but prior to sample analysis, validation of the analytical parameters must be done. For the validation of the method, a certified reference material was subjected to the mineralization procedure previously optimized in-house. The results summarized in Table 1 for the analysis of skim milk show that there is a good agreement between the values determined and the certified levels for the reference material. This indicates that the method may be used to analyze Cd and Pb in the samples. Since there is no certified value for As in the reference material, and because this material is skim milk rather than human milk, spiking experiments were done to ascertain the method performance. For further validation of the method, aliquots of a breast milk sample were spiked with known amounts of the three analytes.

Table 1. Results of the Analysis of Certified Reference Materials, Determined Values of the Analytes in Spiked Samples and Estimated Method Detections Limits (values are for triplicate analysis and reported as mean ± SD)

	Arsenic (As)	**Cadmium (Cd)**	**Lead (Pb)**
Certified values in BCR 150	Not included in the material.	21.9 ± 1.4 mg kg^{-1}	1000 ± 40 mg kg^{-1}
Determined values in BCR 150	-	18.86 ± 0.54 mg kg^{-1}	930 ± 5.01 mg kg^{-1}
Recovery of spiked standards			
1.0 µgL^{-1} added	1.05 ± 0.01	0.92 ± 0.01	0.94 ± 0.11
5.0 µgL^{-1} added	5. 47 ± 0.01	4.68 ± 0.01	4.88 ± 0.05
15.0 µgL^{-1} added	15.72 ± 0.96	13.89 ± 0.40	14.82 ± 0.21

The spike concentrations were done at three levels: 1.0, 5.0 and 15 µg L^{-1} of As, Cd and Pb. The spiked samples were allowed to be equilibrated then subjected to the mineralization procedure and ICPMS analysis. The results presented in Table 1 show that the spiked amounts were effectively accounted for using the analytical procedure. These results imply that the analytical procedure can be used for the determination of the target analytes in these samples.

After method validation, the analyses of actual samples were carried out. The determined values for As, Cd and Pb in the breast milk samples were compared as regards the residential area, smoking habits or exposure to second-hand smoke, reproductive history and diet of the volunteers. The results (summarized in Table 2, 3 and 4) revealed that the number of samples that had As, Cd and Pb above the method detection limits are 89%, 36% and 51%, respectively. Fifteen samples (32%) showed presence of all the three analytes while four (9%) of the samples did not contain any of the analytes. The mean As concentration in the samples was 3.04 μg L^{-1} and ranged between below MDL to 12.02 μg L^{-1}. The Cd concentration had a mean value of 0.11 μg L^{-1} and ranged from below MDL to 0.70 μg L^{-1}. For Pb, the mean value was 1.93 μg L^{-1} and the range was from below MDL to 20.04 μg L^{-1}. Except for As, these values are below the highest reported values for Cd and Pb as reviewed by Gundacker and Zödl (2005). In the review, the authors summarized levels for mercury (Hg), As, Cd and Pb reported by other workers from different countries. The As values ranged from 0.5 to 3.4 μg L^{-1}, the Cd values from 0.06 to 24.6 μg L-1, and Pb ranged from 0.7 to 126.6 μg L^{-1}.

Table 2. Determined values of As, Cd and Pb in actual samples (values are from triplicate analyses and presented as mean ± SD) at Purok Teachers Village, Sto.Tomas Proper Barangay

Sample	Determined concentration (μgL-1) of all analytes, mean ± SD		
	Arsenic (As)	Cadmium (Cd)	Lead (Pb)
A1	5.13 ± 0.76	<MDL	<MDL
A2	4.93 ± 0.56	<MDL	<MDL
A3	6.95 ± 0.70	<MDL	2.38 ± 0.55
A4	5.68 ± 0.52	<MDL	<MDL
A5	7.71 ± 0.53	0.30 ± 0.09	6.56 ± 1.66
A6	2.11 ± 0.50	<MDL	<MDL
A7	2.04 ± 0.51	<MDL	<MDL
A8	2.49 ± 0.50	<MDL	1.47 ± 0.55
A9	1.37 ± 0.46	<MDL	1.63 ± 0.55
A10	2.25 ± 0.56	<MDL	<MDL
A11	3.80 ± 0.32	<MDL	<MDL

These values are notably higher than the values reported by the World Health Organization (WHO) from a study done on different countries in 1989. From the WHO data in 1989, the ranges of concentrations were:

0.1 to 0.8 μg L^{-1} for As, 0.1 to 3.8 μg L^{-1} for Cd, and 0 to 41.1 μg L^{-1} for Pb. Comparison of the determined values from our samples in this study with reported values show that As is the only analyte that is higher compared with other reported data. An inspection of the results show that the higher As values were mostly from the same sampling area which is surprisingly a rural area and the lowest value for As was from an open dumpsite. These observations could mean that the major source of As in the breast milk may be due to the source of the drinking water and the diet of the volunteers.

Table 3. Determined values of As, Cd and Pb in actual samples (values are from triplicate analyses and presented as mean ± SD) at Purok Magsaysay, Loakan Proper Barangay

Sample	Determined concentration (μgL^{-1}) of all analytes, mean ± SD		
	Arsenic (As)	Cadmium (Cd)	Lead (Pb)
B1	2.86 ± 0.58	<MDL	<MDL
B2	3.03 ± 0.65	0.61 ± 0.10	2.91 ± 0.24
B3	1.97 ± 0.59	<MDL	1.04 ± 0.03
B4	1.85 ± 0.60	<MDL	0.30 ± 0.11
B5	5.31 ± 0.76	0.70 ± 0.06	5.75 ± 0.23
B6	1.86 ± 0.60	0.26 ± 0.05	3.38 ± 0.22
B7	3.63 ± 0.97	0.30 ± 0.05	5.98 ± 0.24
B8	2.14 ± 0.56	0.19 ± 0.05	4.52 ± 0.28
B9	3.66 ± 0.64	0.19 ± 0.05	4.45 ± 0.27
B10	1.47 ± 0.57	0.24 ± 0.04	4.41 ± 0.28
B11	1.60 ± 0.34	<MDL	0.72 ± 0.21
B12	4.16 ± 0.41	0.23 ± 0.01	0.70 ± 0.28
B13	4.72 ± 0.76	<MDL	<MDL
B14	6.85 ± 0.81	0.36 ± 0.08	6.06 ± 0.89
B15	4.68 ± 0.26	0.24 ± 0.04	2.08 ± 0.27
B16	4.51 ± 0.61	0.16 ± 0.04	<MDL
B17	3.88 ± 1.10	0.15 ± 0.04	<MDL
B18	2.18 ± 0.20	0.15 ± 0.05	20.04 ± 1.15
B19	4.21 ± 0.22	0.30 ± 0.06	3.61 ± 0.83

Table 4. Determined values of As, Cd and Pb in actual samples (values are from triplicate analyses and presented as mean ± SD) at Purok 17 Irisan dumpsite, Central business district (CBD) and outside Baguio City

Sample	Determined concentration (μgL^{-1}) of all analytes, mean ± SD		
	Arsenic (As)	Cadmium (Cd)	Lead (Pb)
C1	0.97 ± 0.29	<MDL	<MDL
C2	2.32 ± 0.30	0.66 ± 0.17	2.83 ± 0.67
C3	2.18 ± 0.44	0.24 ± 0.05	4.89 ± 0.66
C4	1.68 ± 0.47	<MDL	2.23 ± 0.64
C5	1.51 ± 0.42	<MDL	0.49 ± 0.22
C6	<MDL	<MDL	2.12 ± 0.64
D1	0.65 ± 0.14	<MDL	<MDL
D2	0.56 ± 0.03	<MDL	<MDL
D3	<MDL	<MDL	<MDL
D4	<MDL	<MDL	<MDL
D5	<MDL	<MDL	<MDL
D6	0.36 ± 0.10	<MDL	<MDL
D7	<MDL	<MDL	<MDL
D8	5.94 ± 0.62	<MDL	<MDL
D9	1.53 ± 0.54	<MDL	<MDL
E1	4.35 ±0.33	<MDL	<MDL
E2	12.02 ± 0.84	<MDL	<MDL

Legend: C – Purok 17 near Irisan dumpsite | D – Central business district (CBD) | E – outside Baguio City

Comparison of the determined values from the samples in this study with reported values show that As is the only analyte that is higher compared with other reported data. The prevalence of arsenic could be partly due to the sources of foods of volunteer mother since As is found in most foods and is present in the soil and in the ocean, exposure to vehicular emissions due to the proximity of the community to roads with heavy traffic or the use of herbicides and other pesticide (Bentum et al., 2010). An inspection of the results shows that the higher As values were mostly from the same sampling area which is surprisingly a rural area and the lowest value for As was from an open dumpsite. These observations could mean that the major source of As in the breast milk may be due to the source of the drinking water and the diet of the volunteers.

Residential Area

The mean levels of As, Cd and Pb among the five areas were compared using Kruskall-Wallis Test. The result shows that there are significant differences in the mean level of arsenic as evidenced by p = .001< 0.05 with Area E showing the highest mean level. The statistical analysis also shows that there are significant differences in the mean level of cadmium ($p<0.05$) with Area B producing the highest mean level. Natural Resources Defense Council (NRDC, 2001) reported that exposure to cadmium often comes as a result of work or through hobbies, including metal plating, semiconductor manufacture, welding, soldering, ceramics, and painting. Cadmium can also be a contaminant of drinking water, air, and food, particularly shellfish (ATSDR, 1990). The significantly higher mean cadmium level in Area B compared to the other four locations may be attributed to its proximity to two semiconductor companies and other industrial establishments situated in the Philippine Economic Zone Authority. The result may be correlated to the findings of the study of Batnag and Llamar (2012) which assessed the development needs of the constituent of Magsaysay, Loakan Proper. Residents complained of chemical wastes from nearby manufacturing companies which flow down the canals leading to Purok Magsaysay, producing foul smell, and threaten the health of the residents in the area.

There are also significant differences in the mean level of lead ($p<0.05$), with Area B showing the highest mean followed by Area C (CBD). Lead exposure stems primarily from its use in gasoline, paint, water pipes, and the lining of food cans. In addition, old, peeling paint and old water pipes can still cause exposures. Other common sources of lead include: painting or removing old paint; construction work; battery manufacturing or recycling; automobile repair; electronics work; ceramics and pottery glazed with lead; welding and soldering; firearm shooting and cleaning; jewelry making and repair; stained-glass-window making; and cosmetics, including certain hair dyes and kohl (NRDC, 2001). That said, the higher Pb level in Area B can be attributed to the presence of several automobile shops in the area, its nearness to semiconductor companies and the Loakan Domestic Airport. On the other hand, the level of Pb in Area C can be explained by the exposure of the volunteer mothers to pollution coming from the exhaust of automobiles plying the CBD, considering that these mothers are ambulant vendors selling assorted goods throughout the day almost every day.

Results from Ettinger, Tellez-Rojo, Amarasiriwardena, Gonzalez-Cossio, Peterson, Aro,... & Hernandez-Avila (2004), however, indicate that levels of Pb in breast milk are low, regardless of the mothers' high cumulative lifetime exposure to lead. With this in mind, the mother's exposure to lead is more critical during fetal development than during breastfeeding, as the fetus is more vulnerable through placental transfer than milk (Mead, 2008). Ettinger et al. (2004) suspected previously published studies showing high breast-milk Pb levels, as being a result of contamination and inaccurate analytical methods. A study by Gulson, Jameson, Mahaffey, Mizon, Patison, Law,… & Salter (1998) also came to the same conclusion that breast milk contributes minimally to blood lead concentration in infants up to one year old. In fact, findings by Gulson et al. suggest that the high levels of lead in breast milk in other studies may have been due to contamination from the foil around the alcohol wipes used to clean nipples.

Smoking Habits

The results of the Kruskall-Wallis test show that there are no significant differences in the mean levels of the analytes determined from smokers, non-smokers and those who are exposed to second-hand smoke. These results may be because these contaminants may not be present in the tobacco products or it can mean that there can be no discernible trend due to the low concentrations of the analytes, specifically with regard to Cd which is widely accepted to be introduced via smoking. Eynon, McKenzie-Parnell, and Robinson (1985) estimated that the infants of smoking mothers were exposed to 20-40% more Cd than the infants of non-smoking mothers, while the present Cd milk levels were increased by 8%, 17%, and 28% due to the mother's smoking before pregnancy, father's smoking and smoking at home, respectively. In this study, however, there were only four women who smoked during pregnancy, which may be the reason why cigarette smoking was not reflected in milk cadmium levels significantly.

Duration of Lactation, Reproductive History and Mother's Age

The previously discussed findings on smoking habits were similar to test results conducted to determine the differences of the mean values as a function of the duration of lactation, mother's age, and reproductive history. There are no significant differences in the mean levels of the analytes with respect to the above mentioned variables. As regards the length of breastfeeding and reproductive history, previous reports have shown that these contaminants are released at a higher level during the first days of lactation and/or during the first birth. This correlation may be difficult to be observed in the samples collected as the researchers only analyzed spot samples from volunteers.

In this study, the mean values of Cd and Pb in women aged ≤ 29 years of age are higher compared to the group with more than 30 years of age, but these differences are not statistically significant. The findings are consistent with the results of Frkovic, Kras, and Alebic-Juretic (1997) who observed higher Cd and Pb levels in the milk of younger mothers. However, they found no statistically significant difference. Several studies have reported that maternal age and parity are not correlated with breast milk Cd concentrations (Dursun, 2008; Frkovic et al., 1997; Hallén, Jorhem, Lagerkvist, & Oskarsson, 1995; Honda, Tawara, Nakagawa, Tanebe, & Saito, 2003). On the contrary, Younes, Al-Meshari, Al-Hakeem, Al-Saleh, Al-Zamel, Al-Shammari and Alwarthan (1995) reported lead concentration significantly lower in milk samples obtained from mothers aged 20 years or less in comparison to that in milk from mothers aged 36 years or more. On the other hand, Drasch, Aigner, Roider, Staiger and Lipowsky (1998); and Sikorski, Paszkowski, Radomanski, Jr. and Szkoda (1989) did not find that mother's age affected milk levels of Hg and Cd, respectively.

IV. CONCLUSIONS AND RECOMMENDATIONS

Although the number of samples covered in the study is limited, it is a good indicator of the status of these analytes in breast milk from mothers in the Philippines. The determination of As, Cd and Pb in breast milk samples of volunteer mothers from Baguio City show that these contaminants are detectable in the samples studied. Even though the heavy metals are low compared to reported levels from other parts of the world, these metals do not bind to fat and so do not usually accumulate to higher concentrations in breast milk than in blood (Golding, 1997), as a result, infants are likely to be exposed to higher levels before birth than during breast-feeding.

Nonetheless, metals in breast milk are important as an additional pathway of exposure and as an indicator of likely prenatal exposures. The results of the study show that the analytes are detectable in the breast milk and as Landrigan et al. (2002) pointed out, there is still a lack of evidence-based health standards and thus there is a need for further toxicologic and epidemiologic studies.

The method used in this work provides a simple but reliable way for the easy determination of these contaminants and may be utilized in routine monitoring.

Based on the results obtained, the following recommendations are made:

1. The presence of As, Cd and Pb in the samples indicates that there is a need for a wider study to ascertain which of the important factors (e.g. diet, lifestyle, occupational exposure) may be possible sources of these contaminants, especially in lactating women. It would also be beneficial to carry out further work with longer duration to also include the child in the study but this may require a more thorough review of the protocol that will be used.

2. For a more comprehensive assessment of the levels of the analytes in the breast milk, it will be worthwhile to also evaluate the levels of As in the groundwater as this can be a significant source of this contaminant.

3. The Community Outreach and Extension department of the University of Baguio must be provided with the results of the study which will become a basis in formulating appropriate programs in the adopted barangays. Programs may include the following:
   a. Ettinger et al. (2007) reported that supplementation of the maternal diet with calcium may represent an important secondary prevention strategy aimed not only at reducing circulating levels of lead in the mother but also at reducing lead exposure to the developing fetus and nursing infant. Thus, the Community Outreach and Extension department of the University of Baguio through the School of Natural Sciences (SNS) must create programs to provide mothers in the adopted barangays sufficient calcium intake during pregnancy and lactation.

b. Mothers in the adopted barangays can be provided with vitamin supplements to protect them from Cd toxicity.
c. Faculty members and staffs of the SNS can conduct a seminar or information dissemination activities regarding sources of toxic chemicals and their effects to the health of mothers and babies.
d. Nutrition faculty members can conduct a seminar about proper diet for lactating mothers and mothers planning to have babies.
e. Faculty members and staff can also conduct a seminar about healthy lifestyle.

4. The data gathered must be submitted to the Department of Health and the City Government of Baguio to inform the concerned agencies on the quality of breast milk of mothers in Baguio City.

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TOWARDS ENABLING LEADERSHIP IN THE UNIVERSITY OF BAGUIO VIS-À-VIS ACHIEVEMENTS: THE NEED OF THE MODERN SOCIETY

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ABSTRACT

Leadership is undeniably a key factor for the success of any organization. Leaders are considered significant personalities contributory to the performance of their subordinates. This is a descriptive design study which looked into the enabling leadership of deans in the University of Baguio (UB) and the extent of its contribution to achievements. Records showed that almost all the board courses' performance was beyond the national passing rate during 2010 to 2011. For academic and non-academic awards and citations from local to international levels, the School of Information and Technology leads. Data on the number of employed graduates of the different schools are very limited only to those traced by the deans. Using the Pearson Product Moment Correlation Coefficient and the Spearman Rank Order Correlation Coefficient, there was a very weak and weak correlation, respectively, between the board examination performance and awards and citations to the enabling leadership of deans in UB. However, from the questionnaire checklist used to gather additional data from 143 teachers and seven deans, the enabling leadership of deans is perceived to be very much contributory to achievements of their respective schools. The enabling leadership of deans in UB is perceived by respondents as very much observed. However, there is a significant difference on their perceptions when respondents are grouped and paired: permanent teachers claimed a much observed enabling leadership of deans against a very much observed perceptions of the probationary teachers; while subject heads perceived that the enabling leadership of deans is much observed, teachers perceived it as very much observed and finally faculty members as a whole claimed a very much observed enabling leadership of deans which conforms to the perceptions of deans to their leadership. Deans in UB then are enabling leaders which translate into achievements for the schools. Nevertheless, there are significant comments and suggestions that can be useful for the improvement of the deans and their performance, and eventually, UB.

Key words: Enabling leadership, deans, leaders, University of Baguio

I. BACKGROUND OF THE STUDY

> "Good leaders make people feel that they're at the heart of things, not at the periphery. Everyone feels that he/she makes a difference to the success of the organization. When that happens people feel centered and that gives their work meaning."
>
> - Warren Bennis

This study looked into the influence of deans in mobilizing their faculty members towards excellent performance considering their ability to motivate people and to enhance their performance. Motivating and enhancing people are the most important part of leadership that can define exactly what true leadership is. Motivation, according to Anderson (2003), is a key factor to performance and leaders and management can enhance the performance of the people. As Naval (2011) quoted, "Leadership is lifting a person's vision to higher sights, the raising of a person's performance to a higher standard and the building of a personality beyond its normal limitations."

This study on the enabling leadership of deans in the University of Baguio (UB) vis-à-vis achievements is anchored on Robert House's Model called Path-Goal Leadership Model. This theory states that a leader needs to influence followers' perception of work goals, self-development, and paths to goal attainment. Satisfaction and performance are end products of a leadership style. As noted in the lecture of Noel C. Racho during the seminar on "People Management and Leadership in the Academe" held in UB last August 18, 2011, performance is the function of ability, motivation and environment. Thus, motivation is always a function of enabling leadership. Enabling leadership is passionate in finding ways to actively engage people in working on issues and concerns that affect their organization and themselves. The aim is to discover ways to motivate everyone towards the attainment of the goals of the organization. Enabling leaders are always aware on the impact of their personality and behavior to others and always willing to improve just so they can continuously motivate others. Ability, coupled with humility, trust and respect, plays a significant role in the enablers' approach. It contributes well in working with others, as a team working towards a common goal. The components of enabling leadership include enabling leadership by definition, characteristics, practices, and principles.

According to *Bottom Up Leadership* (n.d.), "working as a team is preferred as this provides an effective vehicle for demonstrating value to everyone involved." Its aim is to have everyone "on the bus and in the right seat," as Jim Collins (cited in "Bottom Up Leadership," n.d.) describes, which in this case, everyone is positioned properly for a constructive process of team working to achieve agreed goals and in which everyone is self-motivated to play his/her full part. Enablers can constructively transform the underachievers … to a productive member of the team. The enabler's drive is to bring everyone to their common destination, as a team who owns the vehicle and knows the road. Then it can be said that "the journey always justifies the destination."

UB has had experiences on complaints regarding its processes, operations, and also on leadership. This study therefore, would help pave the way for awareness and personal reflection among the university's leaders, in order to promote a healthier working environment resulting to the attainment of goals and objectives of the institution.

Specifically, the researcher sought to answer the following problems:

1. What are the achievements of the different schools in the University of Baguio in terms of board performance, and awards and citations?

2. What is the extent to which the components of enabling leadership of deans contribute to the performances and achievements in the University of Baguio?

3. Are there significant differences on the extent to which the respondents observe from their deans the components of enabling leadership according to groups:
   a. Job status (Probationary and Permanent)
   b. Position (Faculty members, Subject heads and Deans)

II. METHODOLOGY

This study used a descriptive design. A questionnaire-checklist was used to gather data. Also, records of accomplishments of the different schools of UB during the term of the present deans were obtained. It includes board examination performance, and awards and citations of the school, faculty members and students from local to international level. Employment profile of the graduates was not included because of limited

data on file. For the data in board examination performance, only the schools with board courses were considered.

Indicators of the questionnaire were based from the lecture of Jose Eviza, Director of Physical Education, Sports and Dance Center of the University of Makati on "Enabling Leadership." This said lecture was part of the lecture series in NSTP 1 during the 1st semester, SY 2010-2011. The concept presented in the lecture was verified and supplemented by other literatures on "Enabling Leadership." The questionnaire- checklist was tested to 20 faculty members in the University of Baguio. Respondents in the dry run are not included in the population of the study. Spearman-Brown Prophecy formula was used to calculate the reliability of 0.50 interpreted as moderately reliable.

The respondents were the deans and the faculty members in UB. A total of 143 teachers and seven deans participated in the study, resulting to a response rate of 43.85%. The Graduate School and the School of Law were excluded from the study.

Data analysis includes both descriptive and inferential statistics. Specifically, weighted mean was used to answer problems 1 and 2, while the t-test was used to test the significant difference in answer to problem 3. The Pearson Product Correlation and Spearman rank Order Correlation were used to test relationships among enabling leadership, board examination performance, and awards and citations. Basing on the UB Faculty and Employees Manual (2009), 5 points are given to local and regional awards and citations; 10 points for national awards and citations; and 15 points for international awards and citations.

Data were interpreted within the scope of knowledge of the researcher through records, readings, observations, experiences and personal encounters with other faculty members as regards their experiences and observations about their deans. The interpretation was also supported by other comments and suggestions of respondents which are strengthened with related literature. Findings were used to recommend a plan of action towards enabling leadership for improved performance and development of the institution.

The respondents were not forced to answer the questionnaire and the gathered data was treated with utmost care and confidentiality. Dissemination of the results of the study was made through a public lecture and publication in the research journal.

The scale utilized for the interpretation of the results in this study is presented:

Value	Scale	Description
4	3.26-4.00	Very much observed/Very much contributory
3	2.51-3.25	Much observed/Much contributory
2	1.76-2.50	Slightly Observed/Not much contributory
1	1.00-1.75	Never Observed/Very little contribution

III. RESULTS AND DISCUSSION

Achievements of the Different Schools in the University of Baguio

Board examination. Figure 1 presents the comparison of board examination average passing rates of the different schools with the national passing rates from 2010 to June 2011. Generally (72.73%), the performance of UB graduates in the licensure examinations exceeds the national passing rates. The School of Dentistry (SD) leads all other schools due to its high average percentage in the Licensure Examination for Dentists which is 93.33%. It is for this reason that SD is considered the flagship of UB. This established honor and prestige of SD reaped a continuous increase in their enrollment which reached 585 for the 1st semester of SY 2010 from 341 during the first semester of SY 2008 – 2009.

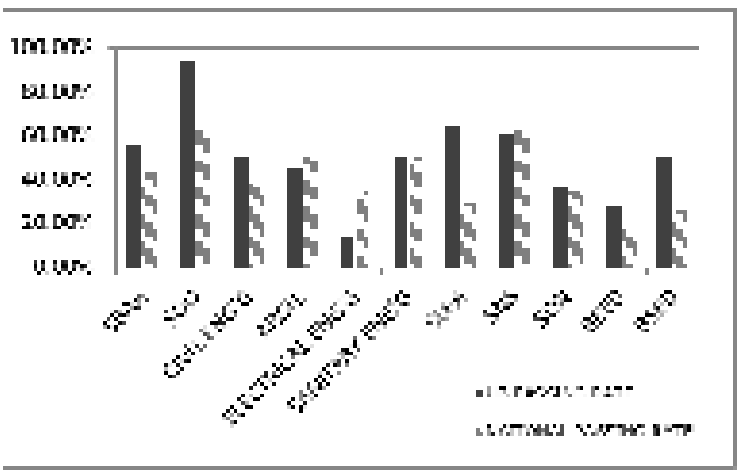

Figure 1.Board Performance of the Different Schools in UB from 2010-2011

As evaluated from Pearson's Product Moment Correlation-Coefficient, there is a very weak correlation of 0.10 between board examination performances and the enabling leadership of deans. This result can still explain a minimal degree of influence of deans in board examination performance. The support and motivation of deans to the examinees during the entire board operation are already manifestations of their leadership towards excellent performance.

Awards and citations for faculty members. Most of the accomplishments of faculty members are as guest speakers. The highest number of awards and citations come from the School of Information Technology (SIT). Two faculty members received international awards: one for being a speaker in an international forum while the other one for receiving the international professional certification. There were seven faculty members who received national awards in a professional conference for being "model instructors," while the others were awarded for being speakers. These awards on speaking engagements, professional certifications, and as model teachers are manifestations of excellent performance of faculty members that could be attributed to the leadership of the dean. The initiative, support, influence, and motivation of the dean in practical sense, contributed to these achievements.

In SD, one faculty member was awarded first prize in a research poster competition. For the School of Business Administration & Accountancy (SBAA), five faculty members were accredited as accounting teachers while one was awarded the Certificate of Accreditation for Teaching Investments. In the School of Teacher Education (STE), one faculty member was honored the Private Education Retirement Annuity Association (PERAA) award.

As to students' awards, the top three schools are the School of International Hospitality and Tourism Management (SIHTM), SIT, and SBAA. Most of these awards ranged from 1st to 3rd prizes during academic and non-academic; local and national competitions.

These excellent academic and non-academic achievements of the different schools can be attributed to the leadership of deans in the sense that participation or involvement of the school in these competitions and activities will not come about without the initiatives of the deans. The support mechanisms again in attaining these awards or certificates of accomplishments are very much needed. Motivations of deans to students for excellent performance are practically considered very much

contributory to performance. It is supported by the data in part II of Table 1 that deans of the different schools are very much contributory to these exceptional achievements which, in turn, enable faculty members and students to perform well. This is a manifestation of what was presented by Racho (2011) in his lecture that performance is the product of the function of ability, motivation and environment. Again, motivation is a function of leadership. Abance (1997) noted also in his study that quality education in schools "manifested in board performance, employment and awards and citations can be achieved if school heads offer quality leadership."

Achievements of other schools (SIHTM and School of Law Enforcement Administration now School of Criminal Justice and Public Safety) are minimal because the deans in these schools are still new. But enabling leadership can be a strong driving force for subordinates or faculty members to move inspiringly and be motivated towards attainment of goals and objectives of the schools as early as the leader assumes his/her responsibility. For "success", according to Sloan Wilson, as cited by Bredenberg (2006), "in almost any field depends more on energy and drive than it does on intelligence."

Enabling Leadership of Deans of the Different Schools and its Extent of Contribution to Achievements

Table 1 generally signifies that enabling leadership of deans is very much observed (3.32) and that the characteristics of leadership are very much contributory (3.34) to achievements of the different schools. The area on characteristics of enabling leadership got the highest mean, 3.33, interpreted as very much observed. Enabling leadership by definition is found with the lowest weighted mean of 3.26 still interpreted as very much observed by the faculty members. The indicators, deans as "a servant leader" and as "a situational leader" obtained the lowest means at 3.18 and 3.27, respectively. This may manifest existence of the traditional definition of a leader being on top of the hierarchy rather than at the bottom of the hierarchy which is the concern of enabling leadership. This shows an over powering personality and tends to be bossy where there is no academic freedom as observed by faculty members.

The indicators under the contribution of characteristics of enabling leadership are perceived to be very much contributory to the achievements of the different schools (Part II of Table 1). These achievements, which have been discussed previously, are manifestations of quality leadership of

deans (McFarland, 1979) which is also noted in the study of Abance (1997) that quality education in schools can be achieved if school heads offer quality leadership to face the challenges of today's new exciting world.
The willingness of deans to listen is with the highest weighted mean (3.49) as contributory factor to achievements while pleasing no one but working within the realm of universal principles of justice and fairness is with the lowest weighted mean (3.25) but still interpreted as very much contributory to achievement of schools. The deans' willingness to listen can address suggestions from faculty members on other qualities or characteristics of leadership contributory to achievements which are good working environment, rapport between deans and faculty members, an open communication, and on being approachable. Ability to listen is one way of communicating the worth and potential of people which Covey (2004) considers as the crucial challenge of our world today. In his words, "finding your voice and inspire others to find his voice…" Dean Rusk, as cited by Bredenberg (2006), states that "the best way to persuade others is with your ears." The weakness among deans in UB not to give action to conflicts in a timely manner can be improved by their general strength of enabling leadership which is willingness to listen.

The correlation between enabling leadership and board examination performance is 0.10 interpreted as very weak. This may imply that board performance is very much dependent on the student's ability. The contributory factors of deans are support mechanisms in terms of financial, psychological and spiritual through board operation program, motivation, and prayers. Awards and citations of the different schools in UB is also weakly correlated to the enabling leadership of deans. There exists a degree of correlation between enabling leadership and awards and citations because of the deans' direct role to check into the full participation of their school to any local or international activities. It is their initiative to look for programs where their students and faculty members can participate. The faculty members and students rely mostly in their deans' motivational ability, since the deans can urge an excellent participation among their constituents by giving them considerations when they miss their classes.

Table 1. Enabling Leadership of Deans of the Different Schools in the University of Baguio and its Extent of Contribution to Achievements

Part I. Enabling Leadership of Deans of the Different Schools in the University of Baguio											
Enabling Leadership/ Schools	**A (17)**	**B (4)**	**C (7)**	**D (11)**	**E (9)**	**F (8)**	**G (21)**	**H (20)**	**I (36)**	**J (10)**	**XW**
A. By Definition:	**315**	**3.44**	**2.47**	**3.13**	**3.04**	**2.38**	**3.63**	**3.11**	**3.47**	**3.49**	**3.26**
1. An Empowering Leader	3.30	3.33	2.52	3.27	2.98	2.54	3.62	3.35	3.52	3.57	**3.33**
2. A Participative Leader	3.19	3.62	2.78	3.32	3.00	2.59	3.72	3.20	3.59	3.48	**3.35**
3. A Situational Leader	2.92	3.25	2.25	2.91	3.16	2.12	3.68	3.06	3.27	3.38	**3.18**
4. A servant Leader	3.20	3.56	2.34	3.02	3.03	2.28	3.49	2.84	3.48	3.54	**3.18**
B. Characteristics:	**3.19**	**3.33**	**2.74**	**3.19**	**3.17**	**2.51**	**3.72**	**3.25**	**3.55**	**3.48**	**3.33**
C. Practices:											
1. Begins with a clear vision providing everyone with a clear direction.	3.38	3.25	2.86	2.91	3.00	2.71	3.89	3.37	3.60	3.00	**3.41**
2. Is responsible to his/her subordinate's need of developing a sense of responsibility but provides them with the support they need.	3.18	3.25	2.71	2.91	3.12	2.43	3.78	3.26	3.53	3.30	**3.29**
3. Is a model of behaviors and values aligned with shared vision to produce good results.	2.94	3.25	2.96	3.27	3.12	2.43	3.83	3.06	3.68	3.50	**3.33**
4. Manages the performance of his/her subordinates.	3.25	3.25	2.43	3.09	3.12	2.71	3.78	3.21	3.54	3.60	**3.33**
5. Does performance planning with his/her subordinates. He/she sets tough but clear goals.	3.50	3.25	2.57	3.00	3.00	3.00	3.78	3.53	3.60	3.60	**3.43**
6. Redirects efforts that are off-base.	3.38	2.75	2.29	2.82	3.00	2.83	3.56	3.21	3.57	3.50	**3.27**
7. Does performance evaluation that is based on goal achievement… on things that can be measured objectively.	3.50	3.75	2.71	3.00	3.12	2.86	3.80	3.53	3.63	3.70	**3.48**
Area Mean	**3.30**	**3.25**	**2.65**	**3.00**	**3.07**	**2.71**	**3.79**	**3.31**	**3.60**	**3.54**	**3.36**

Enabling Leadership/ Schools	A (17)	B (4)	C (7)	D (11)	E (9)	F (8)	G (21)	H (20)	I (36)	J (10)	XW
D. Principles:											
1. My dean considers enabling leadership to change his/her behavior.	3.12	3.25	2.29	3.00	3.00	2.75	3.65	3.15	3.64	3.44	**3.28**
2. My dean considers his/ her characteristics as an important tool in enabling leadership.	3.06	3.50	2.00	3.09	3.00	2.88	3.76	3.35	3.56	3.70	**3.32**
3. My dean is a servant first and a leader second.	3.06	3.25	2.43	3.18	3.22	2.50	3.71	3.05	3.58	3.60	**3.29**
4. My dean's paramount aim is the interest of those he/ she leads.	2.82	3.00	2.29	3.09	3.00	2.50	3.71	3.20	3.53	3.60	**3.23**
5. My dean has a loving care for his/her subordinates.	3.00	3.50	2.57	3.18	3.11	2.38	3.76	3.20	3.58	3.60	**3.31**
6. My dean wants to be held accountable. He/ she asks, "Has my performances meet the expectations of those I serve?"	2.94	3.25	2.29	3.09	3.11	2.62	3.76	3.15	3.61	3.30	**3.26**
7. He/she loves feedback and advice- any information to help him/ her serve well.	3.18	4.00	3.00	3.00	3.11	2.62	3.81	3.40	3.64	3.60	**3.41**
Area Mean	**3.03**	**3.39**	**2.41**	**3.09**	**3.08**	**2.61**	**3.74**	**3.21**	**3.59**	**3.55**	**3.30**

Part II. Extent of Contribution of Characteristics of Enabling Leadership to Achievements of the Different Schools

Enabling Leadership/ Schools	A (17)	B (4)	C (7)	D (11)	E (9)	F (8)	G (21)	H (20)	I (36)	J (10)	XW
1. Equips subordinates to become freer, more autonomous, more capable and therefore, more effective.	3.00	3.50	2.29	3.09	3.33	2.38	3.62	3.15	3.69	3.20	**3.27**
2. Gets personal satisfaction from watching the growth and development of subordinates.	3.06	3.57	2.71	3.27	3.33	2.38	3.76	3.45	3.60	3.50	**3.38**
3. Willingness to listen.	3.06	4.00	3.14	3.45	3.33	2.75	3.81	3.50	3.69	3.60	**3.49**
4. Receives criticism and advices as a gift even when it is not offered.	2.94	3.50	2.43	3.09	3.00	2.62	3.57	3.25	3.67	3.50	**3.29**
5. Serving. Welcomes anything that will help him/her do a better job.	3.12	3.50	2.86	3.09	2.89	2.50	3.76	3.35	3.67	3.60	**3.36**
6. Pleases no one but he/ she works within the realm of universal principles of justice and fairness.	2.88	3.50	2.29	3.09	3.22	2.50	3.71	3.15	3.56	3.40	**3.25**
7. Not egoistic but displays genuine humility.	3.00	3.25	2.14	3.36	3.22	2.62	3.75	3.15	3.61	3.50	**3.30**
8. Not focusing on earthly success and not driven by power, recognition and greed.	3.12	3.00	2.57	3.27	3.22	2.75	3.90	3.26	3.58	3.50	**3.36**
9. Not leaving subordinates alone. Always present when needed.	3.06	4.00	2.51	3.00	3.22	2.62	3.76	3.25	3.67	3.50	**3.35**
Area Mean	3.03	3.56	2.55	3.19	3.26	2.57	3.74	3.28	3.64	3.48	**3.34**
Over-all Weighted Mean	**3.20**	**3.35**	**2.51**	**3.07**	**3.07**	**2.59**	**3.74**	**3.22**	**3.56**	**3.53**	**3.32**

3.26 - 4.00 Very much observed/Very much contributory
2.51 - 3.25 Much observed/Much contributory
1.76 - 2.50 Slightly Observed/Not much contributory
1.00 - 1.75 Never Observed/Very little contribution

Based on responses, there are traces of authoritarian and dictatorial styles of leadership and leadership by "pakiramdam." These leadership styles are manifested in the following comments and suggestions: leadership by the book (rule is rule that cannot be bent whatever the reasons are), no decision of his own, too bossy and overpowering, no political will, not treating subordinates as co-workers, and undemocratic leading. Authoritarian and dictatorial styles of leadership was also expressed in the indicators of enabling leadership least observed by faculty members,

which are equipping subordinates to become freer, more autonomous, more capable and therefore, more effective and respecting the dignity of subordinates and their rights of self-management.

Perceptions of Respondents on Enabling Leadership of Deans and its Extent of Contribution to Achievements According to Groups

Generally, respondents claimed a very much observed enabling leadership of deans in UB, but when respondents are grouped and paired accordingly, it was found that there are significant differences in their responses at 5% level of significance.

Probationary teachers claimed a very much observed (3.64) enabling leadership of deans against the perceptions of permanent teachers which is much observed (3.20). This observation is expected because probationary faculty members are still new in their schools and not much exposed to the leadership styles of their deans. Also, considering their probationary status, aiming and working for permanency, probationary teachers tend to focus on their work and tend to give positive remarks to their deans which can be a plus factor on their recommendation for permanency. At this time, probationary teachers consider their deans as their saviors and feel indebted on them for their permanency. This "utang na loob" Filipino value can mask the true leadership of deans. On the other hand, permanent faculty members are secured in their job already, hence, can openly give their observations about the leadership of their deans without any reservations. Though this may create a gap between teachers and deans, it is for the sake of the attainment of goals and objectives of the institution. Generally, however, both permanent and probationary teachers observed that deans should welcome ideas from their subordinates since they are also assets in the organization. The subordinates may also have bright ideas to share in the betterment of the organization.

The overall weighted mean of subject heads on their perceptions on enabling leadership of deans is 3.03 interpreted as much observed against the overall weighted mean of 3.32 on the part of teachers which means very much observed. This observation is somewhat unexpected considering the fact that subject heads are the right hand of deans and should have been more supportive of their deans' leadership styles. Having to work directly with deans, the subject heads are as well firsthand to be affected by the impact of their deans' leadership styles. The subject heads are leaders themselves and are aware of the leader-subordinate relationship;

their leadership style may not also be necessarily similar with their deans. Their goals and objectives are the same but the process and the way of achieving them are different which can be attributed to their differences in values, character, and principles as leaders.

The deans perceived themselves as enabling leaders at 3.59 which is higher compared to 3.31 from the faculty members. The perception of deans in terms of weighted mean is higher by 0.28 than the perception of the faculty members, although both are still interpreted as very much observed. This could be attributed to the comments and suggestions of faculty members of a need for an open communication and support for each other.

Table 2. Responses of Faculty Members on the Enabling Leadership of Deans in UB (N = 143)

I. Enabling Leadership of Deans in the University of Baguio						
Areas	**Permanent Faculty Members (n=110)**	**Probationary Faculty Members (n=33)**	**Subject Heads (n=11)**	**Faculty Members (n=132)**	**Deans (n=7)**	**Faculty Members& Subject Heads (n=143)**
A. Definition	3.16	3.61	3.00	3.28	3.75	3.26
1. An empowering leader	3.22	3.68	3.06	3.35	3.71	3.33
2. A participative leader	3.27	3.62	3.27	3.35	3.82	3.35
3. A situational leader	3.08	3.52	2.76	3.22	3.61	3.18
4. A servant leader	3.06	3.58	2.89	3.20	3.86	3.18
B. Characteristics	3.23	3.66	3.15	3.34	3.63	3.33
C. Practices	3.27	3.67	3.15	3.37	3.51	3.36
D. Principles	3.18	3.68	3.17	3.31	3.65	3.30
Over-all Weighted Mean	**3.20**	**3.64**	**3.03**	**3.32**	**3.68**	**3.30**

II. Extent of Contribution of Characteristics of Enabling Leadership to Achievements:						
Mean	**3.24**	**3.68**	**3.24**	**3.37**	**3.67**	**3.34**
t-value		22.00	5.75		11.88	
t-crit.(5%)		2.00	2.00		2.00	

3.26 - 4.00 Very much observed/Very much contributory
2.51 - 3.25 Much observed/Much contributory
1.76 - 2.50 Slightly Observed/Not much contributory
1.00 - 1.75 Never Observed/Very little contribution

IV. CONCLUSION AND RECOMMENDATIONS

The role of a leader is very significant to the success or failure of an organization. The trend today is to enable people, to motivate, and to help them and the organization fulfill a common goal.

In UB, most deans are enabling leaders – motivating and influencing their faculty members to work together towards their shared goal. Their leadership has resulted to achievements of the different schools in UB and to the success of the institution in general. The ability of the deans in aligning organizational goals with people's needs should be considered. This may be difficult but not impossible to attain. It can be considered by enabling leadership, as a way to re-structure the relationship between faculty members and administration. Enabling leadership can improve power and authority relationships among and between deans and faculty members. It can maintain the familial relationship considered unique from other colleges and universities. It is also considered a significant tool in the achievement of goals and objectives of the institution and considered as a factor under educational reform. The promotion of mutual understanding can do much to fulfill the expectations on respect for human rights and addressing needs – these goes for both leaders and employees.

The following are recommended for deans and the administration:

For Deans to consider the weaknesses of enabling leadership:

1. Providing and maintaining democracy in the school, seeking input from faculty on most major issues. Promote as much autonomy as possible among faculty members.

2. Providing a comfortable work environment where each is trusted to do his/her job.

3. Taking actions to address conflicts and issues in a timely manner.

4. Striving to maintain an atmosphere in which faculty can do their work and exercise their creativity, often shielding them from useless bureaucratic tasks that come their way from administration.

5. Advocate for each faculty if possible, being the representative of faculty not vice versa. Seeking input from faculty regarding school's decision making.

6. Serving as a role model, facilitate individual achievement by capitalizing on strengths and not getting in the way of their initiatives but rather supporting them while also communicating the collaborative culture of the school as a team of individuals all unique and contributing in different ways.

For the administration:

1. To discuss and consider the weaknesses of enabling leadership of deans with the deans as maybe more effective way of attaining institutional goals and objectives.

2. To be enabling leaders also.

3. To consider the alignment of institutional goals and people's needs for the realization of re-structuring the relationship of teachers and administration as one way under educational reform by:
   a. Looking into work loads of faculty members, not taking all their time to be in school to give them more time for their families and the possibility to look for other means of financial wellness.
   b. Looking into economic benefits due to teachers in consonance with the Collective Bargaining Agreement and the labor law.

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HEALTH AND SAFETY NEEDS OF THE UNIVERSITY OF BAGUIO EMPLOYEES AND FACULTY

by
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ABSTRACT

This study evaluated the health and safety programs implemented by the University of Baguio to establish and maintain adequate protective measures for the members of the organization, and identify shortfalls, if there were, in the effectiveness of the programs. Observational onsite survey was conducted by two certified Basic Occupational Safety and Health (OSH) officers on February 13, 2013 from 8:30 AM to 3:00PM around five identified areas in the University. The findings of the audit were evaluated in accordance with current existing legal requirements as prescribed by local/national and international standards on Occupational Health, Safety, Security and Environment. Sixteen (16) strong commendable items were noted by the OSH inspectors, with two among the 16 need to be further improved. A total of 19 findings (4 HIGH RISK, 9 MEDIUM RISK and 6 LOW RISK) have been raised. Based on the findings obtained from OSH inspectors and the documents submitted, the University was marked FAIR in terms of its health and safety programs. Thus, recommendations were formulated by the researcher which includes: 1) Students, faculty members, employees and University administrators must consider necessary measures to reduce the risks identified in this study. 2) The University must establish and implement programs in reducing workers' exposure to different hazards and preventing occupational illness. 3) The University must appoint a Safety Officer who will be responsible in providing resources for the identification, evaluation, and control of hazardous situations; developing and issuing rules and procedures; consulting with employees and management; and providing safety training, hazardous waste disposal, and occupational safety and health exposure evaluations.

Key words: Safety, hazard, risk, occupational health and safety

I. BACKGROUND OF THE STUDY

The International Labor Organization (n.d.) defines occupational health and safety (OHS) as a discipline with a broad scope involving many specialized fields. In its broadest sense, it should aim at:

- the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations;

- the prevention among workers of adverse effects on health caused by their working conditions;

- the protection of workers in their employment from risks resulting from factors adverse to health.

Workplace Health and Safety Handbook (2006) states that every employer has a duty to each employee to ensure so far as is reasonably practicable that the employee is, while at work, safe from injury and risks to health. Likewise the "Occupational Health and Safety Standards" of the Department of Labor and Employment (DOLE) section 1005 (p.10), specifies that:

1. Each employer covered by the provisions of the Standards shall:
   a. furnish his workers a place of employment free from hazardous conditions that are causing or are likely to cause death, illness or physical harm to his workers;
   b. give complete job safety instructions to all his workers including those relating to the familiarization with their work environment, hazards to which the workers are exposed to and steps taken in case of emergency;
   c. use only approved devices and equipment in his workplace.

2. Every worker shall cooperate with the employer in carrying out the provisions of these Standards. He shall report to his supervisor any work hazard that may be discovered in his workplace.

3. Every worker shall make proper use of all safeguards and safety devices furnished in accordance with the provisions of these Standards for his protection and that of others, and shall follow all instructions given by the employer in compliance with the provisions of the Standards.

Workplace Health and Safety Handbook (2006) defines hazard as something that has the potential to harm the health, safety and welfare of people at work. Risk on the other hand is the likelihood that the hazard will cause injury, illness or disease in the way that it is used or occurs in the workplace, and the severity of the injury, illness or disease that may result. Risk assessment means the process of evaluating the probability and consequences of injury, illness or disease arising from exposure to an identified hazard or hazards.

Physical hazards are the most common hazards and are present in most workplaces at some time. Examples include: frayed electrical cords, unguarded machinery, exposed moving parts, constant loud noise, vibrations, working from ladders, scaffolding or heights, spills, tripping hazards. Ergonomic hazards occur when the type of work done, the body position and/or the working conditions put a strain on the body. Examples include: poor lighting, improperly adjusted workstations and chairs, frequent lifting, repetitive or awkward movements. Chemical hazards are present when one is exposed to any chemical preparation (solid, liquid or gas) in the workplace. Examples include: cleaning products and solvents, vapors and fumes, carbon monoxide or other gases, gasoline or other flammable materials. Biological hazards come from working with people, animals or infectious plant material. Examples include: blood or other bodily fluids, bacteria and viruses, insect bites, animal and bird droppings. (*Workplace Hazards,* n.d.).

A literature review by Venables and Allender (2006) identified many observations that the working culture in universities has changed in recent decades and that this has adversely affected the health of the staff. Venables and Allender commented that universities no longer provide the low stress working environments they once did. Despite the risk and complexity of the hazards identified in universities, little has been written about the occupational health needs of this employment sector. Since employees have a right to know about health and safety hazards associated with their work, it is therefore essential that they are provided with pertinent health and safety information so that they can make knowledgeable decisions about any personal risks associated with employment. It is therefore the objective of this study to evaluate the health and safety programs implemented by the University of Baguio (UB) to establish and maintain adequate protective measures for the members of the organization, and identify shortfalls, if there were, in the effectiveness of the programs.

To attain the objectives of this study, a walk-through survey was conducted guided by the following audit objectives:

1. To serve as hazard identification walkthrough addressing the question "What could possible hurt an individual here today?";

2. To confirm and appraise the completeness and effectiveness of the University's Health Safety Security Environment (HSSE) Management Systems (MS);

3. To confirm the continued compliance to legal and other requirements and continual improvements of its HSSE MS; and

4. Where the audit identifies shortfalls in the effectiveness of the MS, corrective actions may be recommended.

II. METHODOLOGY

Observational (walk-thru) onsite survey was conducted by two certified Basic Occupational Safety and Health officers on February 13, 2013 from 8:30 AM to 3:00PM around UB buildings, infrastructures, offices, halls, classrooms, workshops, clinics and laboratories.

The areas inspected were categorized as follows:

Area 1 – Hazardous Material Storage Area-Central Supply Storage for Hazardous Materials
Area 2 – Mechatronics/ Machine Shop
Area 3 – Centennial Building
Area 4 – Canteen
Area 5 – Health Safety and Security Environment (HSSE) Management Systems

Prior to the conduct of an observational onsite survey, a letter was submitted to the office of the Vice President for Academic Affairs and Vice President for Institutional Development (VPID) informing them of the approved study and its objectives. The offices were assured that the data gathered will be utilized for research purposes only and the results will be used for the improvement of the University's Health Safety Security Environment (HSSE) Management Systems (MS). The following documents were requested from the VPID's office:

1. Safety management plan of the University

2. Health management of the University

3. Environmental and waste management plan of University

4. Guidelines or procedures related to maintaining security in the University

5. All safety inspection records, i.e. fire extinguishers, etc.

6. Latest emergency drills conducted

7. Latest safety evacuation trainings conducted

8. Any proof that tells that the employees have awareness on safety of the workplace

The audit procedure was formulated from two (2) prior separate meetings with a University representative (a personnel from the Campus Planning Office) outlining the intended outcomes, expectations and boundaries of the audit. All concerned departments and offices in the University were informed of the visit prior to the conduct of the audit. The audit proper was initiated with a preliminary introduction on audit scope and procedures. This was followed by a 7-hour site inspection, review of documentation and procedures, and informal interview with the University personnel, staff and students. The interviews were conducted in English, Filipino and Ilocano languages. The audit concluded with a formal review of the observations from the auditors and from the University representative. The audit was completed in accordance with the standard OSHS audit procedure and within the scheduled period. The criteria for the audit were as follows:

1. The Administrative Code on Enforcement of Safety and Health Standards

2. The Occupational Safety and Health Standards (OSHS)

3. Executive Order 307 creating Occupational Safety and Health Center under the Employees Compensation Commission

4. DOH: Sanitation Code

5. RA 9185 Comprehensive Dangerous Drugs Act of 2002

6. RA 6541 National Building Code of the Philippines

7. RA 6969 Toxic Substances Act

8. National Fire Protection Agency (NFPA)

9. Bureau of Fire Protection Services Fire Safety Checklist

10. Control of Substances Hazardous to Health

Throughout the audit date, a representative of the University Campus Planning department was required to accompany the auditors. Documents and reports were also requested such as:

1. Safety Management Plan including incident/ accident reports and investigation reports, inspections and in-house audits conducted,

2. Medical Emergency Response Plan including medical data and reports (first aids, medical treatments, etc.),

3. Chemical Storage/ Facility Storage Management Plan,

4. HR training records,

5. Security Plan, and;

6. Environment and waste management plan.

The audit did not cover: Human Resource Labor Procedures and Legal Compliance with country's permits and consents.

III. RESULTS AND DISCUSSIONS

The findings of the audit were evaluated in accordance with current existing legal requirements as prescribed by local/ national and international standards on Occupational Health, Safety, Security and Environment. To protect the privacy of the interviewed University personnel, staff and students, no names will be divulged in the succeeding presentation of results and findings.

Positive Observations during the Audit

Sixteen (16) strong commendable items were noted by the OSH inspectors, as summarized in Table 1, with two among the 16 need to be further improved. During the OSH inspectors' visit on February 13, 2013, it was noted that despite the provision of Safety Measure Handbook and Security Manual to the OSH inspectors, none of the students interviewed randomly were aware of these manuals. This may be explained by the fact that none of the interviewed faculty, staff and students were aware receiving a copy of such, and its contents. Such observations highlight that since the mentioned manuals were formulated for the safety of the students and employees of the University, safety and security measures should be strongly enforced by supervision around the University. Training and other related activities must be regularly conducted to further inform the stakeholders of the safety practices.

Table 1. Positive Observations during the Audit

SN		STRENGTHS / GOOD OBSERVATIONS	ACTIONS TO BE TAKEN
1	Central Supply Area for Hazardous Materials	The Central Supply Room (CSR) has a dedicated full time laboratory custodian/ supervisor and chemist taking charge of operations of the CSR unit.	None
2	Central Supply Area for Hazardous Materials	Compliance with Philippine Drug Enforcement Agency (PDEA) circular on appropriate tagging, labeling, and control of hazardous substances as evidenced by the provision of recommended storage cabinet, limited volume requisition, and labeling requirements.	None
3	Central Supply Area for Hazardous Materials	Containers were labeled properly according to its content. Date of preparation and expiration is indicated on the vessels.	None
4	Central Supply Area for Hazardous Materials	Good records management as evidenced by updated list of acquisitions, current stocks and storage, and material expiration were readily available for use and reference.	None
5	Central Supply Area for Hazardous Materials	Material Data Safety Sheet (MSDS) is available for use and reference.	None
6	Central Supply Area for Hazardous Materials	Competency development of staff as evidenced by certificates of attendance to seminars and workshops related to managing and handling of hazardous materials.	None

SN		STRENGTHS/ GOOD OBSERVATIONS	ACTIONS TO BE TAKEN
7	Central Supply Area for Hazardous Materials	The Central Supply Room (CSR) has a dedicated full time laboratory custodian/ supervisor and chemist taking charge of operations of the CSR unit.	None
8	All Areas	Ablution and lavatories were clean and maintained regularly. Good adequate provision of running tap water on every faucet.	None
9	AMS and FGB Building	Electrical panel boxes were secured and locked.	Warning signs to highlighting electrocution hazard may be posted to emphasize danger. None
10	AMS and FGB Building	There is a good provision of adequate portable fire extinguishers in every building. Inspection tags were placed indicating the date of inspection and inspector's initials.	None
11	All Areas	Provision of two means of egress for each floor. Classrooms were equipped with two doors to facilitate easier evacuation.	None
12	All Areas	Exit illumination and directional EXIT sign are provided.	None
13	All Areas	Provision of fire exit plan for each floor of the building showing the routes from each room to appropriate exits, displayed prominently on each floor.	None
14	All Areas	Compliance with Bureau of Fire Protection as evidenced by Fire Safety Inspection Certificate number 7713 issued on March 12, 2012	None
15	All Areas	Provision of Safety Measure Handbook and Security Manual	None of the students interviewed randomly were aware of these manuals
16	Human Resources	Though HR staffs were not available for interview, it was learned from their Student Assistants that there were Wellness programs offered to staff and faculty as evidenced by attendance sheets and brochures of the recently conducted Yoga class, program information from the UBlympics conducted on February 2013.	None

Observations and Feedback for Improvement

A total of 19 findings (4 HIGH RISK, 9 MEDIUM RISK and 6 LOW RISK) have been raised as per summary of findings in Figure 1 and Tables 3 to 7. A risk assessment matrix for ranking the audit findings (Table 2) was used to express the severity of the threat posed by the identified observation, referred hereto as RISK. Based on the findings, corrective actions are required to ensure that the control framework is in place and at a level of ALARP (As Low As Reasonably Practicable).

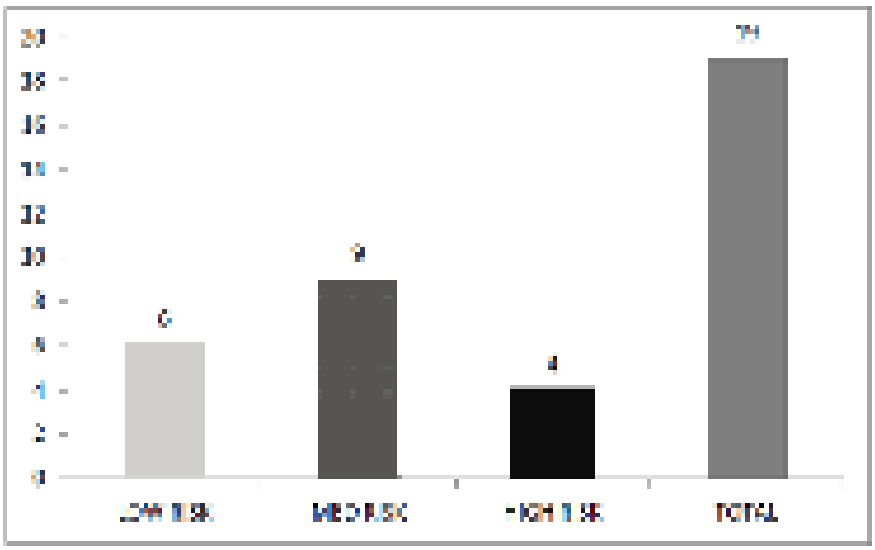

Figure 1. Summary of Findings

Table 2. Risk Assessment Matrix

CONSEQUENCES					INCREASING LIKELIHOOD				
					A	B	C	D	C
Severity	People	Assets	Environment	Reputation	Never heard of in the industry	Heard of in the industry	Has happened in the Organization or more than once per year in the industry Organization or more than once per year in the industry	Has happened at the location or more than once per year in the organization	Has happened more than once per year at the location
0	No injury or health effect	No damage	No effect	No impact					
1	Slight injury or health effect	Slight amage	Slight effect	Slight impact					
2	Minor injury or health effect	Minor damage	Minor effect	Minor impact					
3	Major injury or health effect	Moderate damage	Moderate effect	Moderate impact					
4	PTD or up to 3 fatalities	Major damage	Major effect	Major impact					
5	More than 3 fatalities	Massive damage	Massive effect	Massive impact					

Legend:

LOW RISK
MED RISK
HIGH RISK

HIGH RISK items as defined by the "Occupational health and safety management systems – Guide" entails that substantial efforts should be made to reduce the risk. Risk reduction measures should be implemented urgently within a defined time period and it might be necessary to consider suspending or restricting the activity, or to apply interim risk control measures, until this has been completed. Out of the four HIGH RISK items, three involved physical hazards which were observed at Area 2 (Mechatronics/ Machine Shop). Another HIGH RISK item involving chemical hazard was observed at Area 1 (Hazardous Material Storage Area – Central Supply Storage for Hazardous Materials). The observations of the OSH officers at Area 1 may be a reflection of the results of two large surveys focusing on the institutional response to risks in university laboratories. Goodwin, Cobbin and Logan (1999) surveyed all 33 Australian universities offering courses in chemistry and found that occupational health and safety training for students and staff was variable in amount and content and was frequently not assessed along with other coursework. Rombeck and Schacke (2000) identified 13,764 different chemical substances in their survey of 11 German medical university institutes. Although most institutions were attempting to comply with the recent regulations, the authors identified a lack of listing of chemicals and of internal policies and guidance for workers, a need for substitution of carcinogenic and toxic chemicals with less toxic alternatives, a complete lack of occupational health surveillance.

For the nine (9) items categorized as MEDIUM RISK, according to the Occupational health and safety management systems guide, consideration should be taken as to whether the risks can be lowered, where applicable, to a tolerable level and preferably to an acceptable level, but the costs of additional risk reduction measures should be taken into account. The risk reduction measures should be implemented within a defined time period. Of the nine (9) items, three (3) involved chemical hazards mainly observed at the Central Supply Storage of Hazardous Materials, four (4) physical hazards from the Centennial Building and HSSE Management system, and two (2) biological hazards from the canteen area.

The identified hazards in this study are parallel with the findings of a cross sectional postal survey of health and safety provision at 75 state funded colleges in the United States which had graduate programs. The survey found that the majority (89%) had identified physical, chemical, and biological hazards within the workplace and 70% reported a radiological hazard (Emery, 1997). Venables and Allender (2006) argued that although

exposures to hazardous processes or materials in universities are much smaller in scale than in, say, manufacturing industry, universities have an extraordinarily varied and large number of hazards, some very specialized and exotic. It is likely that this variety of hazardous exposures requires a higher level of occupational health response than that needed in mono hazard industries.

MEDIUM RISKS were observed in the Canteen Area which involved food preparation and food handling. While the Philippine law does not specify that all food handlers operating and serving food must carry with them their food handlers' certificate, it is a public health threat to all the University's students, staff and faculty if there has been no measure to ensure that they are protected from transmissible diseases like Hepatitis A, Amoebiasis, Salmonellosis, Dysentery, Colitis, and other diseases from contaminated food. Sad to say that even in developed countries like the United States, proper food-handling practices were not being followed in many schools. A study of Henroid and Sneed (2004) of 40 Iowa schools revealed that proper food-handling practices were not being followed in many schools and prerequisite food safety programs for Hazard Analysis and Critical Control Point (HACCP) were found to be inadequate for many school foodservice operations.

For the six (6) items categorized as LOW RISK, no additional controls are required unless they can be implemented at very low cost (in terms of time, money, and effort). Actions to further reduce these risks are assigned low priority. Arrangements should be made to ensure that the controls are maintained.

Table 3. AREA 1 – HAZARDOUS MATERIAL STORAGE AREA – Central Supply Storage for Hazardous Materials

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK
1	Whilst storage area's combined entrance and exits are clear and free of obstruction, and an emergency exit was provided, it was observed that during the peak hour of reagent requisition students and faculty have difficulty getting out of the room due to small way provided.	1. A possible stampede may occur during emergency scenarios. 2. An accidental spill of reagents may occur as a result of using one door as a means of access and egress.	1. Provision of entrance and exit doors, OR 2. Widening of the common door for entrance and egress.	LOW

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
2	There were no adequate secondary containments for all liquid hazardous containers.	Should leaks and spills occur, a possibility of containing the floor and other areas, which may also affect other substances, i.e. reactivity risk as per NFPA.	Provision of secondary containment especially for liquid hazardous substances.	LOW
3	Whilst warning signs and NFPA Diamond are provided, the signs fail to provide the true hazard posed by the hazardous substance. Evidence to support includes groups of alcohol containers which had an NFPA Diamond/UN label but do not have the hazard rating for Health, Flammability, Reactivity, and Special Warnings. A corrosive sticker was also posted on the groups of substances that are not corrosive in nature. Attendants are not familiar with these hazardous signs as an evidenced by their response when asked about the hazard rating of a specific substance, though it is noteworthy to mention that they are very competent in the hazards posed by each substance.	Whilst attendants have a very good comprehension of the hazard posed by each substance, failure to provide the appropriate hazard warning to specific substances may lead to failure to identify.	Proper and appropriate labeling of hazardous substances based on the group hazard and risk they pose. Material Safety Data Sheets (MSDSs) may be consulted and proper risk assessment be conducted for each the risk posed by the hazardous material. Risks associated include Health, Fire, and substance Reactivity.	MEDIUM
4	Whilst proper and appropriate Personal Protective Equipment (PPE) were available, it was observed that the attendants were using ordinary gloves and ordinary masks supported by their handkerchief as their respirator.	Whilst attendants may feel better comfort using these improvised PPE, they may put themselves at high health risk such as respiratory infections, severe injury from corrosive substances.	1. Attendants' awareness on use of proper and appropriate PPE needs to be heightened and elevated. 2. Good PPE compliance to be imposed and use of any other improvised PPE not allowed.	HIGH

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
5	No safety showers were located in the room.	The attendant who may be accidentally splashed with hazardous substances may obtain more severe injuries as a result of delayed removal of the hazardous substance in his body.	Provision of safety shower.	MEDIUM
6	Absence of emergency spill kit, emergency response procedure and emergency clean-up procedure specific for chemical spill and leaks. No evidence that attendants were trained how to properly clean and dispose spills and leaks.	Failure to address spills and leaks properly may put the workers' health and the facility at great risk.	1. Provision of emergency response procedure and clean-up procedure specific to spills and leaks, and specific to each substance as appropriately described in the MSDS of each substance. 2. Attendants' awareness on proper clean-up procedure, hazardous substance-related emergencies, must be increased.	MEDIUM
7	Whilst the office has a compiled MSDS for the substances inside the CSR, there were no pieces of evidence that the MSDS were reviewed and updated periodically.	Failure to review and update the MSDS may fail to provide appropriate proactive measures for safety and health planning of the attendants. Example would be use of appropriate PPE specific for the hazardous substance. An attendant may unknowingly putting himself at a great health risk by failure to use the proper PPE.	A periodic review and updating of MSDS of all substances be conducted, documented and filed.	LOW

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
8	Whilst metal shelves were provided for some substances, it was observed that the alcohol groups were stored in a wooden shelf.	Fire hazard as per NFPA may be a consequence of spill or leak.	Conversion of fire susceptible shelves into metal shelves OR keeping organic/ flammable substances in the metal shelves.	LOW

Table 4. AREA 2 – Mechatronics/ Machine Shop

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
1	The lack of awareness of hazard among students performing hotwork as evidenced by a student performing hotwork (grinding) on a piece of metal without faceshield, safety glass, protective gloves, vice grip, and proper working bench. It was also noted that the student is operating the grinder without instructor's supervision. On another occasion, a student used a powertool using his other hand and bare hands to hold the metal piece. When asked what could be the worse consequence of his action - he noted that he could lose his fingers. Note - the student was unsupervised and instructor was at the toolkeeper's room. The grinder may not be safe to use as evidenced by the absence of inspection tag stating it is safe to use.	Serious physical injury that may result to amputation of fingers or even limb may occur as a result of this unsafe act. Fire could also be a serious consequence of the poor housekeeping in the area.	1. Enforce a working procedure that outlines a safe use of powertools amongst students. 2. Supervised use of powertools amongst students. 3. Improve housekeeping	HIGH

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
2	Poor housekeeping, congested working area. Poor cable management, poor stacking of materials, poor working bench for students.	Fire hazard from combustible materials along with hotworks. Electrocution may also pose threat to students and instructors. Slipping, tripping and falling hazards could lead to serious physical injuries	Improve housekeeping. Consider stacking of materials properly.	HIGH
3	Improve housekeeping. Consider stacking of materials properly.	May pose serious physical injuries to users.	Conduct a regular/ periodic inspection of powertools and hand tools to determine their operational fitness. Inspection records must be kept. Unfit tools must be tagged and removed from site.	HIGH

Table 5. AREA 3 – Centennial Building

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
1	Inadequate egress in the Centennial Building as evidenced by the dimension of the common door for entrance and exit of the building versus the possible maximum student capacity of the building going out in panic in case of emergency. Whilst there is an exit at the rear of the building, 6 out of 10 students do not know it exists and were all aware that the only exit of the building was the main gate.	The bottle neck model may occur which could lead to stampede, improper evacuation, and rescue in cases of emergency (earthquake, fire, etc)	Widening of the main access for entry and exit. Consider debriefing building occupants of the rear exit of the building.	MEDIUM
2	A group of workers working at a vacant lot near the School of Education building were trying to fix a hoisted flag using an uninspected scaffold, and completely without any fall arrest system. Note - the distance of working at heights from the ground is approximately 5-8 meters	The absence of a safe work procedure and safety guidelines put the lives of these workers into serious physical injury and even death as a result of fall from heights.		MEDIUM

Table 6. AREA 4 – Canteen

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
1	While most of the stalls catering cooked food in the Canteen area bring prepared cooked food from outside of the facility, it was observed that one of the stalls cook and prepares its dishes inside their own stall. It may be noteworthy to mention that the stall provided exhaust and ventilation fans within the cooking chamber.	While proactive measures were evident as seen by installation of hoods and exhaust, a silent danger may be unseen by this circumstance to the cook and its occupants due to a very narrow enclosed working space. The absence of risk assessment in this working chamber may pose harm from slipping and tripping hazards, as well as injuries from sharp objects. Fire hazard is also likely to occur as a result of using LPG tank.	Conduct a risk assessment to control the working condition of the occupants in every stall. A written guideline may also help establish a healthy working atmosphere especially in this cooking stall	MEDIUM
2	No evidence to show that a control for food handlers is in place. Most of the stalls prepare their food outside the canteen premises exception to one stall, however, none of these staff serving the food have an ID card displaying that they are safe food handlers.	While the Philippine law does not specify that all food handlers operating and serving food must wear their food handlers' certificate, it is a public health threat to all the University's students, staff and faculty if there has been no measure to ensure that they are protected from transmissible diseases like Hepatitis A, Amoebiasis, Salmonellosis, Dysentery, Colitis, and other diseases from contaminated food.	A written procedure or guideline be prepared for food handlers operating on the canteens. Food handlers to undergo training and medical examinations to ensure they are safe from diseases. Certificates or Food Handlers' ID may be displayed as pieces of evidence that they are safe food handlers.	MEDIUM

Table 7. AREA 5 – HEALTH SAFETY AND SECURITY ENVIRONMENT (HSSE) Management Systems

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
1	No evidence to show that the University had an existing HSSE Management Systems in place serving as a management tool to ensure that nobody in the facility gets hurt.	There may be existing rules, guidelines and policies related to occupational health and safety and its limitations may not warrant that gaps may be addressed properly which aims to ensure safety of every student, personnel and staff. Management may appreciate safety but not as a strong priority, and programs that could have prevented injuries may have been shadowed as there is no existing indicator to mirror the overall safety of the institution.	A HSSE Management System be established acting as a charter from leadership/ management team of their commitment to ensure that safety, health, wellbeing, and welfare of every stakeholder is considered to the highest possible standard of execution such that nobody gets hurt and accidents and injury are all preventable. This system will also need to create a team who will be dedicated and committed to protect the health, safety and welfare of every individual.	MEDIUM
2	No evidence to show that a system for reporting unsafe conditions exist within the organization.	Future accidents may not be proactively prevented as there is no mechanism for management to know that an area is posing threat and danger to individuals. Without a proper system in place, a report from a concerned individual may not be properly addressed, thus, an accident is just waiting to happen.	Establish a system of reporting by students, faculty or any staff, of any observation that could be reviewed by management and acted upon proactively.	MEDIUM

SN	OBSERVATIONS	POTENTIAL CONSEQUENCE	RECOMMENDATION	RISK CATEGORY
3	No evidence to show that safety orientation has been incorporated within the individuals of the organization. Evidence to support includes random interviews with a few students, faculty and staff on their responses during emergencies, and safety issues, where the participants demonstrated lack of awareness for emergency contact numbers, muster assembly points, use of fire extinguishers and fire safety, and security concerns. While emergency contact details were newly posted, only 3 out of 10 participants for the random interview knew the emergency contact number of the university. While a Safety Measure Handbook and Security Manual has been issued by the University, none of the interviewed faculty, staff and students were aware receiving a copy of such, and its contents.	Lack of awareness of contingency and emergency measures may put individuals and their colleagues at risk. Emergency scenarios may not be readily addressed and may pose a great threat to the infrastructure, people and environment.	Safety moments be incorporated in periodic meetings, social orientations, home room classes and specific workshops may be officiated by HR team to heighten awareness and understanding of every individual on safety, taking care of themselves, and their colleagues whenever any suspicious, or emergency situations arise.	LOW
4	There is no evidence to show that a program exist to heighten and elevate the awareness to safety. Evidence to support was the 2013 calendar of trainings and workshops from HR Department.	Lack of awareness of hazards and risks on an individual may result to harm to himself and to his colleague. Evidence to support includes unorganized faculty rooms with scattered papers may pose threat as fire hazard. Student assistant in a laboratory may acquire infectious diseases from culture media she may not aware of, or electrical fire being put down by an employee using water		LOW

IV. CONCLUSION AND RECOMMENDATIONS

Based on the findings and recommendations made by the OSH inspectors and the documents presented during the audit, the University is marked FAIR in terms of its health and safety programs. The absence of the organization's safety management plan and systems are greatly reflected on awareness, practices and technical aspects within the organization. It is therefore important that in order to develop a successful health and safety program in the University, it is essential that there must be strong management commitment and strong worker participation in order to create and maintain a safe and healthy workplace.

Based on the findings obtained from OSH inspectors and the documents submitted by the University, the following recommendations are made:

1. Students, faculty members, employees and University administrators must consider necessary measures to reduce the risks identified in this study. This necessitates that all stakeholders must make health and safety a priority. This may be possible by recognizing and carrying out the different recommendations provided by the OSH inspectors.

2. The University must establish and implement programs in reducing workers' exposure to different hazards and preventing occupational illness. Such programs may include trainings on occupational health and safety; regular safety meetings among personnel in their respective departments; and improvement of University facilities to reduce risk encountered by University personnel.

3. Each and every employee is responsible for his/her own safety, and for promoting the safety of their co-workers. Thus, establishment of a system of reporting by students, faculty or any staff, of any observation, is imperative that could be reviewed by management and acted upon proactively. In other words, students, faculty or any staff must be highly encouraged to report all safety concerns related to facilities or procedures. Failure to follow appropriate safety standards may result in disciplinary action to be imposed by the University administration, if possible.

4. In each workplace, the lines of responsibility from top to bottom need to be clear, and workers should know who is responsible for different health and safety issues. For instance, faculty members must supervise their students at all times when using or handling powerful equipment and machineries. In turn University administration must provide personnel that will regularly/ periodically determine operational fitness of equipment and replace those which may pose risks to students and faculty members. In Science laboratories, faculty members, students and laboratory custodians must be aware of the proper use of appropriate PPE in the area which will prevent themselves from high health risk such as respiratory infections and severe injury from corrosive substances. In turn, University administration must provide safe facilities and infrastructures for the conduct of different activities. In general, the University must provide a campus/academic work and learning environment that is free of recognized hazards that are causing or are likely to cause injury, illness or property damage.

5. The University must appoint a Safety Officer who will be responsible in providing resources for the identification, evaluation, and control of hazardous situations; developing and issuing rules and procedures; consulting with employees and management; and providing safety training, hazardous waste disposal, and occupational safety and health exposure evaluations.

6. An information dissemination activity in the form of a public lecture must be conducted by the researcher to inform stakeholders of the identified occupational hazards and types of work generally associated with those hazards. In addition, recommendations to eliminate or reduce the risks associated with the identified hazards will be relayed to the concerned University personnel or department.

7. Other researchers may undertake other studies involving other risk factors not identified in this study.

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PERFORMANCE OF DENTISTRY EXTENDEE GRADUATES IN THE THEORETICAL ASPECT OF THE COMPREHENSIVE EXAMINATION AND BOARD EXAMINATION

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ABSTRACT

The purpose of this study was to determine the relationship between the performance of the Dentistry extendee graduates in the theoretical comprehensive examinations and their performance in the theoretical phase of the Dentistry board examinations. Specifically, the following were determined: the level of performance of the UB extendee graduates in the theoretical comprehensive exams and theoretical board exams; differences in the performance of the extendee graduates in the theoretical comprehensive exams and theoretical board exams according to subject area; and the difference between the performance in the theoretical comprehensive exams and the theoretical dentistry board exams of extendee graduates. An action plan was formulated to improve the conduct of comprehensive examinations and the board performance of extendee graduates to address subject areas with low ratings. Documentary analysis of the review coordinator's files on the results of the theoretical comprehensive examinations and theoretical board examinations was done. A total of 32 extendee graduates who took the Dentistry licensure examinations from 2008 to 2010 composed the population of the study. The null hypotheses were tested by the F-test and the t-test. The overall level of performance of the extendee graduates in the comprehensive exams is poor. The overall performance of the extendee graduates in the theoretical board exams is fair. Significant differences were noted in the performance rating of the extendees according to subject area. The performance of the extendees in the theoretical board exams significantly differed according to subject area. The overall performance in the theoretical phase of the board exams is significantly higher than the overall performance in the comprehensive exams. The Dentistry comprehensive exams serve as rigorous preparation for the Dentistry board exams and could help identify areas that need to be carefully studied in preparation for the licensure exams.

Key words: Extendee graduates, performance, theoretical comprehensive exams, theoretical board exams

I. BACKGROUND OF THE STUDY

The School of Dentistry considers the successful completion of a state or regional dental licensure examination as one of the significant benchmarks for assessing effectiveness of the curriculum (Stewart, Bates, & Smith, 2004). Apparently, performance in national licensure examinations is a global concern. Among professional licensing organizations, ratings of candidates serve as a gauge of quality. Anent this, licensure examinations are also regarded as qualifying examinations. In effect, these examinations serve as rites of passage into the profession.

Examination or even assessment represents a critical component of successful education in the skills, knowledge, affective processes, and professional values that define the competent practice of dentistry. In recent years, there have been reports in the dental education literature of pedagogical innovations such as problem-based or case-reinforced learning, patient simulations, web-based learning, service-learning, and other strategies designed to help students develop critical appraisal skills and gain an appreciation for the concepts of evidence-based oral health care. This movement toward a broader spectrum of teaching and learning methods in pre-doctoral dental education underscores the importance of utilizing appropriate assessment strategies consistent with the level of cognitive skills that can be developed with these new techniques. Virtually all commentaries and expert opinion on performance assessment in health professions education indicate that agencies must evaluate not only the recall and recognition of specific facts and the demonstration of technical skills, but also students' capacity to synthesize information within a given context and apply it in unique situations that require critical thinking and problem solving (Epstein & Hundert, 2002).

The assessment of learning along cognitive, affective, and psychomotor domains of learning are integrated into the theoretical and practical components of the dentistry board examinations. The theoretical component of the board examinations in dentistry encompass problem-solving and case analysis of situations occurring in actual practice. This highlights the relevance of the theoretical comprehensive examination and its role in the preparation and readiness of the candidates to take the actual theoretical board examination in dentistry. Ultimately, the goal of assessment in health professions education is to determine students' capacity to integrate and implement the various domains of learning that collectively define competent practice, over an extended period of time,

with day-to-day consistency, in a work environment that approximates the actual work setting where health care providers interact with patients (Hendricson & Kleffner, 1998).

Licensure examinations in dentistry have become an increasing concern worldwide. In a study covering a nine-year period, Ranney, Gunsolley, Miller, and Wood (2004) studied data of 835 dental school graduates of a certain school from 1994 to 2002. The result shows that the class rank of graduates who passed and failed the North East Regional Board (NERB) dental examinations did not differ. Such finding called into question the reliability and validity of initial licensure examinations.

Most dental schools appreciate the potential of a mock board examination to help prepare their graduates to pass the licensure exams. The mock board course of instruction is an important educational experience for senior dental students. The successful completion of this course and the mock board competency exam is a requirement for graduation. In light of this, dental schools need to provide their graduating students an adequate exposure to mock board. Introductions to the procedures and environment encountered in the licensure exam tend to increase the students' chance for success in the board examinations.

At the University of Florida College of Dentistry (UFCD), performance on the state dental licensure examination is monitored and compared with senior year mock board performance and clinical productivity to identify factors that may contribute to state board "pass" rates. Significant relationships were noted between four of thirteen aspects of mock board performance and clinical productivity data and performance in the Florida Dental Licensure Exam (Stewart et al., 2004).

Dadian, Guerink, Olney, and Littlefield (2002) evaluated the usefulness of the mock board exam as a learning activity to help students gain familiarity with the question formats and the overall board exam experience. Their finding indicates that the mock board exam can be a valid and effective addition to board preparation activities. Dental hygiene faculty members then are urged to incorporate the mock board experience with other activities to prepare students for the Dental Hygiene National Board Examination.

In the Philippines, the Commission on Higher Education (CHED) places a high premium on board performance. Performance in the board

examinations is taken as one of the measures of the quality of a program. If the passing rate during the first attempt is high, then it is a good measure of program excellence (CHED, 2005).

As stipulated in the CHED Memorandum Order No. 33, s. 2006, otherwise known as Policies, Standards and Guidelines for Dental Education, dental education shall develop and equip the students to be adept in the prevention, diagnosis and treatment of oral diseases. Toward this end, the curriculum of the Doctor of Dental Medicine program is two-pronged: theoretical and practical. The theoretical phase covers professional subjects required to complete the program. The practical phase covers clinical dentistry (CD I-IV).

Based on the summary report of performance in the dentist licensure examinations forwarded by the Professional Regulation Commission (PRC), the subject areas included in the theoretical aspect of the board exam are:

Subject area one (S1) – General and Oral Anatomy and Physiology;
S2 – General and Oral Pathology, General and Oral Microscopic Anatomy and Microbiology;
S3 – Restorative Dentistry, Public Health and Community Dentistry;
S4 – Prosthetic Dentistry and Dental Materials;
S5 – Roentgenology, Oral Diagnosis and Oral Surgery;
S6 – Anesthesiology and Pharmacology;
S7 – Pedodontics and Orthodontics;
S8 – Dental Jurisprudence and Ethics and Practice Management; and
S9 – Periodontics and Endodontics.

One of the requirements for graduation in the University of Baguio School of Dentistry is for the candidates to pass the comprehensive examinations in the theoretical part as well as practical part which simulate the board examinations. This will prepare the candidates for the board examinations in Dentistry. Candidates who did not pass the comprehensive examinations and who were not able to complete all their clinical requirements before the deadline set for graduation are referred to as extendee graduates.

At times, it may take more than one semester for extendees to complete all the required clinical cases. The span of time between the last semester when they finished all their professional subjects and when they are cleared to take the board exam puts them out of touch with the theoretical aspect. Another thing is that they also finish their theoretical comprehensive exam earlier than their practical comprehensive exam. The practical aspect is still fresh among the extendees when they take the board exam. These theoretical and practical comprehensive exams are also considered as mock board exam which is a requirement for graduation. The problem that bothers the UB School of Dentistry is: Will extendees perform well in the theoretical phase of the Dentistry Board Exams? This study attempts to address this issue.

The UB School of Dentistry has consistently maintained a 100% passing rate in the board exams and is challenged to maintain its high status as top performing school of dentistry in the country. Thus, there is a need to continuously assess the strengths and weaknesses of the dentistry program not only to help maintain the high percentage of passers but will also help increase the rating of the examinees per subject grouping/area in order to produce topnotchers as well.

While this study will add to the fund of knowledge relating to assessment in dental education, the major purpose of the study was to determine the performance of the extendee graduates in the mock board or theoretical comprehensive exams and their theoretical board performance particularly in each subject area and compare the performance of the extendees in the two examinations.

Specifically, the study answered the following: (1) What is the level of performance of the UB extendee graduates in the theoretical comprehensive (mock board) exams? (1.1) Are there significant differences in the performance of the extendee graduates in the theoretical comprehensive exams according to subject area? (2) What is the level of performance of the extendee graduates in the theoretical phase of the Dentistry board exams? (2.1) Are there significant differences in the performance of the extendee graduates in the theoretical phase of the Dentistry board exams according to subject area? (3) Is there a significant difference between the performance in the theoretical comprehensive exams and the theoretical dentistry board exams of extendee graduates? (4) Based on the identified weaknesses/subject areas with low ratings, what action plan can be formulated to improve the conduct of comprehensive examinations and the board performance of extendee graduates?

II. METHODOLOGY

This study made use of the ex-post-facto research design. The data for this study, which is from 2008 to 2010, were derived from the records on file at the review coordinator's office. A total of 32 extendee graduates who took the dentist licensure exams during this period were included in the study.

Since only the ratings in the theoretical comprehensive exams and theoretical board exams were needed and the extendee graduates who were identified for the study have already graduated and have taken the board exam, the researcher sought permission from the Dean of the School of Dentistry for her to look into the records filed by the review coordinator. The results of the study will be presented to the review coordinator and the faculty who will utilize the findings to formulate and implement an action plan. The said action plan aims to present programs to improve the performance of the next batches of candidates in the theoretical aspect of the board exam.

The ratings of examinees according to date of examination and subject area were tabulated. Informal discussion with the review coordinator who is in charge of preparing, administering and checking the theoretical comprehensive examinations was done to validate the results on file. To ensure anonymity, coding was done to protect the identity of the examinees.

The following arbitrary scale based on 75% passing rate was used to interpret the data regarding level of performance:

90 and above	Excellent
85 - 89	Very Satisfactory
80 - 84	Satisfactory
75 - 79	Fair
74 and below	Poor

The one way analysis of variance (ANOVA) or F-test was used to test if there are significant differences in the performance in the theoretical aspect of the comprehensive exams and board exams of extendee graduates who took the board exam according to subject area, while the t-test was used to determine if there is a significant difference between the performance in the theoretical comprehensive examination and the performance in the theoretical dentistry board examination of extendee graduates.

III. RESULTS AND DISCUSSION

Performance of Extendee Graduates in the Theoretical Comprehensive Exams

The overall level of performance of the extendee graduates is 72% denoting a poor performance in the theoretical phase of the comprehensive exams. The distribution of the level of performance of the extendees is as follows: excellent – 3.12%; very satisfactory – 3.12%; satisfactory – 28.12%; fair – 31.25%; and poor – 34.38%.

Based on feedback from the clinical instructors and the review coordinator, the poor performance of the extendees is attributed to the fact that their last two or three semesters were spent in completing their clinical requirements since they already finished their seminar subjects. Having done with their theoretical comprehensive exams at this time, the extendees are now more focused on the practical comprehensive exams during their last semester. The time between the last semester when they finished all their professional subjects and when they are cleared for the board exam puts them out of touch with the theoretical concept.

It is observed that the extendees gave more focus on the practical aspect of the comprehensive exams which will explain their poor performance in the theoretical aspect. The extendees could not be blamed, however, because the criteria for rating practical exercises are more rigid as compared to the theoretical exam. They are cleared in the theory comprehensive exam as long as they get 70% in each subject grouping. This shows the need to devise a scheme in the administration of the comprehensive exams where the examinees will give equal priority to both aspects.

Comparison of Performance of Extendee Graduates in the Theoretical Comprehensive Exams According to Subject Area

Based on Table 1, the extendees performed highest and have an overall rating of 73% along the subject areas, namely, S3 (Restorative Dentistry, Public Health and Community Dentistry); S7 (Pedodontics and Orthodontics); and S8 (Dental Jurisprudence and Ethics and Practice Management). These subjects are professional subjects which they have taken during their junior and senior years. Since these are more recent, this could explain why they got a higher rating along these subject areas.

Table 1. Performance of Extendee Graduates in the Theoretical Comprehensive and Theoretical Board Examinations

Subject Area	Comprehensive Exam Performance	Board Exam
S1 (Gen & Oral Anatomy & Physiology)	71	78
S2 (Gen & Oral Pathology, Gen & Oral Microscopic Anatomy & Microbiology)	70	77
S3 (Restorative Dentistry, Public Health & Community Dentistry)	73	81
S4 (Prosthetic Dentistry & Dental Materials	71	77
S5 (Roentgenology, Oral Diagnosis & Oral Surgery)	71	80
S6 (Anesthesiology & Pharmacology)	70	79
S7 (Pedodontics & Orthodontics)	73	78
S8 (Dental Jurisprudence & Ethics & Practice Management)	73	76
S9 (Periodontics & Endodontics)	72	81
Overall	**72**	**78**

Although they performed highest in these subject areas, the poor overall rating can be attributed to the observation of clinical instructors that the candidates give more priority to their unfinished clinical cases than the comprehensive examinations. According to the review coordinator, the extendees also gave more priority to the practical comprehensive examinations than the theoretical comprehensive examinations. He observed that the graduating clinicians tend to use common and existing reviewers at the review room when there are available latest review materials including online reviewers. The graduating clinicians may revert to their textbooks as well, however, generally, there is a need to update the review materials in the review room.

The extendees performed lowest in the following subject areas: S2 (General and Oral Pathology, General and Oral Microscopic Anatomy and Microbiology) and S6 (Anesthesiology and Pharmacology), with an overall rating of 70% interpreted as poor. These subjects are pre -clinical subjects which were taken during their first and second year in the dentistry proper. Based on feedback, the examinees focused more on their most recent professional subjects.

To test the significant difference in the performance of the extendees in the theoretical comprehensive examination according to subject area, the computed F-value of 33.45 is greater than the tabular value of 1.94 at 0.05 level of significance, suggesting a significant difference in the performance of the extendees in the theoretical comprehensive examination according to subject area. Further analysis through the Tukey HSD showed that the differences lie between S1 and S7, S8, S9; S2 and S3, S4, S7, S8, S9; S3 and S4, S5, S6, S9; S4 and S6, S7, S8; S5 and S7, S8; S6 and S7, S8, S9; S7 and S9; S8 and S9. Subjects 1 and 2 are general pre-clinical subjects where the examinees got lower ratings than the professional subjects. This proves further that the extendees focus more on the most recent subjects when they took their theoretical comprehensive examinations. This finding is similar with the study that compared senior year mock board performance and state dental licensure examination where significant relationships were noted between four of thirteen aspects of mock board performance and the dental licensure exam (Stewart et al., 2004).

Performance of the Extendee Graduates in the Theoretical Board Exams

The overall performance of the extendee graduates in the theoretical board exams is 78%. This shows that although the extendees passed the theoretical board exam, they only performed fairly. The distribution of the level of performance of the extendees in the theoretical board exam is as follows: satisfactory – 37.50% and fair – 62.50%. None among the extendees were rated excellent, very satisfactory, and poor. In a study on the performance of second takers in the theoretical aspect of the dentist licensure exams, the examinees had an overall rating of 71.70% which is interpreted as poor (Cantor, Garcia, & Ramolete, 2009). This shows that the extendees performed better than the second takers in the theoretical aspect of the board exam. This proves that recent modifications in the clinical dentistry program of the UB School of Dentistry which includes the administration of comprehensive exams, helped improve the performance of board examinees. The fact that since 2010, all fresh graduates passed during the first take further proves the effectiveness of the program considering the number of board passers. However, at present, the school's goal is not only to maintain this good standing but also to produce board topnotchers. Therefore there is a need to modify the board review and comprehensive exam system in order help improve the performance of the examinees and to garner higher ratings such as from satisfactory to excellent.

Comparison of the Performance of Extendee Graduates in the Theoretical Board Exams According to Subject Area

The extendees performed highest in the following subject areas: S3 (Restorative Dentistry, Public Health and Community Dentistry) and S9 (Periodontics and Endodontics), with a rating of 81.00%. This shows that the examinees performed satisfactorily in these subjects. The same observation was noted in the review coordinator's report that board examinees of the UB School of Dentistry performed highest in Restorative Dentistry, Public Health and Community Dentistry (Bungaoen, 2008).

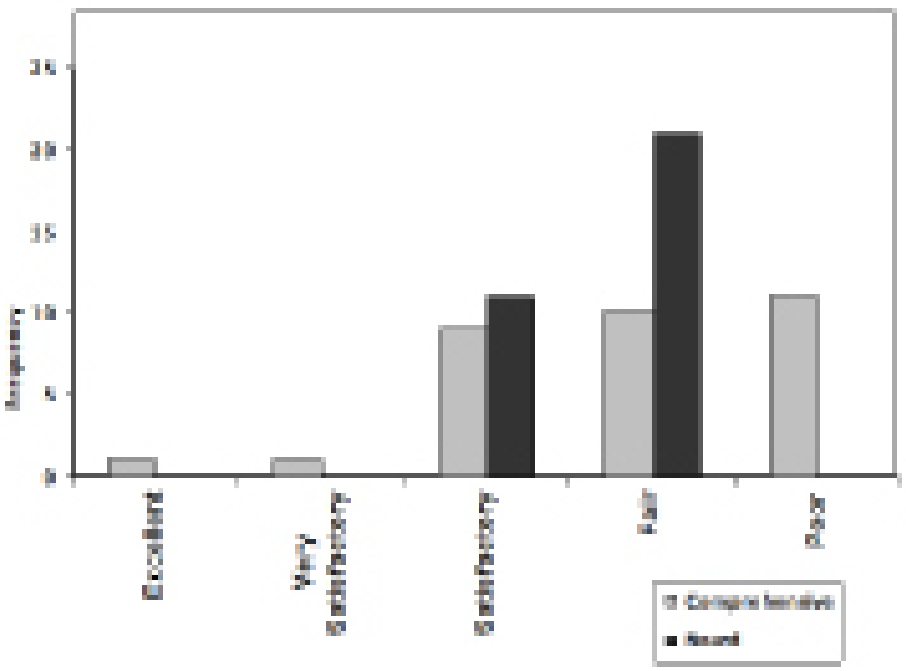
The extendees performed lowest in the subject S8 (Dental Jurisprudence and Ethics and Practice Management), with a rating of 76%, followed by S2 (General and Oral Pathology, General and Oral Microscopic Anatomy and Microbiology) with a rating of 77%. The extendees performed fairly in both areas. As reported by Bungaoen (2008), the board examinees performed lowest in General and Oral Anatomy and Microbiology. This similarity of findings in the UB School of Dentistry justifies the need to strengthen the review system focusing on the subject areas where the examinees got the lowest ratings.

The computed F-ratio of 6.93 is greater than the tabular value of 1.94 at 0.05 level of significance indicating that the null hypothesis, the performance of the extendees in the theoretical board exams does not significantly differ according to subject area, is rejected. Further analysis using the Tukey HSD shows that the difference lies between the following: S2 and S3, S5, S9; S3 and S4, S8; S4 and S5, S9; S5 and S8; S8 and S9. The extendees had a higher rating in professional subjects than the pre-clinical subjects.

Comparison of Performance of Extendee Graduates in the Theoretical Comprehensive Exams and Theoretical Board Exams

The overall performance of 78% in the theoretical board exams is higher than the overall performance of 72% in the theoretical comprehensive exams. This shows that the extendee graduates performed better in the board exams with their satisfactory performance than in the comprehensive exams where they performed poorly. This difference is significant as proven by the t-test result with a computed value of 10.186 which is greater than the tabular value of 2.306 at 0.05 level of significance in a two tailed test.

The higher performance of the extendees in the board exams shows that passing through the tedious comprehensive exams prepared them well for the board exams. The findings of this study corroborate with Dadian et al. (2002) that the mock board exam can be a valid and effective addition to board preparation activities. According to the visiting extendees who passed the board exam, that after they fulfilled the requirements for graduation which includes passing the comprehensive exam, they already had the mindset and time to focus on reviewing for the theoretical aspect of the board exam. They further mentioned that the comprehensive exam helped a lot in their preparation for the board exam because they were able to gauge their performance which motivated them to review harder.



In the study of Cantor et al. (2009), the overall rating of the second takers in the theoretical board exam is 71.70%. Compared to the results of the present study, it shows that the board performance of UB Dentistry graduates has improved a lot considering extendee graduates since most of the second takers in the previous study are also extendees.

IV. CONCLUSIONS AND RECOMMENDATIONS

The theoretical comprehensive (mock board) exam can be a valid and effective board preparation activity.

The theoretical comprehensive exam (mock board) does not predict success on the actual licensure exam. However, the theoretical comprehensive exam is an effective practice exam that prepares students to take their actual board examinations.
Passing through the tedious theoretical comprehensive examinations prepared them well for the theoretical board examinations.

Performance in the comprehensive examinations could well serve as "warning" for the examinees to intensify their review efforts not only in order to pass the licensure examinations in Dentistry but also to get higher ratings.

Based on the findings and conclusions, the researcher recommends that intensive review classes at regular intervals geared towards mastery of the subject areas in the theoretical board exams should be conducted.

The intensive review classes should focus on the subjects where examinees got the lowest ratings.

Regular review and updating of comprehensive exam questions should be done, including updating and preparation of review materials based on the specifications of the professional regulation commission.

A follow-up study could include surveying recent graduates for their reactions/feedbacks on the value/usefulness of the comprehensive theoretical exams in relation to their experiences and performance in the actual dentistry board exams.

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A SURVEY OF THE UNIVERSITY OF BAGUIO RESEARCH & DEVELOPMENT CENTER'S SERVICES

by
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ABSTRACT

The University of Baguio Research and Development Center as a Student-Personnel Service Office conducts evaluation of its services, namely application for thesis/dissertation grant, processing of research proposals, and editing and review of research outputs. The evaluation is done every semester by seeking whether or not its clients agree to the processes of those services rendered by the R&DC. The evaluation reports from SY 2010-2011 to SY 2011-2012 were gathered and converted to research. The comments gathered for SY 2012-2013 were as well utilized to enrich the results from previous school years. The main intention is to see the strengths and weaknesses of the Center and also to obtain information on whether the respondents agree with the steps done in the Center in making their services available to the clienteles. Further, this study intends to come up with a tool that measures satisfaction or effectiveness of the services of the Center. The respondents of the evaluation were the faculty members and employees who availed of the grant, and who had experienced processing their proposals in the Center. Based on findings, majority of the respondents agree on the Center's procedures for the application of grants during the school years included in the study. However, respondents claim that grant availed should be increased to subsidize their undertaking. As regards the processing of research proposals and reviewing of research outputs, majority agree on the effectiveness, clarity, and strict implementation of the process. However, some respondents would find the process strict, time-consuming, and bureaucratic. On the other hand, respondents find the R&DC efficient by concurring on the personnel's courtesy and friendliness in attending to their clients however they have indicated that this indicator be removed from the evaluation tool since they have no idea on how the personnel execute their functions or about their professionalism. On the same vein, the respondents indicated to be not much aware about the completeness of facilities in the Center, hence should be removed from the tool.

Key words: UB-R&DC services, SPS evaluation reports, research processing, research review, application for grants

I. BACKGROUND OF THE STUDY

According to the United Nations Children's Fund (UNICEF, 2000), educational institutions need to provide quality learning environments if they want to be competitive in the academic arena. Learning environments are said to be made up of physical, psycho-social, and service delivery elements. Corollary to providing quality learning environment is quality education that UNICEF describes the learners as healthy, well-nourished, and ready to participate and learn, and supported by their families and communities. It is with this thought which says, quality learning environment come positive learning outcomes, come about. In a University, aside from teachers, there are student-centers that render services in support to the learning and development of the students. These centers may or may not work directly, but all aim toward the attainment of the school's objectives.

One of the factors contributing to the success of an organization is its openness in using the results of the evaluation of the services it renders. Evaluation results can serve as a challenge for organizations or student-centers to meet in order to make their service better. According to Carranza (2010), evaluation of student services is vital for student development process. It is when the administration sees whether goals are achieved or procedures are effective. It also informs whether student-clients are well-served. The *Three Primary Uses of Evaluation* (n.d.) identifies three uses of evaluation which are to judge merit or worth; to improve programs; and to generate knowledge. Judging merit or worth includes quality control, cost-benefit decisions, and for accreditation purposes; improving programs means, as a learning organization is identifying strengths and weakness, for quality enhancement and for continuous improvement; and generating knowledge is theory building, scholarly publishing, for policy-making, and for synthesizing patterns across programs. Any one or all three may be attained by an organization in order to be service-oriented or client-oriented.

The University of Baguio performs evaluation to its activities and services as part of its culture. While it maintains to be student-centered, it also endeavors to be more service-oriented, especially the offices which cater to the needs for the students and employees. Among these offices, otherwise known as Student-Personnel Service (SPS) Offices, is the Research & Development Center (R&DC) which through it, UB promotes and encourages its constituents the conduct of researches (R&DC Objectives, 2012) for the use of the University or for community consumption. The R&DC

is grounded to provide a supportive and conducive research environment that enables the UB constituents to acquire research skills pertinent to their profession and to disseminate and implement research findings that respond affirmatively to different issues/concerns (R&DC Objectives, 2012). Also, its activities are to conduct seminars and trainings that will help the faculty members and its employees in doing research, from writing to treating their data statistically, among others. The R&DC also schedules public lectures and poster exhibit of researches to disseminate the findings of studies conducted by its faculty and employees. These activities are also evaluated to determine the strengths and weaknesses of these programs.

As an SPS office, the R&DC evaluates its services on thesis/ dissertation grant application, processing of research proposals, and on the evaluation and editing of research outputs. Also assessed are its work space, facilities and equipment of the office, and the personnel. The evaluation/survey is done every semester, and usually given to employees who availed of the services. The idea was to obtain the agreement of the employee-evaluators regarding the policies of the Center, the processes, the people who rendered the service, and the facilities or equipment that the staff are using in the Center.

The processing of the grant, research proposals, and the outputs are often the R&DC services that are evaluated. The processing of any of the R&DC services includes the clarity; effectiveness and strict implementation of the policy. These evaluation reports on SPS are prepared every semester with the purpose of looking into functions or services of SPS offices that need improvement and enhancement.

SPS reports from other SPS offices are collated every after semester and filed in the Center. Often times, a report on the actions taken are asked from deans or heads of offices to prepare following the report. SPS reports are exhibited during accreditations. Weiss (1998), as cited by Rogers, Petrosino, Huebner, and Hacsi (n.d.), suggests that evaluations like this are done to formulate programs which are more responsive to the concerns of its clients. As such, Weiss also encouraged that results of such evaluations should be communicated so that concerned individuals will know the results of the evaluation, because working with people means understanding and addressing their concerns. Through evaluations, evolution of programs happens because their relevance is known, or else, revision or omission of some aspects of existing programs maybe done.

With the purpose of having research done about SPS from SPS offices, evaluation reports done in SY 2009-2010 to SY 2011-2012 in the Center were pooled and is converted to research. This is to check strengths and weaknesses of the Center, and also to check whether some steps in availing the services need improvement or rethinking. It is also used as a basis to improve programs and may be to come-up with new policies. Findings will be analyzed vis-à-vis comments during SY 2012-2013 and the processing of the said services during the First Semester, SY 2013-2014. Moreover, this study intends to come up with an evaluation tool to be used by the Center in measuring the effectiveness of the R&DC services or the satisfaction of its clients to these services. The results will be again converted to research that will cover in-depth analysis of the services rendered by the Center.

Statement of the Problem

This study looks into the evaluation reports of the R&DC services from SY 2009, SY 2010, and to SY 2011-2012, specifically assessing the R&DC as regards services offered. The evaluation reports cover work area, facilities, and personnel, however, these are not included in the study. The services on availing thesis/dissertation grant, submission of a proposal, and review of a final research output are only the services of R&DC which this study looked into.

Specifically, it sought to answer the following problems:

1. Do the respondents agree on the clarity, effectiveness, and implementation of the Center's procedure of the following:
   a. application for thesis/dissertation grants?
   b. preparing of research proposals?
   c. editing and review of research outputs? and

2. What other concerns the respondents have regarding the services rendered by the R&DC?

II. METHODOLOGY

This study utilizes the descriptive-evaluation-survey design in answering the problems of the study. There were three (3) different evaluation forms that were answered by a yes or no to indicate agreement or disagreement on the indicators. Percentage was used in the interpretation and analysis of data because the evaluation reports from SY 2009-2010 to SY 2011-2012, which this study was based from, were interpreted through percentages.

The participants were faculty members and non-teaching staff who applied for thesis or dissertation grant, and those who submitted a research proposal or a research output from SY 2009 – SY 2010 to SY 2011-2012. Those who were given the survey form yet refused to answer were not forced to render an opinion.

Further, to supplement the data gathered and to gain further understanding to the responses done in these reports, comments by clients during SY 2012-2013 and the new processing of the said services during the first semester, SY 2013-2014, were utilized to corroborate the findings. Informal interviews were also conducted with some identified evaluators.

III. RESULTS AND DISCUSSION

Agreement on the Center's Procedures on Application for Thesis/Dissertation Grant

Based on the Federal Student Aid (n.d.), grants are need-based. Hence, the thesis/dissertation grant is applied for by interested permanent employees to assist them in the completion of their master's or doctorate degrees. UB gives a maximum amount of twenty thousand pesos (P20,000) for both master's and doctoral programs. In exchange of the grant, one is required to render two years if grantee receives full grant while a partial grant requires a grantee to render a year of service. This policy contradicts the statement by the Federal Student Aid (n.d.), an office of the US Department of Education which considers grants and scholarships as "gift aid" or free money. But they consider having the grantee pay back what was already given if he/she withdraws during the duration of the grant. Similarly, in UB, the grantee is required to cash out amount that was already released to him/her in case of resignation or non-completion of the thesis/dissertation (UB R&DC, 2010).

To process the grant, a form is accomplished and submitted together with the proposal. After the VPAA, VPAD, and the University President approved the proposal, the applicant signs a scholarship contract. The grantee is required to complete his/her thesis/dissertation on a date he/she sets for him/herself, otherwise informs through writing to the Center of its cause of delay. If the grantee fails to inform the Center, the remaining grant is said to be forfeited (R&DC Policy Manual, 2010). As of first semester, SY 2013-2014, there is a total of 118 grantees who availed of the grant since 2005 and a total of 4 faculty members and employees who are on-going with their program.

It can be gleaned in Figure 1 that the respondents unanimously agreed on the Center's procedures for the application of thesis/ dissertation grants during the 1st semesters of SYs 2010-2011 and 2011-2012, and the 2nd semester SY 2011-2012. The said procedures were seen to be clear, effective, and strictly implemented. During the 1st semester 2009-2010, 88% of the respondents agreed on the process while during the 2nd semester of the same school year, only 67% of the respondents signified their agreement. There were no grantee-respondents who returned the evaluation forms during the second semester SY 2010-2011.

While the respondents at the time cannot remember their responses to the evaluation or their dissatisfaction on the process, some of them said that they think the grant should be increased. Those respondents who graduated during the school year 2011-2012 and October 2012 nodded on the need to increase the grant. According to them, P20, 000 is not enough to cover the expenses needed in the completion of a thesis or dissertation. Some of them availed of the UB cash advance and other loans just so they can finance their undertaking. It is lucky for those who were able to avail of the grants given by other institutions such as the Commission on Higher Education (CHED).

On the other hand, some respondents queried on the dissemination of information regarding the process of availing the grant during SY 2011-2012. They claimed to have not been informed of the process that application should be made prior to the approval of the proposal or the proposal defense. Although, at that time, the Dean for Graduate School (GS), Research & Extension issued a memorandum to various deans in the University, a poster was also prepared to inform the employee-students of the process then. The process of availing the grant is also discussed in the R&DC Policy Manual 2010, where a flowchart is presented.

According to the VP for Administration and Research (VPAR), the grant is used to subsidize the conduct of thesis/dissertation of employees, hence the scheme of fund release need reshuffling to address grantees' financial needs. Hence, instead of the usual initial release of 10, 000 pesos upon approval of the grant, P5, 000 before pre-oral defense, and P5, 000 when the hard-bound copy of the thesis/dissertation is submitted to the Center, now it becomes P5, 000-P10, 000-P5, 000 schedule of payment. Based upon bird's eye view on the process for defense among graduate students, expenses are usually high before the final defense of the paper, hence the bigger amount.

Grounded in Figure 1 that towards the SY 2011-2012, respondents unanimously agreed on the processing of the grants. During SY 2012-2013, some respondents claimed that the processing was made easier because of the courtesy and professionalism of the staff assisting them in the Center. They urged then the staff to keep up the good work.

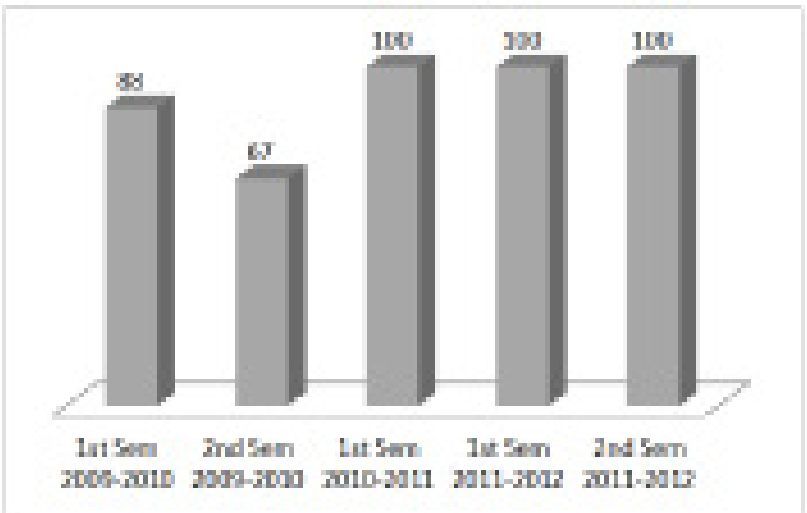

Figure 1. Percentage of Respondents' Agreement on the Clarity in the Application for Thesis/Dissertation Grant

Relative to the requirements for application of the grant, the VPAR suggested that application should commence once the proposal is approved. According to him, the grant is released to assist the grantees in their undertaking, hence funding comes after the proposal is approved which ensures that there is indeed a project being assisted by the University.

Agreement on the Center's Procedures on Processing Proposals

Research proposals are encouraged to address any of the research priority areas of the University. The major classifications of the research priority areas are institutional, departmental, and commissioned with an allotted honorarium of Php15, 000, Php10, 000, and Php5, 000, respectively. Community-related researches are allocated the maximum honorarium given.

A full-blown proposal is complete with background of the study, statement of the problem, working bibliography, budgetary outlay, expected output, and information about the proponent. During the school year 2011-2012, submission of a title proposal was required first before a full blown proposal was prepared. A title proposal includes the objectives, problems of the study, and information about the proponent/s. The intention is for the editorial member and the R&DC Director to check proposed title, contents, and intentions of the proponents. As such, suggestions to improve the proposal may be made, otherwise the proposed study maybe disapproved if it goes against a University policy or if it is not appropriate or qualified for funding by the University (personal communication, April 2011). Also, this will not waste the effort of faculty-researchers to prepare the full-blown proposal should the study be disapproved.

The proposal is routed to the members of the IRRB: an editorial, instrumentation consultant, statistical consultant, and ethics monitoring. The proponent may incorporate the comments or suggestions made by the IRRB, submits a new, edited draft to the Center, and then the R&DC Director and the VPAA approve the study. In some proposed studies where funding from the University is needed, the R&DC conducts the budget hearing with members of the Executive Committee (Execom).

There is, however, a new process being implemented this First Semester SY 2013-2014, that instead of a Title Proposal, the Research Coordinator or otherwise known as the School/Department Research Anchorperson (S/DRAP), reviews the proposal. The submission of the proposal to the Center for the ethics, statistics and instrumentation review would mean that the SRAP approves the proposal.

Generally, grounded in Figure 2, majority of the respondents agreed on the procedures in processing of proposals since the 1st semester, SY 2009-2010. The respondents unanimously concurred on the process of research proposals during the first and second semesters of school year 2010-2011. As projected in the figure, it was in 2nd semester SY 2011-2012 which has the least percentage of respondents agreeing on the effectiveness and clear procedures for proposals. It was at this time when some respondents claim to have wasted their time preparing proposals which were only disapproved. Additionally, other respondents perceived that the process is strict. According to them, there is no chance of finishing their research on time, or that the time frame for completing their studies needs to be extended by the Center because they have other responsibilities and

duties as faculty members. It can be deduced, therefore, that teachers are more committed to their function as teachers who prepare lesson plans and their instructional materials. Basing on Donovan's (2012) Teacher's oath, teachers need to master their subjects and their duty not to deprive a child of a good education. The National Council of Teachers of English (NCTE, 2008) declares that "the relationship between teaching and research is often assumed and just as often ignored. Research should and does influence teaching (and vice versa), but the gulf between the two can at times seem large. Teachers are told to use "research-based strategies" and yet such strategies may be presented to them stripped of the very sensitivity to context, analytic rigor, and thoughtful skepticism that are the hallmarks of quality research." Further, persons in the academe should view themselves as teachers, teacher educators, and researchers. This is bringing one's work a keen awareness that classrooms are multi-dimensional and dynamic places, and that effective approaches to research honor human complexity, acknowledging the many influences that shape students' learning and the differences among people, schools, and communities. Teachers should be aware that using and conducting research well means being informed by a range of perspectives and empirical traditions as they address the particular challenges presented by communities, classrooms, and students (NCTE, 2008).

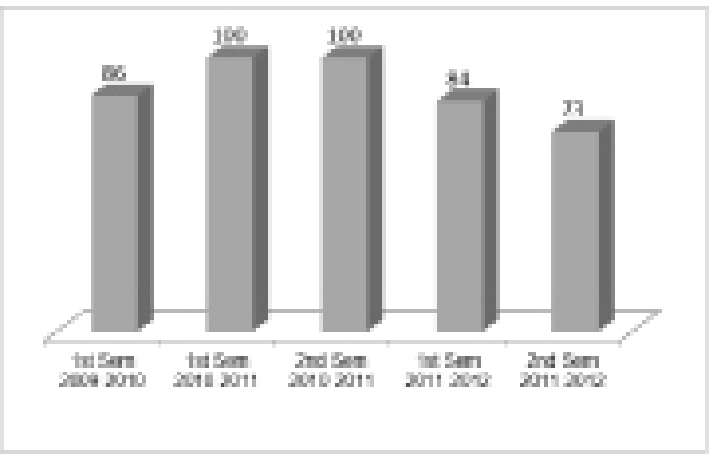

Figure 2. Percentages on the Agreement on the Processing of Research Proposals

The policy on research honorarium stipulates that the proponent must be able to submit the final draft of his/her study within the time period they have indicated in their Research Grant Agreement contract. In cases when

the proponent cannot meet the deadline he/she sets for himself/herself, he/she can readily inform the Center through the Research Progress Report form or in a separate letter about the reason for his/her non-completion and may set another date to complete it. Based on the records available in the R&DC, there is no instance yet that a study was terminated because it has reached the supposed date of completion. Moreover, termination of studies by the R&DC happens only when the proponents decide to cease it through a formal writing to the Center. In some occasion, some studies were terminated if there is never-a-word heard from the proponents despite follow-ups and the study has not progressed for more than two years or more.

During the 2nd semester SY 2011-2012, the respondents were asked to agree or disagree about the procedure on reviewing research proposals, whether it is systematic, strictly implemented, effective, and clear, to which majority of the faculty/employee-respondents concurred. As to clarity of the procedures, 55% of the respondents agreed while 45% disagreed.

While strict implementation of the processing of research proposals seemed agreeable to a majority of the respondents, others, however, consider the process as very strict. During the first and second semesters SY 2011-2012, some faculty-respondents mention about having separate process intended for studies that are for Center for Excellence/Development (COE/COD). According to them, the review process by the IRRB is bureaucratic for studies that need to be addressed urgently especially those for COE/COD. Some of the respondents claim that these are special studies that need not go through the IRRB. However, studies that UB recognizes for funding or for honorarium are studies that are processed with the IRRB. Based on the UB-RDC Operations Manual (2010), the IRRB serves as part-time consultants "who act in advisory capacity for the development of various research endeavors and continual production of sterling researches." The IRRB acts as ally to the R&DC Director in suggesting for the betterment of submitted proposals and research outputs. Thus, to address the comment on not involving IRRB on proposals and outputs as a process, the R&DC requests the IRRB members to fast track the evaluation of studies that are said to be urgent, those for COE/COD or for accreditation purposes. The R&DC makes sure these are returned to the proponents after a week. It can be observed that some proponents do their part to facilitate the approval of their proposals, while others do otherwise. This may be due to difficulty in integrating the comments or suggestions posited by the IRRB. It is sad to note that what comes next is termination of their studies.

A summary of the percentages is presented in Figure 3.

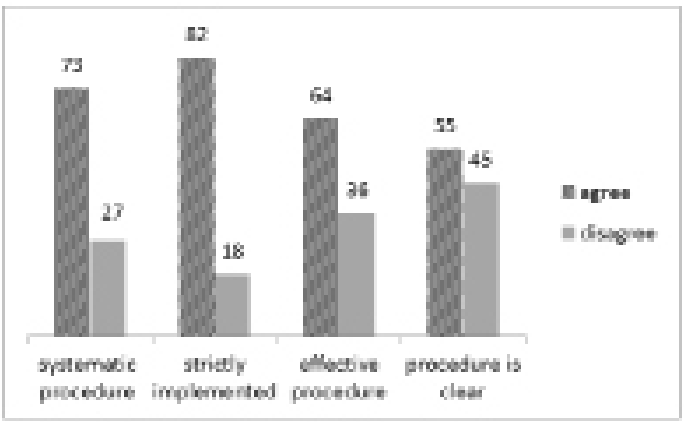

Figure 3. Percentages on agreement on the procedure in processing research proposals during the 2nd Semester SY 2011-2012

A respondent said that there were loopholes in the procedure and others pointed out their frustration in preparing proposals that were later disapproved because these were not related to their department. They suggested then that nature of researches should not depend on one's department. According to them, they have identified these proposals through their KRAs which are concerns of their department. To address this, the Dean for GS, Research & Extension (personal communication, December 2012) proposed that all schools and departments should have their own list of priority areas for research, which is separate from the list of priority areas for research for the University. This will address their concerns or needs in their own schools/departments while filling in the requirement needed during accreditation. This will also justify the studies which are not aligned with the University's agenda. Meanwhile, this could be tasked to the School/Department Research Anchorperson (S/DRAP) by the Dean; however most deans and S/DRAPs follow the list of priority areas for research by the University.

Related to this, an SRAP queried about a faculty who is interested to do research but not along the priority areas for research by the University. He was then informed about coming up with their own School's list of areas for research and could be one of his projects as the research coordinator. But according to him, his dean must be informed first about such (personal communication, September 2013).

Further, during the first semester SY 2009-2010, the faculty-respondents who did not agree on the effective processing of proposals observed that comments from members of the IRRB on their studies are contradicting and inconsistent from each other. Related comment resurfaced during the second semester SY 2011-2012 from those who negated on the process for research proposals, indicating that there should be a better coordination between IRRB members and the adviser of the proponent/s. The adviser referred to here is not specified, but research anchorpersons may serve as advisers. Research coordinators are assigned per school to guide their co-faculty members in the conduct of their research as specified in the R&DC Operations Manual (2010). Nevertheless, to address such inconsistencies of comments, some IRRB members request the proponents to visit/see them for clarifications pertaining to the suggestions made. Also, the R&DC Director serves as moderator and decides which suggestions or comments are more apt for the proponent to follow. For some proponents who encountered such confusion, they have sought guidance from faculty members in the University who are known of their expertise on research, and who were often referred to as research gurus.

Nevertheless, related comments were gathered during the first semester of SY 2012-2013, that some respondents still observed conflicting suggestions from the R&DC personnel and the IRRB reviewers. Based on a suggestion, one respondent hopes that checking by the IRRB and the R&DC personnel should be done once so that editing of proposals can be done in a single sitting. The VPAR engineered a new process to hasten the approval of proposals. In a meeting held on August 3, 2013 with the IRRB members and Research Anchorpersons, he then bestowed greater responsibility among the latter to review thoroughly the submitted proposals. He then clarified that all proposals should be submitted to the research anchorpersons for review using the evaluation tool intended for their use. The proposal which reached the R&DC would mean to have passed their scrutiny and is approved for evaluation by the IRRB, namely the statistical, instrumentation, and ethics review. A maximum of one week is given for each reviewer, and another one week for the proponents to do the suggestions by the IRRB members. A proposal is expected to be approved in a month.

During SY 2011-2012, among other concerns in the processing of proposals are to have IRRB members who are specialized in Physics or Biology. According to these respondents, evaluators who are in the education field may not be well aware of the models or methods used in the physical or biological sciences. While there could be a basic pattern for

doing research, the editorial board members of the IRRB are composed of researcher-faculty members of multi-disciplines, in order to address such concerns. Studies that are related to physics or biology or natural sciences are given to members of the IRRB who also do the same studies for that field. However, that study must still have to undergo the evaluation of other IRRB members for its tool to gather data, statistical treatment, and ethical considerations, just so to comply with the process.

The accomplished evaluation survey forms during the SY 2012-2013 reveal the request from a respondent about a "maximum number of days for research evaluation to give more time for researchers to edit their work." Another wrote similar comment yet focusing on the number of days for the review of proposals which should be strictly implemented or observed. There had been deliberate comments to the R&DC about the lengthy time it takes for proposals to be approved. But in order to arrive at a more conclusive picture, tracing and monitoring of the research proposals is done to determine where the bottleneck really occurs.

Agreement on the Center's Procedures on Evaluating and Editing Research Outputs

When a research is completed, the final output is submitted to the Center for evaluation by the same group of IRRB members who evaluated the proposal. After the proponent/s incorporated suggestions in their final draft, the final manuscript may now be approved by the VPAR for presentation and publication in the UB Research Journal and in the UB R&DC website. The proponents shall be asked to present their study to a public lecture if the study is institutional while poster exhibit if it is a departmental or a commissioned undertaking.

Generally, most respondents concur on the Center's procedure for the evaluation and editing of final research outputs. As presented in figure 4, 100% of the respondents agreed on the process for the evaluation of research outputs for the 2nd semester SY 2009-2010 and 1st semester SY 2010-2011.

Furthermore, majority of the respondents agreed that procedures are clear and effective, strictly implemented, and that said process is seen to contribute to a thorough review of the outputs in a shorter span of time. However, during the 1st semester SY 2011-2012, 25% of the respondents indicated that the process is tedious and time-consuming. A respondent

further elaborates that comments of IRRB are not consistent. During the 2nd semester SY 2011-2012, the suggestion on having an IRRB member whose field and expertise should be the same with the proponent's field of expertise resurfaced. The respondent insisted that most IRRB members are in the educational field and may not be qualified to review researches that are about physical, biological, or environmental sciences. It is for this reason that the R&DC sought experts from other institutions for peer-reviewing after being scrutinized by the IRRB.

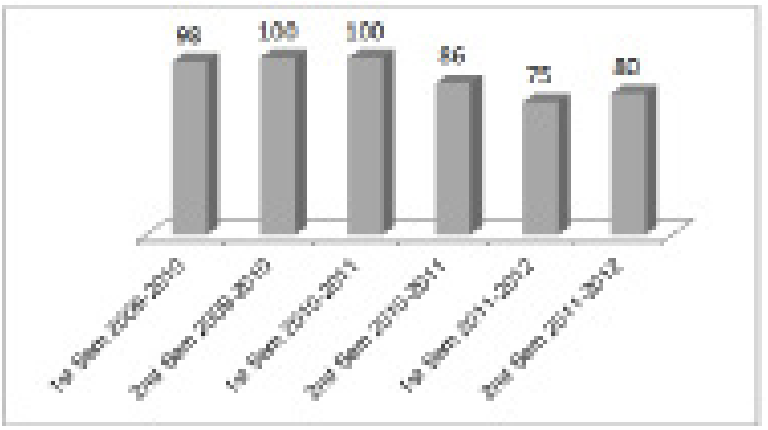

Figure 4. Percentages on the Agreement on the Processing of Research Outputs

Among other reasons of respondents indicating that they are not satisfied with the procedure was that the process was too bureaucratic. A proponent said that there seems to be unending editing of their paper resulting to their laziness in working on it. This is one of the issues which writers do not understand if their write-ups are often returned or even rejected for publication. The Scholarship.Com (2013) presents that the editing process is tedious yet always pays off in the end. Feedbacks from other people are invaluable resources, or extra pair of eyes helps to spot check errors in the manuscript.

Basically, outputs are returned due to the failure of the proponents to follow crucial suggestions made on the paper. According to the then R&DC Director, if only they will follow the reviewers' (IRRB) suggestions then the paper could have been done. Hence, the paper is returned to the proponents for the second time or even for the third time just so they can incorporate the suggestions of the Director or the IRRB. If suggestions are incorporated, the paper is given back to the reviewer to obtain his/her

consent regarding the action done by the researcher. Most often, reviewers affix their signatures on the paper as a signal that the paper is already good.

On the other hand, some proponents say that some suggestions from the so-called experts in the University may not be necessarily applicable to their research. One researcher who was questioned about the process of her undertaking during a presentation and was suggested another should-have-been process said that the suggestion was not applicable to her study. She is very certain of the process she did to arrive at her findings, stating that if only someone whose field is the same with hers will review her study, considering that they think in the same way on tackling the technicalities of their studies. According to her, she has presented studies with similar processes in the region with audience whose the same field as hers, and the process was not much of a concern. In response to such allege, a member of the Editorial Review of the IRRB wrote that no discipline can claim exclusivity of a research procedure or method. Established research procedures can be contextualized to suit the needs of a discipline. Further, audience in a conference where research presentations are done are not all research-oriented; some are concerned more about the content, while others with the methods (personal communications, November 2013).

Relative to a slow pacing of finishing outputs, research outputs are submitted to referees or external reviewers before they get published. This is one of the measures done by the R&DC in 2010 to ensure quality of researches produced in the University, thus, in 2011, almost all outputs were submitted to external referees. Some proponents who have their studies underwent the scrutiny of an external referee claimed to have more confidence in presenting and having their studies published. However, what seemed to be slow is when research outputs stay with the external reviewers in a month or more. When the checked manuscript is returned to the proponent to re-work on the suggestions by the referee, the proponents lose interest usually thinking they have already finished the study. To address such, the incumbent director of R&DC suggests that studies which are not related with UB will only be studies for refereeing. He claims that studies about and for UB will only for UB alone and will not be brought out for refereeing. Since most studies conducted by UB employees pertain to UB, outputs will then be hastened for publication.

Other Issues Regarding R&DC Services

While most respondents would comment about the R&DC as one of the most efficient offices in the University, the office is critiqued about not having enough space for its visitors/clients. A respondent who want to read journals in the Center finds the space not conducive for reading. Journals were made available to the library but some readers find it better to research with the R&DC since personnel could help them in their search for particular topics.

Further, one of the respondents mentioned about the Center's coming up with policy manual and procedures manual. The respondent claims this will guide the researchers and the Center to follow certain steps in facilitating research proposals and outputs. However, based on record, the first set of policy and operations manual was dated in 2007 and a revision of which was done in 2010. Copies were given to Schools for their reference. The R&DC however is not aware on how these policy manuals are presented to the faculty members in their schools/departments.

Likewise, majority of the respondents did not tick their agreement on the indicator that sought about the Director's professionalism or dealing with clients, and the personnel's way of discharging their functions, indicating that they have no ideas regarding these. Hence, these will not be included in the evaluation form anymore. Moreover, among the concerns of some respondents is whether or not they are satisfied with the services rendered by the office and not only agreeing on the indicators. Thus, the evaluation tool will be revised to seek the level of satisfaction among clients to the R&DC services. In addition, while the R&DC has the list of priority areas for research, one of the respondents claimed that the R&DC should encourage the UB employees to do more relevant researches that will enhance their working conditions, for the betterment of their services to the department or college they are associated with. Related to this, an accreditor in charge of the instruction area said that with better working conditions, there is a better employee. This must be made known then to faculty researchers so they will delve into researches related to the aforementioned kind of studies.

IV. CONCLUSION AND RECOMMENDATIONS

Generally, majority of the respondents during the SY 2010-2011 and SY 2011-2012 agree on the Center's procedures for application of thesis/dissertation grants, preparing of a research proposal, and editing and review of research outputs. They specifically agree on the clarity, effectiveness, and strict implementation of the procedures for availing these services. However, there are those that need to be addressed, hence the following recommendations:

To determine the level of satisfaction of clients to the services rendered, the evaluation tool will be revised to a four-point Likert scale; effectiveness of the service may as well be sought. And since the indicators that pertain to the Director and personnel are often left out unanswered, these will be omitted in the evaluation tool to measure satisfaction/ effectiveness of the R&DC services.

As regards the reading space in the R&DC, faculty members will be encouraged to utilize the library; space and facilities will be requested accordingly if there will be an increase of clients.

Deans and their SRAP must be encouraged to come up with their own School's list of research priority areas to address their departmental concerns.

Further monitoring and tracing of research proposals and outputs will be done to determine where processing of these researches have gone awry, so that measures will be made accordingly.

Regarding the clamor of grantees about the insufficient fund for thesis or dissertation, there is a need to rethink if UB will increase the amount from 20, 000. Doing so will increase the number of years of service in exchange of a bigger amount.

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COMPLETION OF CLINICAL REQUIREMENTS OF UB DENTISTRY CLINICIANS

by
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ABSTRACT

This study focused on the status of completion of clinical requirements of UB dentistry clinicians along extent of completion; most common clinical requirements not finished on time; causes of delay of completion of clinical requirements as perceived by the clinicians; and the comparison of the extent of completion and requirements not finished on time according to clinical level and semester. These were used as bases in formulating an action plan to increase the level of completion of clinical requirements. Documentary analysis of the tally sheets of all 121 clinicians enrolled in Clinical Dentistry I-IV (1st and 2nd Semester, SY 2010-2011) which are on file at the clinical dentistry department was done. A survey was also conducted among the clinicians on their perceived causes of delay in completion of clinical requirements. The overall extent of completion of clinical requirements is high. The clinicians need to attain the prescribed cut-off percentage before being promoted. The most common clinical requirements not finished on time are anterior/posterior crown, fixed partial denture and removable partial denture. Clinical level affects both extent of completion of requirements and most common requirements not finished on time. Senior clinicians tend to have a higher percentage of completion while level II clinicians who are in the transition period have the lowest percentage of completion. There are special cases unique to each clinical level and lower level clinicians have fewer special and long cases. Difficulty in finding specific cases, cost of long cases/procedures, patient compliance and holidays disrupting clinic schedule topped the list of causes of delay in the completion of clinical requirements as perceived by the clinicians.

Key Words: Clinical requirements, Dentistry clinicians, extent of completion

I. BACKGROUND OF THE STUDY

Clinical requirements have historically been used as a means to ensure that dental students experience a specified number of essential clinical procedures (Beltrán-Neira & Beltrán-Aguilar, 2004). Clearly, the time, energy, and strategies that students devote to finding patients who can help fulfill unit requirements are a major part of the dental school experience. Some students are concerned about this approach to clinical education because it adds stress to an already arduous phase of the curriculum. It also places doubt in their qualification to graduate or to take the licensure exams if the proper number of points or procedures have not been accumulated (Henzi, Davis, Jasinevicius, & Hendricson, 2007). On students' own words about the strengths and weaknesses of the dental school curriculum, the most significant concern was the impact of "requirement-seeking." The students mentioned that searching for patients and scheduling of patients takes a lot of time (Henzi et al., 2007).

In the Philippines, the duration of clinical practice of dental students is four semesters and commences on the first semester of the third year and continues until the second semester of the fourth year. Certain number of clinical requirements are prescribed in each of the clinics and are pre-requisites for graduation in compliance with the requirements of the policies, standards and guidelines in dental education (Commission on Higher Education, CMO No. 33, series 2006).

In a previous study by Cantor and Lee (2005), only 37% of students reached the requirement for promotion which is 81-100% based on points for cases completed. Based on record and observation, only a few clinicians enrolled in clinical dentistry in the University of Baguio School of Dentistry finished all their clinical requirements within the semester. For the past three years, an average of five students graduated per semester which is an average of 33.98% of enrolled clinic IV per semester. The existing policy in the clinics regarding promotion and retention is that a clinician can be promoted to the next level if he or she attained the required percentage points for required cases as follows: 80% for clinic I; 85% for clinic II; and 90% for clinic III. For clinic IV, all cases (100%) should be completed including passing the comprehensive examinations before a clinician can be cleared for graduation (Clinical Dentistry Department, 2006-2007).

Most clinicians who are promoted to a higher clinical level still have unfinished requirements in the previous clinical level. The backlog

of unfinished requirements is a major cause of delay of graduation; hence the clinicians have to enrol for another semester or more. Since the dentist licensure examination has two phases, the theoretical and practical aspects, the delay in the completion of the clinical requirements makes the graduating clinicians concentrate more on the practical aspect. They now tend to set aside or delay their review for the theoretical aspect of the board examination which may affect their performance in the board examination. Although the college has maintained its 100% passing rate for new graduates in the combined theoretical and practical aspects of the board exam, the challenge is not only to maintain this standing but also to produce topnotchers as well.

The above mentioned issues and situations posed a need to increase the level of completion of clinical requirements of dentistry clinicians of the UB School of Dentistry in order to help the students graduate on time and balance their preparation for the theoretical and practical aspects of the board examination. Results of this study will help in improving the clinical dentistry program and in boosting the performance of the graduates in the theoretical and practical phases of the dentist licensure examinations.

Specifically, the researchers sought to determine the following: the extent of completion of clinical requirements of the dentistry clinicians; the most common clinical requirements that are not finished on time; the causes of delay of completion of clinical requirements as perceived by the clinicians; and if there are significant differences in the extent of completion of requirements and the requirements not finished on time according to clinical level and semester. These were used as bases in devising an action plan to increase the level of completion of clinical requirements.

II. METHODOLOGY

The descriptive and ex-post-facto research designs were used through documentary analysis of the tally sheets of all the clinicians enrolled in Clinical Dentistry I-IV (SY 2010-2011) which are on file at the clinical dentistry department. The utilization of the results of a previous survey on the causes of delay of completion of requirements conducted among the clinicians enrolled during SY 2010-2011 were used to corroborate the findings. The clinicians were informed that the data in their tally sheets will be utilized in the study. The names of the clinicians were coded during the tabulation of data.

Frequency count and percentage was used in determining the most common requirements that are not finished on time and the perceived causes of delay of completion of clinical requirements (multiple response). The chi-square test of independence was used to determine if there is significant difference between the extent of completion of requirements and the clinical requirements that are not finished on time according to clinic level and semester.

Table 1. Population of the Study according to Semester and Clinic Level (SY 2010-2011)

Clinic Level	1st Semester	2nd Semester	Total
I	19	16	35
II	9	11	20
III	23	21	44
IV	13	9	22
Total	**64**	**57**	**121**

III. RESULTS AND DISCUSSION

Extent of Completion of Clinical Requirements of the Dentistry Clinicians

The overall completion of 66.88% indicates a high extent of completion of clinical requirements among the clinicians during SY 2010-2011. This means that the clinicians are doing well in completing their requirements. The level of completion of requirements in this study is higher than the 37% completion level in the study conducted by Cantor and Lee (2005). However, the subjects of the present study have not reached beyond 80% level of completion, which means that the clinicians were not able to complete all their requirements at the time they were enrolled in their clinical level.

Although there is a higher number of clinicians who attained high to very high extent of completion, it is noteworthy that there are still some who attained low to very low extent of completion. It means that they still have to attain the prescribed cut-off percentage to be promoted to a higher clinical level. Further review of the tally sheets and recording forms of

those with low to very low extent of completion showed that they have long cases which have just started. These cases were given lower points, hence the low to very low extent of completion.

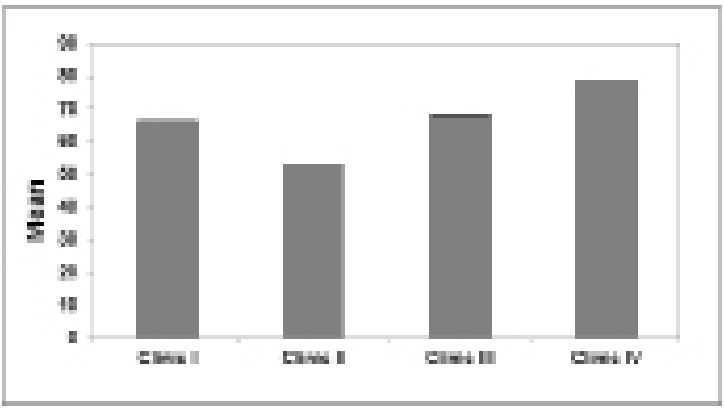

Figure 1. Extent of Completion of Clinical Requirements Based on Average Percentage of Individual Points per Clinician (SY 2010-2011)

Extent of Completion of Clinical Requirements of Dentistry Clinicians According to Clinical Level

Clinic I has the same percentage of clinicians with very high and moderate extent of completion, followed by high and low extent. None among the level I clinicians had very low extent of completion. This can be explained by the fact that there are fewer requirements in Clinic I (Clinical Dentistry Department, 2006-2007). The overall completion of 66.32% shows that not all of the level I clinicians were able to reach the cut-off percentage of 80% in order to be promoted. This can be explained by the feedback and observation that in Clinic I, the clinicians are still learning the clinical dentistry system, how to manage their time and look for patients.

In Clinic II, more clinicians had moderate extent of completion, followed by high, low, very high and very low, respectively. In this clinical level, the junior clinicians are in a transition period. When they move to Clinic II, they have more criteria and considerations to look into in selecting patients for special cases such as root canal treatment. It is in this level when they are required to pass the defense for endodontics and surgery before they are allowed to start cases under these disciplines. This is also the level when they start to treat child patients. Here, clinicians have to

deal with factors such as after- school schedule of the child, parent's or guardian's consent, and child management. The overall completion of 53.25% shows that not all of the level II clinicians were able to reach the cut-off percentage of 85% in order to be promoted.

In Clinic III, most of the clinicians have very high extent of completion, followed by high, moderate, low and very low extent of completion. Although most of them had a very high extent of completion, the over-all completion of 68.82% shows that not all of the clinicians were able to reach the cut-off percentage of 90% in order to be promoted. In this clinical level, there are a lot of special and long cases such as special periodontal case with complete patient rehabilitation; orthodontics-pedodontics case; and root canal treatment. These cases require case defense with pre and post operative write-up and discussion. There are more points in this level compared to Clinic I and Clinic II. In addition, they have to attain a higher percentage of points as they advance to a higher clinical level.

In Clinic IV, most of the clinicians had very high, followed by low, then high, and moderate extents of completion. At this level, clinicians are now considered for graduation and are expected to have done with their clinical requirements, thus none among them was categorized under very low extent of completion. The over-all completion of 79.13% shows that not all the clinicians were able to attain a 100% extent of completion. This corroborates previous observations that only a few clinicians graduate at the end of the semester. In Clinic IV, the clinicians do more complicated cases than the previous levels such as pulpotomy, post and core restoration, odontectomy and special surgical cases. Patients for these cases are difficult to find considering the criteria for approval which is in line with the indications and contraindications specified in the clinical handbook. For example in pulpotomy, it should be primary molars that are indicated for formocresol pulpotomy and no history of spontaneous pain. For post and core restoration, the tooth should be endodontically treated and restorable with post and core. For odontectomy, the tooth should be an impacted mandibular third molar (Clinical Dentistry Department, 2006-2007). This is also the clinical level of graduating clinicians who are required to pass the theoretical and comprehensive examinations as part of their Clinic IV grade. Their comprehensive exams are scheduled during their clinic days so they cannot work on their clinical requirements during the exams.

The computed chi-square of 26.82 is greater than the tabular chi-square value of 23.34 (two-tailed) at 0.05 level of confidence. The null

hypothesis that there is no significant difference between the extent of completion of clinical requirements among the clinical levels fails to be rejected. The extent of completion of clinical requirements is affected by clinical level. The groups with the highest chi-square values are Clinic IV (12.64) and Clinic II (8.82), respectively. As mentioned earlier, the graduating clinicians have the highest extent of completion while the level II clinicians have the lowest extent of completion. Clinics I, III and IV have high level of completion while Clinic II have a moderate level of completion.

Extent of Completion of Clinical Requirements of Dentistry Clinicians According to Semester

The overall 66.42% for the first semester and 67.34% for the second semester show a high extent of completion of clinical requirements per semester. However, not all clinicians have attained the required cut-off percentage of completion. The high to very high extent of completion can be explained by the fact that clinicians who were retained in their previous clinic level with moderate to high extent of completion were able to complete most but not all of their unfinished requirements. Although the trend is similar for both semesters, there is a higher percentage of very high completion in the second semester. However, there is also a high percentage of clinicians with very low extent of completion during the second semester because the clinicians are aware of the summer completion period where they can finish as many cases as they can so that they can be promoted to the next level during the first semester of the next school year.

The computed chi-square of 10.48 is less than the tabular chi-square value of 11.14 (two-tailed) at 0.05 level of confidence. The null hypothesis fails to be rejected, hence there is no significant difference in the extent of completion of clinical requirements according to semester. Semester enrolled in does not affect the extent of completion of clinical requirements as shown by the mean extent of completion of the two groups.

Most Common Clinical Requirements that are Not Finished on Time

In Clinic I, anterior crown ranked first as the requirement not finished on time. This is a consistent observation from the past school years. The criteria for approval of anterior crown is extensive caries on the mesial

and/or distal surfaces, fractures, discolorations and endodontically treated teeth with proper build-up; preferably on a maxillary anterior tooth and provided that there is sufficient dentin thickness, opposing and adjacent teeth (Clinical Dentistry Department, 2010). Based from the feedback of level I clinicians, it is difficult to find a case for this requirement because of the previously mentioned criteria for approval.

Second in rank is removable partial denture. The criteria for approval for this case is partially edentulous case, provided that bilateral bracing is needed; with at least four replacement teeth indicated for a removable partial denture with frame, provided that the oral structures have been rehabilitated and there is sufficient number of abutments (Clinical Dentistry Department, 2010). In Clinic I, this is one of the most common requirements not finished on time because patient rehabilitation is required before getting the final impression. In other words, all teeth needing restoration should be restored. The time frame for the restoration of teeth depends on the extent of the lesion, the material to be used and the number of teeth and surfaces to be restored. This is a long case and there is also framework designing that has to be approved by the clinical instructor before proceeding to the next step.

In Clinic II, the top ranking requirement not finished on time is root canal treatment (mono-rooted case). This case requires passing three phases of defense which include instrumentation, procedure, and diagnosis. The requirement for root canal case in Clinic II is maxillary incisor with irreversible pulpal involvement and/or periapical disease and should be restorable (Clinical Dentistry Department, 2010). Also, there are factors to be considered such as patient compliance and conditions beyond the control of the clinician such as flare-up and weeping canal. Before the final restoration is done, cleaned and shaped root canal has to be obturated. The factors that influence the appropriate time to obturate a tooth include the patient's signs and symptoms, the pulp and periradicular status, the degree of difficulty, and patient management (Cohen & Hargreaves, 2009). There are times that a clinician has to look for another patient for reasons like the patient cannot come back due to change of place or schedule of work or the patient cannot be contacted at all for recalls, so the clinician has to start all over. Next in rank is extraction of posterior teeth followed by extraction of anterior teeth. The clinicians also have to finish the surgery defense which also includes instrumentation, procedure (including anatomical landmarks), diagnosis, anesthesiology and pharmacology before they can start extracting teeth on live patients.

The simulation or demonstration is also part of the defense. The defense takes about ten or more meetings because the clinician has to go back to the clinical instructor to answer the questions which were not answered during the previous meetings. The completion of the surgery requirements depends on the condition of patients, like a case may not be approved due to the patient being medically compromised. The patient needs to get medical clearance from a medical doctor before the clinician is allowed to extract the tooth.

In Clinic III, the top ranking requirement not finished on time is special periodontal case. This is one of the long cases which requires longer diagnostic procedures which includes radiographic examination, probing and case presentation and case defense. Level III clinicians claim that it is difficult for them to find cases that conform to the criteria for case approval. For example, a case may be classified as periodontitis but there are other conditions which need to be addressed if rehabilitation is made. The complexity of the case will affect the time of completion because it might take more than two semesters so it will be a cause for the delay of a clinician's graduation. That is why clinicians are instructed to consider their case selection. Another example is a severe case where most of the teeth will be extracted anyway so the clinical supervisor disapproves the case. Based on observation, most patients that come to the dental infirmary have complicated cases which require longer time of treatment. Next in rank is root canal treatment, bi or tri-rooted. This case cannot be completed in one seating and conditions needed for placement of root canal sealing material is case dependent. The treatment may require one to three or more appointments, depending on the diagnosis, the number of roots, and the complexity of the case (Cohen & Hargreaves, 2009). Aside from that, a final restoration should be placed which requires another set of procedures which may take about three to four appointments. Third in rank is pedodontic appliance. This case also requires long diagnostic procedures done on a child-patient. Complete patient work up is also needed and case completion depends on the response of the patient to treatment. Follow-up phases of treatment may be needed because of the biological basis for monthly visits. The clinical implication of cellular change, tooth movement, and cellular reorganization is that appliances should be activated only at 4- to 6-week intervals (Pinkham, McTigue, Fields & Nowak, 2005).

In Clinic IV, special surgical case ranked first as the most common requirement not finished on time. According to clinicians, it is difficult to find cases for approval because even if the treatment is indicated, there

are conditions to consider which may hinder case approval, for example, the patient is medically compromised. According to clinical instructors, since their professional license is at stake once they approve a case and let the student do the procedure, they approve cases based on the student's capability considering the difficulty or complexity of the case. In addition, this case also requires case defense which takes about three to four sessions. Next in rank is odontectomy (removal of impacted tooth). The same explanation is given as in the special surgical case. Third in rank is post and core, one of the major prosthodontics cases in Clinic IV. The requirement of this case is that the tooth to be treated must have undergone root canal treatment. This case also requires defense which takes about two to three sessions where the clinician must be able to answer questions regarding the procedures. The preparation of the tooth and post and core pattern also takes time and the post is brought to the laboratory for processing. In the over-all picture, the major cases and long cases with defense are the cases most commonly not completed on time.

Most Common Clinical Requirements that are Not Finished on Time according to Clinical Level

In the comparison of the requirements not finished on time, the clinical requirements common to all clinical levels were considered. Special cases or major cases unique to each clinical level were not included although these were included in the previous discussions per clinic level. The top five requirements not finished on time are as follows: first in rank is anterior/posterior crown followed by removable partial denture, fixed partial denture patient, class II patient and complete denture.

For anterior/posterior crown, clinic IV and clinic I had the most clinicians who did not finish it on time, followed by clinic III then clinic II. For removable partial denture, clinic I had the most who did not finish it on time, followed by clinic IV, then clinic II, and then by clinic III. For fixed partial denture patient, clinic IV had the most who did not finish it on time, followed by clinic III, then clinic II. For class II patient, clinic II had the most who did not finish it on time, followed by clinic IV, Clinic III, then clinic I. For complete denture, clinic IV had the most who did not finish on time, followed by clinic I, clinic II, and clinic III.

The computed chi-square of 133.31 is greater than the tabular chi-square value of 59.34 (two-tailed) at 0.05 confidence level. The null hypothesis fails to be rejected, hence there is a significant difference in the

most common cases not finished on time according to clinical level. Based on record, senior clinicians have more unfinished long or special cases than the junior clinicians. This is due to the complexity of the cases of the higher clinical levels.

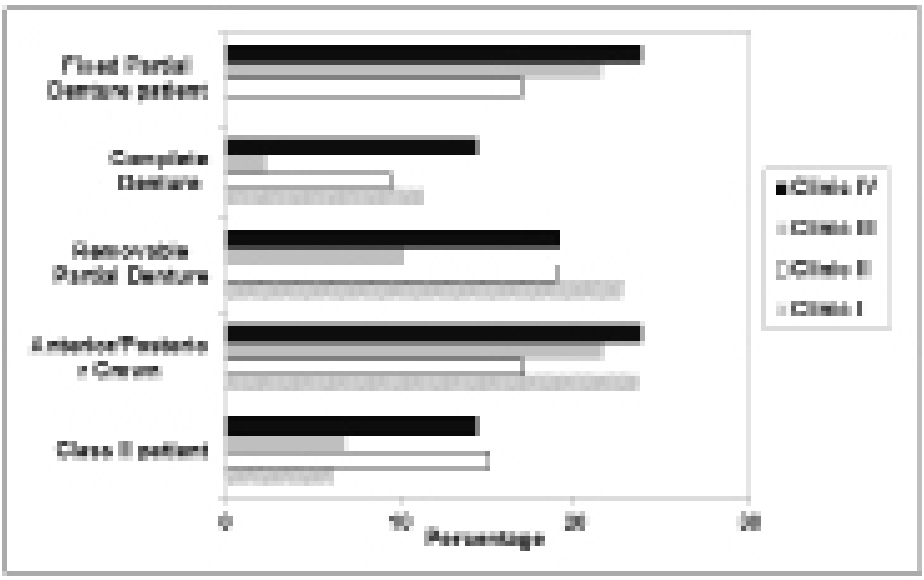

Figure 2. Most Common Clinical Requirements that are Not Finished on Time According to Clinical Level

Most Common Clinical Requirements that are Not Finished on Time According to Semester

For anterior/posterior crown, removable partial denture, fixed partial denture and complete denture, more clinicians failed to finish them on time during the second semester. For class II patient, more clinicians did not finish it on time during the first semester. During the first semester, there are more school activities, holidays and suspensions due to the rainy season. Clinicians tend to finish more requirements during the first semester because according to them, they want to reach the required percentage of points for promotion which is posted at the end of the semester before the enrolment period for the second semester. During the second semester, although there is the December break, there are fewer suspensions of classes and the clinicians are aware that they still have the summer for completion. The list of clinicians for promotion is usually posted after the

completion period during summer and not after the second semester. This gives them more time to garner more points for promotion. However, the difference in percentage between the two semesters is not significant as evidenced by the computed chi-square of 10.578 which is less than the tabular chi-square value of 24.736 (two-tailed) at 0.05 confidence level. The null hypothesis, semester does not affect the most common clinical requirements that are not finished on time, fails to be rejected.

Causes of Delay of Completion of Clinical Requirements as Perceived by the Clinicians

Among the top five causes of delay of completion of requirements, the first in rank is that specific cases are hard to find. Second is financial problem or cost or lack of budget for long cases/procedures. Tied in third rank are patient compliance to the scheduled time, holidays affect clinic days, lazy clinicians, and cases are not approved most of the time. Together in fourth rank are schedule of clinic, defense for major cases, time management, and patient compliance to instruction. In fifth rank are poor patient cooperation and fear of starting a case (lack of confidence).

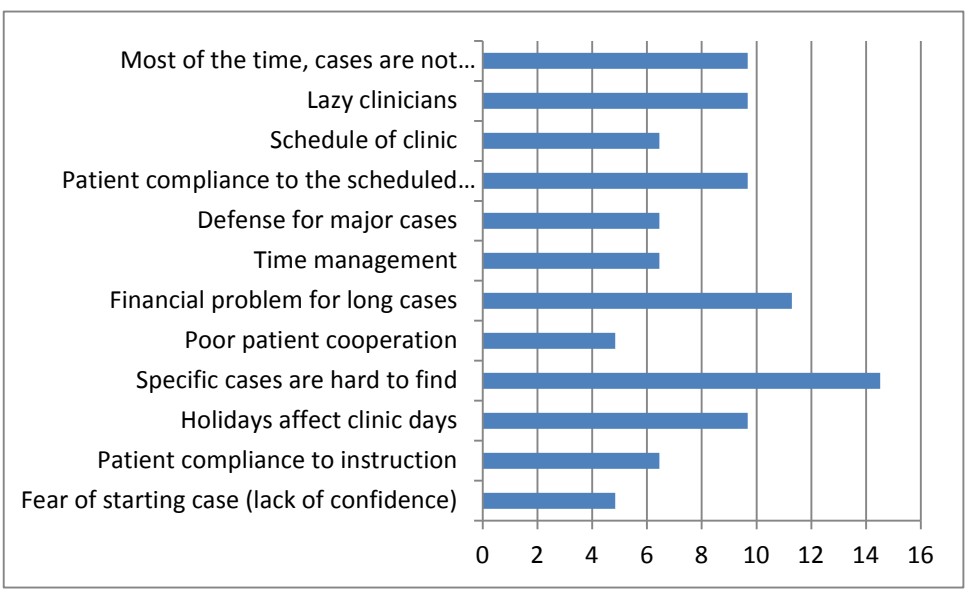

Figure 3. Causes of Delay of Completion of Clinical Requirements as Perceived by the Clinicians

Based from feedback and observation, major cases are hard to find because of the criteria for approval such as condition of the patient, the tooth and surrounding areas, and the degree of difficulty. Some clinicians do not carefully check the criteria and present cases that may not be approved. When they find another patient, they have to go through another process of diagnosing their patient which consumes a lot of their time. This corroborates the finding that, as mentioned by students, searching for and scheduling of patients takes a lot of time (Henzi et al., 2007).

In the case of financial problem/lack of budget due to the cost of long cases or procedures, there are some clinicians who do not want to start their long cases because of the perceived expenses. Since undergraduate, non-licensed clinicians are not allowed to charge their patients, the cost of materials and laboratory (dental technician) fees are shouldered by them.

On patient compliance and cooperation, it was also observed that there are patients who do not keep their appointments. Some patients prefer the short, one-seating procedure and seemed not to return for a series of treatments. Since the checking of cases follows a step by step process, the clinician cannot proceed to the next unless the previous procedure is approved by having the clinical instructor sign in the patient's chart.

On clinic schedule, the clinic days and time conform to the number of laboratory units per clinical level. Because of this, clinicians are not allowed to work if it is not their schedule.
Clinicians also have to pass the defense for major cases. Some clinicians do not prepare well for their defense because they are in a hurry to start while others are reluctant to start because they feel they are not prepared.

Regarding time management, some clinicians do not balance their work in the clinic. They tend to concentrate more on some cases while not attending others. Some do not manage their time well while others attribute to their laziness. As observed, there are few clinicians who come only towards the end of the semester and eventually rush to finish their cases.

Generally, it is the nature of cases, patient factor, and the attitude of clinicians contributes to the delay of completion of requirements. Other causes mentioned by the clinicians are related to time or schedule. Doing requirements in other subjects was also indicated to affect clinic time among clinicians. Having the comprehensive examination which

is scheduled during the clinic days also contributes to finishing clinical requirements.

IV. CONCLUSION AND RECOMMENDATIONS

Although the clinicians are performing well, they still need to attain the prescribed cut-off before being promoted to a higher clinical level or finish all their requirements for them to graduate on time. Clinical level affects the extent of completion of clinical requirements. Senior clinicians tend to have a higher percentage of completion. The most common requirements not finished on time are anterior/posterior crown, fixed partial denture and removable partial denture. These are the cases that cannot be done in one seating and require a series of procedures. Clinical level affects the most common requirements not finished on time. There are special cases unique to each clinical level and lower level clinicians have fewer special and long cases. Semester enrolled in did not affect their level of completion of clinical requirements. Difficulty in finding specific cases, cost of long cases/procedures, patient compliance and holidays disrupting clinic schedule topped the list of caused of delay in the completion of clinical requirements as perceived by the clinicians. Generally, it is the nature of cases, patient factor, and the attitude of the clinicians that contribute to the delay in the completion of clinical requirements.

Based on the findings and conclusions, the researchers recommend that the devised work plan be implemented. Specifically, the following measures are recommended:

1. Weekly monitoring of completion of requirements should be done. Clinicians should be required to report the status of their on-going cases regularly, especially the special and long cases to the head for clinical instruction; the attention of clinicians who are lagging behind should be called and constant reminders be given;

2. Time management and patient management should be emphasized among the clinicians through the help of the clinical instructors;

3. The patient logbook and referral system should be updated to help clinicians get patients for their cases;
4. Matters related to the completion of clinical cases should be tackled during the general assembly and scheduled meetings of clinicians and clinical instructors;

5. Considering clinical level, the requirements per clinic level should be reviewed by the academic council of the college in order to determine or decide on what cases are to be transferred, added or removed using the Commission on Higher Education memorandum as guide in revising the clinical dentistry curriculum; and

6. Advisers for each clinical level should be assigned to follow-up regularly the progress of the clinicians so that they will be guided properly in completing their requirements.

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EMERGING METHODOLOGIES AND CHALLENGES IN ENGINEERING EDUCATION RESEARCH

by
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INTRODUCTION

A relatively new area in engineering research is engineering education research. Engineering education research studies the influence and/or theme of environments, perspectives, methods, scope, and understanding of engineering knowledge with the goal of improving and/or defining the respective topic (Borrego & Bernhard, 2011). Also, it aims to identify the goals of engineering education in order to advance the understanding of specific areas linked to those goals. These areas may include its epistemology, policy, assessment, pedagogy, and diversity. This suggests a thorough review of pedagogy in engineering education as the research problem relates to specific fields of application in engineering.

There are five (5) core research areas in engineering education research identified by the Steering Committee of the National Engineering Education Research Colloquies in 2006, namely ("Engineering Education Research", n.d.):

1. Engineering Epistemologies: research on what constitutes engineering thinking and knowledge within social contexts at present and into the future;

2. Engineering Learning Mechanisms: research on engineering learners' developing knowledge and competencies in context;

3. Engineering Learning Systems: research on the instructional culture, institutional infrastructure, and epistemology of engineering educators;

4. Engineering Diversity and Inclusiveness: research on how diverse human talents contribute solutions to the social and global challenges and relevance to the engineering profession; and

5. Engineering Assessment: research on and the development of assessment methods, instruments, and metrics to inform engineering education practice and learning.

DISCUSSION

The need to enhance engineering education pedagogy cannot be overstated. An innovative engineering program aimed to enhance the students' education in their engineering fields will have exponential effects in their future careers as engineers. These innovative programs in on-the-job trainings, company-based student training initiatives, in- and off-campus trainings, mentorship, extra-curricular education, field trips and seminars, research-based engineering projects, teacher-student collaborative research, and new engineering technology transfers may be studied for their specific purposes for adoption or for further development. With this in mind, for instance, the Washington State University established the Engineering Education Research Center (EERC) which fosters collaborative interdisciplinary teams among engineering and education scholars. It facilitates research into innovative and effective educational practices and technologies that advance engineering education (EERC, 2013). Likewise, the University of Georgia also set up the Collaborative Lounge for Understanding Society and Technology (CLUSTER) which is a trans-disciplinary, collaborative group that focuses on engineering education research. The CLUSTER uses interpretive research methods to investigate the diverse aspects of engineering and build on the results of their research to push the boundaries and transform their engineering curricular and teaching practices in their engineering programs. Among the methods used is the teacher-student collaborative research projects aimed at attaining meaningful education via mutual learning and shared discoveries (CLUSTER, 2013).

Emerging Methodologies in Engineering Education Research

Borrego (2007) and Shavelson and Towne (2002) suggest abiding by the six principles of scientific inquiry formulated by the National Research Council, when conducting an engineering education research, which are to

1. pose significant questions that can be investigated empirically;

2. link research to relevant theory;

3. use methods that permit direct investigation of the question;

4. provide explicit, coherent chain of reasoning;

5. replicate and generalize across studies; and

6. disclose research to encourage professional scrutiny and critique.

These principles posit a biased inclination towards empirical data and quantitative methods. However, current practices in engineering education research methodologies are swaying over to the qualitative and mixed-methods approaches from the quantitative. Numerous researches and publications such as by Moskal, Leydens, and Pavelich (2002); Frechtling and Wastat (1997); Creswell (1998); Patton (1990), Geertz (1973); and Ragin (1987), provide persistent arguments and bases for such shift.

Among the differences between quantitative and qualitative methods are: quantitative methods are designed to provide summaries of data that support generalizations about the phenomenon under study, whereas qualitative research seeks to understand more about social and human problems in their natural settings and provide a complete description of a given event or phenomenon (Creswell, 1998). Quantitative results are limited in that they provide numerical descriptions rather than detailed accounts and generally provide less elaborate accounts of human perceptions or motivations than do qualitative findings. (Moskal, Leydens, & Pavelich, 2004). Moskal et al. (2004) noted that these numerical descriptions underlie the divide between the proponents of the quantitative and qualitative approach to engineering education research and that this divide is mostly fueled by a misunderstanding of their purposes and the kind of information they provide. Moreover, qualitative research features a holistic approach while quantitative research takes an analytic one by dividing the research problem into sizeable parts. Qualitative researchers often transfer iteratively between data collection and analysis using inductive methods, while quantitative researchers generally conduct analysis after data collection by working deductively (Moskal et al., 2004).

Further, qualitative research yields rich data that require diverse data analysis techniques which builds on ten key characteristics (Patton, 1990) as presented in Table 1:

Table 1. *Ten Key Characteristics of Qualitative Research and their Quantitative Equivalents*

Qualitative Characteristic	Function in Qualitative Research	Equivalent Quantitative Concept
1. Naturalistic	Occurs in a real world, naturalistic setting, without manipulation and control ; with openness to emerging data	Often takes place in a laboratory setting and has careful controls and manipulations
2. Inductive Analysis	Immersion into details, then inductively seeking the findings. Iteratively moving between data collection and analysis.	Works deductively by first posing a hypothesis using different controls. Analysis begins after data collection.
3. Holistic Perspective	Study the whole phenomenon as it occurs; variables are not controlled.	Controls for interfering variables, breaks the phenomenon into analyzable parts.
4. Data	Detailed description designed to capture the participants perspectives.	Numeric summaries.
5. Personal contact	Direct contact with the participants and settings; researcher's perspective and insights are critical to understand the phenomenon.	Analysis of numerical summaries wherein contact may not be required. Researcher's perspective is generally considered irrelevant.
6. Dynamic systems	Changes in the participant(s) and the setting(s) are attended to.	Examines a single event or multiple "snap shots" of a dynamic event.
7. Unique case orientation	Assume each case is unique, creating a need to capture the details before exploring issues of transferability.	Summaries across data, often removing outliers. Seeks to generalize across situations.
8. Context sensitivity	The social, historical, and temporal contexts of the setting are important; hence, transferability is approached with caution.	Generalizations made across different contexts.
9. Emphatic neutrality	Complete objectivity is impossible; yet pure subjectivity undermines credibility, so the focus is on seeking neutral understandings of the participants, setting, and self.	Strive to maintain objectivity throughout the investigation.
10. Design flexibility	Research design is open to change depending on the discovery process.	Research design is rigid; validity of results is dependent upon holding to pre-determined standards.

There tends to be a lack of qualitative studies in the engineering education literature and there is more preference among reviewers of archival journals for the use of quantitative methods. Borrego, Douglas, and Amelink (2009) note that, ''engineering educators who have been trained primarily within the quantitative tradition may not be familiar with some of the norms of qualitative research'', which some reviewers of journals may be of the same limitation. It is with this that Borrego et al. (2009) made the crucial point saying that a wider range of data collection methods will allow researchers to address a wider range of research questions. They presented a comprehensive overview of quantitative and qualitative methods and a discussion of mixed-methods studies which used both methods.

Table 2. *Description of Seven Emerging Methodologies in Engineering Education Research*

Methodology	Description
1. Case Study	It is described as an in-depth study or examination of a distinct, single instance of a class of phenomena such as an event, an individual, a group, an activity, or a community (Abercrombie, Hill, & Turner, 1984; Shepard & Greene, 2003). It can be used as a motivation for the validity of findings emerging either from an analysis of a single case or across multiple cases. Case study can be particularly appropriate to address research questions concerned with the specific application of initiatives or innovations to improve or enhance learning and teaching.
2. Grounded Theory	It is described as "a general methodology for developing theory grounded in a data systematically gathered and analyzed" (Strauss & Corbin, 1994). At the heart of grounded theory is the idea that theory is generated from the data at hand rather than already existing theory being used in the analysis. This follows the stages: 1st stage: open coding which initial categories are developed by grouping similar incidents together. The coding of each incident is carefully compared with other incidents previously coded in the same category. 2nd stage: axial coding entails further refinement on the categories and their properties by reviewing and testing all incidents coded in the identified categories. These categories are compared and examined for possible relationships. 3rd stage: theoretical saturation is the endpoint of data collection which occurs when additional data collection and analysis does not substantially change the findings.

Methodology	Description
3.Ethnography	It is a method or set of methods having the researcher overtly or covertly participating in the respondents' lives for an extended period of time, watching what happens, listening to what is said, asking questions, and collecting whatever data are available to provide answers to issues that are the focus of the research (Hammersley & Atkinson, 2007). The researchers keep records of discussions, chance conversations, interviews, overheard remarks, observational notes, audio and video recordings, and quantitative data gathered from surveys or structured observation.
4. Action Research	The aims and benefits of action research are strategic improvement of practice. Kemmis and McTaggart (1988) describe the implementation of action research as a continuous cycle of four moments: • a plan of action to improve what is already happening; • action to implement the plan; • observation of the effects of action in the context in which it is occurs; and • reflection on these effects as a basis for further planning, subsequent action and so on, through a succession of cycles. Action research of this kind can be a particularly effective methodology for engineering faculty who are not only interested in systematically doing research for their own educational practices but also in implementing substantial personal and social change in their practice.
5. Phenomenography	It is the investigation of the different ways in which phenomena or aspects of a phenomenon (such as specific concepts), are experienced or understood within a particular educational or learning context. A phenomenographic research searches for a comprehensive record of the variation in the experiences of people in such contexts; or focuses on ways in which learners differ (Marton, 1989). Identifying different conceptions makes phenomenography particularly well suited for the design of educational learning objectives, pedagogical strategies, assessments, and evaluations (Micari, Light, Calkins, & Streitwieser, 2007). Phenomenography takes experience of the phenomenon as its unit of analysis. The data collected from individuals are pooled together and analyzed in a careful iterative process to identify a set of distinctive categories (and the critical dimensions of variation which differentiate these categories) by which the full collective experience can be described. The analysis aims to identify the fewest, logically related, categories required to describe the totality of variation discerned in a pool of experiences.

Methodology	Description
6. Discourse Analysis	In the context of engineering education, it is important to note that discourse analysis not only comprises written text but also includes mathematical equations, graphs, figures, verbal exchanges, among others. The discourse of being an engineer will involve the practice of design to solve real world problems, and this includes collecting and analyzing data, using empirical laws and correlations, doing mathematical calculations and modeling, as well as presenting one's results to a range of different audiences. Discourse comprises those that describe the academic and professional activities which characterize the engineering practice. It usually requires data in the form of transcriptions of utterances and practices— pieces of discourse— recorded during the event like classroom discussions or during student conversations.
7. Narrative Analysis	Narrative methodology is focused on investigating the way people experience life since this method is built on the work of John Dewey which points to the deep interrelationships between experience, education, and life. Telling stories is a fundamental human activity by which man represents himself to others and makes sense of his life. With narrative methodology these stories are collected and analyzed in order to understand human experience. In the context of engineering education, narrative methodology helps in understanding how students experience their educational contexts.

Case and Light (2011) noted seven (7) emerging methodologies (Table 2) that present promising usage in the engineering education research. Collectively, these methodologies might allow the research community to better address questions around key engineering education challenges such as the students' responses to innovative pedagogies, diversity issues in engineering, and the changing requirements for engineering graduates in the twenty-first century.

Challenges in Engineering Education Research

Challenges facing researchers in this field are varied. As highlighted above, traditional methodologies using empirical data and rigor might not be applicable to address some research questions which may require a qualitative approach. Also, faculty members in the engineering who are aiming to conduct engineering education researches are limited to the demands of their time, profession, and knowledge. Some of the difficulties encountered by them in doing engineering education researches were identified by Borrego (2007). These are (1) framing research questions

with broad appeal, (2) grounding research in a theoretical framework, (3) fully considering operationalization and measurement of constructs, (4) appreciating qualitative or mixed-methods approaches, and (5) pursuing interdisciplinary collaboration. Borrego (2007) also noted the fundamental differences that prevent application of traditional engineering standards of rigor directly to engineering education research which could be addressed specifically by applying a qualitative and mixed-methods research paradigm.

Another challenge to engineering education research is globalization. Globalization poses a threat as engineering education cultures vary from country to country. Practice in the engineering fields also varies due to regionalization and cultural aspects (Borrego & Bernhard, 2011). With the introduction of globalization and the need to address internationally-accepted engineering competencies, global engineering education such as the Global Engineering Program at Purdue University and Erasmus Mundus were established.

Without a strong engineering research policy, policy formulation and revision tend to be a difficult challenge especially for academic institutions with strong inclinations toward established norms. However, upkeep of policies in engineering education, to some degree, is externally driven. International accrediting bodies such as the Accreditation Board for Engineering and Technology, Inc. (ABET) exert a strong influence by incorporating industrial demands in their accreditation procedures through their emphasis on both technical (e.g. design, problem solving) and professional skills (e.g. teamwork, communication, ethical/global thinking) ("Engineering Education Research," n.d.). Attainment of these skills requires innovative research-based program policies and a strong collaborative-research culture from academic institutions aiming for meaningful accreditations.

Moreover, engineering education research requires a strong foundation in specific engineering fields. Collaborative efforts through shared knowledge and talents address this problem. Teacher-students research collaborations, however, require a great deal of effort on the students for them to fully grasp and understand the specific engineering research problem and all of its related aspects. Hence, engineering education should start at the grassroots through exposure to actual engineering research and problems. Among the websites that address this concern are engineering.purdue.edu/INSPIRE and ysa.engr.wisc.edu/.

Departmental and/or collegiate research and inquiry journals could also address this problem partially.

Problems on technology transfers in engineering are stimulated by a disconnection between the academe and actual engineering practice (Jesiek, Borrego, & Beddoes, 2010; and Borrego & Bernhard, 2011). Though advances in the engineering fields are documented in a lot of engineering journals, only concerned researchers in those specific fields read them. Engineering education research aims to bridge this gap through numerous cyclical models developed by engineering education researchers (Jesiek et al., 2010; and Borrego & Bernhard, 2011). These models allow research and practice to continuously influence and develop one another.

CONCLUSION

An innovative engineering program requires constant monitoring and upkeep in its pedagogy and departmental policy. This is continually increased by a strong collaborative-research culture and research-oriented academic body through the immersion of faculty and students in engineering education research initiatives. However such initiatives will require continuous support from the academic administration and the academic community. This could be attained through a determined departmental and administrative policy and a paradigm shift from the traditional systems to new and innovative grounds.

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EXPLORATORY ASSESSMENT OF CARBON STOCKS IN BENGUET PINE (Pinus kesiya) AND OTHER CARBON POOLS IN BUSOL WATERSHED AND FOREST RESERVATION

by
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INTRODUCTION

The problems on climate change are realities that ripple through economic and socio-political sectors and not only the environment. Multitudes of intensive studies on global warming and climate change reveal evidence on the current digression of temperatures from the normal patterns of weather and climate, towards more extreme levels. King (2004) mentioned that since 1991, global temperature have risen by about 0.6o C, while global sea levels have risen by about 20 cm; and, in the last 100 years, warming caused the global average temperature to increase by 0.740C while the average rate of sea level rise was pegged at 1.8 mm/year from 1961 to 2003 (Intergovernmental Panel for Climate Change (IPCC), 2007, as cited by Racelis, 2008).

The Philippine Science and Technology Agenda on Climate Change 2010-2016 (2008) defines climate change as events associated with the increase in global temperature, changes in precipitation pattern, occurrence of extreme events, and increase in sea level. These effects are apparent realities that our country is experiencing. This is further echoed and asserted by the IPCC (2007) that the warming of the climate system is unequivocal as is now evident from observations of increases in global average air and ocean temperatures.

It is an accepted fact that global warming and climate change are caused by the accumulation of greenhouse gases in the atmosphere. Lasco, Pulhin, and Sales (2002) cite studies by Watson et. al. and Schimell et.al. that among the greenhouse gases (GHGs), which includes methane (CH4), nitrous oxides (N20), chlorofluorocarbons (CFCs), and carbon dioxide (C02), is the most abundant and is responsible for more than half of the radiative force associated with the greenhouse effect. Major policies on Climate Change Mitigation and Adaptation are mostly focused on fossil fuel use since it causes the bulk of CO2 emissions, but Lusiana, van

Noordwijk, and Rahayu (2005) reminds us that 20% of CO2 emissions, as well as that of other GHGs, are caused by land use change in the tropics. Inevitably, the impact of the land use change component should not be ignored in policy formation.

One of the major advancements in climate change mitigation and adaptation is the introduction of market-based instruments that provide economic incentives for maintaining and restoring carbon stocks. Carbon stocks, within the context of forest ecology, refers to the amount of carbon stored in the forest ecosystem, mainly in living biomass and soil, but to a lesser extent also in dead wood and litter ("Carbon Stock", n.d.). Jana, Biswas, and Majumder (2009) underline the relationship between tree biomass density and carbon stocks such that as the tree biomass experience growth, the carbon held by the plant also increases its carbon stocks. Trees can increase their carbon stocks by sequestering atmospheric carbon through a process known as carbon sequestration. This process refers to the capture and secure storage of carbon that would otherwise be emitted to, or remain in the atmosphere (Herzog & Golomb, 2004). Eventually when carbon is sequestered by the plant through photosynthesis, it is stored as biomass in different parts of the tree (Jana et al., 2009). Calculating the carbon stocks of a forest ecosystem as a whole (i.e. including above-ground biomass, below-ground biomass, soil organic carbon etc) or in specific carbon pools (i.e. trees, litter, understorey, soil etc.) is known as carbon stocks assessment.

Market-based instruments used in climate change mitigation and adaptation are taking shape largely due to the Clean Development Mechanism (CDM) of the Kyoto Protocol. This includes other approaches such as the Reducing Emissions from Deforestation and Degradation (REDD) which focuses on afforestation and reforestation activities. Lasco et al. (2002) cited studies by Brown (1997) regarding the potential of tropical forests in carbon sequestration via forest land protection, reforestation, slowing down rates of deforestation, as well as agro-forestry. Furthermore, Lasco et al. (2002) cited Moura-costa (1996) and Myers (1996) in saying that tropical forestry still has a high potential in terms of carbon uptake and can offset carbon emission due to its cost-effectiveness. In the Philippines, there had been estimates on the potential of our forests and watershed for carbon sequestration projects such as those of Lasco and Pulhin in 2002 and Lasco and Pulhin in 2003.

Watersheds are extremely important ecological sites that supply water to major human populations and even other animals that consider the location as their habitat. Since it is a forested area, a watershed is able to hoard large amounts of water, hence its impact to the environment, humans and animals is numerous and highly profound. Watersheds and their tributaries also greatly affect agriculture and economic development and they also play a very significant role in environmental protection in the Philippines.

According to Lasco, MacDicken, Pulhin, Guillermo, Sales, & Cruz (2006) nearly three-quarters of the total land area of the Philippines lie in watersheds where approximately 1.5 million hectares of agricultural land depend on these for irrigation. In addition to this, there are about 20 million people who also live within the upland areas of these watersheds and depend largely on these as source of clean water for their homes and their industries.

In the Cordillera Administrative Region (CAR), widespread logging and the conversion of much forest land into agricultural and residential sites in the 13 watersheds here lead to devastating loss of forest cover. The estimated rate of human encroachment to these areas is at a rate of about 1,735 hectares annually since 2006 (Carino, 2008). The National Irrigation Administration also expressed alarm over findings that the region's major river systems' water levels (Chico, Agno, Bued and Abra) are decreasing over the past years.

Here in Baguio City, the Busol Watershed and Forest Reserve is the second largest water source comprising approximately 336.64 hectares and is number seven in the 2002 List of Protected Areas in the Philippines. The forest reserve supplies 25% of the water supply of the city servicing more than 8,000 families in 11 different barangays. Within the context of this study however, the focus is more on how the dominant trees species, the Benguet pine (Pinus kesiya) in the Busol forest reserve performs a vital ecosystem service which is its ability to sequester atmospheric carbon. Lasco et al. (2002) cited Watson et al. in stressing that forest ecosystems, such as the Busol Watershed and Forest Reserve, play an important role in the climate change problem since they can be both sources and sinks of atmospheric CO2.

Racelis (2008) notes that the capacity of a tree to store atmospheric carbon is a function of its diameter, which in turn is related to its biomass density and consequently its capacity to store atmospheric carbon. This study utilizes the relationship between tree biomass density and the potential of a certain tree to sequester and store atmospheric carbon. Tree biomass density refers to the total amount of aboveground living organic matter in trees expressed as oven-dry tons per unit area. This concept provides the framework for this study since this is the main concept behind almost all carbon sequestration studies such as those of Lasco et al. (2006) in the Pantabangan-Caranglaan Watershed, which measured the biomass density of different tree species ranging at 55-286 Mg ha-1, and Lasco et al. (2006) in the La Mesa Watershed which had a range of 16-160.68 Mg ha-1 (Racelis, 2008).

There is a need for carbon sequestration studies in the Philippines. Gevana and Pampolina (2009) assert that, with the problems associated with climate change becoming more distinct and prominent, ecosystems services should be given much attention. Included in these services provided by ecosystems are biodiversity and carbon sequestration. This is further accentuated in the strategic action of the Climate Change Commission which calls for the protection and rehabilitation of critical ecosystems, including the restoration of ecological services (National Climate Change Action Plan (NCCAP) Executive Summary, 2011).

It is then therefore a necessary endeavor to collect as much information regarding the vital ecosystem services provided by forest reservations and watersheds especially considering the fact that little or no studies on carbon sequestration potentials of forests in Baguio City exist. Ultimately, the amassed information will contribute to the pursuit of aggressive steps to protect these areas.

On an academic note, the information coming from these studies greatly influence the direction of environmental studies discourse to lead to further accuracy in the assessment of the conditions of watersheds and forests in the region and the country to continue strengthening the positive effects of research to policy-making and implementation.

The study was conducted in the Busol forest reservation and watershed located in Baguio City. This study seeks to analyze the distribution of the dominant tree species in the Busol Watershed and Forest Reservation and eventually determine the carbon sequestration potential

of the Benguet Pine (Pinus kesiya), as well as the other carbon pools found in the said locality. Due to limitations in time as well as financial constraints, the number of sampling plots was limited only to an area of 4,000 m2 as presented in Figure1.

The standard measurements for carbon sequestration studies to show between two (2) plots are the following:

Bearing 247 degrees from Plot 1 to Plot 2
Distance 208 meters from Plot 1 to Plot 2

Figure1. Location of the study sites in Busol Forest Reservation and Watershed in Baguio City

Prior to the conduct of the study, written correspondences were made and necessary permits were secured from the Baguio Water District, the lead agency tasked to oversee the protection of the Busol Watershed and Forest Reservation. Sampling was limited to 2 days so as not to create any disturbances in the said locale.

Estimates on the carbon density of trees were in accordance to the protocol formulated by Hairaiah, Sitompul, van Noordwijk and Palm (2001) who were often cited by most carbon assessment studies in the Philippines, such as Patricio and Tulod (2010) and Lasco and Pulhin (2003, 2009). An ocular inspection of the site was done prior to the actual field measurement. A stratification of the study area was also conducted to improve the precision of the data. Stratification can be based on the vegetation or species type, soil type, topography, and age classes (Hairaiah et al., 2001 as cited in

Patricio & Tulod, 2010). Within the context of this study, the stratification used was based on the dominant tree species which is the Benguet pine, Pinus kesiya. In addition to this, topography was also used as a parameter in choosing the study site and dividing it into homogenous units or strata. The sample plots, therefore, were chosen based on the specification that it should not fall in the area with the densest or least vegetation (Hairaiah et al., 2001).

The Global Positioning System (GPS) was also utilized to mark not only the sample area but the specific trees inside the 2 plots. Accordingly, groundtruthing maps were also created using MapSourceTM since this would facilitate stratification, plot location and measurements (Patricio & Tulod, 2010).

The nested sampling design developed by Hairaiah et al. (2001) was used for the establishment of the sampling plot and eventually for data collection. Measurements for the live tree biomass involved the setting up of a single 5m x 40 m quadrat in both sample plot 1 and 2. Trees with diameter at breast height (dbh) < 30 cm were determined using a diameter tape. A bigger quadrat measuring 20m by 100m was set up for trees measuring > 30cm present within the sampling plot (Fig.2).

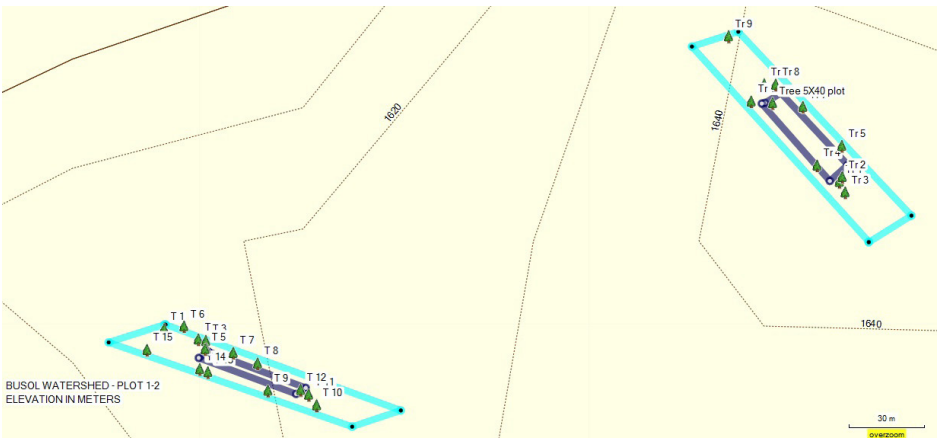

Figure 2. Nested sampling design adopted from Hairaiah et. al. (2001) showing the 2 sample plots

Allometric equations for conifers developed by Brown (1997) was also used to compute for the tree biomass density where

Eq. 1. Y (Kg) = EXP {-1.17+2.119 *LN (dbh)}

Tree biomass density in Mg/ha were computed based on the formula adopted by Patricio and Tulod (2010) where

Eq. 2. Tree biomass density = Tree biomass /sample area in hectare

while the amount of carbon stored in the tree biomass was computed based on the default value of 45% Carbon content used by Lasco and Pulhin (2009) where

Eq. 3. C stored = Tree biomass density / C content
C content = 45%

Table 1. Aboveground Parameters and Methods used in C-stock Measurement based on Hairaiah et al. (2001)

Parameter	Methods
1. Living trees with a stem diameter of • 30 cm in a standard sample plot (20*100m) • 5<…<30 cm in large area (5*40m)	Non-destructive measurement of stem diameter, apply allometric equation on the basis of stem diameter
2. Understorey vegetation (including trees < 5cm in diameter)	Destructive
3. Litter • Coarse/standing litter • Fine litter • Surface roots	Destructive
4. Charcoal	Destructive
5. Ash	Destructive
6. Dead standing trees	Non-destructive, apply allometric or cylinder equation (for branched & unbranched remains, respectively)
7. Dead felled trees	Non-destructive, apply cylinder (or allometric) equation
8. Stump (trunk) remains in the forest	Non-destructive, apply cylinder equation

Table 1 shows the general methods described by Hairaiah et al. (2001) in above ground data collection. Since the main focus of the study in basically carbon stocks assessment of P. kesiya, only the first two parameters were conducted to measure the carbon stock of the study area. Carbon content analysis of both plant tissues and soil organic carbon (using Walkey-Black method) were not performed due to limitations in time and money.

Destructive sampling was used in both sample plots within the 5m x 40m quadrat. Sampling frames measuring 1m x 1m were randomly placed along the said quadrat. All under storey biomass were harvested with the 1m x 1m area. The total fresh sample was weighed in the field. A subsample of 300g- 330 g was taken for oven-drying. The subsamples were oven dried for 40 hours at 80oC at the UB Science High School Laboratory. Due to the absence of laboratory equipment, sample of plant tissues were not analyzed for its carbon content. Instead a default value of 44% was used based on Patricio and Tulod (2010) where

Eq.4. Total dry weight = Total fresh weight X Subsample dry weight

Subsample fresh weight X Sample area
C stored = Total Dry Weight x C content; C stored
was based on default value of 44%

The root biomass was also measured although root biomass determination has not been standardized especially for that of conifers. However, in his study of P. kesiya, Patricio and Tulod (2010) used the recommended allometric equation based on Cairns, Brown, Helmer, & Baumgardner (1997) where

Eq. 5. Root biomass = EXP {-1.0587 + 0.8836 * LN (AGB) }
AGB = Above Ground Biomass

The abundance and population density of P. kesiya with dbh ≥ 30 cms. within the 2 sample plots were determined using the formula.

Eq. 6. Abundance = Sample/Area (ha)

While few studies exist on terrestrial carbon sequestration, the vital role of the forest ecosystem in amassing atmospheric carbon cannot be denied. This apparent shortage of baseline data on the carbon

sequestration potential of forest ecosystem extends to coniferous forests specifically Benguet pine, Pinus kesiya. However, studies conducted by Lasco and Pulhin (2009) in a P. kesiya plantation in Nueva Ecija showed that the carbon sequestration potential of 13-year old Benguet pine reached a maximum of 48.52 Mg/ha, the highest among all species used for reforestation purposes. With a biomass of 107.83 Mg/ha, the P. kesiya plantation surpassed Gmelina arborea, Acacia auriculiformis, and Tectona grandis. In fact, the same study also showed that even when the Benguet pine was combined with broadleaf species, it still has the second highest biomass 83.24 Mg/ha and consequently carbon density 37.46 MgC/ha.

Busol forest reservation and watershed still has a high abundance of P. kesiya. Table 2 shows the population density of P. kesiya in the study area with dbh ≥ 30 cm.

Table 2. Population Density of P. kesiya with dbh ≥ 30 cm. in Sample Plots 1-2

SITE	Number of trees Dbh≥ 30 cm.	Area (m2)	Population density per hectare
Sample plot 1	11	2,000	
Sample plot 2	15	2,000	
TOTAL	**26**	**4,000**	**65**

Although this study did not specifically measure the age of the individual trees similar to Lasco and Pulhin (2009) and Patricio and Tulod (2010), having a population density of 26 grown P. kesiya within an area of 0.4 hectares would translate to 65 trees with dbh ≥ 30 cm in one hectare of the forest. This will have an implication on the carbon sequestration potential of P. kesiya in the Busol forest reservation. Tree biomass density is measured by getting the diameter at breast height at 1.3 m from the ground (Hairaiah et al., 2001). Having 65 trees with dbh ≥ 30 cm in one hectare of the forest would give us an idea of the carbon sequestration of P. kesiya in the study site.

Table 3 and Table 4 show the relationship between the tree diameter with its biomass density, and consequently its carbon density for sample plot 1 and 2.

Table 3. Tree Biomass Density and corresponding Carbon Density of P. kesiya in Sample Plot 1 based on Tree Diameter

GPS COORDINATES	TREE NUMBER	TREE DIAMETER (cm.)	TREE BIOMASS DENSITY (Mg/ha)	CARBON DENSITY (MgC/ha)
N16 25.713 E120 37.117	1	29.62	2.04	0.918
N16 25.714 E120 37.117	2	31.1	2.26	1.017
N16 25.708 E120 37.114	3	29.77	2.06	0.927
N16 25.718 E120 37.114	4	29.53	2.03	0.914
N16 25.720 E120 37.116	5	30.12	2.11	0.950
N16 25.726 E120 37.107	6	69.39	12.4	5.58
N16 25.726 E120 37.107	7	29.81	2.07	0.932
N16 25.731 E120 37.103	8	29.02	1.95	0.876
N16 25.744 E120 37.093	9	36.76	3.22	1.449
N16 25.733 E120 37.100	10	64.29	10.53	4.739
N16 25.730 E120 37.098	11	29.94	2.08	0.936
		TOTAL	**42. 75**	**19.24**

Note: Tree Biomass computed using the equation EXP {-1.17+ 2.119*LN (dbh)} for conifers (Brown, 1997); Tree Biomass density = Tree biomass/ sample area in hectare; C stored = Tree biomass density X 45% (Lasco & Pulhin, 2009)

Table 4. Tree Biomass Density and corresponding Carbon Density of P. kesiya in Sample Plot 2 Based on Tree Diameter

GPS COORDINATES	TREE NUMBER	TREE DIAMETER (cm.)	TREE BIOMASS DENSITY (Mg/ha)	CARBON DENSITY (MgC/ha)
N16 25.681 E120 36.970	1	44.72	4.88	2.196
N16 25.679 E120 36.977	2	46.58	5.32	2.394
N16 25.679 E120 36.979	3	42.90	4.47	2.012
N16 25.677 E120 36.979	4	65.41	10.9	4.905
N16 25.677 E120 36.979	5	56.88	8.12	3.654
N16 25.682 E120 36.974	6	50.07	6.20	2.79
N16 25.679 E120 36.987	7	53.60	7.16	3.222
N16 25.674 E120 36.990	8	56.53	8.02	3.609
N16 25.668 E120 36.992	9	54.17	7.33	3.299
N16 25.665 E120 37.003	10	66.97	11.48	5.166
N16 25.668 E120 37.001	11	46.56	5.31	2.390
N16 25.669 E120 36.999	12	46.15	5.22	2.349
N16 25.670 E120 36.978	13	29.88	2.08	0.936
N16 25.672 E120 36.977	14	29.75	2.06	0.927
N16 25.675 E120 36.965	15	57.00	8.16	3.672
		TOTAL	**96.71**	**43.52**

Note: Tree Biomass computed using the equation EXP {-1.17+ 2.119*LN (dbh)} for conifers (Brown, 1997); Tree Biomass density = Tree biomass/ sample area in hectare; C stored = Tree biomass density X 45% (Lasco & Pulhin, 2009)

Biomass production of P. kesiya in the two sampling plots reached 139.46 Mg/ha. This is still within the accepted value of 22 – 607 Mg/ha for P. kesiya plantations (Patricio & Tulod, 2010). Based on the default value of 45% in determining carbon stocks in trees given by Lasco and Pulhin (2009), the two sample plots have a cumulative carbon density of

62. 76 MgC/ha. It is noteworthy to mention that the population sampled is composed of 26 trees with dbh ≥ 30 cm. But relating this figure to the population density of P. kesiya with dbh ≥ 30 cm within a one-hectare area, which is 65 trees per hectare, we can infer that biomass production and carbon sequestration will increase. This is consistent with the general rule of having greater amounts of carbon sequestered if biomass production increases (Patricio & Tulod, 2010).

As far as the understorey vegetation is concerned, Table 5 shows a cumulative total dry weight of 5.627 Mg/ha for the 2 sample plots. Due to the absence of laboratory equipment to measure carbon content in plant tissues, computations of total carbon stored in the understorey vegetation was based on a 44% default value (Patricio & Tulod, 2010). The resulting carbon sequestered by the understorey, which is 2.48 MgC/ha is still within the values presented by other studies focusing on P. kesiya forests although Patricio and Tulod (2010) have lower values (1.13-1.30 MgC/ha) probably due to the fact that it was conducted, not in a natural forest setting, but in a plantation.

Table 5. Total Dry Weight of the Understorey Vegetation and Corresponding Values for Carbon Stored in Sample Plots 1-2

SITE	TOTAL FRESH WEIGHT (Kg)	SUBSAMPLE FRESH WEIGHT (g)	SUBSAMPLE DRY WEIGHT (g)	SAMPLE AREA (m2)	TOTAL DRY WEIGHT (Mg/ha)	C STORED (MgC/ ha)
SAMPLE PLOT 1	0.6589	302.5	129.83	1 m2	2.832	1.25
SAMPLE PLOT 2	0.5697	327.4	160.6	1m2	2.795	1.23

Note: Total dry weight = Total fresh weight X Subsample dry weight
Subsample fresh weight X Sample area (Hairiah et al, 2001)
C stored = Total Dry Weight x C content; C stored was based on default value of 44% (Patricio & Tulod, 2010)

Root biomass was measured based on the allometric equation adopted by Lasco et al. (2006); Patricio and Tulod (2010); and Sales, Lasco, and Banaticla (2005) based on Cairns et al. (1997). Table 6 shows the estimated root biomass and its corresponding carbon stored. It is important to note that the values shown, especially the total carbon density of the root biomass is based on the aboveground biomass since root biomass is

a function of the above ground biomass (Patricio & Tulod, 2010). Similar studies show that the mass of the plant's leaves and stems is proportionally scaled to that of its roots in a mathematically predictable manner (Law, 2002 as cited by Patricio & Tulod, 2010).

Table 6. Root Biomass from Sample Plots 1-2 derived from AGB or Aboveground Biomass

SITE	TREE BIOMASS DENSITY	DRY WEIGHT, UNDERSTOREY VEGETATION	TOTAL ABOVE GROUND BIOMASS	ROOT BIOMASS	C STORED (MgC/ ha)
SAMPLE PLOT 1 and 2	139.46	5.627	145.087	28.20	12.69

Note: Root biomass = EXP {-1.0587 + 0.8836 * LN (AGB) }
AGB = Above Ground Biomass = tree biomass + understorey vegetation

The default value for carbon content at 45% for tree biomass was still applied to get the carbon stored in roots in consonance to similar, but limited studies on P. kesiya. Some studies, such as Sales et al. (2005) pegged the default value at 49% but this includes tree species such as yemane, Gmelina arborea and mahogany, Swietenia macrophylla. The total value of carbon stored in the root biomass of P. kesiya in the Busol forest reservation, at 12.69 Mg/ha, is higher than the carbon sequestered in roots of P. kesiya aged 1-4 years old which ranges from 3.03 -1075 Mg/ha (Patricio & Tulod, 2010). This is consistent with the fact that trees, especially P. kesiya which is a fast growing species, continue to accumulate biomass as it gets older. Studies by Hairaiah et al. (2001), Sales et al. (2005), Lasco and Pulhin (2009), and Patricio and Tulod (2010) all show that, although the rate varies by species, biomass production is intertwined with its age.

CONCLUSION

Although the study had its limitations in terms of time, manpower, equipment, and finances, it was able to come up with vital baseline data that could be useful for future research. Based on the results of the study, the following are the conclusions:

1. Pinus kesiya or the Benguet pine with dbh ≥ 30 cm as the dominant tree species at 65 trees per hectare, still is relatively abundant within some parts of the Busol forest reservation and watershed;

2. Biomass density of P.kesiya, at 139.46 Mg/ha within the 2 sampling plots, still is well within the normal range of 22- 607 Mg/ha for P. kesiya. It is important to note, however, that normal range of values was derived from Benguet pine plantations and not natural forests;

3. Carbon sequestration of P. kesiya within the 2 sampling plots, at 62.76 MgC/ha is well below the mean carbon density for Benguet pine plantations at 158.98 MgC/ha since on 26 trees with dbh ≥ 30 cm were present in the said site;

4. Total carbon stocks of Busol forest reservation, which comprises of P. kesiya, the understorey vegetation, and the root biomass is pegged at 77.93 MgC/ha which is relatively higher when compared to a 6-year old P. kesiya tree plantation. This value does not even include soil organic carbon and the litter layer;

5. Overall, the Busol forest reservation shows great potential to sequester atmospheric carbon and contribute to mitigation measures against climate change and global warming; and

6. A concerted effort from all sectors of the society must therefore be done to ensure and guarantee the protection and preservation of the tree cover and consequently, the carbon stocks of the Busol forest reservation and watershed.

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TEACHING PRACTICES IN COMMUNITY AND PUBLIC HEALTH COURSE AMONG SCHOOLS OF MEDICAL TECHNOLOGY

Dissertation Abstract
by
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Doctor of Philosophy in Development Education

The study described the teaching practices in Community and Public Health (CPH) among Medical Technology Schools in the Philippines for the SY 2011-2012 and the development of a handbook in CPH for Medical Technologists. Using the descriptive-normative survey method as well as phenomenological inquiry, it ascertained the prevailing practices in CPH course among the MT schools. Data gathering tools included the researcher-made questionnaire, interview, and focus group discussion with the dean/program chair/subject head, Community and Public Health instructors, and students. Results showed that for the lecture component of the course, the individualized, group-based, classroom-based, and media-based teaching strategies were moderately implemented. Two concerns foreshadow the objectives of the lecture component. These are the lack of references that can be used by the teachers and students of CPH in the medical technology field and the lack of time to finish the given topic outline. For the laboratory component of the course, student research, the round table, worksheets or laboratory manual, demonstrations and community immersion were all always observed, with community immersion protocol provided by the Philippine Association of Schools of Medical Technology have been always observed in the schools that included community immersion in their curriculum. Teachers and students clamor for a guideline that can be used for the community immersion of CPH classes which is designed for medical technologists. The output of this study is a prototype syllabus and a handbook in CPH for medical technologists that can be used by CPH students and faculty. The first part of the handbook is a set of notes on the topics that need to be covered, with specific objectives and suggested activities. The second part of the handbook is composed of twelve activities strategically designed to promote health in the community.

COMPETENCIES OF COMMUNITY HEALTH NURSES IN BAGUIO CITY AND BENGUET

Dissertation Abstract
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Doctor of Philosophy in Development Education

This research study investigated the self-assessed competency level of community health nurses along five components of the competency framework. This research looked into the level of performance of community health nurses as perceived by the clients in terms of personal and professional development, nursing care function, collaborating and coordinating function and health promotion and education function, level of satisfaction of clients in the health services rendered by the community health nurses in terms of personal and professional development, nursing care function, collaborating and coordinating function and health promotion and education function. This research made use of quantitative research methodology and utilized the descriptive – survey method of research in gathering data. The data used in this research were collected using records review, validity and reliability testing of the questionnaire and the final competency standards (self-assessment tool) for community health nurses. Weighted means, t-test and correlation formula were used to interpret the data gathered from the survey. Questionnaires were given to the heads of the rural health units for distribution to the community health nurses of Baguio City and Benguet as well as retrieval, collection of the questionnaires. The self-assessed competency of the community health nurses revealed an overall mean of 3.51 interpreted as "very high competency level". This implies that the community health nurses are "76–100% capable of doing the tasks" in the community and as what the community expects from them based on the given clusters of competency. Moderator variables for evaluating levels of satisfaction and performance of community health nurses as perceived by the clients in the community showed that gender and ethnic background affect the level of perceptions of the clients on health promotion and education. Based on the findings of the study, an action plan for community health nurses was formulated with corresponding result statements or interventions and their given indicator.

MENTORING PRACTICES IN PRIVATE HIGHER EDUCATION INSTITUTIONS IN BAGUIO CITY

Dissertation Abstract
by
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As viewed by many, mentoring has become increasingly apparent as professional practice that occurs in the context of teaching whenever an experienced teacher supports, challenges, and guides novice teachers in their teaching practice. This is a descriptive-survey that mentors play in the career development/advancement of faculty members of higher education institutions in Baguio City. Specially, it focused on the level of knowledge in mentoring, mentoring experiences, problems encountered in the implementation of mentoring, and the contributions of mentoring in the professional development among the faculty members. It also determined whether the differences in the responses of the subjects of the study were significant or not. A total of 19 faculty members and 334 students from Saint Louis University (SLU), University of Baguio (UB), and University of the Cordilleras (UC), were involved using the sample random sampling. A questionnaire-checklist and informal interviews of faculty members were used to gather needed information. The data were analyzed and interpreted using weighted means. The F-test with .05 level of significance and Kruskal-Wallis rank test for difference in medians were applied. The analysis of the data showed that the respondents were sufficiently knowledgeable; that experiences in mentoring among mentors were lost attributed to being mentored or coached by someone more senior (with more knowledge) within the last one to five years and sharing the school's functional group mentoring program; the problems encountered in the implementation of mentoring were moderately serious and; the mentors strongly agree that mentoring has helped/boosted them in their professional development. The responses according to schools did not differ significantly. The findings led to the following recommendations that institutions of higher learning are encouraged to improve the mentoring structures to help indicate factors of quality of teaching. It is further recommended that the policies and practices in relation to mentoring.

EMOTIONAL LITERACY OF BASIC EDUCATION TEACHERS IN THE DIOCESE OF BAGUIO-BENGUET

Dissertation Abstract
by
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Doctor of Education

This study sought to determine the emotional literacy status of basic education teachers in the Diocese of Baguio-Benguet. The descriptive-survey research design was used, with a valid and reliable questionnaire-checklist as data-gathering tool. The study was conducted during SY 2008-2009, among 338 elementary school and secondary school teachers in four elementary school and 13 high schools of the Diocese of Baguio-Benguet. Total enumeration was used. The null hypothesis was tested through the F-test (Analysis of Variance). The very much level of self- awareness of the teachers indicates optimum emotional self-awareness contributory to subjective well-being and individual happiness. The much level of emotional awareness of others manifested by the teachers denotes much empathy in their emotional awareness of others. This leaves room for improvement as far as intrapersonal intelligence is concerned. The much level of emotional expression denotes much proficiency in emotional expression on the part of the teachers. Also, there is still room for improvement as far as emotional expression is concerned. Emotional coping strategies are often utilized by the teachers, denoting that they are moderately other-directed as far as coping strategies are concerned. The often extent to which the teachers manage their emotions denotes a moderate level of emotional literacy. The overall conclusion is that the teachers of the Diocese of Baguio-Benguet manifest a much level of emotional literacy, denoting that they are at the moderate or proficient level of emotional literacy. As such, since moderate is not the highest level, the teachers have not yet obtain the optimum level of emotional literacy.

THE AL-MAARIF EDUCATIONAL CENTER INC.: AN EVALUATION

Thesis Abstract
by
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This study used the qualitative descriptive method of research in evaluating the Al-Maarif Educational center, Inc., the only madrasah imam training school in Northern Luzon, along the areas of attainment of objectives and implementation of the learning standards namely; Qur'an, Human Rights, Fiqh,Tawheed, Aqueeda, Seerah, and Hadith. It also looked into the constraints encountered by the center in relation to attainment of objectives and implementation of learning strands. A total of 160 students from the 173 enrollees, 2 administrators from the 6 members of the board of the organization, and 10 faculty members participated in this study. Data gathering was done on April and May 2011, through questionnaires and interviews. The questionnaire was personally administered and retrieved from the respondents. Informal interviews with the help of a male Muslim were conducted with the respondents, especially with the administrators. Ocular visit was also done with the permission of the administrators. Findings revealed that the objectives of the Al-Maarif Educational Center, Inc. were much attained, with no specific objective gaining a rating lower than much attained. Among different learning strands, Tawheed and Ageeda were found to be very much implemented while Human rights, Figh, Tawheed, Seerah and Qur'an were much implemented. The inadequacies of physical facilities, the attitude of the Baguio people towards the Muslims and the adequacy of funds to run the center were the primary constraints hampered the attainment of the objectives. In the implementation of the learning strands, the methodologies used by the teachers were the primary constraints. To address the salient findings of the study, recommendations relative to the provision of sports cum social facilities, invitation for resource speakers to talk on topics not sufficiently covered by the teachers during the lessons, and adaption by the teachers of various methodologies of teaching were forwarded.

ANG ALLUYON NG UNIVERSITY OF BAGUIO SCIENCE HIGH SCHOOL: ISANG PAGTATAYA

Thesis Abstract
by
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Master of Arts in Education

Ang alluyon ay Opisyal na Pahayagang Pangkampus sa Filipino ng University of Baguio Science High School. Sa Pananaliksik na ito nabatid ang lagay ng ALLUYON sa pamamagitan ng pagtukoy sa pagkakakilanlan nito, antas ng implementasyon sa mga pangunahing layunin ng pamahayagang pangkampus alinsunod sa R.A. 7079, antas ng kredibilidad, at antas ng kahusayan batay sa pamantayan ng pamahayagang pangkampus. Naging posible ang mga resulta sa tulog ng descriptive na paraan ng pananaliksik. Ginamit ang talatanungan bilang pangunahing paraan ng pangangalap ng datos na linahukan ng 21 guro at 477 estudyante ng University of Baguio Science High School, gayundin ang apat na eksperto sa larangan ng pamahayagang pangkampus. Ang ALLUYON batay sa pananaw ng mga eksperto, at ng mga guro at estudyante ay mahusay ay may napakataas na kredibilidad, gaya ng pinatutunayan ng mga gantimpalang natanggap nito mula sa pandibisyon, panrehiyon, at pambansang pampaaralang press conference. Gayunpaman, ang ALLUYON ay may kahinaang dapat pang paunlarin sa larangan ng pag-aanyo, pagsulat at pag-uulo ng balita. Ang resulta sa pag-aaral na ito ay gagamitin UPANG mapagbuti ang bawat edisyon ng ALLUYON na pakikinabangan ng buong pamilya ng University of Baguio.

FACTORS AFFECTING THE SCIENCE COMPETENCY OF THE UNIVERSITY OF BAGUIO HIGH SCHOOL STUDENTS

Thesis Abstract
by
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Master of Arts in Education

Science education across the globe underscores the crucial role of Science and Technology in nation's development and progress. This is why improved and high quality of basic science education has been a long term goal of the Department of education. Facts and figures from different national and international examinations, however, show that many Filipino learners are not attaining the minimum competencies which they are supposed to possess. The sole purpose of this study was to determine the factors affecting the Science competency of the University of Baguio High School students. The study was conducted at the University of Baguio High School (UBHS) among a total enumeration of 168 second year high school students and four Science teachers during SY 2012-2011. Documentary analysis and survey questionnaires were used to analyze and treat the problems using descriptive statistics which includes tabulation, mean, weighted mean, and descriptive interpretation of the mean. To test the null hypotheses, t-test was used and for the level of correlation between Science competency and teacher-related and student-related factors, the Pearson Product Moment Correlation was used. It was found out that the level of Science competency of the students is average. The extent of influence of teacher-related factors on the students' Science competency as perceived by the students and Teachers are much and very much respectively; and that there is a significant difference on the extent of influence of the factors affecting Science competency as perceived by the respondents. The research found no correlation between current Science competency of the students and their perception of the impact of the teacher-related and student related factors on the students' performance in Science indicating that both low and high performers are in Science that indeed these factors are much influential. Therefore, in order to enhance the level of Science competency of the students, both student-related and teacher-related factors should be reinforced.

RESPONSE AND REHABILITATION SERVICES OF BAGUIO'S SOCIAL WELFARE AND DEVELOPMENT OFFICE

Thesis Abstract
by
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It was the major purpose of this study to determine the perceptions of both the employees of the City Social Welfare and Development Office (CSWDO) and the Disaster Relief/Rehabilitation Assistance (DRRA) recipients from four selected barangays on the delivery of disaster response and rehabilitation by the CSWDO of Baguio. This descriptive-survey type of study made use of questionnaire-checklist as its main data gathering tool. In addition, a documentary analysis and informal interviews were utilized during the data gathering process. Results of the analysis on the level of attainment of the objectives on disaster relief and disaster rehabilitation demonstrated an overall mean indicating a moderate to high rating. Significant differences were also found between the groups therefore the test ended up rejecting both the hypotheses. In terms of the moderator variables of the DRRA recipients, the null hypothesis which indicates no significance on the perceptions was accepted apart from location. The same result applies to the attainment of rehabilitation objectives. The level of effectiveness of the strategies used in providing both disaster relief and disaster rehabilitation also fell under a moderate to high category.

However, these two differ in the context of having or having no significant differences. For disaster relief strategies the test found significant differences thus rejecting the null hypothesis. This is in contrast with the results exhibited for rehab objectives which denote the opposite scenario thus accepting the null hypothesis in terms of all the moderator variables. The degree of seriousness of the problems encountered during relief/rehabilitation operations were evaluated similarly by both groups, indicating an acceptance of the null hypothesis. The problems were found to be not in very serious circumstances. When the results were analyzed in terms of the moderator variables, location at some point is a concern while the rest were deemed to have no effect to the recipients.

READING PERFORMANCE IN FILIPINO OF GRADE FOUR PUPILS IN SELECTED PRIVATE SCHOOLS IN BAGUIO CITY

Thesis Abstract
by
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The major purpose of this study was to determine the reading performance in Filipino of the grade four pupils in selected private schools in Baguio City. The reading performance of the intermediate grade pupils was treated as the dependent variable. The reading performance of the pupils was measured through the independent variables which include: the level of performance in oral reading along reading level and comprehension level, level of performance in silent reading along reading level, speed level and comprehension level, the level of correlation between the performance in oral reading and silent reading performance. The factors that affect the pupils' reading performance were investigated through the moderator variables which include the school and language spoken at home. A total of four selected private schools in Baguio City participated in the conduct of the study: Baguio City Science Foundation, Mary Immaculate School, Easter College and University of Baguio Laboratory Elementary School. The population of the study was composed of 113 grade four pupils. Random sampling was used in selecting the pupils to get the sixty percent of the total number of pupils in each school. The following results were derived from the study: the pupils have attained an instructional oral reading level in Filipino; the pupils' level of performance with respect to speed and comprehension in silent reading is average or moderately efficient; oral reading and silent reading are complementary; that is, they supplement each other and the most common oral reading difficulties or reading miscues of the pupils include: repetition, mispronunciation, and substitution. An action plan was formulated to address the needs of the pupils and to help plan future instruction in Filipino. With all these, the researcher, together with the school administrators and teachers in Filipino, could lay down the foundation for a comprehensive reading program in Filipino.

FOSTERING ENGLISH LEARNING THROUGH STRATEGIES IN TANGSHAN CITY, CHINA

Thesis Abstract
By
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As the most populous country in the world, China is also becoming one of the largest populations of English learners. Traditionally, English teaching/ learning in China is dominated by a grammar-translation method that is teacher and book centered, and which emphasizes rote memory. As a consequence, Chinese students experience many difficulties in developing communicative competence (especially listening and speaking skills) in their English as a Second Language (ESL) courses in China. Tangshan No. 1 High School was selected by the researcher as the setting for this study as a representative of Chinese high schools. The English teachers' teaching strategies in teaching listening and speaking were not meeting the students' learning needs. The high school students desired more interesting teaching strategies and opportunities besides their class. The anticipation of taking the National College Entrance Exam (NCEE) was the main reason. This study can help the Tangshan Education Bureau re-examine the English listening and speaking strategies used by English teachers, and improve the English learning outcome through combined efforts of the schools, teachers, and students in the future. This is a qualitative study that employed descriptive survey and in-depth interview as research tools to determine the teaching strategies that are used by English teachers in the area of listening and speaking and the most helpful strategies that are considered by students. A new model of learning English was developed based on the findings.