ISSN: 2661-4545

SPUP INTERNATIONAL INTERDISCIPLINARY RESEARCH CONFERENCE JOURNAL

Vol. I, No. 1 2014

21st Century Education: Milestones and Directions

February 5 - 7, 2014

ST. PAUL UNIVERSITY PHILIPPINES
CARITAS VERITAS SCIENTIA
SPUS
1907
TUGUEGARAO CITY

ISSN: 2661-4545

Cover Design by Dr. Jesus B. Pizarro

St. Paul University Philippines

INTERNATIONAL INTERDISCIPLINARY RESEARCH CONFERENCE JOURNAL

Vol. I, No.1 2014

Published by
Research and Publications Office
St. Paul University Philippines
Tuguegarao City, Cagayan Valley 3500

Re-published by
Ascendens Asia Publishing Pte. Ltd.
NLB Publisher Reg. No. R2019061600009
Republic of Singapore

EDITORIAL BOARD

STRUCTURAL – FUNCTIONALIST ANALYSIS OF ORGANIZATIONAL CULTURE: INPUTS TO CULTURE BUILDING MODEL IN A MANUFACTURING ORGANIZATION

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ABSTRACT

This study focused on the identification of correlates of corporate culture, concept of a learning organization, leadership skill, and corporate culture of TMZ Semiconductor, Ltd. The study used the descriptive-explanatory research design and triangulation technique (quantitative and qualitative data) for data analysis. The company is employing a hierarchical culture, which emphasizes standardization, control and a well-defined structure of authority and decision-making. Adaptability as the type of leadership skill in the organization recognizes their attention on the continuing need to tweak the operations in view of the highly-competitive global market for their products. Three factors were identified as the three correlates of corporate culture: (1) people orientation; (2) detail orientation; and (3) outcome orientation. The hierarchy-oriented type of corporate culture of this manufacturing industry enabled the company to secure a competitive advantage in coping with the changing circumstances of the international market for their products and services. Moreover, the introduction of leadership skill as test factor to elaborate the bivariate relationship between the correlates of corporate culture and corporate culture is done statistically using the zero-order correlation. Thus, leadership skill is an intervening variable. A culture- building model for a manufacturing organization is hereby proposed as a template for an effective and sustainable business operation. The model focuses on the paradoxes that every manufacturing company is constantly seeking to balance.

Keywords: *Structural-functionalist analysis, organizational culture, culture building model, manufacturing organization, leadership skills*

INTRODUCTION

There is a recognized importance in determining a corporation's working culture and how to change it because this can be used for the competitive advantage of the organization[3]. This means that the corporation's organizational culture can and should be used to increase a business' efficiency and productivity because a corporation's working culture can either foster an atmosphere that drives success or kills the corporation.

Leadership style cannot be separated from the general culture in which it occurs. Most managers believe that they must adapt their style of leadership to the culture of the organization. They strongly believe that leadership is culturally contingent[7]. How can a leader behave and manage culture and communication within the workplace in a way that implies the application of the leader's preferred culture? Some leaders try to police their subordinates, some do not even supervise.

It was observed that organizational culture and leadership style are intertwined. He illustrated this interconnection by looking at the relationship between leadership and culture in the context of the organizational life cycle[5].

Any organizational change of significance requires management and its leaders to perform what they are paid for, that is, to lead or, even more, to lead well. The employees of a corporation are normally looking towards their leaders for many reasons, such as, during difficult times when there are changes in the workplace and when there are sensitive issues that need careful assessment and decision-making processes.

The study of how to optimize the performance of any corporation's human capital is not only essential but long overdue. Needless to say, the formation of a preferred and working organizational culture is the key to such optimization.

METHODOLOGY

The study adopted a descriptive-explanatory research to address the major research questions and to evaluate the validity of the model used.

Quantitative data from the research questionnaire were triangulated with qualitative data from key informant interviews (KIIs) and available secondary data from the internet and library sources.

A simple random sample (SRS) of the population was drawn with the use of the Slovin's formula and a computer-generated table of random numbers (http://www.randomizer.org/form.htm 4 April 2012). With a 0.05 standard error, this yielded a sample size of 74 respondents for the administration of the research questionnaire to gather the quantitative data for the study.

The typical respondent is a married female, 30 to 39 years old and a college graduate. She is a Catholic who occupies a supervisory position in the company, has been employed in the company for more than 12 years and currently receives a monthly salary of 26,000 to 33,000 pesos.

Quantitative data from the research questionnaire were encoded using Microsoft Excel 2011. In addition, the SPSS program was used to prepare tables and diagrams based on the data from the research questionnaire.

The collected data on the correlates of corporate culture were stratified into three (3) categories namely: people orientation, detail orientation and outcome orientation. Data for leadership skill were stratified into four types namely: adaptability, involvement, mission, and consistency. Likewise, the data for the third variable: corporate culture, were stratified also into four types namely: adhocracy, hierarchy, market, and clan.

The study collected index scores through the use of the semantic differential scale in the research questionnaire, parametric and non-parametric statistical tests and techniques, means as a measure of central tendency and standard deviation as a measure of dispersion, were used in summarizing quantitative data. In addition, Spearman's rho was used as the correlation coefficient to measure relationships between the variables and the Student's t as the test of significance. Factor analysis was used to determine, by factor loading, the cluster of items (factors) that constitute the correlates of corporate culture. Partial correlation was used to test whether the leadership skill is an intervening variable or not.

Qualitative data from the KII's were coded, analysed and interpreted with the use of the qualitative techniques of content analysis, Lazarsfeld's latent structure analysis and the post- modern techniques for interpreting written and oral narratives like hermeneutics and deconstruction.

RESULTS AND DISCUSSION

Organizational culture and leadership are important elements in a company whose employees work in conjunction with one another toward organizational success. Both corporate culture and leadership influence the function and achievement of the company.

For a manufacturing company, such as the TMZ Semiconductors Ltd., company leaders need to be the role-models worthy emulating for other employees. They focused on the concern for people and concern for production that leads to the satisfaction of the stakeholders.

The operational excellence, quality production, and the institutionalization of a culture of dynamic synergy and improvement were achieved by TMZ Semiconductors Ltd. through the relationship different components and processes.

The correlates of corporate culture

The TMZ Semiconductor Ltd. management tends to put people first (people orientation) when making decisions and leaders believe that people are the driving force in the organization's productivity and overall performance.

Detail orientation is characterized as emphasizing performance precision and paying attention to details. Thus, employees are continuously monitoring signs that rules are changing, that there are new cases and decisions that are coming out[1].

Outcome orientation correlate of corporate culture emphasizes achievement, positive actions and results as important values[2].

Senge's concept of a learning organization

The following are the five key disciplines in a learning organization: (1) achieving personal mastery,

(2) building shared vision, (3) mental models, (4) team learning and (5) systems thinking. He said that the convergence of these five disciplines can facilitate a new wave of experimentation that could eventually lead to the establishment of a learning organization wherein people continually expand their capacity to create the results they truly desire[6].

The leadership skill

A climate of complexity and overlapping change experienced in every organization requires leadership that does not set itself in isolation from the rest of the organization.

The management of TMZ Semiconductors Ltd. considered the crucial role of leadership in the three major aspects of the business process: (1) leaders create change, (2) they emphasize customer focus and (3) they promote organizational learning.

People within the company agreed on the adaptability leadership skill in their organization as needed and effective. It is a reflection of the company's engagement in international or global business competition.

The organization's corporate culture

As a hierarchy-oriented company, TMZ Semiconductor Ltd. managers and supervisors rigorously maintain standardization, control, careful planning, clear procedures, and efficiency.

The hierarchy type is somehow in agreement with the fact that sensitivity to customers' need is important for a company that is operating globally; therefore, every aspect of the job must be given utmost priority and attention.

The existing culture of the company right now can be considered as a powerful source of energy and influence that could drive or help the company to sustain and maintain their competitive edge in their share of the international market.

The relationship between the identified correlates of corporate culture and leadership skill

The overall correlation between the two variables was computed and interpreted as moderate correlation based on the standardized matrix for interpreting Spearman's rho.

This implies that a strategic and integrated approach to delivering business for this type of organization not only depends upon the orientation of the company's correlates of corporate culture but also on the performance of the people leading the company.

Leaders in TMZ Semiconductor company are the ones who provide the solutions to the problems faced by the organization as well as the ones who perform the crucial task of unifying the organization into one cohesive whole, then the leaders should go about their job by empowering people, building the team spirit of the organization, and developing human capability at all levels.

The relationship between leadership skill and corporate culture

One of the primary responsibilities of leaders is to create and maintain the organizational characteristics that reward and encourage collective effort. Perhaps the most fundamental element of this is the organizational culture[2].

The findings indicate that the employees of TMZ Semiconductor Ltd. understood their leader's direct involvement in the formation of their organization's corporate culture. Leading the employees in the right direction ensures positive outlook toward their assigned jobs.

The relationship between the correlates of corporate culture and corporate culture

Results revealed that there is a moderate zero-order correlation (0.449) between the two variables, also revealed that the good fit of an organization's culture with the employees' work ethos could be concomitant with the way the employees are given enough opportunity to accept and understand it.

As a result of the leaders' effective and decisive management of the company, the organization moves as one to accomplish its goals and the employees begin to appreciate and recognize the importance of an effective but people-oriented leadership in addressing their shared vision of an ideal workplace.

Serendipity: Leadership skill as an intervening variable

The introduction of leadership skill as a test factor is done statistically through the technique of partial correlation. The technique elaborates the relationship between the antecedent and the consequent variables by controlling on the test factor. This is done by a partial correlation between the two variables (controlling on the test factor) and comparing the result with the zero-order correlations between the same variables.

The foregoing analyses provide impressive evidence regarding the role of leadership skill in relation to the correlates of corporate culture and organizational culture in providing critical contribution to the success of a business enterprise. Results of the partial correlation analysis also provide further evidence regarding the functional relationship between the three variables [5, 6]. For TMZ Semiconductors Ltd., business success and their competitive advantage in the international market can be attributed to the leadership skills of their managers and supervisors. Thus, their leaders rigorously strive to manage the quality of their services better, particularly with their customers, clients, suppliers, and other corporate entities. Satisfied customers return more often, buy more, stick with them, and recommend them to others.

Proposed culture-building model for a manufacturing organization

The hierarchy-oriented culture of the company exerts pressures on the employees from the top for them to perform their jobs efficiently and to satisfy the needs of their clientele.

One of the best characteristics of this model is that it focuses on the paradoxes that every company is constantly seeking to balance. Companies that are market–focused might encounter problems with internal integration and those that are too well-integrated might be over-controlled and lack adequate flexibility to adjust to the external environment.

Lastly, the combination of the three variables in the proposed model can create an operational management which recognizes the importance of practicalities and the truth behind managing culture in a highly competitive business climate.

The proposed model, therefore, arguably recognizes the imperative to harmonize the three variables into a positive relationship and business process into a standardized, but somehow flexible, framework for creating operational excellence and quality production. Quality production should always be an executive priority, and the organization should continuously move towards a culture of dynamic synergy and improvement. Needless to say, operational excellence, quality production, and the institutionalization of a culture of dynamic synergy and improvement can only be achieved by TMZ Semiconductors Ltd. with an empowered workplace when employees are afforded the democratic space to be engaged in critical decision making and when they take responsibility and are held accountable for their actions.

IMPLICATIONS

Findings of the study showed that TMZ Semiconductors Ltd. is employing a hierarchical type of corporate culture, which emphasizes standardization, control, and a well-defined structure of authority and decision making.

That the adaptability type of leadership skill in the company is the dominant type. That is, the leaders recognize and focus their attention largely on the continuing need to tweak the organization's operations in view of the highly competitive global market for their products and services.

The result of the introduction of leadership skill as an intervening variable provides a "happy accident" of finding incontrovertible evidence regarding the functional relationship between the correlates of corporate culture, leadership skill, and corporate culture in providing the critical foundation for the success of a business enterprise. Results of the study showed that the functional relationship between the correlates of corporate culture, leadership skill, and corporate culture have significant impacts in the operation of a manufacturing company.

In search of a type of corporate culture that could function effectively and efficiently not only for a manufacturing company but for other types of business, the researcher recommended the following: (a) people within the organization should feel that their voices, opinions, and ideas are valued and taken into considerations when decisions are made; (b) a company, no matter how successful it may be, should always consider--first and foremost--the welfare of the entire workforce, especially the experienced, the knowledgeable, and the risk taker who are responsible with the way business processes are being done; (c) a study is needed to explore further the systemic and multi-faceted relationships of the variables, the study should be replicated using a larger sample from two or more companies which are engaged in the same industry; (d) a similar study be conducted that will address the effects of some external variables; (e) a study could also be conducted to rigorously examine why employees tend to quit than to remain committed to the organization by looking at the positive and negative zones of culture effectiveness[4]; and (f) to further explore the possibility of having different perceptions on corporate culture according to individual position in the company as manager, supervisor, and office personnel.

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BUILDING THE "SPIRITUALITY OF EXCELLENCE" OF SPU MANILA FACULTY: RESPONSE TO NEW EVANGELIZATION

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ABSTRACT

For two consecutive schools years (2009-2011), SPU Manila excellent faculty were rated with a common characteristic—"approachable." This action research concretizes their journey as it uncovers the word "approachable" as the key to build the spirituality of excellence by reference to Scripture. Sixteen faculty members, across Colleges, participated, i.e., those with summer loads of 2013. The seven "I am" sayings in John's gospel were chosen as these uniquely declare Jesus' divinity with rich symbolism. The chosen bible passages: "I am the bread of life" (6:35) and its indicative text "I will not reject anyone who comes to me . . ." (6:37) offered three insights subsumed in the titles: God's Word, Christian hope, and Nurturing Vocation. The concurring teacher-behaviors are: ("God's Word") they do not pre-judge students; they facilitate and guide; ("Christian hope") they encourage students to speak; they show conviction in students' decisions; and ("Nurturing Vocation") they stop anything when a student approaches; they answer questions to the best of their ability. The suggested deepening activities are: ("God's Word"), more group discussions be held on teachers' and students' growth issues; ("Christian hope"), the strict implementation of school rules should be considered, being "approachable" is not a license to unrestrained freedom; and ("Nurturing Vocation"), a prayerful relationship with God must be maintained. The recommendations are: that the Campus Ministry consider four biblical stories/images—Bethlehem, "true vine", the multiplication of the loaves and the wedding at Cana as topics in Faculty formation; that the titles be incorporated in a "Faculty Credo of Excellence"; that the Academic and Student Services units organize group discussions; and that the faculty develop the devotion to the daily Noon Mass.

Running Head: *Spirituality, Excellence*

INTRODUCTION

During his first Mass on the morning of March 14, 2013 for the intention of the Church-"Missa Pro Ecclesia", newly-elected Pope Francis reminded his brother Cardinal- electors: "Building the Church. We speak of stones: stones are solid; but living stones, stones anointed by the Holy Spirit. Building the Church, the Bride of Christ, on the cornerstone that is the Lord himself. This is another kind of movement in our lives: building."

This study was given impetus by this brief message from the Pope. As a follow-up to the research submitted by the proponent to the Vice President of Academic Services last March 9, 2012 entitled "The Journey to Excellence of SPU Manila Faculty SY 2009-2011: A Study on the Student Evaluation," the idea of "building" as a life-movement befits the journey to excellence. Culling from the Message of Sr. Zeta Caridad Rivero, SPC during the 2012 SPCEM Educators' Congress, she clearly re-iterated: ". . .excellence as being the best of what one is capable of being. . . . Excellence results when we maximize the God-given gifts of nature, nurture, and opportunity we have received. . . . our standard of excellence is the image of God that he has placed within our being and in the heart of all created realities – including our schools. . . . This is where excellence meets spirituality; this is where spirituality informs and guides excellence."

Interestingly, this study was doubly needed as we in SPU Manila celebrate the extraordinary Year of Faith in the thrust of the New Evangelization, i.e., toward a renewed vigor in our mission of education. In truth, by building this spirituality of excellence, we, the faculty are but building ourselves as a Church, a living Church on the cornerstone of Jesus, the Christ.

Recalling the context of the 2012 research, is "approachable" a unique Paulinian character of excellent faculty evident in all SPC schools? Uncovering the word was the key to build the spirituality of excellence among the faculty. One clear path to take was to refer to Scripture, specifically the gospels, and be enlightened by the Lord's own words and deeds—a guide for Christ-centered spirituality. Instead of threading simplistic pedagogical and psychological strategies and techniques in being "approachable," one encompasses a more spiritual and personal viewpoint which characterizes the true vocation of a Paulinian teacher—a Catholic, Christian, and Filipino teacher.

Statement of Objectives

The main objective of the study was to uncover in concrete terms the behavioral indicators of the word "approachable" as widely used to describe Excellent faculty among students using gospel passages.

Specifically, the following questions were answered:

Among the seven "I am" gospel passages found in John's gospel, what is the most appealing passage where Jesus is found to be "approachable"? What are the significant elements which elicit indicators of being "approachable" as provided in the text? Based on one's teaching experience in SPU Manila, how are these indicators translated into concrete behaviors in and out of the classroom? What are the hindrances that impede these behaviors? How can one imbibe Jesus' "approachable" example with its concrete behaviors and overcome hindrances?

METHODOLOGY

Research Design

This study is a simple qualitative-descriptive research which employed survey method through a questionnaire.

Participants and Sampling Technique

Out of the fifty-four (54) faculty members assigned with a summer load, AY 202-2013, random sampling was applied in order to get respondents from all the Colleges. From a list given by the Registrar, all odd-numbered faculty were selected as respondents. Twenty-six (26) faculty were included.

Research Instrument

The proponent made use of an original survey questionnaire, choosing the specific passages where the sayings are to be found. These were presented chronologically as written in the gospel, namely: "I am the bread of life" (Jn. 6: 32-40), "I am the light of the world" (Jn. 8: 3- 12), "I am the gate for the sheep" (Jn. 10: 1-10), "I am the good shepherd" (Jn. 10: 11-18), "I am the resurrection and the life" (Jn. 11: 21-29, 32-35), "I am the way and the truth and the life" (Jn. 14: 5-14), and "I am the true vine" (Jn. 15: 1-10).

Validation of the Instrument

As a subject matter expert (SME), the proponent considered the background of the chosen participants who are neither theology majors nor possessing biblical scholarship. The instrument highlights the evocative approach of the scriptures as the reader appreciates the meaning of the passages as related to one's present understanding and consciousness. The proponent also included an "informal" consent agreement by allowing the participant to return the questionnaire personally, if he/she cannot adequately and easily respond to the questions. By so doing, the instrument was safeguarded in its content validity.

Date Gathering Procedure

Following the sampling technique mentioned earlier, the proponent photocopied the instrument and personally distributed a copy to the identified faculty in order to verbally encourage participation in the study. As to the length of time in answering the tool, twenty minutes was enough to adequately respond to the specific problems posed. There was a two- week grace period to answer the tool, i.e. from April 23 to May 7, 2013.

Data Analysis

As a qualitative study, the data was treated along common threads of ideas. Since there was only one choice among seven, this was generated in a cumulative manner of which the majority choice became the first choice. As to the specific problems, these were answered in a chronological manner following the same procedure.

RESULTS AND DISCUSSIONS

Participants in the Study by Academic College/Unit

There are sixteen (16) faculty members participated in the study; all Colleges were well represented with the CNAHS, CMPA and REL having a 100% retrieval rate. This gesture of support is to be appreciated. In total, a 64% retrieval rate (16/25) is way above the required 50% rate for this study as the target respondents were not the total number of employed faculty but representative-faculty only.

The results for the specific problems

Among the seven "I am" gospel passages found in John's gospel, what is the most appealing passage where Jesus is found to be "approachable"? What are the significant elements which elicit indicators of being "approachable" as provided in the text?

The most appealing "I am" passage where Jesus is found to be "approachable" is "I am the bread of life" (in Jn 6:32-40)—seven faculty chose this passage. Next is "I am the good shepherd" (in Jn. 10: 11-18)—five chose this. The other three passages chosen were: "I am the way and the truth and the life" (in Jn. 14: 5-14), "I am the light of the world" (in Jn. 8:3-12) and "I am the true vine" (in Jn. 15: 1-10)—the former was chosen by two faculty and the last two by one faculty each.

The significant elements which elicit indicators of being "approachable," as provided in the text, are as follows: "I will not reject anyone who comes to me . . ."—a unanimous text for all seven respondents.

"Whoever comes to me will never hunger, and whoever believes in me will never thirst"—three respondents also liked this passage.

"Everything that the Father gives me will come to me . . . I should not lose anything of what he gave me"

"Everyone who sees the Son and believes in him may have eternal life, and I shall raise him (on) the last day." Each of these last two verses above was significant to one respondent.

Based on one's teaching experience in SPU Manila, how are these indicators translated into concrete behaviors in and out of the classroom? What are the hindrances that impede these behaviors?

The concrete behaviors in and out of the classroom which translate the text- indicators above are as follows:

Have an open mind & a big 'heart' when dealing with students. Always project a pleasant disposition—smiling and greeting them whenever one meets them or upon entering the classroom to make students feel at ease.

Being concerned for students who are absent—finding out their reasons, giving them extra projects/ make-up exam for valid reasons

Do not pre-judge students according to looks, behavior and what people say; teachers must facilitate the learning process and guide them to be better individuals. However, for caution, too much familiarity can bring out disrespectfulness.

From encounters with "problem" students, their stay on school gives them an affirmation of their positive qualities—something that gives them pride and dignity even though they are not academically good and morally upright.

Help them to communicate their thoughts; listen to them and give sound advice and genuine support.

Encourage students to speak their minds out when they have class problems; be confident in doing what students believe is right when they have issues to resolve; show conviction in students' decisions contrary to the dictates of the majority.

Clarify issues raised by students pertaining to the lesson or otherwise, either through face-to-face or electronic means. Make one available for the students inside and outside the classroom.

One stops anything one is doing when a student approaches; one can always be interrupted at the middle of the lesson if there are questions; answer students' questions to the best of one's ability.

One approaches students to inquire of need if one sees them waiting in the office.

As to the hindrances that impede these behaviors, the common response was the limited time one has to offer students due to other things that teachers need to attend to. Quite observable is that this impediment was also cited among the other respondents who chose the other “I am” gospel passages.

How can one imbibe Jesus’ “approachable” example with its concrete behaviors and overcome hindrances?

Maintaining a prayerful relationship with God, as a constant reminder, can affect a balance in one’s life especially in dealing with students.

Having more group discussions, fora, conferences on issues related to teachers’ and students’ personal, academic and spiritual growth encourages open communication. This entails collaboration among the Academic, Student Services and Christian Formation-Campus Ministry units.

A pool of qualified class advisers can help students in problem solving in coordination with the Guidance Office and subject teachers; strengthening tutorials and peer counseling activities are to be considered. More “visibility” of the Sisters can impact on students and employees by interaction.

Organizing leadership training/group activities like simple sharing of lunch or snacks where student leaders can freely interact with the Administrators provides avenues of communication.

In particular, the Campus Ministry should initiate a culture of “friendship and trust” in a “warm and welcoming” community. A simple “hi” or “hello” greeting to students not in one’s class is a good habit to start.

The strict implementation of school rules should be considered carefully to have a family-oriented community.

DISCUSSIONS

The results for specific problem no.1 will be trimmed into two, namely, that the first choice among the gospel passages is “I am the bread of life” (Jn 6:35) and the textual indicator is “I will not reject anyone who comes to me . . .”(Jn. 6:37). A discussion on these passages will guide the treatment on the second and third specific problems.

On Specific Problem 1

Understanding “I am the bread of life” (Jn 6:35) as the fulcrum in building a Spirituality of Excellence among SPU Manila Faculty.

The proponent’s choice of using the “I am” sayings in John’s gospel is deliberate for an action research. First, John’s gospel is unique compared to the synoptic gospels—Mark, Matthew and Luke thus focusing attention to one orientation and avoiding references to other passages found in the other gospels. Second, the “I am” sayings—in seven different passages, declare Jesus’ own divinity by portraying a rich symbolism which connects with preceding “signs”—also in seven different passages, that show and prove that divinity. Thus, there can be more than one reflection/insight in deepening one passage. In this case, this study will pursue one of the many expressions of the spirituality of excellence based on the chosen “I am” saying.

One way to understand “I am the bread of life” (Jn.6:35) is to view it in a so-called “menorah” structure as explained in a biblical website: http://www.wellofbethlehem.witnesstoday.org. It shares: The “I am” statements of Jesus, and the corresponding details of his birth, form a menorah structure which shows Jesus to be the “I am” who became the Passover lamb. . . . Six of the “I am” statements form three pairs of matching statements, and six details of Jesus’ birth form three pairs of matching details (as shown below, numbered for reference).

“I am the bread of life.” John 6:35, 41, 48-51
“I am the light of the world.” John 8:12, 9:5
“I am the door of the sheep.” John 10:7, 9
“I am the good shepherd.” John 10:11, 14
“I am the resurrection, and the life.” John 11:25
“I am the way, the truth, and the life.” John 14:6
“I am the true vine.” John 15:1, 5

The first and seventh form a matched pair, the second and sixth form a matched pair, and the third and fifth form a matched pair. The fourth one stands alone in the center, and is by far the most significant one. The first matched pair of "I am" statements, "I am the bread of life," and "I am the true vine," are both linked to the place of Jesus' birth, Bethlehem Ephratah (Micah 5:2, Matthew 2:5, 6), since Bethlehem means "house of bread," and Ephratah means "fruitful."

The base of the menorah is "I am; don't be afraid," John 6:16-21 which Jesus said while walking on the Sea of Galilee, relating to all the statements above. As to the confirming "sign" or work (miracle), the "sign" for the "bread of life" is the feeding of the 5,000—five loaves of barley bread and two small fish are multiplied to supply 5,000 men plus women and children (John 6:1-13). While the "sign" for the "true vine" branch, is the turning of water into "wine"— six large waterpots of water are turned into "wine" for the guests at the wedding in Cana (John 2:1-11). Both the bread and the "wine" were consumed at the last supper, and represented the body and blood of Jesus (Matthew 26:20-29, Mark 14:17-25, Luke 22:14-20).

By this consideration, the common understanding of the passage "I am the bread of life" as referring directly to the Eucharist is enriched in three ways: first, by accommodating the reference to the birthplace of Jesus, i.e., Bethlehem as the "house of bread", second, by connecting it with another saying "I am the true vine" and vesting it with a sense of "fruitfulness" and third, by proposing two miracle stories of Jesus expressing the signs" of divinity in the natural images, i.e, the multiplication of bread to 5,000 people from 5 loaves of bread and two fishes and the turning of water into wine in the wedding feast in Cana.

By hindsight, one can easily see the richness of meaning of the Bethlehem "manger" where the animals eat and take shelter and in which Jesus was humbly born. Jesus, the bread of life, gives life—physical and animate, even to the simplest creature. Jesus as the bread of life sustains fruitfulness of life; life is generated and always new. Jesus, the bread of life, is the true spiritual food that provides satisfaction to human need and joy to the needy. Indeed, the following verse: "whoever comes to me will never hunger, and whoever believes in me will never thirst" (Jn. 6:36) is a fitting complement to the saying. It even expresses a reminder that before "partaking" Jesus in holy communion, one needs to "come and believe" him first, e.g. in the conscious appreciation of His Word, in spending time to talk and meet Him in prayer and in action, to name a few. These related biblical stories/images are to be deepened more clearly in the spirituality for excellence.

Understanding the textual indicator "I will not reject anyone who comes to me . . ." (Jn. 6:37) "in building a Spirituality of Excellence among SPU Manila Faculty.

The New Jerome Biblical Commentary provides three considerations in understanding this text. First, the group of texts from verses 36-40 is a continuation of the condemnation of Jesus' audience found in verse 30: "So they said to him, 'What sign can you do, that we may see and believe in you? What can you do?'" due to the latter's unbelief. Jesus had just performed a miracle— multiplication of the bread (stated above) and still the people—the Jews were skeptical of him as a man of God—the people still need "convincing" signs, more spectacular than Jesus himself. Second, these verses also prepare the reader for the future divisions that will definitely come even among Jesus' disciples. "As a result of this, many (of) his disciples returned to their former way of life and no longer accompanied him. Jesus then said to the Twelve, "Do you also want to leave?" (Jn 6: 66-67). Third, the text indicator itself is a clear proof against the Jews who will cast those who believe in Jesus out of the synagogue, particularly in the case of a man born blind (Jn. 9:13-38). Having been cured by Jesus on a sabbath, the man became a source of controversy among the Pharisees and the Jews in the temple. Twice called for questioning, since his parents were afraid to be identified as believers of Jesus, he faced his skeptic inquisitors and profoundly said: "This is what is so amazing, that you do not know where he is from, yet he opened my eyes" (Jn 9:30). For this, he was thrown out of their sight. But the story continues:

RECOMMENDATIONS

The following recommendations are proposed:

That the Christian Formation-Campus Ministry unit considers the four biblical stories/images: the Bethlehem story, the "true vine", the multiplication of the loaves and the wedding at Cana, as topics in Faculty formation sessions, e.g., recollections, retreats, BEC faith- sharings, as these pertain to the building of a spirituality of excellence.

Corollarily, that the titles: God's Word, Christian hope, and Nurturing Vocation be incorporated in a "Faculty Credo of Excellence" to be posted on the faculty room bulletin board or be printed in bookmarks for personal use of the faculty as constant reminders in the journey to excellence in SPU Manila. Adding colored images/

pictures of the Bethlehem story, the "true vine", the multiplication of the loaves and the wedding at Cana to the corresponding titles can enhance appreciation of the biblical significance of the titles. (Samples are placed in the Appendix).

That the Academic and Student Services units organize concrete projects as suggested, e.g., group discussions, fora, conferences on issues related to teachers' and students' personal and academic growth even once a semester for the faculty. To suggest for interesting topics, a related study of the proponent—the Student Satisfaction Survey (SSS) of 2013 can give light. To cite a few findings: three priority concerns of school service recurred from the 2012 survey, namely: "All students have equal opportunities to participate in intercollegiate athletics" (co- curricular), "Class change (drop/add) policies are reasonable" and "It is an enjoyable experience to be a student on this campus" (condition of service rendered). While on the Paulinian Core Values, one priority concern recurred: "A respectful attitude towards all persons is felt in this campus" which refers to the Paulinian Core Value of Community. These are areas for improvement in student satisfaction which directly relate with teacher-student interaction. As to the Student Services unit, discussion on the rationale on the strict implementation of school rules (as mentioned) is urgent.

That the faculty be guided in this "Eucharist-centered" spirituality of excellence by developing the devotion to the daily Noon Mass as its practical basis in school. Ultimately, being an "approachable" and excellent teacher is a constant following of Jesus and He allows Himself to be received entirely in this sacramental celebration in a prayerful relationship.

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CODE-SWITCHING: A CATALYST OF CHANGE IN TEACHING COLLEGE ALGEBRA

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ABSTRACT

As of today, many Filipinos experience not only an aversion but also a phobia from mathematics. Moreover, assessments done on the impact of reforms on the achieved curriculum showed little improvement (Nebres, 2006). Hence, it is assumed that the missing link might be the insufficient attention to the implemented curriculum and not in specialized pilot programs. In view of the fact that understanding the mathematical concepts entails understanding the language of instruction, the author believes that code-switching is an effective approach in improving the mathematics achievement of students. The author employed Pre-test-Post-test Control Group Design, using Matched Group Subject which involved first year BSBA students of Isabela State University – Cauayan Campus. Moreover, this study utilized paired-samples t-test to compare the pre-test and post-test scores of the two groups; independent samples t-test to compare the gain scores of the two groups; and ANCOVA to compare the mathematics achievement scores of the two groups, while controlling for their quantitative quotient. The students who were exposed using code-switching manifested higher post-test scores and gain scores than students who were taught using English as the medium. Thus, code-switching is an effective way to improve the performance of the Filipino students in College Algebra.

Keywords*: Mathematics, College Algebra, Code-Switching, Pre-test-Post-test Control Group Design, using Matched Group Subject, Philippines*

INTRODUCTION

One of the major concerns and challenges of Mathematics education in the Southeast Asia nowadays is the relatively weak achievement of students and the school systems in learning basic mathematics[9]. The concern is thus on success in teaching the basic content in mathematics.

Unfortunately, Philippines is one of the countries involved in the said dilemma. As of today, many Filipinos experience not only an aversion but also a phobia from mathematics. Most students consider mathematics as extremely difficult, tedious and mind-numbing[2]. As a consequence, Philippines showed no indication of improvement in its general performance. To support this premise, the results in the Trends in International Mathematics and Science Study (TIMSS) revealed that Philippines consistently ranked low[1]. These findings serve as challenge to Mathematics teachers on offering solutions to the above-mentioned impasse because if this is not properly acted upon, then the performance of the Filipino students is assumed to continue to degrade drastically.

Although the countries of Southeast Asia are geographically closer to the East-Asian countries, the mathematics education of the former has been more influenced by colonial history, notably by the United States and the United Kingdom[9]. The typical method of reform from the United States has been a new theory of mathematics education such as new math, back to the basics, problem-solving approach, realistic mathematics education, etc. But assessment done years later on the impact of this reform on the achieved curriculum shows little improvement. Hence, it is assumed that the missing link might be the insufficient attention to the implemented curriculum (what actually goes on in the classroom) and not in specialized pilot programs but in a broad range of actual classrooms.

Conversely, the teacher's knowledge of the subject matter and his ability to communicate it are the very important factors in the teaching and learning process[10]. This indicates that for understanding the mathematical ideas and concepts, one has to be able to understand the language of instruction, which means if this language is foreign to the learner then it becomes a double task of learning both the foreign language as well as the mathematics that is being taught – all at the same time[6]. She then suggested that this problem can be addressed only by allowing the movement between the languages used in the class, known as code-switching.

Code-switching takes place on account of a need felt by learners to make sense of the given instructions and also of the tortuous mathematics. Generally, there is a shift to local language as soon as there is some conceptual difficulty[8]. [9]In the classroom where English is popularly used as the medium of class instructions, first language provides an effective way of understanding the content deeply and quickly. Besides, [7]using two languages in teaching and learning Mathematics, classrooms bring additive effect on students' cognitive ability that provides students not only to be more adept in mathematics lesson, but also for both their languages proficiency.

It is for these reasons and arguments that the researcher conceived this study to find out the effect of code-switching as medium of instruction in teaching College Algebra and its effectiveness as an approach in improving the mathematics achievement of first year students.

METHODOLOGY

The Pre-test-Post-test Control Group Design, using Matched Group Subject was utilized in the study. In this specific type of design, two groups of subjects were used, with both groups being measured and observed twice. The first measurement obliges as the pre-test while the second as the post-test. Random assignment was utilized to form the groups. The measurement or observations were collected at the same time for both groups.

The subjects of this study were taken from two sections of first year Bachelor of Science in Business Administration students who were enrolled in College Algebra at Isabela State University – Cauayan Campus during the First Semester of the Curriculum Year 2012-2013. The toss-coin method was used to decide which of the two groups would form the Code-switching group and English group. The participants of the two groups were harmonized depending on the result of their Mathematics Quotient to guarantee the group equivalence. As a result of the matching procedure, there were thirty-one (31) students from the Code-switching and another thirty-one (31) students from the English group.

The following data gathering instruments were used and administered in this study.

Mathematics Achievement Test. This teacher-made test was developed by the researcher to quantify the achievement of the participants in the study. This was given to both groups as a post-test at the end of the treatment. The researcher formulated 20 multiple choice items. The specific contents covered were Rational Expressions (Simplification of Rational Expressions, Multiplication and Division of Rational Expressions, Lowest Common Denominator, Addition and Subtraction of Rational Expressions, and Complex Fractions) and Radicals (Laws of Radicals, Sum and Difference of Radicals, Multiplication of Radicals, and Division/Rationalizing the Denominator). To further scrutinize the content validity of the test, the mathematics instructors who had been teaching for more than 5 years in the university were consulted to check if there are poorly constructed items. The instructors were asked to read carefully the items in the test in relation to the prepared table of specifications which are based on the syllabus in College Algebra. For the reliability test of the mathematics achievement test, the Cronbach's Alpha value was 0.716 which indicates that the 40-item test turned out to be an internally consistent measure of the mathematics achievement. In other words, it is an indication of the content to which respondents' answers are consistent. Moreover, another section of the Bachelor of Science in Business Administration students of ISU-CC was considered as the try-out group.

Scholastic Abilities Test for Adults. This is a standardized test developed by Briant, Patton, and Dunn which is designed to be a general measure of scholastic accomplishment. This test was utilized to measure the Quantitative Quotient and Mathematics Quotient of the students. The Quantitative Quotient has four (4) composites, these are: Quantitative Reasoning, Math Calculation, Math Application, and Nonverbal Reasoning. This variable was utilized as the control variable in the study. On the other hand, Mathematics Quotient is derived by combining the scores of the two composites Math Calculation and Math Application. This variable is included as a datum to fortify the comparability of the students grouping. This has seven levels, there are: very superior for students with above 130 mathematics quotient, superior for students with 121 – 130 mathematics quotient, above average for students with 111 – 120 mathematics quotient, average for students whose mathematics quotient is 90 – 110, below average for students with 80 – 89 mathematics quotient, poor for students with 70 – 79 mathematics quotient, and very poor for students with below 70 mathematics quotient.

Voice Recorder. Data were transcribed using recorder during the actual teaching. The transcribed data were included in the appendix of this study. This was done to serve as evidence that code-switching really took place during the teaching-learning process.

On the process of collecting data, the researcher followed three phases namely: Pre- experimental phase, Experimental Phase and Post-experimental phase respectively.

Pre-experimental Phase

Before the conduct of the study, the researcher prepared a letter addressed to the Campus Guidance Officer to administer the Scholastic Abilities Test for Adults (SATA). Afterwards, a mechanical matching was done for the groupings using their Mathematics Quotient scores as the matching variable. Lastly, the Mathematics Achievement Test was administered for pilot testing.

Independent Samples t-Test for Equality of Quantitative Quotient between the English and Code-Switching Group

There is no significant difference between the quantitative quotient mean scores of the English (mean = 93.45) and Code-switching (mean = 92.74) groups as tested in the 0.05 level of significance. The magnitude of the differences in the means was very small (eta squared = 0.002) which means that only 0.22% of the variance in quantitative quotient can be explained by the two groups. This implies that the English group and the Code-switching group are statistically the same. Moreover, this furthers that the mechanical matching done by the researcher was successful.

Meanwhile, independent-sample means was carried out to find out if the English and Code-switching groups were comparable in terms of mathematics quotient.

Independent Samples t-Test for Equality in College Algebra between the English and Code-switching Groups before the treatment

There is no significant difference in the pre-test mean scores of students with average mathematics quotient of the English group (mean = 3.8) and Code-switching group (mean = 5.2); t (8) = -0.80, p = 0.45 (two-tailed). The moderate effect (eta squared = 0.074) indicates that 7.41% on the variance in College Algebra mean scores before the treatment is explained by the two groups. Moreover, the same is true with the pre-test mean scores of the students with poor mathematics quotient of English group (mean = 2.57) and Code-switching group (mean = 3.71); t (12) = -1.69, p = 0.12 (two-tailed). The magnitude of the differences in means was large (eta squared = 0.19) which implies that 19.23% of the variance in College Algebra mean scores is explained by the two groups. On the other hand, the students with below average mathematics quotient manifested significant difference between the pre-test mean scores of English (mean = 2.89) and Code-switching (mean = 4.16) groups; t (36) = -2.83, p = 0.01 (two-tailed). The eta square statistics (0.18) indicated a large effect size.

Generally, it is evident that the achievement of the English group and Code- switching group when categorized according to their mathematics quotient level was comparatively equal. In relation, the researcher affirms that any difference that exists between the two groups after the treatment was brought by the media of instruction.

Experimental Phase

In this phase, five sessions (sixty minutes per sessions) were executed to the English and Code-switching groups. The said sessions lasted for five days and were set both to English and Code-switching groups. Identical lessons, illustrative examples, exercises and assignments were taught and were given to both groups. However, a specific strategy was applied to each of the group, that is, the medium of instruction to be used by the researcher varied.

Post – Experimental Phase

Post-test on Mathematics Achievement was given at the end of the treatments. The result of the post-test was analyzed and examined to evaluate and assess comparative effects of using English language and Code – switching as media of instruction.

The different statistical tools that were used to treat the data which were tallied, tabulated and analyzed are: t-test of independent sample means which was used to test if the two groups of students have the same performance in mathematics before the conduct of the experimental treatment; paired – samples t-test at 0.05 level of significance was employed to determine if there is a significant difference on the pre-test and post-test mathematics achievement mean scores of the English group and Code-switcing group; and Analysis of Covariance (ANCOVA) was utilized to test if the two groups of respondents have the same mathematics achievement, considering the effect of the quantitative quotient as the covariate. Finally, the gathered data was processed using a statistical package.

RESULTS AND DISCUSSION

Paired-Samples t-Test for Equality in Mathematics Achievement of the English Group

There is a statistically significant increase in the mathematics achievement mean scores of the students with an average mathematics quotient from pre-test (mean = 3.8) to post-test (mean= 16.4); t (4) = - 4.47, p = 0.01 (two-tailed). Same scenario is shown in students with below average mathematics quotient level from pre-test (mean = 2.89) to post-test (mean = 14.42), t (18) = -8.82, p < 0.005 (two-tailed). Lastly, it also revealed a statistically significant increase in the mathematics achievement scores of the students with poor mathematics quotient from pre-test (mean = 2.57) to post-test (mean – 14.71); t (6) = -13.33, p < 0.005 (two – tailed).

In over-all class performance, combination of students with various levels of mathematics quotient exposed under the control methodology had a significant increase in the performance in pre-test (mean = 2.97) and post-test (mean = 14.81); t (30) = -12.89, p < 0.005 (two-tailed). Hence, the use of English as a medium of instruction in teaching College Algebra significantly increased the mean scores of the students at different Mathematics Quotient levels.

Paired-Samples t-Test for Equality in Mathematics Achievement of the Code- switching Group

There is a statistically significant increase in the achievement test scores of the average students from pre-test (mean = 5.2) to post-test (mean = 22.2); t (4) = -5.43, p = 0.01 (two-tailed). Parallel to this is the statistically significant increase in the achievement test of the below average students from pre-test (mean = 4.16) to post-test (mean = 17.11); t (18) = -8.99, p < 0.005 (two- tailed). Finally, students with poor mathematics quotients showed the same significant increase in mathematics achievement from pre-test (mean 3.71) to post-test (mean = 20.29); t (6) = -11.6, p < 0.005 (two-tailed). As a whole, students that were taught using code-switching as the medium of instruction exhibited a remarkable increase of scores before the treatment (4.23) and after the treatment (18.65); t (30) = -13.27, p < 0.005 (two-tailed). Hence, the data divulge that the participants of the Code-switching group perform significantly higher on the post-test regardless of their mathematics quotient level as an effect of code-switching as medium of instruction in teaching. [4] Bilingualism has no effect on mathematical problem solving.

Analysis of Covariance between the Mathematics Achievement Scores of the English Group and Code-switching Group, while controlling for their Quantitative Quotient

There is no statistically significant increase in the mathematics achievement of students with an average mathematics quotient (covariate = 99.90, F = 2.61, p = 0.15) and with a below average mathematics quotient having quantitative quotient as the covariate (covariate = 93.55, F = 1.88, p = 0.18). Therefore, the performances of average and below average students can increase whether or not they are exposed to code-switching. On the other hand, the mathematics achievement of the students with poor mathematics quotient having the quantitative quotient as covariate suggests that a difference existed between the mean scores of English (mean = 14.71) and Code-switching (mean = 20.29) groups, in favor of the students who were exposed in code-switching (covariate = 87, F = 8.83, p = 0.01). This implies that students with poor quantitative quotient can learn more in an environment where code- switching is permissible.

In general, differences in the mathematics achievement scores were largely due to the type of treatment (covariate = 93.10, F = 7.15, p = 0.01). This exemplify that participants who were taught using code-switching (mean = 18.65) as the medium of instruction demonstrate significantly higher College Algebra achievement than those who were taught using English (mean = 14.81). This is a manifestation that the increase in the achievement of students can be attributed to the use of code-switching as the medium of instruction and not because they are naturally good in mathematics.

[8]Code-switching fosters a positive learning ambiance, makes challenging subject matter comprehensible to students and may remedy the poor language competence of speakers. This serves as an advent in uplifting the mathematics achievement level of students.

CONCLUSION

The use of either English or code-switching as media of instruction in teaching College Algebra significantly increased the mean scores of the students at different Mathematics Quotient levels. Thus, students can learn whether they are exposed to code-switching or not.

Moreover, the students with poor Mathematics Quotient level in the Code-switching group significantly achieved more than their counterparts in the English group. Thus, code- switching is remarkably better than that of English in teaching concepts to students with poor Mathematics Quotient level. However, students with average and below average Mathematics Quotient levels can have significant improvement in learning Contemporary Mathematics whether they are instructed using English or code-switching as medium.

As a whole, students who are exposed using code-switching significantly performed better than students who were taught using English as the medium. Thus, code-switching is an effective way to improve the performance of the students in Contemporary Mathematics.

RECOMMENDATIONS

On the basis of the conclusions, it is recommended that teachers should use code- switching when they are teaching College Algebra to students with poor Mathematics Quotient. Moreover, trainings should be conducted that is focused on Mathematics educators to help them understand how code-switching can be implemented in mathematics teaching. Furthermore, educational planners, curriculum developers, textbook authors and teachers need to be aware of the uses of language skills in mathematics teaching so that they consciously incorporate them into the curriculum policy, syllabuses, textbooks and lessons. Lastly, other researchers should conduct the same investigation to look the possibility on how code-switching could enhance the achievement of learners which leads to the development of higher order thinking skills.

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DESIGNING QUESTIONNAIRE FOR THE INFORMATION REQUIRED BY A STUDY

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ABSTRACT

In this paper, the writer shares his experience and knowledge gained from the experience of preparing for data collection for a master's thesis in Sociology at Xavier University. Discussion includes the following: how the student arrived at the decision to construct his own questionnaire as the main instrument of data gathering;; how the questionnaire was planned, designed, and organized; the order with which these questions appeared in the questionnaire; how each question was worded, formulated and/or discriminated, etc. This paper also highlights the challenges of research instrument design even under the mentorship of a highly esteemed scholar like the world renowned late Francis C. Madigan, S. J. Despite the challenges in the task of design and construction, the process is a necessary and worthwhile experience.

***Keywords**: designing questionnaire, information*

INTRODUCTION

Directing energies to gather information for a research question can be difficult especially for a beginning researcher when he decides to develop his / her own instrument or tool. It is for this reason that this paper is designing a data collection tool or instrument, a literature review is very helpful[1].

This paper shares the experience of the writer in designing one of the commonly used methods in data collection in social research, namely, the questionnaire[8]. The questionnaire was preferred over interview and observation methods of collecting the information he needed to discover whether religion contributes to the shaping of human experience in one particular but very important aspect of society, namely, concern and involvement in the distributive and social justice cases. If religion does so contribute, the researcher's further concern was to see whether diverse belief systems produce differences in the behavior of specific individuals in relation to other men and in relation to self – help or action projects[2].

A further problem suggested by the preceding discussion is whether a person who believes in a God who is one, personal, all powerful, all good, omnipotent, and who is actively interested in the moral quality of man's daily life, will feel greater responsibility, obligation, and duty to benefit the common good. This common good can either be manifested in the role he plays in development projects to liberate neighbors and fellowmen caught in oppressive structures and the help he extends to persons caught in serious need.

A second related problem is whether persons who believe in such a God, through development activities or projects actually participate in work for the common good of neighbors and fellowmen and attempt to help them in time of need, to a measurably greater extent than persons with different beliefs about God, including persons who do not believe in God's existence at all.

The above discussion provided the student researcher a way to figure out the information that he needed to answer research questions which he found to be in line with the thought of who suggested that questionnaire design should begin by specifying the information required for the questions asked by the researcher[3].

METHODOLOGY

No single method is applicable in all studies[6]. Of the three commonly used methods, the questionnaire approach was preferred over the interview and observation methods.

The choice of questionnaire method over other methods was based on the following reasons. First the researcher, at time of thesis writing, was a graduate student, university lecturer – instructor, and research assistant for the late Dr. Francis C. Madigan, S. J. Second, the respondents were college students of Xavier University and can therefore read and follow instructions. Third, the questionnaire was found a very convenient tool to use for data collection within very limited time Fourth, the questionnaire method was found cheaper to use than the other methods. The questionnaire as data gathering tool proved the most practical and effective choice.

The problem of non-response which is one of the difficulties posed by the questionnaire was anticipated by devising a follow-up technique which, in this case, was to personally see and remind the respondents about returning filled out questionnaires at least twice to a designated place in the university.

As in all researches, the study required a schedule design. The researcher constructed his own which was deemed necessary due to the non-availability of other sources of data such as original documents or records.

Designing And Constructing The Questionnaire For The Study

Before the final instrument or questionnaire was pre-tested and used, unstructured interviews were done with neighbors, students, businessmen and individuals with varied religious beliefs or membership. Results of these interviews then formed the basis for judging what relevant issues must be included in the questionnaire. This process was called for considering that the research was first of its kind and therefore exploratory in design that was interested in generating knowledge and / hypotheses as output or product of the study [7]. Thus using the same categories of people, preliminary interviews revealed that the inclusion of cases such as foreign students and people with varied social backgrounds did not yield different responses to questions regarding important questions. In other words, analysis of responses to preliminary questions showed that foreign or non-foreign, people of low status or people of high status or people with varied cultural backgrounds shared similar experiences and attitudes.

From the research's inception, the researcher considered what questions should be included in his research instrument. Upon the suggestion of his mentor he made sure that his questions are relevant to the research problem and that all unnecessary questions, those that do not satisfy the research objectives should be eliminated through a continuous process of assessment[4]. The researcher ensured that the sequence of topics or problems included in the study was logically arranged. As in most research instruments, the questionnaire tailored for the main concern of the study was decided by the student to begin with an introduction (Peterson, 1999), a set of instructions to explain the purpose of the research and to clarify how the respondent should fill out the questionnaire. Personal information about the respondents was included for profiling purposes.

The next question was about the belief systems of the respondents. It contained questions on beliefs in God or gods, the concept of God or gods, belief in life after death, and belief in spirits (folk type). From this, the student was able to classify or categorize his respondents as monotheists, polytheists, agnostics or skeptics, atheists, syncretic and so forth.

The second set of questions centered on the reaction of respondents towards their fellowmen. Measurement was made on their attitudes towards friends, relatives, enemies; towards beggars, squatters, and indigent persons; towards persons other than friends and relatives but not enemies; finally towards social action projects and the nature of participation in the projects.

The third question asked for the participant's interest in knowing the extent of poverty in Cagayan de Oro City which, at time of the study, referred to 1974.

The fourth question asked the nature of the respondent's past experience/s in providing relief or assistance work to needy families and individuals. The questions were particularly designed to discover whether the past experience/s of the respondents in helping the poor was through organizations, private work, or only through chance contacts.

The fifth question inquired about the respondent's awareness of facts regarding provision of relief or assistance work to the poor by agencies like the city, the churches, and other organizations. Questions were so designed to measure the knowledge of the respondents regarding provision of relief or assistance by said agencies.

The sixth question centered around the respondent's reaction to a proposed Citizens' Committee for the improvement of the lot of the poor families which would be set up permanently in Cagayan de Oro City. An explanation or example was asked to make the respondent's answer/s clearer.

The final question was intended to determine the commitment and the nature of this commitment to take part in the provision of relief or assistance to the poor families and persons in Cagayan de Oro City in case a Citizens' Committee will be formed or created. This was ultimately concluded with a request for those who expressed commitment to join the proposed committee to write their name and complete address and submit this to the student so they can be contacted in case the said Citizens' Committee will be organized.

Measuring belief systems relative to God/s, spirits, Life on Earth and in heaven

One major concern of the student – researcher was the method of collecting the data or information required by the study. After ruling out the use of observation and interview methods, the student concentrated all his efforts on the questionnaire and how it will best measure the belief systems, awareness, concern, and involvement of his respondents.

The student's first main concern was the measurement of belief systems in non-traditional ways like religiosity as determined by religious affiliation, frequency of attendance to mass, the act of praying, and the like. He wanted to ask questions that would elicit differentiations among the respondents' held beliefs about God and other super – and preter - natural beings as well as life after death.

For this, the student, upon the direction of his most able mentor, the late Francis C. Madigan S. J., Ph. D., listed a series of statements (approximately 25 statements) each of which expresses an idea or belief about God and / or life here and after. This procedure was intended to develop some kind of an opinionnaire to measure the respondents' belief/s. Each statement requested the respondents to indicate whether they agree or disagree with a dichotomous format to each statement (Martin, 2006; Seymour, et. al., 1983).

The pretest of these statements required each of thirty respondents in and outside of Xavier University to place an x mark or a check (/) mark in boxes which represent ideas and beliefs which he agrees or disagrees with. This instruction was also used during the final administration of the questionnaire.

After data gathering from tryout respondents, answers were analyzed for inconsistencies per individual respondent then as a whole to find out which statement the respondents found confusing or unclear. These statements were then revised for simplification and clarification before they were returned to the respondents for verification. Statements that were found vague or confusing were dropped from the list of twenty five statements. This process resulted to a reduced number of 14 statements that were included in the questionnaire. These positively and negatively constructed statements included the following:

- I believe that God exists.
- I do not believe in a personal God. I believe God is a force that cannot think, cannot choose and cannot plan.
- I believe that all beings including myself are parts of God so that He and I are the same being.
- My sensations and feelings deceive me because they make me think that I am different from God. I believe that I am different from God.
- I do not believe in the personal existence for men in the next life. Nothing with continue to exist except God. Everything else will become God.
- I believe in one supreme God.
- I believe that there are two (or more) supreme (or very great) Gods vastly more powerful than men, who can control the forces of nature and inflict good or harm upon men.
- Although I believe in only one supreme God, I also believe that there are many spirits (like tumaos, engkantos, anitos, agtas, etc.) who have great powers to help or harm man.
- I believe in two (or more) supreme gods and also in the existence of many spirits (tumaos, engkantos, anitos, etc.) who have power to help and harm man.

- Although I do not believe in a supreme God, I believe in many spirits who have powers to help and harm man.
- I do not believe in an all powerful God.
- I believe this present life on earth is the only life of man. There is no other life after death.
- I believe God is too great to be bothered with small things, and because of this, He cannot pay attention to the everyday activities of each man.
- I believe God is interested in the acts of every man. While He is merciful and forgiving, He will reward the good intended and will punish the evil intended in each act.

Questions to gather the reaction of participants towards fellowmen

It is important to note that the study's main interest was to discover whether or not a relationship exists between belief systems and social concern and involvement. If such a relationship exists, do varied types of religious beliefs also tend to produce different social attitudes among the participants. This was referred to by the researcher as the social dimension of belief systems.

Several questions relating to current social issues, poverty and the problem of carrying out community projects were asked of each respondent. The questions were classified along three social dimensions. These were the following: 1) respondents' social awareness of the poor, about their existence in places like Cagayan de Oro, and about the assistance provided to poor or disadvantaged families or persons; 2) respondents' social attitudes or social concern of respondents towards various kinds of people, namely, friends, relatives, enemies, beggars and others, and towards action projects; and 3) respondents' willingness to be socially involved in programs directly engaged in providing work or money or other kinds of assistance to the poor.

For an evaluation of social attitudes, the study considered asking questions relating to specific groups. Questions were so designed to elicit the verbally expressed concern of respondents towards different members and segments of society such as friends, relatives, enemies, beggars, squatters, indigents, persons other than friends, and relatives but not enemies.

Several queries were used to set the stage. The question of real interest to the researcher was that which specifically asked each respondent whether he/she should always try to be helpful and generous to every person, not just to friends and relatives. Thus, using the summative ratings developed by Rensis Likert (1932), respondents were asked for their closest opinion by agreeing, agreeing more than disagreeing, disagreeing more than agreeing, or by simply disagreeing on each of the following questions or statements:

- We should always try to be helpful and generous to our friends.
- We should always try to be helpful and generous to our relatives.
- We should always try to be helpful and generous to every person, not just to friends and relatives.
- We should not do well to enemies (unless they become friends). Doing good to them may strengthen their bad intention towards us, and they may take advantage of us.
- The city should be cleared of beggars, squatters, and indigent persons by sending them elsewhere (back to where they came from if newly arrived, etc.). Persons like them are a source of crime.

In addition, a question was included to determine the respondents' attitude to social action projects, and towards the nature of participation in similar projects: Bayanihan projects should be completely voluntary and nobody who does not want to participate in them should feel that he has failed in any obligations, religious or civic.

Questions for determining Social Awareness

This portion of the questionnaire is to determine the respondents' awareness of the truth of and extent of poverty among families and persons in Cagayan de Oro City. This part also covers real conditions of assistance to the needy families and persons by various agencies in Cagayan de Oro City. Two sets of statements were constructed and designed for the respondents to reveal his or her knowledge of the extent of poverty in the city and of the assistance extended by such agencies as the city, churches, and other organizations to families and persons in dire need.

A question concerning familiarity with problems of the poor was also constructed to determine the respondents' level of knowledge about the extent of families in dire need in Cagayan de Oro City. This query began with the following:

- Because of the growth of Philippine cities, the government and the media have given extensive attention to squatters, and to poverty problems. The following topic was, therefore, selected as important for study.

Needy Families

The participants' social awareness was further evaluated through a set of questions which probed their knowledge about the provision of relief services and/or of assistance work to the needy families and individuals. These questions were asked against the commonplace observation that poor families and individuals are inadequately provided for in Cagayan de Oro by the city, churches, and other organizations. Each of these questions or statements was discriminated by words ranging from very adequate to very inadequate provision of assistance to the needy families or persons. With this in mind, the student came up with the following statements for the respondents to select the closest representation of what they know of the social issue:

- The city, the churches, and other organizations in Cagayan de Oro are providing very adequately for the assistance of such needy families and persons.
- The city, the churches, and other organizations in Cagayan de Oro are providing adequately for the assistance of such needy families and persons.
- The city, the churches, and other organizations in Cagayan de Oro are not providing adequately for the assistance of such needy families and persons.
- The city, the churches, and other organizations in Cagayan de Oro are providing very inadequately for the assistance of such needy.

Questions about involvement in helping the poor

At this stage of questionnaire construction, the main concern was to determine the commitment (past and present) of respondents to work for the benefit of the underprivileged or disadvantaged families and persons in Cagayan de Oro city. This particular concern called for a reevaluation of the respondents' social attitudes and social awareness in the light of their social involvement.

The first set of questions developed for this purpose was designed such that a survey of the respondents' past involvement with the poor is carried by the research. Each respondent was asked to report in general at least one or more personal experience/s where he/she had participated in something that has to do with the welfare of the needy. Seven statements about the possible experiences that the respondents may have in working with needy families were formulated. The statements were carefully formulated such that each description is different from the other. Respondents were then asked to indicate with a check mark on the description that comes closest to his or her experience/s with the poor sector of the population. The idea of asking these questions was to gather or know from verbal self – reports of respondents if the past experience/s of the respondents with the poor included: 1) having worked privately or through an organization, or 2) only through occasional contacts. Thus the descriptive statements include the following:

- I have been employed for one year or more in an organization directly engaged in work with the poor and with needy people.
- I have regularly for one year in a voluntary (non – pay) organization directly engaged in work with the poor and the needy.
- I have worked for less than a year, or not regularly, in an organization like the one referred to above in work with the poor and the needy.
- I have regularly but privately worked for a year or more with the poor and needy.
- I have worked regularly but privately for less than a year with the poor and needy.
- I have worked privately a good bit but not regularly nor for as long as a year with the poor and needy.
- My experience with the poor and needy has mostly been through occasional contacts with them, for example, like a family head asking for help or families I have found out about from chance contacts.

Measuring commitment of respondents to help/assist the needy families or persons

This portion of the questionnaire was carefully designed to measure not just the respondents' verbal commitment but also the nature of commitment that they are willing to provided to help / assist needy families or persons in Cagayan de Oro through a proposed Citizens' Committee. The set of questions prepared for this purpose was centered on a proposed Citizens' Committee for improving the lot of the poor which, as presented to the respondents, would be permanently established in Cagayan de Oro City. The intent of doing this was to determine who among the respondents would like to get involved in the provision for needy families and persons in the city. This was also to check who among those who are aware and concerned about the needy would like to get involved, the nature of their involvement in a proposed Citizens' Committee that will be created specifically for that purpose.

The participants were guided to read carefully and check the statement/s about commitment to help/assist needy families and persons that are closest to their views and opinions. This was accompanied by an introductory statement which said: 'If a voluntary Citizens's Committee to assist needy families and persons can be set up in Cagayan de Oro City' what will the respondent's do? For this purpose, a set of ten statements were carefully worded:

- I am willing to give at least one hour of my time each week to work with this Committee and I am willing to make small regular donations of money in accordance with my means.
- I am willing to give one hour of my time each week with this Committee and perhaps I will be willing to make regular small donations in accordance with my means.
- I would not like to be obligated to giving time regularly to work with this Committee but I am willing to make regular small donations in accordance with my means.
- I am willing occasionally to give time and/or small donations to the work of this Citizens' Committee but would not like to be obliged to regular obligations of either time or money.
- I would not like at the present to any that I will give the time or financial assistance to this work with the poor although I recognize it as a very worthy undertaking. But I may decide to give time or financial assistance later on.
- I am not inclined at present to give my time or financial assistance to the work of this Committee.
- I am disinclined to give time or financial assistance to this project and I do not expect that my future reactions to it will change.
- I am not in favor of this project and therefore I will not give time and/or financial support.
- I am definitely against this project and feel it would be unwise to organize it. I will oppose it if it is organized.

On top of this, the participants were asked to explain their answer and give actual examples, if possible, for the purpose of clarity.

Questioning to measure sincerity of respondents to become a part of the proposed citizens' committee for the welfare of the poor families and individuals in Cagayan De Oro City

The test of sincerity given to participants who had verbally made claims of commitment involves asking them to submit their names and addresses to the proposed committee which they have previously alleged to support with their labor, their financial assistance or both. Their approval of any of the first four statements became bases for the next step which was the submission of their contact information. More precisely, the final question on the willingness of the respondents who verbally expressed to get involved in the provision of assistance and / or help to the families and persons in dire need in Cagayan de Oro City through a proposed Citizens' Committee proceeded with the following:

'. . . . Kindly write your name and complete address on a half sheet of paper (or smaller piece if you like) and hand this to me separately so that when we attempt to organize such a committee, we can then contact you.'

Few final comments

Research or thesis and dissertation writing requires careful planning of the data gathering method, choice of good mentor, etc. In this paper, the student – researcher emphasized the contribution of a very seasoned researcher and writer as his mentor. The mentor is a prolific writer of research reports and articles. He wrote for the American Journal of Sociology, Demography, Population Index or Studies, Philippine Sociological Review, and several other venues where useful insights and knowledge can be disseminated to larger and/or bigger audience or, even, used as required reading materials for Sociology, Population or Demography students enrolled in big universities in the United States of America and Europe. This same mentor also wrote books namely, The Farmer Said No, Birth and Deaths in Cagayan de Oro, and various papers presented along with his research associates and students in various international, national, local trainings, conferences and conventions like the East – West Summer Seminars on Population, annual conventions of the International Union of Social Sciences and Population, etc.

The said mentor was instrumental in guiding the student to strategize data collection particularly on the aspects pertaining to social awareness, social concern, and involvement, and determining the belief systems of his respondents. The sets of questions were so organized to take a funnel form with a two – stage filtering feature screening those who are socially aware of the extent poverty in Cagayan de Oro City from those who said that they have some experience/s in the past in the provision of assistance to the same sector of the population of the said city. The design also worked to obtain verbal expressions of the respondents' concern and commitment to a socially oriented action.

Overall, questionnaire construction done in the manner just presented proved to be a worthwhile undertaking for its effectiveness in measuring the sincerity of the socially aware and concerned respondents about the poor of the city and urging their involvement in development work for this sector of the population.

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DEVELOPMENT AND EVALUATION OF COMPUTER AIDED TESTING AND INFORMATION (CATI) FOR THE GUIDANCE OFFICE AT THE ISABELA STATE UNIVERSITY, CABAGAN, ISABELA

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ABSTRACT

The study aimed to develop and evaluate a Computer Aided Testing and Information (CATI) for the Guidance Office at Isabela State University, Cabagan, Isabela. The development phase of this study included the design of the CATI, used the Waterfall Model, together with Unified Modeling Language. The system made used a Client-Server configuration that allows any connected client to the functions possible from the server interface. The systems administrator can just "watch" what is happening at the server from their connected computers. On the other hand, the evaluation phase utilized two methods: technical evaluation with system testing and humanistic evaluation with acceptability of the system. The data gathered was classified according to the respondents to determine if there is a significant difference between their perceptions towards the CATI system. The study revealed that across all features, the CATI system was consistently adjudged by the students and IT experts as "highly acceptable" in terms of accuracy, efficiency, reliability and security features. The study revealed that evaluations based on requirements are effective as most software organizations used in system testing regardless of their sizes and levels. This information confirmed the need to automate the process used to administer, check and score the university entrance examination as well as keeping the students record thus, the study contributes to the body of literatures on the effectiveness of the use of computerized assessment in higher education.

Keywords: *Computer Aided Testing and Information, System Testing, Acceptability*

INTRODUCTION

With the current technological advances in the field of information technology, society has to continually adapt the changing demands such advances has brought to it. Communities have become increasingly dependent on computers, systems analysts, programmers, as well as on more reliable and efficient systems. Due to these advancements, productivity demands from employees in any given work setting have dramatically increased to a point that it is intolerable without technological intervention. The Guidance Office of the Isabela State University (ISU) at Cabagan, Isabela is not an exemption.

In order for ISU to cope with these demands, it is necessary that it adapts itself to the use of available technologies to aid its operations—more specifically, the application of CATI in the general management of its admission system, and eventually managing its students' information.

Currently, the Office of the Guidance Counselor at Isabela State University is using the paper-based form or the traditional written examination in administering the University Entrance Examination and manually keeping the Students' Information in the filing cabinet. After the examination, the guidance counselor corrects the examination manually and the result is given to the student which takes up to two (2) weeks after the examination. This kind of set-up is found to be time consuming and inevitably, there are errors in checking the examination. As a consequence, the guidance counselor cannot do other guidance services which may be deemed important to clarify issues and academic concerns about the welfare of the students.

With the cited problems above, the researcher developed the Computer Aided Testing and Information (CATI) for the Guidance Office at the Isabela State University, Cabagan, Isabela. This system aimed to automate the process use to create, administer, check and score the University Entrance Examination as well as keeping the Students' Information. It is geared towards improvement of the traditional written entrance examination and the manual keeping of student's personal information. It also aimed to evaluate the CATI system as to its congruence to its intended use as well as to its acceptability by its intended or potential users with a survey of the perception with regard to the features of the system based on the software criteria used in System Testing that will further validate the effectiveness of the CATI.

Statement of the Problem

Specifically, it sought to answer the following questions:

1. What are the features of the Computer Aided Testing and Information (CATI) in terms of the following software criteria used in System Testing: (a) Accuracy, (b) Efficiency, (c) Reliability and (d) Security;

2. What is the perception of the respondents in the CATI system with respect to the software criteria used in System Testing? And

3. Is there a significant difference in the perception of the IT experts and students on the CATI system with respect to the software criteria used in System Testing?

METHODOLOGY

Research Design

The study used a two-phase process method: The development of a system (First Phase), and its consequent evaluation (Second Phase).
Development Phase

Developmental Model

There are various software development approaches defined and designed which are used during development process of software, these approaches are also referred as "Software development Models". Each process model follows a particular life cycle in order to ensure success in process of software development.

This study employed the Modified Waterfall Model (Mavaddat, 2008) derived from the Waterfall Model approach which was the first process introduced and followed widely in software engineering to ensure success of the system to be developed. A number of variants of this model exist, with each one quoting slightly different labels for the various stages however, the model may be considered as having six distinct phases namely 1.) Requirements; 2.) Analysis; 3.) Design; 4.) Implementation; 5.) Post delivery maintenance; 6.) Requirements.

Evaluation Phase

System Testing

The evaluation is focused on the accuracy, efficiency, security and the reliability features of the CATI system. This also involved humanistic evaluation focused on the acceptability of the system with a survey of the perceptions by its intended users and was statistically analyzed using the weighted mean to describe the effectiveness of the CATI system and the t-test to compare the perception of the IT experts and the students on the said system at 0.05 level of significance. The software criteria were emphasized by AXIA consulting agency that helped enterprises specify and select new software systems – by providing business managers with impartial time-saving tools and advice, to enable them to make the optimum decision.

A survey questionnaire was employed which was formulated based from the software criteria used in system testing that includes accuracy, efficiency, reliability and security in which the parameters to measure such criteria were requirements-driven based from the requirements needed in the admission system of the university[7].

The scale has five (5) point scales which have a corresponding descriptive equivalent as presented below.

Scale	Descriptive Equivalent
5	Strongly Agree
4	Agree
3	Undecided
2	Disagree
1	Strongly Disagree

The weighted mean rating was used to get the respondents general rating on the CATI.
To describe the perceived features of the CATI system

in terms of accuracy, efficiency, reliability and security, the following arbitrary intervals and descriptions were used.

Point Range	Descriptive Equivalent
4.21 – 5.00	Highly Acceptable
3.41 – 4.20	Acceptable
2.61 – 3.40	Fair
1.81 – 2.60	Unacceptable
1.00 – 1.80	Highly Unacceptable

Participants

There were two groups of respondents in the study. The first group consisted of students from the ISUC – CDCAS who were enrolled during the second semester of the school year 2009-2010 and the second group was IT experts of the ISUC including the campus guidance counselor. The stratified random sampling was used to determine the student-respondents using the Slovin's Formula wand finally applying proportionate allocation while total enumeration was applied for the second group of respondents.
Out of one hundred eighty students (180), a stratified random sample of ninety two (92) students and twelve (12) IT experts including the campus guidance counselor served as respondents of the study.

Data Gathering Procedure

Prior to the pilot test of the study, the system was presented for trial - run and demonstration to the campus where the audience consisted of the campus guidance counselor and the IT experts. This included system testing of the integrated system to verify if the system meets the specified requirements. Suggestions like the user's manual and the video on how to take the examination were integrated into the system.

An evaluation was conducted if the system satisfies the requirements outlined and to ensure that they are error-free. The CATI system was pilot tested to the ISUC – CDCAS students and the IT experts including the campus guidance counselor. For the student-respondents, the researcher tried to get a representative from the different departments of ISUC – CDCAS (e.g. Natural Sciences, Information and Communications Technology, Development Communication and Social Sciences) with closed coordination to the different department heads. The researcher floated the questionnaire after watching the video on how to take the examination with live or actual demonstration and used of the CATI system. The researcher personally collected the questionnaire to ensure a one hundred percent (100%) retrieval.

Data Analysis

All the data gathered were collected, organized, tabulated and analyzed using the weighted mean. For in depth analysis of data, the t-test was also employed to determine if there is a significant difference between the perception of the IT experts and the students.

RESULTS AND DISCUSSION

Development of the CATI System

Description of the CATI System

The use of the developed CATI system will help speed-up the process of generating reports originally prepared by the Guidance Counselor. Before the student takes the examination, the student must have the information on his high school average grade together with the desired course to be taken in the university. This process includes the filling-up of the Personal Data Form which is given by the Guidance Counselor. The filled-up form will be submitted to the Guidance Counselor who will then verify whether all the required information where properly filled-up. The Guidance Counselor will enter into the system all the necessary student information including the student's examinee number. Before the student takes the entrance examination, he will be oriented on how to take the exam by watching the embedded video on the system. After watching the video, the student is now ready to take the examination. After taking the examination, the student will be immediately notified as to his performance in the examination which will be given by the Guidance Counselor. The system will also generate all the necessary entrance examination reports i.e. the student personal information, entrance examination results, list of students who took the exam per course and college, etc.

Client-Server Configuration

The CATI system used a Client-Server configuration that allows any connected client to the functions possible from the server interface. The systems administrator can just "watch" what is happening at the Server from their connected computers. The Server computer should be secured in an area like in the office of the Guidance Counselor or to the Executive Officer's office, and can be administered remotely across the network.

The Evaluation of the CATI System

This part presents the evaluation of the CATI system by getting the perception of the ISUC – CDCAS students and the IT experts including the guidance counselor. Their perceptions were elicited through a questionnaire after watching the video on how to take the examination and with the live or actual demonstration and used of the CATI system.

Accuracy of the CATI System

The perception of the ISUC – CDCAS students and IT experts on the accuracy of the CATI system yielded the following results: precise in checking the examination, 4.88 or highly acceptable; provides correct examination score, 4.84 or highly acceptable; generates exact test items, 4.83 or highly acceptable; generates correct student's personal information, 4.87 or highly acceptable; precise with the time of the examination, 4.88 or highly acceptable. In general, the ISUC – CDCAS students assessed the accuracy of the CATI system at 4.77 and the IT experts at 4.95, which are both described as "highly acceptable". The combined perception of the two groups of respondents shows that the abovementioned accuracy features of the CATI system are "highly acceptable".

Efficiency of the CATI System

The perception of the ISUC – CDCAS students and IT experts on the efficiency of the CATI system are as follows: provides automatic checking, 4.87 or highly acceptable; provides automatic scoring, 4.90 or highly acceptable; provides automatic remarks for English, 4.76 or highly acceptable; provides composite scores for the four subtests, 4.77 or highly acceptable; provides update on time, 4.83 or highly acceptable; provides update on course, 4.82 or highly acceptable; provides update on test items, 4.88 or highly acceptable; provides update on student's information, 4.88 or highly acceptable. In general, the ISUC – CDCAS students assessed the efficiency of the CATI system at 4.73 and the IT experts at 4.94 which are both described as "highly acceptable". The combined perception of the two groups of respondents shows that the abovementioned efficiency features of the CATI system are "highly acceptable."

Reliability of the CATI System

The perception of the ISUC – CDCAS students and IT experts on the reliability of the CATI system are as follows: can be an aid for administering the university examination, 4.76 or highly acceptable; can be used to keep student's personal record, 4.78 or highly acceptable; runs in a stand-alone environment, 4.77 or highly acceptable; runs in a network environment, 4.80 or highly acceptable; maximum set-up time of administering the examination must be 12o minutes, 4.72 or highly acceptable; loading time is less than 10 seconds, 4.77 or CATI system is highly acceptable. In general, the ISUC – CDCAS students assessed the reliability of the CATI system at 4.69 and the IT experts at 4.85 which are both described as "highly acceptable". The combined perception of the two groups of respondents shows that the abovementioned reliability features of the CATI system are "highly acceptable."

Security of the CATI System

The perception of the ISUC – CDCAS students and IT experts on the security of the CATI system as follows: protected with a password, 4.86 or highly acceptable; allows only authorize users to access the system, 4.82 or highly acceptable; allows only authorize student can take the examination, 4.87 or highly acceptable; allows only administrator or authorize representative manages the CATI system, 4.83 or highly acceptable; the examination result cannot be change, 4.85 or highly acceptable.

In general, the ISUC – CDCAS students assessed the security of the CATI system as 4.82 and the IT experts as 4.88 which are both described as "highly acceptable." The combined perception of the two groups of respondents showed that the abovementioned security features of the CATI system are "highly acceptable."

CONCLUSIONS

The following conclusions were drawn based on the results of the study:

The participants "highly accepted," the accuracy, efficiency, reliability and security features of the CATI system. This information is confirmed the need to automate the process used to administer, check and score the university entrance examination as well as keeping the students record.

The implementation of the developed system is more beneficial than maintaining the present system. The developed system possesses the identity of generating information at a favorable speed with accuracy and reliability. It is also secured against unauthorized access hence; the guidance counselor will not only be benefited but also the school administrators and the whole studentry.

Adopting the developed system is designed to cater even to non-computer literate. The students were able to cope with the use of the CATI system after watching the video on how to take the exam.

The high acceptability of the developed system will motivate the school administrators, guidance counselor and other concerned officials to undertake an action to improve the quality of the admission system of the university and eventually, managing its students record.

RECOMMENDATIONS

Premised on the results and conclusions of this study, the following recommendations were drawn.

1. That the developed system will be implemented to minimize the time consumed in the manual manipulation of the voluminous information in the university entrance and eliminates other problem that have been perennially observed which make the existing system left behind in the computer world.

2. That proper information dissemination is conducted to the school administrators, the guidance counselor and other concerned officials.

3. That the students should watch the CATI video prior to taking the entrance exam.

4. That the CATI system be submitted to the Executive Officer of the Campus for an action to improve the quality of the present admission system of the university and eventually, managing its students' record.

5. That the users of the system be trained on how to install and use the system.

6. That the IT experts should be tapped to assist the guidance counselor in the initial implementation of the entrance examination.

7. That the Guidance Office should be equipped with electronic facilities for the implementation of the CATI system.

8. That the Guidance Counselor continually updates the content of the university entrance examination.

9. That the CATI system will serve as a vehicle for extension project of the department of ICT if ever other ISU campuses wish to adopt the said system.

10. That future researcher should look into the validity of the questionnaire by integrating a cross-checking of item questions.

11. That further studies should be conducted to improve or upgrade the CATI system if ever there are changes in the admission system of the university.

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DIVERSITY, PHYTOCHEMICAL SCREENING AND UTILIZATION OF MACROALGAE

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ABSTRACT

This study aimed to determine the diversity, utilization and phytochemical composition of macroalgae in the coastal towns of Cagayan. The macroalgae that were used in this study were collected from the intertidal zones of Sta.Praxedes, Claveria, Gonzaga and Sta. Ana Cagayan during a low tide using a transect line. The species covered by the 100 cm x 100 cm quadrant used were counted (Quadrat method). The researcher initially identified the macroalgae species using the book of Dr. Gavino C. Trono Jr. (2004) and was then brought to the Bureau of Fisheries and Aquatic Resources (BFAR) Regional Office, Tuguegarao City for further verification and validation. The macroalgae extracts were subjected to phytochemical screening to determine the different secondary metabolites present. Findings of the study revealed that there were forty eight (48) prevalent species of macroalgae found in the coastal towns of Cagayan for the months of October, November and December. The macroalgae was dominated by Rhodophyceae. Thirteen (13) species belongs to Chlorophyceae, eleven (11) species belongs to Phaeophyceae, and twenty four (24) species classified under Rhodophyceae. The qualitative analysis of the secondary metabolites present in the forty eight (48) macroalgae species through phytochemical screening revealed that the macroalgae species contain various amount of valuable phytochemicals. It was further found out that only Ulva lactuca and Chlorodesmis fastiaga contain all the six secondary metabolites tested. The most diverse coastal town in terms of the number of macroalgae species found was Sta. Ana with twenty six (26) species of macroalgae, followed by Gonzaga with twenty five (25) species of macroalgae, then Claveria with twenty two (22) species of macroalgae and the least with fifteen (15) species of macroalgae was Sta. Praxedes. The coastal town with the most abundant macroalgae species in terms of frequency and relative frequency was Sta. Ana, followed by Gonzaga, then Claveria and lastly Sta. Praxedes. Macroalgae growth is abundant in the month of November as compared to the months of October and December. The utilization of macroalgae by the local communities is based primarily on their economic uses as human food, herbal medicine and as items of trade, or as a source of livelihood.

INTRODUCTION

The Philippines is one of the most diverse ecological environments in the world and known for its wide variety of terrestrial and aquatic plant organisms. The intertidal zone that surrounds the 7,100 islands of the Philippines is renowned for its wonderful organisms and for providing one of the most diverse habitats of marine organism of the planet. Among those as pointed by Trono and Fortes (1988), which are conspicuous are the mangrove, macroalgae (seaweeds) and seagrasses. These plants dominate the marine flora in wide ranging type habitat associated with highly diverse forms of animal life. The importance of these plants not only prevent coastal erosion but they also serve as sites of high organic production, as habitat, feeding ground and nursery for shallow water fishes.

The macroalgae are among the major plant groups which have recently been the object of attention of multi-sectoral groups, fishermen and businessmen, the government and academe, for the reason that of their economic value as food, and as item of trade and research. Their importance as alternate source of livelihood for coastal inhabitants is further emphasized because of the slow but continuing depletion of the coastal fisheries in many parts of the country (Agatep and Lagundi, 2009).

Macroalgae or seaweeds farming is a major industry in our country that provides economic livelihood to thousands of coastal families. In 2006, the Philippines produced 1,338,597 metric tons of seaweeds and were the top carrageenan producer in the world as reported by the Agri Business Week (2008).

People resourcefulness has found many uses for algae. Algae provide food for people and livestock, serve as coagulant in some products like gelatin and ice cream, and are used as medicine against diseases.

Algae have been used for centuries, especially in Asian countries, for their purported powers to cure or prevent illnesses as varied as cough, gout, gallstones, goiter, hypertension, and diarrhea. Recently, algae have been surveyed for anticancer compounds, with several cyanobacteria appearing to contain promising candidates. Algae can also serve as indicators of environmental problems in aquatic ecosystems. Because algae grow quickly and are sensitive to changing environmental conditions, they are often among the first organisms to respond to changes (Steinman 2008).

What is fascinating now is that researchers from the National Cancer Institute recently published findings that carrageenan had properties that decreased human papillomavirus infections of cells in laboratory screenings (Buck et al. 2006). The current research report in biotechnology may increase the use of algae in our society. As a replacement of new pharmaceuticals from the rainforest, this may now be obtained from the oceans.

Actually, algae already speed along research in colleges, universities and in private laboratories worldwide, as the polysaccharides agar and agarose. These are also derived from red macroalgae, and are used to form the gel used to create Petri dishes that researchers use to work with bacteria, fungi, animal cells and phytoplankton. They are also used in a slew of experiments to study genes and DNA. Closer to home, the recent resurgence of holistic and homeopathic medicine has renewed interest in the use of macroalgal extracts. Lining supermarket shelves, many of the lotions, creams and moisturizers that claim to firm skin also contain extracts from macroalgae (Lardizabal, 2008).

There is, therefore; the urgent need to determine the diversity and abundance of macroalgae in Cagayan, in order to develop them for the improvement of the quality of life of the people in the coastal towns of Cagayan.

Statement of the Problem

This study generally aimed to determine the diversity, utilization and phytochemical composition of macroalgae in the coastal towns of Cagayan.

Specifically, it sought:

1. to identify the taxonomic classification of macroalgae;
2. to determine the secondary metabolites present through pythochemical analysis;
3. to determine the abundance of macroalgae of Cagayan;
4. to compare the abundance of macroalgae by location, month and species; and
5. to identify the utilization of macroalgae by the local communities.

METHODOLOGY

This chapter presents the materials and the different experimental procedures that were used in the study.

Collection and Identification of Macroalgae

Materials

The following materials used in the study were: labeling materials (pen, masking tape, sticker), plastic bags, pair of scissors, knife, pegs, quadrat (1 m x 1 m), styrofoam box and transect line.

Identification of the Sampling Sites per Coastal Town

The sampling sites were situated at the Intertidal Zone of Sta. Praxedes, Claveria, Gonzaga and Sta. Ana, Cagayan which was identified by the Bureau of Fisheries and Aquatic Resources (BFAR) Regional Office No. 2. The collection site was identified using a transect line. The transect line was laid down from the seashore to the intertidal zones. The distance between the sampling sites was measured 100 m. Data were collected at every interval of 10 m.

Descriptions of the Sampling Station

The sampling sites were characterized by sandy, rocky and coralline substrata.

Collection of Seaweed

The macroalgae that were used in this study were collected from the intertidal zone of Sta.Praxedes, Claveria, Gonzaga and Sta. Ana, Cagayan during a low tide using a transect line. The species covered by the 100 cm x 100 cm quadrant used were counted (Quadrat method). Samples of every species were uprooted with the help of a knife or scraping tool to obtain the complete plant (including the holdfast) from the substrate. The macroalgae collected were placed in a Ziploc or plastic with enough seawater. The macroalgae were brought to Saint Paul University Philippines, Science Laboratories the next day for phytochemical screening.

Identification of Specimen

The specimen for initial identification was cleaned and properly labeled. The macroalgae species were initially identified using the book of Dr. Gavino C. Trono Jr. in (2004). The specimen were initially identified basing on their morphological characteristics using references in terms of their thallus (branched or unbranched), leaves (ventrally, horizontally, attached, small, large), holdfast (scutate, dicoid-lobe), leaf margin (serrate, denticulate), blade (reticulate, nonreticulate) and habitat (rocky, sand), and were then brought to the Bureau of Fisheries and Aquatic Resources (BFAR) Regional Office, Tuguegarao City for further verification and validation.

Classification

The algae collected were classified according to their division namely Chlorophyta, Rhodophyta, and Phaeophyta using primarily the reference “Field Guide & Atlas of the Seaweed Resources of the Philippines”, authored by Dr.Gavino Trono, Jr. of the University of the Philippines, Diliman, Quezon City.

Frequency and Density

The dominant species were determined through frequency and relative frequency using the method described by Smith and Smith (2001).

Frequency was determined by means of counting the number of intervals or points where the species occurs and dividing it to the total number of sample plots or points (see Appendix).

Relative frequency is an index based on the number of sample points or plots in which a species is found to occur relative to the total number of samples taken (see appendix).

Statistical Treatment of Data

For the difference of abundance of species in terms of frequency and relative frequency in relation to location and month the frequency count, percentage, mean, standard deviation d and analysis of variance were used.

Procedure for Phytochemical Analysis

In an erlenmeyer flask, twenty (20) grams of seaweeds are weighed and 100 ml 80% ethyl alcohol are added and covered with a funnel that will act as a condenser to minimize evaluation as the solvent. Place the flask over a hot water bath and reflux for an hour. The mixture was poured while it was still hot through a Buchner funnel line with filter paper and filled to a suction flask. The flask and seaweeds material was rinsed with fresh portion of 80% methyl alcohol and the seaweeds residue was discarded. The extracts are concentrated to about 45 ml and keep this in a tightly stopped container. (Guevara, 2005)

Test for Alkaloids

Ten (10) ml seaweeds ethanolic extract was taken and placed in an evaporating dish. The extract was evaporated to a syrup consistency over a water bath. Five (5) ml of 2M (HCL) was added then heated while stirring for five 5 min and then cooled. About 0.5 grams of (NaCl) are added and the mixture was filtered. The residue was washed with enough freshly prepared 2M HCL to bring the filtrate to a volume of about 5 ml. A one milliliter of the filtrate was taken and tested with 2 to 3 drops of Wagner’s reagent. Reddish Precipitation observed indicate the presence of alkaloids.

Test for Glycosides

Ten (10) ml seaweeds ethanolic extract taken, was dissolved in 5 ml hot distilled water and filtered. The filtrate was used for the test. 2 ml of the extract was placed in each of the two test tubes. One ml of diluted HCl was added to sample one (1) while nothing was added to sample two (2). The two test tubes were placed in a boling water bath for 5 minutes. Then let the test tubes cooled. Both samples were neutralized samples by adding anhydrous sodium carbonate until no more effervescence is produced. Fehling’s solution was added to the test tubes then heat over a water bath for two minutes. An increase in amout if brick red precipitatate in hydrolyzed sample as compared to the other sample indicates the presence of glycosides.

Test for Tannins

Ten (10) ml of the macroalgae extract was allowed to evaporate to incipient dryness over a water bath. The residue was extracted with 20-ml of hot distilled water and cooled. To remove undesirable constituents, 5 drops of 10% sodium chloride was added and the residue was filtered with a filter paper. The filtrate was further filtered and equally divided into two test tubes to be labeled as test tubes A and B. Control treatment was the test tube A where no solution was added. Three drops of ferric chloride solution were added to test tube B. For the presence of tannins, a blackish green color or precipitate was observed.

Test for Saponins

Froth test was used for the determination of saponins. Ten (10) ml of hot distilled water was added to two (2) ml of the extract then shaken vigorously for about thirty (30) seconds and allowed to stand and observed over a period of thirty minutes. A positive result showed the formation of honeycomb froths at a height of three (3) cm above surface of the liquid.

Test for Flavonoids

For the determination of flavonoids color test was used. Two (2) ml of the extract was treated with two (2) ml of 10% HCL then a small piece of magnesium ribbon was dropped into the solution. A formation of reddish color was evidence of a positive result.

Test for steroids and Triterpenoids

Two (2) ml of the extract was dissolved in one (1) ml acetic anhydride. Then the soluble portion was decanted and two (2) drops of concentrated sulfuric acid were added. A green color either immediately or gradually turning to red and blue tones indicated a positive result.

Data Gathering Procedure on the Utilization of Macroalgae

The researcher gathered information through an interview using an interview guide to obtain information regarding the utilization of macroalgae in the localities.

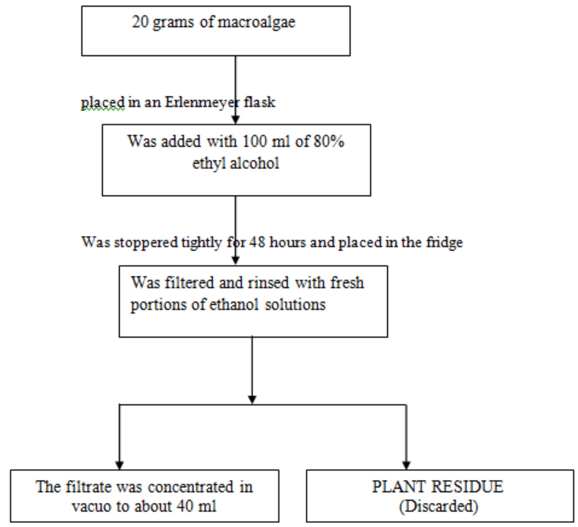

Figure 1. Schematic Diagram of of the Crude Extraction of Macroalgae

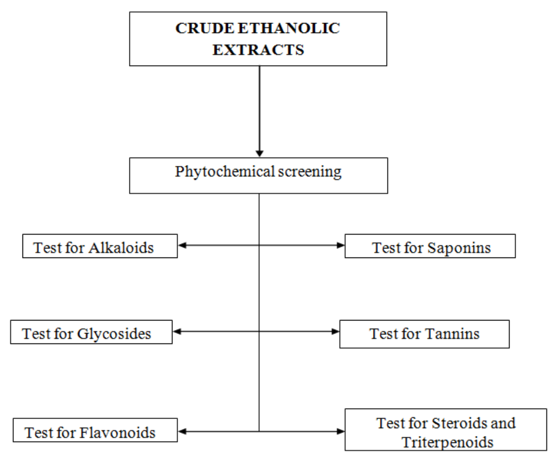

Figure 2. Schematic Diagram of the Phytochemical Screening of Macroalgae

RESULTS AND DISCUSSION

Taxomonic Classification of Macroalgae

The comprehensive study of the different macroalgae in the intertidal zones of the coastal towns of Cagayan revealed that forty eight (48) species of macroalgae were identified and collected in the four different sampling sites. The divisions are as follows:

Chlorophyceae

There were thirteen (13) species of green macroalgae belonging to four (4) orders. As shown in Table 1 there was only one (1) species identified for order Cladophorales family Cladophoraceae, this was Chaetomorpha crassa. For order Ulvales family Ulvaceae, two (2) species were identified, namely Ulva lactuca and Ulva reticulata. For order Siphonoclades family Valoniaceae, two (2) species were also identified namely Dictyosphaeria cavernosa and Valonia Aegagrophila. For order Bryopsidales, there were eight (8) species identified belonging to four (4) families. For family Udoteaceae, two (2) species were identified, namely Chlorodesmis fastiaga and Chlorodesmis hildebrandtii. There were also two (2) species identified for family Caulerpaceae, namely Caulerpa racemosa and Caulerpa taxifolia. Three (3) species were identified belonging to family halimedaceae, namely Halimeda macroloba, Halimeda opuntia and Halimeda tuna. And finaly for family Codiaceae, only Codium elude was identified.

Phaeophyceae

There were eleven (11) species of the brown macroalgae belonging to two (2) orders. For order Dictyotales family Dictyotaceae, four (4) species were identified, namely Dictyota cervicornis, Dictyota dichotoma, Padina Japonica and Padina Minor. There were seven (7) species belonging to order Fucales. For family Sargassaceae, namely Sargassum crassifolium, Sargassum cristaefolium, Sargassum gracillimum, Sargassum oligocystum, Sargassum polycystum, and Turbinaria ornata. And for family Cystoseiraceae only Hormophysa triquetra was identified.

Rhodophyceae

Twenty four (24) species of red macroalgae that were identified belong to nine (9) orders and eleven (11) families. Order Gigartinales has the greatest number of species. For order Gigartinales twelve (12) species belong to four (4) families. For family Gracilariaceae seven (7) species were identified, namely Ceratodictyon spongiosum, Gracilaria arcuata, Gracilaria coronopifolia, Gracilaria edulis, Gracilaria eucheumoides, Gracilaria firma and Gracilaria salicornia; for family Solieriaceae two (2) species were identified, namely Euchema denticulatum and Kappahycus cottonni; for family Hypneaceae two (2) species were also identified, namely Hypnea pannosa and Hypnea valentiae; and for Rhizophyllidaceae only one (1) species was identified known as Portieria hornemannii. For order Bangiales family Bagiaceae only Porphyra crispata was identified. For order Bonnemaisoniales family Galaxauraceae two (2) species were identified, namely Actinotrichia fragilis and Galaxaura oblongata. For order Gelidiales family Gelidiaceae only Gelideilla acerosa was identified. For order Corallinales family Corallinaceae three (3) species were identified namely Amphiroa fragillissima, Cheilosporum cultratum, and Mastophora rosea. For order Nemaliales family Liagoraceae only Liagora sp. was identified. For order Ceramiales family Rhodomelaceae two (2) species were identified namely Acanthophora muscoides and Acanthophora specifera. And finally for order Cryptonemiales family Cryptonemiaceae two (2) species were identified namely Halymenia durvillaei and Halymenia dilatata.

Phytochemical Screening

Thirteen (13) species of chlorophyceae (Chaetomorpha crassa, Ulva lactuca, Ulva reticulata, Dictyosphaeria cavernosa, Valonia aegagrophila, Chlorodesmis fastiaga, Chlorodesmis hildebrandtii, Caulerpa racemosa, Caulerpa taxifolia, halimeda macroloda, Halimeda opuntia, Halimeda tuna and Codium Edule), six (6) species of phaeophyceae (Dictyota cervicornis, Dictyota dichotoma, Padina japonica, Padina minor, Sargassum cristaefolium, and Sargassum oligocystum), and eighteen (18) species of rhodophyceae (Porphyra crispata, Actinotrichia fragilis, Galaxaura oblongata, Gelideilla acerosa, Amphiroa fragillissima, Cheilosporum cultratum, Mastophora rosea, Acanthophora muscoides, Halymenia durvillaei, Eucheuma denticulatum, Kappahycus cottonii, Hypnea pannosa, Hypnea Valentiae, Portieria hornemannii, Ceratodictyon spongiosum, Gracilaria edulis, Gracilaria eucheumoides, Gracilaria firma, and Gracilaria salicornia) showed positive results with alkaloids.

Glycosides on the other hand were observed in the ten (10) species of clorophyceae (Chaetomorpha crassa, Ulva lactuca, Valonia aegagrophila, Chlorodesmis fastiaga, Chlorodesmis hildebrandtii, Caulerpa racemosa, Caulerpa taxifolia, halimeda macroloda, Halimeda opuntia, Halimeda tuna and

Codium Edule), eight (8) species of phaeophyceae (Dictyota cervicornis, Dictyota dichotoma, Padina minor, Sargassum crassifolium, Sargassum gracillimum, Sargassum polycystum, turbinaria ornate, and Hormophysa triquetra) and 15 species of rhodophyceae (Porphyra crispata, Galaxaura oblongata, Cheilosporum cultratum, Mastophora rosea, Acanthophora specifera, Halymenia durvillaei, Eucheuma denticulatum, Kappahycus cottonii, Hypnea pannosa, Portieria hornemannii, Ceratodictyon spongiosum, Gracilaria coronopifolia, Gracilaria edulis, Gracilaria eucheumoides, and Gracilaria firma). Several plants store important chemicals in the form of inactive glycosides; if these chemicals are needed, the glycosides are brought in contact with water and an enzyme, and the sugar part is broken off, making the chemical available for use. Many such plant glycosides are used as medications.

The presence of tannins were seen in seven (7) species of chlorophyceae (Chaetomorpha crassa, Ulva lactuca, Ulva reticulata, Chlorodesmis fastiaga, Caulerpa taxifolia, halimeda macroloda, and Halimeda tuna), seven (7) species of phaeophyceae (Padina minor, Sargassum cristaefolium, Sargassum gracillimum, Sargassum oligocystum, Sargassum polycystum, turbinaria ornata, and Hormophysa triquetra) and six (6) species of rhodophyceae (Kappahycus cottonii, Hypnea Valentiae, Portieria hornemannii, Ceratodictyon spongiosum, Gracilaria arcuata, and Gracilaria firma), which only indicates the ability to react with and precipitate proteins forming stable water-insoluble compounds.

The presence of saponins were observed in eleven (11) species of chlorophyceae (Ulva lactuca, Ulva reticulata, Dictyosphaeria cavernosa, Valonia aegagrophila, Chlorodesmis fastiaga, Chlorodesmis hildebrandtii, Caulerpa racemosa, Caulerpa taxifolia, halimeda macroloda, Halimeda opuntia, and Codium Edule), ten (10) species of phaeophyceae (Dictyota cervicornis, Dictyota dichotoma, Padina minor, Sargassum crassifolium, Sargassum cristaefolium, Sargassum gracillimum, Sargassum oligocystum, Sargassum polycystum, turbinaria ornata, Hormophysa triquetra) and fourteen (14) species of rhodophyceae (Porphyra crispata, Actinotrichia fragilis, Galaxaura oblongata, Gelideilla acerosa, Cheilosporum cultratum, Liagora sp., Halymenia durvillaei, Halymenia dilatata, Eucheuma denticulatum, Hypnea pannosa, Hypnea Valentiae, Portieria hornemannii, Ceratodictyon spongiosum, Gracilaria eucheumoides, and Gracilaria firma).

There are also eleven (11) species of chlorophyceae (Ulva lactuca, Ulva reticulata, Dictyosphaeria cavernosa, Valonia aegagrophila, Chlorodesmis fastiaga, Chlorodesmis hildebrandtii, Caulerpa racemosa, Caulerpa taxifolia, halimeda macroloda, Halimeda opuntia, and Codium Edule), eleven (11) species of phaeophyceae (Dictyota cervicornis, Dictyota dichotoma, Padina japonica, Padina minor, Sargassum crassifolium, Sargassum cristaefolium,Sargassum gracillimum, Sargassum oligocystum, Sargassum polycystum, turbinaria ornata, Hormophysa triquetra), and thirteen (13) species of rhodophyceae (Porphyra crispata, Actinotrichia fragilis, Galaxaura oblongata, Gelidiella acerosa, Cheilosporum cultratum, Liagora sp., Halymenia durvillaei, Halymenia dilatata, Hypnea pannosa, Hypnea Valentiae, Ceratodictyon spongiosum, Gracilaria arcuata, and Gracilaria edulis), showed positive for flavonoids test.

Moreover, eight (8) species of chlorophyceae (Ulva lactuca, Ulva reticulata, Valonia aegagrophila, Chlorodesmis fastiaga, Chlorodesmis hildebrandtii, Caulerpa racemosa, Halimeda tuna and Codium Edule), nine (9) species of phaeophyceae (Dictyota cervicornis, Dictyota dichotoma, Padina japonica, Sargassum crassifolium, Sargassum cristaefolium, Sargassum gracillimum, Sargassum oligocystum, Sargassum polycystum, Hormophysa triquetra), and thirteen (13) species of rodophyceae (Porphyra crispata, Actinotrichia fragilis, Amphiroa fragillissima, Cheilosporum cultratum, Acanthophora muscoides, Acanthophora specifera, Halymenia durvillaei, Eucheuma denticulatum, Hypnea pannosa, Portieria hornemannii, Gracilaria arcuata, Gracilaria edulis, and Gracilaria salicornia) have also showed positive result for the presence of steroids.

Quantitative Analysis on the Abundance of Macroalgae in the Coastal Towns of Cagayan

A total of 48 species were collected and identified in the four coastal towns of Cagayan over the three month period from October to December 2011. It was found out that the macroalgae species present in the four locations for the entire duration of the study were Chaetomorpha crassa, Halymenia durvillaei and Sargassum cristaefolium.

There were also species that were found in one of the locations only (appendix table 2), these were Acanthophora muscoides, Acanthophora specifera, Gelidiella acerosa, Gracilaria eucheumoides, Gracilaria firma and Halimeda dilatata which were only located in Gonzaga, Cagayan. Amphiroa fragillisima, Caulerpa taxifolia, Dictyota cervicornis, Dictyota dichotoma, Euchema denticulatum, Gracilaria coronopifolia, Halimeda tuna, Hypnea valentiae and Turbinaria ornata were found ony in the coastal areas of Sta. Ana, Cagayan. Likewise, for Caulerpa racemosa, Codium edule and Portieria hornemannii were found in Sta. Praxedes, Cagayan. Furthermore, Padina minor and Ulva lactuca were the species located only in Claveria, Cagayan. Moreover, Chaetomorpha crassa, Halymenia durvillaei and Sargassum cristaefolium were common in all the locations.

Macroalgae Present by Month

The month of November has the highest total individuals counted with a mean of 5.60 and has a frequency mean of 0.198, December has a mean total individual of 5.18 and mean frequency of 0.183, and October has the lowest total individuals with a mean of 4.64 and a frequency mean of 0.177.
The few population of macroalgae in October may be attributed to environmental factors, such as typhoons Pedring and Quiel which had affected Cagayan on the last week of September and the first week of October 2011, respectively. The growth of macroalgae is believed to be directly influenced by the storm. The observed increase of the number of macroalgae in November is attributed to the stability of the weather condition of the month.

Macroalgae Parameters by Location

The coastal areas of Sta. Praxedes has the highest mean total individual of 12.78, although it has the lowest number of population which is 45 and a mean frequency of 0.231. This is attributed to Porphyra crispata which has low frequency but has the highest relative density. Besides, it was found in large clumps where it did occur. Gonzaga followed next with mean total individuals of 3.15 and a mean frequency of 0.192. On the other hand, macroalgae found in Claveria has mean total individuals of 5.47 and a frequency mean of 0.180. Macroalgae in Sta. Ana has the lowest mean total individuals of 2.37 and a frequency mean of 0.159, even though it has the most number of populations. This situation is attributed to the few number of individuals of macroalgae found in the coastal area.

Total Macroalgae Count by Location

There are 78 species found in Sta. Ana, 65 species has a count of 1-10 and there were 13 species which was not found in once or twice of the three-month duration of the study. For Gonzaga, there were 70 species has a count of 1-10 and 5 species was not found once on the course of the study. Furthermore, Sta. Praxedes has 4 species has a count of 21 and above, 11 species has a count of 11-20, 28 species has a count of 1-10 and only 2 species was not found in one of the three-month duration of the study. Lastly, Claveria has 4 species with a count value of 21 and above, 5 species has 11-20 counts, 51 species has 1-10 counts and 6 was not found once or twice during the duration of the study. As observed, the macroalage found in all locations have frequency count of 1-10. It is interesting to note that there were 4 macroalgae that had a count of 21 and above for both Sta. Praxedes and Claveria, hence these macroalgae are abundantly found in their coastal areas.

The highest number of macroalgae was found in Sta. Ana; however they have few numbers of counts. In contrast, in Sta. Praxedes and Claveria few macroalgae were found but were found abundant. This is attributed to the kinds of species of macroalgae found in the four locations.

Analysis of Variance on the Total Macroalgae Count by Location

Results of the analysis of variance yielded an F-ratio of with associated probability of 0.00, thus, the null hypothesis is rejected. There are significant differences in diversity and abundance of macroalgae in the coastal towns of Cagayan. This finding implies that the diversity and abundance of macroalgae in the coastal towns of Cagayan vary significantly in terms of its local distribution. This trend is attributed to the differences of substratum of the four coastal towns of Cagayan where macroalgae locally inhabit.

Total Macroalgae Count by Month

The month of November has the highest macroalgae count with three species counted from 21 and above, seven species with 11-20 counts, 73 species with 1-10 counts and five species were not found during this month. For the month of December, two species were found to have 21 and above counts, five species had 11-20 counts, 71 species had 1-10 counts and 10 species were not found. Lastly, October had the lowest counts of species during the entire duration of the study with three species with 21 and above counts, four species with 11-20 counts, 70 species with 1-10 counts. Eleven species were not found during this month.

Analysis of Variance on the Total Macroalgae Count by Month

The analysis of variance yielded an F-ratio of 0.189 with associated probability of 0.828, thus, the null hypothesis is accepted. This signifies that the monthly macroalgae count across the coastal towns does not vary significantly. This can be attributed to the season where the study was conducted.

Relative Frequency of Macroalgae Found by Location

Gonzaga has the highest relative frequency of macroalgae found in each of the coastal towns of Cagayan. From the relative frequency ranges 0.3 to 0.5, twenty one species or 31.3 per cent of the sixty seven species found in Gonzaga. And for the relative frequency ranges 0.1 to 0.2, fifty one species or 29.8 per cent of the one hundred seventy one species were found in Sta. Ana, on the other hand forty nine was found in Gonzaga, followed by Claveria with forty six species and twenty five species found in Sta. Praxedes. Macroalgae in Sta. Praxedes has the lowest relative frequency recorded.

Analysis of Variance on the Relative Frequency of Macroalgae by Location

As manifested in Table 12, the relative frequencies of macroalgae grouped by location differ significantly as evidenced from the result of the analysis of variance yielded an F-ratio of 4.879 with associated probability of 0.003, thus the null hypothesis “There is no significant difference on the relative frequency of macroalgae in the coastal towns of Cagayan when compared in terms of location” is rejected. There are significant differences in diversity and abundance of macroalgae in the coastal towns of Cagayan.

This implies that the relative frequencies of macroalgae grouped by location differ significantly. This can be attributed to the differences in the physical and biological factors present in each of the coastal towns (sampling sites). With few exemptions, macroalgae are strictly benthic plants; that is they are always attached to the seabed or a solid substratum such as natural reef, rocks, shells, mangrove roots, boat hulls, jetty pilings, mooring lines, etc. When dislodged, most macroalgae have a limited lifespan as free floating seaweeds drift and they may only live for hours to several months. Direct human impact such as mechanical damage, eutrophication, aquaculture, siltation, coastal constructions and alteration of food web; along with indirect human impacts, including the impacts of climate change, can contribute to a widespread loss of macroalgae.

Relative Frequency of Macroalgae by Month

The month of November was the highest with 27 species from the total number of species which is 67. For the relative frequency value of 0.1 to 0.2, the month of December was the highest with 58 species out of 171. Furthermore, the table manifest that there was an increase of the relative frequency of the macroalgae from October to November and a slight decrease in the relative frequency from November to December. However, the relative frequency value of the three months duration of the study has almost constant value. This can be attributed to the prevailing season during these months.

Analysis of Variance on Macroalgae Relative Frequency by Month

The obtained F-ratio value associated with probability of 0.410 signifies the relative frequency of macroalgae observed per month does not vary significantly, hence the null hypothesis that “there is no significant difference in the relative frequency of macroalgae in the coastal towns of Cagayan when compared in terms of month of collection” is accepted. As stated in the previous discussion, this may be attributed to the constant prevailing climatic environmental conditions within the months of collection.

Utilization of Macroalgae by the Local Communities

Seaweeds have long been utilized as food by many coastal populations in Cagayan. Their recognition as a fishery resource is only very recent. Based on the interview conducted by the researcher, the economic uses known by the local communities of the different coastal towns of Cagayan is for food and as item of trade or as a source of livelihood. The present problem encountered by these people was that seaweed species that are economically valuable are seasonal; they could only have high productivity during the time these macroalgae abundantly grow in the wild since there is no present seaweed farming in their locality.

From the interview made by the researcher, seaweeds have long been traditionally utilized as food in the form of salad vegetables (blanched fresh seaweeds garnished with onions and tomatoes and/or flavored with calamansi juice). When the researcher surveyed on the local public markets for available seaweeds for trade, unfortunately, there are no single seaweed found. The local fisher folks of Sta. Ana and Gonzaga say that seaweeds are only available during the summer season where these macroalgae abundantly thrive in the wild.

Gamet (Porphyra) was abundantly found in the rocky coastal areas of Sta. Praxedes, based from the interview conducted on the seaweed gatherers, during the months of October where prevailing rainfall takes place, this gamet starts to grow. From the researcher's interview on the importance of gamet, old folks in the community used gamet not only as usual food but also as herbal medicine for stomach ache, they usually pan fry the dried gamet, pulverize and then add with hot water and will be given to person who is suffering from stomach ache. Gamet is also used to treat vitamin C deficiency. Other macroalgae like the Ulva lactuca (lab-labig), Sargassum (aragan) and Codium edule (pukpuklo) are said to be antihelmintic, treats goiter and gout.

Gamet gathering starts on the later month of October, November till February. The average income of the fisherfolk per month is Php 5,460.00 (data from BFAR RO2); during gamet season the average harvest was 13 pieces per day. The local trade in the public market have a selling price of Pph 28.00-35.00 per piece with an average mass of 15-16 grams per piece (dry), the average selling price of dried gamet per kilogram is amounting to Pph 2,333.00 while Pph 750.00-1500.00 for fresh per kilogram. Their number of seaweed gathering days is usually every other day or 15 days per month.

Furthermore, the local government of Sta. Praxedes through the Department of Agriculture Municipal Unit created a cooperative for gamet. The cooperative purchases the gamet from local seaweed gatherers and process the gamet for trade.

Among the macroalgae that are locally known by the people in the coastal towns of Cagayan as edible are the following (given their local name): aru-rusip (Caulerpa racemosa), lab-labig (Ulva lactuca), pukpuklo (Codium edule), ar-aritus (Valonia aegagropila), Gayong- gayong (Halymenia durvillaei), gamet (Phorphyra crispata), guraman or caocaoayan (Gracilaria), aragan (Sargassum), cawat-cawat (Chaetomorpha crassa), and canot-canot (Euchema denticulatum).

CONCLUSIONS

Based on the results obtained, the following conclusions are drawn:

The coastal towns of Cagayan have a diversified macroalgae species; the growth of macroalgae was highly affected by the different physical and biotic factors every month. The high abundance and diversity of macroalgae in the intertidal zones of the coastal areas of Cagayan support a great diversity of life. These coastal areas of Cagayan could become breeding grounds for local varieties and seaweeds farming. The local communities of the coastal towns of Cagayan used macroalgae species as human food and as items of trade; however, these species also have a wide potential for pharmaceutical and commercial purposes, thus paving the way for the people along the coastal areas a wider utilization.

RECOMMENDATIONS

The following recommendations are presented:

1. That macroalgae species that are rapidly decreasing in abundance as a result of being phased out by superior varieties should be preserved through the establishment of more gene banks. Hence, the Local Government units of the coastal towns of Cagayan should come up with a municipal ordinance to regulate seaweed gathering and to control the over harvesting that contribute to the decreasing abundance of macroalgae.

2. Researchers on the improvement of the present uses of or on the novel uses of macroalgae be encouraged in order to save the species from eminent extinction.

3. Further investigation on the diversity and abundance of macroalgae in relation to the physic-chemical parameters of the intertidal zones of the coastal towns of Cagayan for a year-round duration is conducted.

4. A follow-up study should be conducted to quantify, isolate, and identify the types of alkaloids, glycosides, tannins, flavonoids, saponins, steroids and triterpenoids present in each of the macroalgae species.

5. Further investigation of seaweeds claimed to possess therapeutic or curative properties be carried out on more technologically advanced laboratories manned by highly trained research workers.

6. Information education campaign and training should be provided to the fisher folks and seaweed gatherers on the wide utilization of macroalgae and seaweed propagation and farming to contribute to food security by the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR) in cooperation with the different Local Government Units of the coastal towns of Cagayan.

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EMERGING PAULINIAN VALUES FROM RESEARCH EXPERIENCES OF UNDERGRADUATE NURSING STUDENTS

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ABSTRACT

This study also aimed to propose an action plan to improve the CNAHS students' research experiences. The study utilized a convergence mixed method, action research design. The participants of the study are the 31 student research groups. The instrument used was an online form inquiring about their weekly research-related experiences, and the specific Paulinian values that were realized from those experiences. It used frequency and percentage for quantitative analysis and narrative analysis for the qualitative data. Findings reveal that the Paulinian core value that emerged with the highest frequency from the BSN4 students' experiences is community (f=256), which is realized during communication and interaction with the stakeholders of research. It is seconded by commitment to mission (f=154), which is recognized when they fulfill both research and academic responsibilities. The core value of charism (f=130) is felt when they face challenges in research while using their unique gifts and aspire to create quality output. Charity (f=82) is manifested when they accept changes and ideas for their research. Finally, from the experiences of praying to God to seek guidance for research emerged the value of Christ-centeredness (f=57).

Keywords*: Research, Paulinian 5 Cs, nursing research*

INTRODUCTION

Being a part of the tripod function of higher education institutions together with instruction and community service, research has always been regarded as an integral part of academic activities of universities in a global scale [3]. Government, legal and professional regulating bodies of tertiary schools upholds research as an important aspect that defines the state and effectiveness of a program or college. For an academician, research activities, programs and publications have career, social and financial implications. Being a university, St. Paul University Manila (SPU Manila) is gradually and systematically raising research consciousness and assimilating research culture among its undergraduate and graduate students, faculty, staff and administrators. Its establishment of a research center, inclusion of qualified research personnel and reinforcement of policies and procedures to involve its members in scholastic productivity, are clear indicators that SPU Manila is truly walking towards the direction of following international academic research hegemony.
St. Paul University Manila has been in existence for over a century. With its current vision of forming a community of disciples deeply rooted in Christ, the school does not only produce academically inclined and competent graduates, but also form professionals and practitioners who are Christ-centered, charitable, community and service-oriented, committed and charismatic. Aside from general and core courses offered by their respective programs, the university also require students to go through religious and values education programs to augment the attainment of this mission. It also offers extracurricular activities that further develop both the students' personality and spirituality[12].

One of the programs that St. Paul University Manila offers is Bachelor of Science in Nursing under the College of Nursing and Allied Health Sciences. For the past 50 years, SPU Manila CNAHS has led the formation of compassionate, skillful and globally competitive nurses. CNAHS is considered as a valuable nursing education institution as evidenced by continuous high licensure exam passing percentages and graduates taking important positions in various health agencies in and out of the country. Also, CNAHS has made a name due to its growing research culture and research productivity. For almost a decade, the college has hosted biannual research forums for both professionals and students. Moreover, students and faculty members from the CNAHS have presented their research in both local and international conference, even winning research-related contests. Truly, SPU Manila recognizes that nurses are not only care providers for patients and managers of health organizations, but also they are compassionate researchers.

In the BSN program in the CNAHS, research is integrated from the first to the fourth year. As indicated in the Commission on Higher Education (CHED) memo 14 (2009), the students go through two formal research courses. Within a one-year period, the students have to go through the whole research process and submit a full research manuscript as a partial requirement for the degree.

As a research instructor and mentor for five years, the researcher has noticed that the BSN students undertaking the research courses have varying values and behaviors towards the activities required by the subject. Research or 'thesis' as a social construct seems to elicit more negative than positive responses and appraisals among those who went through and are going through the process. Although there seems to be a general assumption that doing research builds character and certain traits, there is a scarcity of literature that tries to find the values that researchers develop in the scholarly activities that they do. Given these class observations, the social reality of the college 'thesis' and personal beliefs about scholastic productivity, the researcher hopes that this study provides an enlightenment of what specific Paulinian values are recognized and felt by Paulinian Nursing students from their research experiences as they go through the process.

Statement of the Problem

This study attempted to determine the emerging Paulinian values from the research experiences of senior BSN students undergoing the Nursing Research 2 course.

More specifically, this study aimed to answer the following questions:

1. What are the emerging Paulinian values from the research experiences of the participants in terms of the following core values?
    1.1 Community;
    1.2 Commitment to mission;
    1.3 Charism;
    1.4 Charity;and
    1.5 Christ-centeredness?

2. Based from the findings, what actions can be recommended to improve the research skills, output and experiences of undergraduate students?

METHODOLOGY

Research Design

This study utilized a mixed methods design. According to Johnson, et al as cited by Angell & Townsend, mixed methods research is "the type of research in which a research… combines the elements of qualitative and quantitative approaches… for the purpose of breadth and depth of understanding and corroboration…"

More specifically, this study used the convergent parallel mixed methods design. This approach, quantitative and qualitative strands are conducted concurrently and merged at the point of interpretation. This study is utilized to gain a more complete understanding of the topic, or to validate quantitative scales. The quantitative strand of the study is found in the computation of frequency of the Paulinian values reflected, and qualitative analysis will be done to uncover and relate these values with their research experiences. Also, the use of both approaches which have demonstrated the use of both qualitative and quantitative methods in the study of school values [9]. Finally, this study is an action research for it presents a concrete action plan based from the findings of the study.

Research Instrument

Since the study is internet-based, the research instrument used is an online form constructed using google docs. This is to facilitate the ease in collection and mining of the data to an electronic form, for easier analysis. Other noted advantages of using online forms are reduction of costs, timeliness of results, improved accuracy, increased response rates and accessibility (Das, 2012). The link for the forum is posted in the personal blog site of the researcher, www.learnburger.blogspot.com. The online form is entitled: Nursing Research Progress Worksheet. A clause warranting informed consent and ethical consideration is found before the start of the first question.

Preliminary questions included the names of the group members and research titles. The form also inquired for a description mentor and mentee sessions. The questions in the online forum that were actually analyzed in the study are those that asked: (1) the research activities that were done in the week; (2) the difficulties encountered in doing their research with the week, and; (3) three Paulinian values that they reflected from the week's research experiences (see appendix for screenshots of the online form). For each question, a sample answer is indicated to ensure accuracy and consistency of responses. The answers are then downloaded as cell inputs in a Microsoft Excel file. The online form was presented to and validated by the CNAHS dean.

Research Participants

The participants of the study are the thirty-one research groups of BSN batch 2012-2013 (Les Enfantes de Marie), officially enrolled in the Nursing Research 2 class during the first semester. The types of research studies done by the research units included quantitative, qualitative and mixed methods designs. Each sampling unit of researcher/s was comprised of one, two and three members. One submitted online form with complete responses corresponds to one research unit. For this study, one participant equates to one research unit. The researcher used universal sampling: all the research units were included in the study.

Data Collection Procedure

The faculty researcher secured administrative clearance from the CNAHS dean during the start of the semester, before the Nursing Research 2 class. During the first meeting, the researcher, who is also an instructor of the class, discussed the procedure of updating the Nursing Research Writing Progress Worksheet. The effectiveness of the instruction was evaluated through a return demonstration.

The researcher instructed the participants to accomplish this form on a weekly basis and submit it online every Saturday before 5pm. The time span of the study was from mid-July to September of 2013. A methodological limitation that was noted in the study that not all research units posted on a regular basis and missed some weeks.

In order to properly answer the question inquiring about the Paulinian values reflected from the experiences, the students were provided with a list of all specific Paulinian values and behavioral indicators as they are categorized in the Paulinian 5 Cs or core values. The list served as a guide in identifying the value that struck them the most during their research activities in the week.

At the end of the Nursing Research 2 course, the researcher downloaded all the responses in a Microsoft Excel format and yielded a total of 693 responses. Out of this number of responses, the researcher only considered 679 whose responses were complete and had answers which complied with the proper format. The researcher tallied both the specific values and the core value which each belongs to. This is the quantitative analysis strand of the study. The researcher utilized qualitative narrative analysis. For a systematized analysis of information from the postings, Powell and Renner (2003) introduced a five step process in analyzing narrative data.

RESULTS AND DISCUSSION

Community Core Value

Among the realized specific Paulinian values under the community core value, communication emerged as the one most mentioned by the research units (f=109). Qualitative analysis of experiences shared by the students demonstrates that this value is appreciated when they communicate with their research group mates, advisers and panel members. This can be illustrated by the following narratives:

"…Working apart with my partner in our research and doing what was assigned to us, we have practiced good communication so as to practice uniformity in analyzing…"

"…Doctor communicated with us though she was miles away from the country. It is always essential to keep in touch with an adviser because they are the guides to an excellent research."

"…We need to communicate with our entire panel, adviser because it is important that they know what the status of our research…is"

"…we have a poor communication with our adviser and I pray that we can talk to her soon"

Other experience wherein the value of communication was realized by the student researchers was dealing with respondents during data gathering. One research group shares, "…when we had our first interview, we had a very good communication and we built rapport easily…" This value was also recognized when they secure administrative clearances as manifested by the post, "…we talked to the secretaries of the schools we have visited this week and explained our intention to conduct our study in their school, we also asked for their contact number so that we could follow up our request…"

Cooperation is the second most common value on community that emerged from the participants' research experiences (f=63). This value is expressed mostly in cooperating with research partner and adviser, as one participant posted:

"…in order for us to finish our research study with a good outcome it is important for us research partners to work together and comply with the tasks assigned to us. As well as, cooperating with our research adviser, putting in her ideas and suggestions as well…"

According to some participants, effectively dealing with the respondents and the locale was also a form of cooperation. Some also noted that cooperation is important in both quantitative and qualitative analysis, as reflected from the following posts:

"…Cooperation - it is one of the reasons why we have done our tally on time…"

"…This week was all about cooperation. We have to cooperate with another person in order to have the verbalizations translated. We had to coordinate with each other because of all the clashed ideas which we had to transform into one united one."

The third most common value realized under the core value of community is dialogue (f=18). Students find this value during their interaction with research group member, adviser and respondents. Also to a few, dialogue is important in expressing research ideas, setting schedules and solving problems. One student posts:

"…I feel that listening attentively to every detail is important especially with regards to research timing of schedules because I have assumed and modified my own schedule of activities and it lead to waste…"

Some responses indicated respect as a value realized through accepting rejection of prospective respondents to partake in the study, following the procedure of securing administrative clearance and treating data carefully and preventing bias in analysis, as one participant stated, "…One of the most challenging parts of this week was trying to prevent bias from affecting the interpretation of our results. In this aspect, we really had to put ourselves in our respondent's shoes…"

Research units recognized the value of connectedness locally and globally, through the experiences of searching for foreign literature for analysis, communicating with an adviser in another country and sampling graduate-respondents from other nations.

Respect for cultural differences and diversity also emerged as a significant value. This was felt during the times were translating and interpreting narratives, and dealing with respondents abroad.

Other values under the community core value which also emerged but in lesser frequency than those previously mentioned were mutuality, interdependence, solidarity, coordination, freedom from discrimination, protecting human rights, sense of belongingness, wide use of web and media, sharing of resources and unity.

This core value of community is overtly expressed in the SPU Manila Research Center's mantra: "research adds service to life, and research adds life to service."

Commitment to Mission Core Value

Among the realized specific Paulinian values under the commitment to mission core value, sense of responsibility emerged as the one most mentioned by the research units (f=126). It also important to note that this specific value has the highest incidence compared to the rest, covering 18.56% of the total value responses. Qualitative analysis of experiences shared by the students demonstrates that this value is usually recognized in terms of accomplishing assigned research tasks. This can be illustrated by the following narratives:

"…we must be able to do the planned activities in order to be able to finish the research on time. We must recognize the importance of knowing our responsibilities in order to make our research…"

"…in the research study that we are conducting it is important to know our responsibilities in order to finish our tasks/parts so that we could finish and accomplish our research study…"

"…we are now having a sense of responsibility because we need to move forward with our research. We should be responsible especially on the task and opportunity that our adviser gave us…"

Balancing research activities and academic requirements is another experience wherein which the participants' sense of responsibility is challenged. This is manifested through the following quotes:

"…We felt that we really need to be responsible enough in managing our time in order to have a successful data gathering because other than [being researchers] we are nursing students, we also have hectic schedule that's why we really need to adjust on our respondents…"

"…we still made sure that we could finish the tallying despite the exams…"

"…Even if we're both tired due to our prior clinical and community exposure, we still pushed through passing our requirement [to the locale]…"

The practice of time management both efficiently and poorly also brought upon the value of sense of responsibility among the student research groups. One group shares how they managed their time effectively:

"…We felt that being responsible to your action and works is important to the process of research because you need to manage your time to finish the study…"

On the other hand, another unit posts managing time in a phenomenological study was challenging for them:

"…Time management was truly one issue that [my partner] and I had difficulty with this past week. We have realized that qualitative research takes more time than expected. We need to be more responsible in time management in order to finally finish this…"

It can be noted that in most of the activities related to the research process, such as sampling, securing administrative clearance, data collection, analysis and actual writing, emerges the Paulinian value of sense of responsibility. A peculiar experience noted that is related to this value was working solo in research. This is usually shared by research units with only one member. A solo student researcher responds:

"…throughout the process of finishing my research, I always feel the sense of responsibility since I am the only one working on this research. I know that if I would not move, nothing will really happen to me…"

In the act of owning up to mistakes, some participants also reflect sense of responsibility. For instance, one participant shares their experience about late submission, "…we are responsible [for] any sanction that we will get in our research…" Another research group posts: "…we are taking all the responsibilities of the delays and corrections in relation to our research…"

Another specific Paulinian value that emerged under the commission core value is accountability. The most common experience shared by the students wherein this value has been realized is due to late submission of research requirements. Here are some responses that illustrate this point:

"…the researchers shall be accounted on the reason why their research paper will be passed late…"

"…Since we didn't able to submit on time our research, we are liable in any consequence that our panel will give…"

"…we weren't able to finish all the survey, which was supposed to be done this week…"

Accountability was also realized in the efforts to accomplish assigned tasks, managing time and handling the data. Accountability in the careful handling of data can be seen in the post of one participant:

"…By us being accountable, the respondents will have their trust on us and will give the information that we are asking from them. By knowing that we are accountable for such data, we will be careful and we'll do our work properly…"

Sacrifice was the third most common value under commission that was recognized. Sacrifice was realized by the students when they set priorities and manage their time. Some mentioned that they had to give up leisure time to finish their research, as shown by the following statements:

"…during our afternoon break, we usually go and do our survey instead of having our break…"

"…Though the challenges of sitting and analyzing for hours exist, the sacrifice of the time put into the work will shine through as it will benefit others…"

Other specific values that emerged under the commission value are involvement in social issues (one group did a study about abortion), deep sense of direction and purpose and tranquil daring.

Charism Core Value

Among the realized specific Paulinian values under the charism core value, courage emerged as the one most mentioned by the research units (f=18). Qualitative analysis of the narratives demonstrates that the common experiences wherein this value is felt is when the students are facing changes and difficulties in research. This is illustrated by the following responses:

"…I hope that while making this study, we will able to face all the challenges and difficulties with courage and confidence…"

"…even though we already did data collection changing the questionnaire and began again from scratch will defiantly need a lot of courage and percipience…"

"…It takes courage to withdraw from the institution we have been vying for all these weeks. Looking for participants for such a short length of time also requires it…"

Another common experience wherein courage is realized is during encounters with respondents for data collection. Some of the student researchers expresses that she needs courage in administering a survey among student respondents during their class: "We should have the courage to gather data because sometimes we could interrupt a class but still we should have respect in stating our intention…" Another nursing research group, doing a phenomenology about an HIV and AIDS prevention and care advocate has learned the value of courage during their interview with her. The student researchers post:

"…courage was present in our participant. She said that if you do not have an initiative to speak for yourself and for the whole HIV community nothing will happen…"

The specific value under charism that garnered the second highest frequency (f=17) is healthy ambition. Many of the participants expressed their aspiration to create quality research output as seen in the following posts:

"…We really want to finish our research strong. We want to be able to reach our goal comprehensively and to the best of our ability. We want to open new doors with our research because we understand that this topic is unique especially in a conservative country such as the Philippines. That is why we are ambitious to improve our interpretation and analysis of the verbal cues…"

"…this study is not only for us to pass a research paper and to complete our course requirement… It is for the future nurses to know how to help the children on their studies and for effective health teachings to children to be done…"

Healthy ambition is also reflected in aiming for future research dissemination and awards. One participant shares: "we always put in our mind as a motivation that we have one of the best research in our batch..." Another research group aims to present their output in another school: "we still hope that our research will be chosen for inter school research presentation."

Aspiring for perfection is the third most common value that emerged under charism. This was experienced by the participants in ensuring the quality of the research output. Others were so concerned about the good quality of research that they had to forego submitting the manuscript on the due date prescribed, as reflected in the following quotes:

"…One of the reasons why we will not be able to pass in our research is because we really want to make it the best final draft as possible. We would rather it be late than to turn in something rushed and not well-thought about…"

"…as said by one of my group mate, 'I don't want to pass half [baked] work.' Worse comes to worst, we won't pass on the deadline. We would not pass it not unless we did it 'perfectly'…"

Other charismatic specific values that arose from the experiences are critical thinking and creativity. This value emerged from the experience of analyzing qualitative data and development of themes, as illustrated by one research group through the post, "…since we are in the process of categorizing and analyzing of our themes, critical thinking is very essential in order to do this properly…" Also critical thinking is realized during making necessary abrupt changes, such as deciding to change the respondents and reformulating the survey tool.

Love for study, academic excellence and thirst for knowledge also emerged as a significant specific charism values. Most participants felt these values in doing and finishing research in its totality, without mentioning specific research incidents.

Leadership is another value that surfaced from the experiences. This is seen in the practice of shared leadership within the group, as illustrated by the post: "…This week we have learned that as two researchers working in one research, we must be each other's leader and remind each other of each other's responsibilities…" Moreover, leadership is also enfleshed through taking initiatives.

Pursuing professionalization also emerged as a charismatic value. This is practiced when interacting with respondents and administrators of locale. Other values that were identified under charism that did not garner a notable frequency are pursuing lifelong learning and assertiveness.

Charity Core Value

Among the realized specific Paulinian values under the charity core value, acceptance emerged as the one most mentioned by the research units (f=27). Qualitative analysis of the narratives demonstrate that the common experiences wherein this value is recognized is when the students are accepting changes and challenges in research. This is illustrated by the following responses:

"…We were able to accept the things our co-author wants to change [in] our research paper and revise it…"

"…I feel that when we are talking with our adviser and panel we always need to accept whatever they want us to change because [it is] for the best…"

"…acceptance: We felt that even though our schedule proposals for data gathering were rejected we still managed to adapt with the undesirable turn out of events…"

"…We accepted the last minute changes that were made in our study because we believe that it would be beneficial and it is for the betterment of our research. We student nurses are open and known for… flexibility and adaptability…"

Also, the aforementioned value is felt when the research group accepts support from other people, whether it be from family members or classmates who are not part of the group. One participant shares that her sister, some alumni and classmates assisted her in data management: "the help I was able to receive from this study was really overwhelming. At first I was hesitant but I realized that I needed other people's help to meet the deadline…"

The value of acceptance is also manifested when the researchers receive the evaluation from the panel members during validation. One group posted, "…we accepted the panel's decision [of] major revision. In the brighter side, we will [be] able to learn from our mistakes."

Openness is the next most common value realized under the charity core value. Being open was recognized by the research groups in the exchange of ideas and criticism within the group, from the adviser and panel members. For instance, a participant posted: "We're very thankful to each other that we share our ideas and it feels good for both of us to work together again…"

Another specific value that emerged under the charity core value is kind language, which is usually recognized when communicating with respondents. In line with this, a research group answered, "… [I] and my partner talked about how we should approach the people whom we're going to conduct are research to. We said that we need to be courteous and show that we are Paulinian…"

Tact was also a value under charity that was realized from their experiences, especially during careful handling of data, from collection to analysis and presentation. One participant who was doing an internet-based research expressed her concern about upholding confidentiality of the data, "…I realized that this research I am conducting has a community, a cyberculture community. Hence, I should be tactful in sharing what I read and see in their forum…"

Other values that emerged under the charity core value were forgiveness, friendliness, kindness, concern for the deprived, hospitality and joy.

Christ-centeredness Core Value

Among the realized specific Paulinian values under the Christ- centeredness core value, deep personal relationship with God emerged as the one most mentioned by the research units (f=25), followed by practice of personal prayer (f=10). Qualitative analysis of the narratives demonstrates that the concrete activity wherein these two values are recognized is through praying to God. This is illustrated by the following responses:

"…We always pray to the Lord to guide us in finishing the research and guide us on the right method of analysis in our study…"

"…we are in really sorrowful days now, because we cannot have proper consultation. We are praying to God that He will help us to pass through this tough time…"

"…With all the pressure and the deadline [fast] approaching, we put God first and pray for his help that we may finish our research paper with no revisions at all…"

Other ways that the student researchers practice this value is through attending mass and offering their efforts to Him. It is also indicated in the posted statements of some participants that they seek for God during the difficult times of the research, as illustrated by the following:

"…This week had been a real challenge for me, I needed to finish three major tasks on different subject while doing my research, I was getting exhausted which I dealt with my praying dearly everyday…"

"…I am starting to lose hope in finishing my research. But I always end up going to the prayer room and asking God for the strength to face these adversities and give me wisdom to know what step I should take next. I know, I am not alone in this, because I have Him…"

From the research experiences, also emerged the value of peace under the Christ- centeredness core value. This value is realized as the group takes effort to maintain a harmonious relationship. One participant illustrates this by posting:

"We consider peace for this week because, even though we have allotted of things that needs to be done... and with all of the chaos around us, and the pressure that we are experiencing, we still try to maintain our peace with each other, even if at times we have our [shortcomings]..."

"…even if we had some petty [misunderstandings] with each other, we were still able to have peace with each other…"

Also, a few participants reported feeling inner peace when they reach certain milestones in research. One research group shares: "…we felt inner peace when we saw the progress in our research letter…"

This is also related to the post: "…thank God we finally getting into the core of our study, we are almost starting it by next week…"

Other values that emerged under the Christ-centeredness core value are Love of Christ, faith, reverence, awe, closer to God and lightness of spirit.

Paulinian Five C's

The core value that got the highest frequency is community (f=256), followed by commission (f=154), charism (130), charity (82) and Christ-centeredness as that gained the least frequency (f=57).

CONCLUSIONS

Based from the findings, the researcher therefore concludes that:

Community is the core value that is most frequently realized as undergraduate nursing students go through the research process. For the Paulinian student nurse researcher, research is a highly social activity wherein they communicate, interact, collaborate and work with the various stakeholders of their respective study to ensure its efficient conduct.

Undergraduate nursing students doing research conduct their study with a sense of responsibility. Being only a partial requirement to earn their BSN degree, they exert effort to work around their schedules to achieve both their research and academic goals. Paulinians consider research challenges and difficulties as opportunities to make use of their God-given intellect, abilities and leadership skills. Despite the uneasy nature of research, BSN students undertaking this endeavor express their charism through aspirations to create a quality paper and to disseminate its results. BSN students doing research resilience as they accept changes and inputs for the improvement of their study. They are open to ideas. However, there seems to be a misfit on how acceptance as a specific value of charity is actually manifested. Not much of the charitable nature of research was exposed in the responses. Christ-centeredness is the value least realized in the research process. It is important to note, however, that Paulinians place God in the center of their scholastic activities, and make Him seem like a constant member of the research groups.

RECOMMENDATIONS

From the findings presented and conclusions drawn, the researcher therefore proposes the proceeding action plan for St. Paul University Manila:

1. Further emphasis on the importance of communication skills; teaching proper oral and written, and verbal and non- verbal communication techniques that can be utilized in the conduct of research.

2. Upgrading internet connection; increasing availability of internet for students; Awareness campaign for existing online research databases available; making more online research databases available.

3. Improving the coordination of curricular and extracurricular activities within the program; monitoring performances; adjusting requirements and schedules as needed.

4. Assessment of student's capability and attitude towards research, and available resource before granting solo- authorship; closer monitoring of solo researcher's progress.

5. Monitoring of research progress; Constant consultation; Logistic support; Speedy address of arising concerns.

6. Hosting of research forums; Involvement in outside research forums; Finding avenues for publication; Co- authorship with faculty.

7. Monitoring of research progress; Constant consultation; Logistic support; Speedy address of arising concerns.

8. Values clarification program; strengthening value understanding through infusion in the classroom.

9. Encouragement of students to pray and participate in sacraments; Offering prayers and mass intentions for the student's research.

10. Including reflective process in research classes; Full implementation of the self- realization page in research manuscripts.

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EMOTIONAL INTELLIGENCE AND TEACHING EFFICACY: THE CASE OF ISABELA STATE UNIVERSITY MATHEMATICS PRE-SERVICE TEACHERS

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ABSTRACT

Evidences have shown that emotional intelligence is associated with job performance. However, emotional intelligence has not been proven to be a factor for good teaching performance. In view of this, the author correlated the emotional intelligence and teaching efficacy of mathematics pre-service teachers of Isabela State University. Forty (40) mathematics pre-service teachers from the six campuses of Isabela State University, School Year 2010-2011 were considered as subjects of the study. The emotional intelligence of the mathematics pre- service teachers was measured through the use of the EQ MapTM while their teaching efficacy was assessed through the use of the NCBTS-based rating scale to determine efficacy of pre- service teachers. The author concludes that a negative correlation exists between resilience and the domains teachers' personality and lesson planning, and between intuition and teachers' personality; and a positive correlation was observed between interpersonal connection and the domains content, teaching methods, classroom management and questioning skills, and between trust radius and questioning skills. Therefore, the universities should provide Mathematics pre- service teachers with programs and activities such as training courses, seminars, workshops, and conferences that would help the student teachers overcome their resilience and strengthen their interpersonal connection.

Keywords: *Correlation, Emotional Intelligence, Teaching Efficacy, Mathematics, Pre- Service Teachers*

INTRODUCTION

Over the past 20 years, a vast amount of evidence has accumulated demonstrating that a different set of factors, related to emotional intelligence, can play a more important role in our ability to succeed at work and at home. This is due to the fact that cognitive theory could simply not explain the questions we wonder about most: why some people just seem to have a gift for living well; why the smartest kid in the class will probably not end up the richest. Cognitive intelligence without EI can get one a "1.0" on a test but will not get him ahead in life. This is the dilemma that concerns most of the educators for EI may actually be a greater indicator of lifelong success than cognitive intelligence.

Research tracking over 160 high performing individuals in a variety of industries and job levels revealed that emotional intelligence was two times more important in contributing to excellence than intellect and expertise alone[11].

The development of EI is in the formative years of a person. Hence, the role that teachers play is crucial since they can affect inadvertently the students under their care. The level of the teachers' EI provides a kind of barometer for the social values of the students and can contribute to the development of the students' EI. It is the responsibility of every teacher to develop students in their highest potential. [5]Emotion has the power to increase retention and learning. One tends to remember and learn more those that strike his heart! In fact the more emotionally involved the students become in his lesson, the greater is the impact to him. Thus, they encourage educators to add an emotional touch to learning. They stressed that without the emotional dimension, our subject matter will remain cold and lifeless. They cited the statement of Wolfe (2001) that "our own experience validates that we remember for a longer time events that elicit emotion in us." His pedagogical advice is for us to recognize the power of emotion to increase, and plan instruction accordingly.

Thus according to EI models, man's affective acumen is significant in attaining success in almost all aspects of human endeavors. EI, however, is a concept that has not been fully explored and that is often overlooked. Its significance in the life of man especially in determining how well one performs is often ignored. In fact, public education itself has given little attention to the promotion of emotional competency among students. It has been observed that educators focus themselves in nurturing the cognitive development of students, and give little attention in students' affective development.

The same scenario is observed in the teaching efficacy (TE) construct which has proven its importance in an educational setting that has further significance beyond the impact it has on student achievement. Furthermore, majority of studies that examine student teacher efficacy has largely been limited to the United States with only two universities accounting for 40% of the total population sampled[2]. Little research into student teacher efficacy has been conducted in the Filipino context. Thus, further research priority for studying teacher efficacy in student teachers in the universities in the Philippines is warranted and the present study seeks to gain such insight.

Moreover, no study has examined the EI of mathematics student teachers as the variable possibly affecting teaching efficacy levels at the secondary level. It is for these reasons that the writer was encouraged to undertake this study to find out the relationship of EI and TE of mathematics student teachers.

Statement of the Problem

The study aimed to determine the emotional intelligence of the mathematics student teachers in Isabela State University and relate this to their teaching efficacy.

Specifically, this study sought to:

1. Determine the emotional intelligence of mathematics student teachers;

2. Determine the teaching efficacy of mathematics student teachers;

3. Determine the difference between the teaching efficacy of the mathematics student teachers as rated by their cooperating teachers, themselves; and

4. Determine the relationship between their emotional intelligence and teaching efficacy.

METHODOLOGY

This study applied the descriptive correlation method. The subjects of this study are the mathematics student teachers of Isabela State University, School Year 2010 – 2011. The emotional intelligence of the mathematics student teachers was measured through the use of the EQ MapTM which is an extensively researched, norm-tested and statistically reliable instrument that was developed in 1996 by Orioli, working in collaboration with Cooper which was validated in the Philippines [10]. On the other hand, their teaching efficacy was assessed through the use of the Criteria for Judging Efficacy of Student Teachers which is based from the Experiential Learning Handbook. The researchers personally went to the different cooperating schools to administer the EQ MapTM to the mathematics student teachers during their off campus and to ask them to rate their own teaching efficacy. Furthermore, the researchers also asked their cooperating teachers to assess the teaching efficacy of the mathematics student teachers under them.

The researchers utilized the weighted mean to gauge the level of emotional intelligence and teaching efficacy of the mathematics student teachers, standard deviation to represent the spread of the distribution, Independent Samples t-Test to compare the mean differences in the teaching efficacy as perceived by themselves and their cooperating teachers, and Pearson-product moment correlation coefficient to determine the relationship between emotional intelligence and teaching efficacy. The gathered data were processed through the use of the Statistical Package for Social Sciences (SPSS).

RESULTS AND DISCUSSIONS

Emotional Intelligence of the Mathematics Student Teachers

The mathematics student teachers have an optimal outlook (mean = 3.50, sd = 0.31), and interpersonal connections (mean = 3.32, sd = 0.30). They are least proficient and most homogeneous in terms of personal power (mean = 2.96, sd = 0.18), and emotional expression (mean = 2.81, sd = 0.27). The mathematics student teachers have a proficient emotional intelligence (overall mean = 3.05, sd = 0.18). The strength of mathematics student teachers in terms of outlook can be credited to the fact that in the realm of Filipino psyche, Filipinos are religious thus they devote time to reconnect with God. They have strong faith, believing that problems and adversities in life will surpass with the help and providence of God [13]. Positive outlook is innate to the Filipinos for we are born in a developing country which experiences a lot of problems due to poverty and even natural disasters. Even if we experience a lot of dilemma in life, we still manage to hang on and move on no matter what happen and cling on to the idea that God is always there to help us though this difficulties.

Moreover, relationship management, or social skills, is the core competency put forth [9] and describes one's adeptness at effectively handling interpersonal relationships. Thus, the strength of the Filipinos in terms of interpersonal connection can be rooted to the fact that an absence of kapwa is viewed by the Filipino as a most negative state a person can have: Pakikipagkapwa is much deeper and profound in its implications. It also means the Filipino way of accepting and dealing with the other person as an equal. The company president and the clerk in an office may not have an equivalent role, status, or income but the Filipino way demands and implements the idea that they treat one another as fellow human beings (kapwa-tao). This earns a regard for the dignity and being of others[6].

Weighted Mean of the Perceptions of the Student Teachers and their Cooperating Teachers on the Teaching Efficacy of the Mathematics Student Teachers

The 4.22 overall mean indicates that the student teachers have a very satisfactory performance in mathematics teaching. Furthermore, they are most efficacious in the domain teacher's personality with a mean of 4.46 and least efficacious in questioning skills (mean = 4.08). This indicates that they possess the necessary competencies needed in the teaching field. In support to the fact that they are most efficacious in terms of teacher's personality[11,7] and others, chose the personality/ability constructs to add to a growing inventory of effective teaching characteristics. The long-term objective is to link personality/ability data with the actual outcomes of teaching performance, even though this approach may take many years to evolve.

All in all, the mathematics student teachers of Isabela State University are extremely efficacious. Hence it can be said that teaching efficacy includes being organized/well-prepared, selecting appropriate objectives, aligning teaching activities to meeting those goals, time management, communication, explaining difficult topics in simple terms, and assigning useful tasks and homework.

t-Test for Equality of Means between the Mean Perceptions of the Mathematics Student Teachers and their Cooperating Teachers

There is a significant difference in the teaching efficacy of mathematics student teachers as perceived by themselves and their cooperating teachers as tested in the 0.05 level of significance in the domain questioning skills with 0.005 value of significance. This implies that the mathematics student teachers of Isabela State University are consistently judged as efficacious in terms of personality, lesson planning, content, teaching methods and classroom management. Furthermore, the mathematics student teachers obtained the lowest rating from the cooperating teachers in the domain questioning skills compared to their self rating has negative mean difference of -0.207. This indicates that the cooperating teachers' judgment on the questioning skill of the mathematics student teachers is significantly lower than their own judgment. In view of the broad-spectrum, the 0.693 value of significance implies that both the mathematics student teachers and cooperating teachers perceived that the mathematics student teachers are highly efficacious as tested in the 0.05 level of significance.

Correlation between the Emotional Intelligence and Teaching Efficacy of the Mathematics Student Teachers

Resilience

The significance values of 0.021 and 0.016 imply that resilience is negatively associated with teachers' personality and lesson planning as tested in the 0.05 level of significance with a moderately low correlation based on their Pearson r values of – 0.419 and – 0.434, respectively. This indicates that the mathematics pre-service teachers who are less flexible to retain a sense of curiosity and low level of hopefulness in the face of adversity have better teachers' personality and are more skilled in lesson planning.

Interpersonal Connection

In terms of interpersonal connection, the 0.001, 0.016, 0.000 and 0.000 values of significance indicates that interpersonal connections is positively associated with content, teaching methods, classroom management, and questioning skills, respectively, as tested in the 0.05 level of significance. Moreover, moderately high correlation exists between interpersonal connection and the three domains of teaching efficacy, questioning skills, classroom management, and content, with Pearson r values of 0.617, 0.600, and 0.593 respectively, while moderately low correlation can be observed between interpersonal connection and teaching methods as shown in their Pearson r value of 0.438.

Hence, it is a manifestation that the mathematics pre-service teachers who have high efficacy in terms of content, teaching methods, classroom management and questioning skills have high ability to create and sustain a network of people with whom they are in their real and whole self. To whom they can express caring and appreciation with whom they can share their vulnerabilities and hopes.

Intuition

The significance value of 0.044 entails that intuition is negatively associated with teachers' personality as tested in the 0.05 level of significance. Furthermore, the Pearson r value of -0.370 means that there is a moderately low association between intuition and teachers' personality. This indicates that the mathematics pre-service teachers who are less efficacious in terms of teachers' personality have a higher ability to notice, trust and actively use their hunches, gut-level reactions senses and other non-cognitive responses produced by the senses, emotions, mind and body.

Trust Radius

Trust radius is also positively associated with questioning skills with a 0.039 value of significance as tested in the 0.05 level of significance. In addition, the 0.379 Pearson r value marks a moderately low correlation between trust radius and questioning skills. This means that the mathematics pre-service teachers who are highly efficacious in their questioning skills have a higher degree to which they expect other people to be trustworthy, to treat them fairly, and to be inherently "good", their inclination to trust until they have specific reason not to.

However, none of the domains of teaching efficacy is significantly associated with emotional quotient in general with significant values of 0.228, 0.310, 0.808, 0.712, 0.422 and 0.748 as tested in the 0.05 level of significance. This implies that emotional intelligence did not significantly relate to the teaching efficacy of the mathematics student teachers. [14] Emotional intelligence and teaching performance are not related. Hence, emotional intelligence is not significant factor for good teaching performance.

One of the reasons may be the reality that EI, though a crucial ability for human beings as a whole, is just one human ability among many. Human beings exhibit a marvelous capacity to adapt to their own skills and preferences in the face of a complex environment. That is, a person will compensate for low EI by building on other strengths. This may also be attributed to the fact that one factor underscoring the method of student teacher assessment is the routine inflation of student teachers' grades[3].

CONCLUSIONS

The result of the study revealed the following statements:

The Mathematics student teachers demonstrated steady balanced emotional intelligence effectiveness in most situations. The Mathematics student teachers are equipped with the necessary competencies needed in teaching. The perceptions of the Mathematics student teachers do not differ with the perception of their cooperating teachers in terms of teaching efficacy. Emotional intelligence is not the only factor in attaining a very satisfactory teaching efficacy.

RECOMMENDATIONS

In the light of the study, the following recommendations were made:

1. The university should provide Mathematics student teachers with programs and activities such

as training courses, seminars, workshops, and conferences in emotional intelligence.

2. Mathematics student teachers must keep an on-going professional development in accordance with the needs of students and society.

3. The higher education institutions should strengthen the connection with their chosen cooperating schools so that the cooperating teachers are given more opportunities to share their insights regarding the efficacy of the student teachers.

4. Further study should be conducted to investigate the relationship between emotional intelligence and other aspects such as leadership styles, leadership qualities, and job satisfaction.

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ENROLMENT MANAGEMENT SYSTEM

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ABSTRACT

An Enrolment Management System enhances the process of enrolment transaction during enrolment period. It was formulated with specific objectives: to determine the effectiveness of the existing and developed enrolment management system as perceived by the respondents along the following quality characteristics of software: functionality, reliability, usability, efficiency, maintainability, and portability; to determine the performance of the existing and developed EMS during enrolment and evaluation process; to determine what features to propose to enhance the effectiveness and performance of the EMS to be developed; to determine if there is a significant difference between the effectiveness of the existing and developed EMS during the enrolment and evaluation process. The Descriptive and Developmental Method of research was used. The respondents were the personnel who have direct stake in the enrolment process. The data used in this study in this study was gathered through the use of interviews, observations and questionnaires. Through the use of percentage formula as the statistical tool, the results were interpreted and analyzed, and the researcher found out that there were various factors that must be considered in developing the system. The result of the study will serve as an advantage to the person-in-charge of the enrolment process. It would provide accurate enrolment results and rapid enrolment transactions during enrolment period. To this end, it is recommended that a comprehensive development program and sound strategies be implemented in order to manage the complexity of the system and to enhance its efficiency and effectiveness. As an improved system design, it will present a user friendly interface. The Enrolment Management System will be made to enhance and speed up the different enrolment transactions and processes.

INTRODUCTION

When man learns to value objects and other people, he strives to develop more effective and efficient measures to keep track of his resources. An old adage says, "If you have difficulty in sleeping, just imagine yourself beside a fence and count all the sheep that jump over the fence. By the time you get to 100 you'll be more or less asleep". This illustrates the hardship in keeping track of resources before the advent of writing was implemented.

Keeping track of resources became better when paper was introduced. The abundance of material for recording allowed the development of different ways of keeping track, cross-referencing and crosschecking. Information storage and retrieval has been revolutionalized by the widespread of computers. These remarkable machines have become indispensable tools of modern business systems. Computers have redefined work and organizational structures, flow of work, and outputs of many firms.

The latest trend in information storage is the paperless office, an office where all documents are stored in computers for convenient access. A more sophisticated version would be an online access where the users would be able to transact through the Internet depending on their access rights.

The Internet, particularly the World Wide Web (WWW), started as a means of communication in research laboratories. Millions of people use the Internet today for a variety of reasons. Wherever you are, as long as you have a computer terminal with access to the Internet, you can connect to another remote Internet-connected computer.

Some colleges and universities, about 95 percent in the Philippines have responded to the call towards globalization via computerization. Registration, paying of fees, dropping from enrolment, and other related processes are carried out much easier, faster and more conveniently with computerization. But even with computers, things can still go wrong. Hence, there is a need to seek better ways of catering services to the students or clientele.

Statement of the Problem

Generally, the study focused on the development of an (EMS) Enrolment Management System for Data

Center College of the Philippines – Laoag City.

Specifically, the study addresses the following questions:

1. What is the effectiveness of the existing enrolment management system as perceived by the respondents along the following quality characteristics of a software:
   1.1 functionality;
   1.2 reliability;
   1.3 usability;
   1.4 efficiency;
   1.5 maintainability; and
   1.6 Portability?

2. What is the performance of the existing EMS during the enrollment and evaluation process?

3. What features are proposed to enhance the effectiveness and performance of the EMS to be developed?

4. What is the effectiveness of the developed enrolment management system as perceived by the respondents along the following quality characteristics of a software:
   4.1 functionality;
   4.2 reliability;
   4.3 usability;
   4.4 efficiency;
   4.5 maintainability; and
   4.6 portability?

5. What is the performance of the developed EMS during the enrollment and evaluation process?

6. Is there a significant difference between the effectiveness of the existing and developed EMS along the quality characteristics of software: functionality, reliability, usability, efficiency, maintainability, and portability.

7. Is there a significant difference between the performance of the existing and developed EMS during the enrollment and evaluation process.

METHODOLOGY

Research Design

The Research and Development (R&D) type of research was used in this study. According to Bennof (2005), Research and Development type of research is a creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge is to devise useful materials, devices, and systems or methods, including design, and development of a new processes to meet the specific requirements.

The researcher proposed an Enrolment Management System for Data Center College of the Philippines – Laoag City based on the existing LAN-based enrolment system of the school; it adopted and enhanced some of its processes and functions with additional features that enhanced the existing system as a whole. The researcher also used Descriptive Method and the Developmental Research Method.

The Descriptive Method was used by the investigator to gather information about presenting existing conditions. This method involves collection of data in order to test the purpose or to answer questions concerning the present status of the subject of the study. In this method, the researcher showed the existing system's flow of transaction and operation, its different processes or procedures, and the difficulties or problems encountered by the personnel involved in the enrolment process.

The Developmental Research Method was used to document the development of a system for the design, including the unit of analysis, participants, software approach, data sources, collection procedures, and data analysis for each case. In this method, the researcher performed this by the use of the Software Development Life Cycle (SDLC) to ensure that end-state solutions meet or even exceed the user's requirements in support of business strategic goals and objectives. The SDLC also serves as a detailed guide to help Program Managers with all aspects of IT system development, regardless of the system size and scope.

Participants of the Study

For the needs assessment, the researcher included respondents involved in the operation of the enrolment and evaluation system of the college to get the necessary information needed for the research/ study. The personnel included in the process of getting the baseline information were the college registrar, the front desk personnel, the college cashier, dean/ advisor/evaluator, the programmer and the different departments involved in the enrolment.

Research Instruments and Data Collection

The instruments were based on PIECED Framework by Wetherbe (2002). Relevant data were gathered using questionnaires and through observations and interviews. These instruments were utilized to collect sufficient information needed for the study.

Observation. This is an approach of analyzing computer system requirements. This extensively helped the researcher in terms of step-by-step proceeding in developing the system. The researcher used this method to supplement the facts that were adopted in this study. The researcher personally observed and experienced how the job would be handled, performed and accomplished in the workplace by the respondents.

Interviews. The research used this method in gathering significant facts and information that were utilized in the study. Casual interviews were administered to the students and personnel involved during enrolment period who have a direct involvement in the proposed system in order to understand the current system and determined their opinions towards the proposed Enrolment Management System.

Questionnaires. These instruments were used to gather additional data and information needed for the study. The survey questionnaires were constructed based on ISO 9126, a model to standardize the quality factors of software (Aggarual & Sirgh, 2005). This tool was the primary source of data and information. The proponent prepared set of questionnaires that was validated by her adviser and distributed to the respondents.

Statistical Treatment

The frequency, percentage and mean were the statistical measures applied to measure the effectiveness and performance of the proposed enrolment management system.

The frequency summarizes the distribution of attributes by reporting the number of cases contained in each category of the attributes which were treated in numbers 1 to 7 on the statement of the problems. Percentages would supply the frame of reference for reporting research results in the sense that they standardize the raw data: percentages to the base of 100 problems were treated. Mean average called the arithmetic average (x), which is by far the most commonly measure central tendency were utilized for problems 1 and 7.

Data Analysis

To quantify the effectiveness of the existing system and the effectiveness of the developed system, the following weighted means and interpretations were followed.

Scale	Weighted Means	Interpretation
5	4.20 – 5.00	SA– Strongly Agree
4	3.40 – 4.19	A– Agree
3	2.60 – 3.39	MA– Moderately Agree
2	1.80 – 2.59	D– Disagree
1	1.00 – 1.79	SD–Strongly Disagree

Computed t-value was used to determine if there is a significant difference between the effectiveness of the existing and developed EMS along the quality characteristics of software and if there is significant difference between the performance of the existing and developed EMS during the enrollment and evaluation process.

RESULTS AND DISCUSSION

The effectiveness of the existing enrolment management system as compared to the developed enrolment management system as perceived along the quality characteristics of a software in terms functionality, it was revealed there is no significant difference between the existing over

the proposed EMS. On the other hand, the other quality characteristics of software namely: reliability; usability; efficiency; maintainability; and portability were found to have significant difference between the proposed and existing enrolment management system. Along with these attributes on the software quality characteristics, the proponent found out that only the assessment process is applicable in this area during enrollment transactions. The existing student registration process of DCCP is done manually.
In the existing system, only on the assessment area was fully computerized with regards to the assessment of tuition fees and other fees.

In the existing enrolment management system, there are glitches encountered such as the manual grade evaluation of students and limited number of personnel in-charge of the different enrolment transactions.

The features of the proposed Enrolment Management System of DCCP, are: provides registration enrolment form online, provide users a confirmation of the registration process through e-mail, views list of the courses and subjects offered, views user's status regarding their subjects, schedules and grade evaluation, determines student allowed to enroll subjects with their pre-requisites, views student grades entered by the instructors, and reports generation on demand.

The proposed Enrolment Management System is an enhancement to the performance as regards to enrolment transactions by the College.

CONCLUSIONS

After careful analysis, the proponent comes up with these conclusions:

The developed Enrolment Management System has the capability to evaluate grades of students including their pre-requisites, as well as to assess their fees.

Based on the assessment results or the effectiveness of the existing and the developed Enrolment Management System of DCCP-LC, the system functions as specified and can be adopted for implementation by the college.

RECOMMENDATIONS

Based on the conclusions, the following recommendations are presented to maximize the efficiency of the proposed system.

1. The system is implemented by the Registrar's office of Data Center College of the Philippines, Laoag City.

2. To effectively run the program, the software and hardware requirements cited are relevant for use.

3. For the system to work well and be more beneficial to the College, the person-in-charge must have enough knowledge in using the propose system. Training with user's manual must be provided by the college.

4. Student records (hard copy) must still be maintained.

5. Further analysis and programming must be made to enhance the capabilities of the system.

FILIPINO NURSES' CARING RESPONSES TO TRANSCULTURAL ENCOUNTERS: A CASE IN POINT FOR HOSPITAL ADMINISTRATION

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ABSTRACT

This study aimed to determine the transcultural encounters and responses of the nurses in the selected tertiary hospitals in Iloilo City. It adapted the data gathering tool of Cang-Wong Murphy and Adelman which was developed in 2009. Another data gathering method employed was the focus group discussion (FGD). The researcher conducted the FGD in every hospital in separate schedules depending upon the availability of the informants. Grounded theory method was employed. It has been evident that Ilonggo nurses are not indifferent to this phenomenon, finding it beneficial to practice the emergent "Makibagay Theory"- a culture engrained to any Ilonggo. This encompasses the value system such as compassion, respect and empathy. Thus, affirming the global image known as the Tender Loving Care of the Filipino nurse which reflects the Ilonggo nurse as highly value-oriented.

Keywords*: Transcultural nursing, Tanscultural encounters, Tanscultural responses, Ilonggo Nursing Care*

INTRODUCTION

Transcultural nursing has become recognized in nursing and other fields as one of the most significant and growing trends in the twentieth and twenty-first centuries (Leininger, 1997). Agravante (1996) stated that caring differs from culture to culture and has meaning only in the context of culture. Transcultural nursing has not found its importance in Philippine nursing circles as to merit being a topic for seminars or conferences or taught as a major thread in the Bachelor of Science in nursing curriculum. This could be due to the fact that both nurses and clients come from the same basic culture, the Filipino culture. Therefore, transcultural care is not an obvious need. But due to the changes in society, sub-cultural life-ways is quite different from what one is familiar with what one has encountered.

Unless cultural differences are taken into consideration, optimal care to all patients cannot be provided. Misunderstandings can often lead to misdiagnoses and the worst scenario of a client deprived of culturally competent care will reflect the status of the Nursing profession deficient of integrity and foresight.

The researcher reflected on the main problem of this study: "What are the Filipino nurses' caring responses to transcultural nursing encounters: A case in point for hospital administration?"

Statement of the of the Problem

This study aimed to determine the following:

1. Different ethno-linguistic groups, subcultures and communities of the patients they have attended to in the hospitals; and

2. Nursing responses to transcultural encounters by the nurses from selected tertiary hospitals of Iloilo City in terms of:
   - 2.1 Processes employed to identify the existence of cultural differences;
   - 2.2 Most challenging experiences the nurses have when caring for patients whose ethno-linguistic origin, communities differ from him/her;
   - 2.3 Barriers identified in caring for patients of different culture;
   - 2.4 Personal responses to the challenging experiences and barriers they have encountered, and
   - 2.5 Their needs to help provide culturally competent care.

METHODOLOGY

Qualitative approach was used in this study specifically the grounded theory method. The actual experiences of nurses in dealing with patients of different ethnicities specifically those patients/clients whose culture differ from them were given emphasis.

This study was conducted at St. Paul's Hospital Iloilo (SPHI), located at General Luna Street and Iloilo Mission Hospital (IMH) located at Mission Road, Iloilo City, Region VI, Philippine both are private owned hospitals; For government owned hospitals, the setting were at West Visayas State University Medical Center, located at La Paz, Iloilo City and Western Visayas Medical Center, at Mandurriao (WVMC), Iloilo City.

Conveniently selected staff nurses from these different tertiary hospitals were the respondents of this study. A considerable 30% of the total population of permanent staff nurses was taken as respondents, while six (6) representatives from every hospital were chosen as key informants for the focus group discussion.

A questionnaire adapted from Cang-Wong Murphy and Adelman which was developed in 2009 when they conducted a Study on Transcultural Nursing in Santa Clara County, California, USA.

The tool includes multiple choice, fill in the blank and open ended questions. This format invited nurses to speak for themselves about what they observed as culturally important and unique experiences. The questionnaires were content validated by three (3) experts in the area.

A guide question for focus group discussion included the experiences of nurses and patients with varied cultural orientations specifically on age and gender differences, religious beliefs and practices. The interview was initially guided by an interview schedule on the dynamics of Filipino nurses' caring responses to the transcultural encounters. The answers were extracted through formal and informal interviews, casual discussion and verbatim accounts of different situations.

This study utilized qualitative data, analysis employing the grounded theory by Strauss and Corbin (2004). This method is often referred to as the constant comparative method, which is a qualitative tradition built on compared concepts.

RESULTS AND DISCUSSION

Culture Care in a Private Owned Hospital

There were (111) nurses, majority of whom were female nurses and only a few male nurses volunteered to be answer. More than half of the informants were 22-25 years old, while the rest were in their early and mid-thirties and the oldest informant was 40 years old. All of the informants have their Baccalaureate degree in nursing and have no graduate units or degrees. Almost all of them are Hiligaynon speakers with a few Karay-a and Akeanon speakers.

As to their religion, majority of the informants were Roman Catholic while the rest were Baptist, Protestants and Aglipayans. A large number of the informants were residents of the Lone district of Iloilo City. A small number of the informants were from the other districts of Iloilo such districts 1-5. A few of the informants were from the other provinces of Panay such as, Aklan, Antique, Capiz, Guimaras and Roxas.

Transcultural Encounters of Nurses

Cultures Encountered by the Informants

Culture in the context of this study is not only limited to nationalities, and ethnic origin, but this encompass the different cultural orientations of the patients such as residence, age group, sex, occupation, and socio-economic status which are different from the nurses' demographic profile. It is the researcher's point of view that these groups have their own sub-cultures different from the others.

In their work as nurses assigned in different areas, informants have revealed that they have encountered lots of patients with culture different from them. Such as in the following:

As to the nationalities of their patients, they have encountered Chinese, Indians, Americans, Australians, British and Germans who do not know a single English word.

In terms of religion, informants revealed that they have also encountered some religions whose practices and beliefs differ from them, some of these patients were: Baptists, Born Again Christians, Jehovah's Witnesses, Muslims, and Roman Catholics.

As for ethnicity, the informants enumerated the following Filipino ethno linguistic groups they have encountered, Aetas, Capizeños, Akeanon, Guimarasnon, Dingleanon, taga-Pototan, taga-Sara, taga-Carles, taga-Passi, taga–Cabatuan, taga-Antique, taga-Bacolod, taga-Leon, taga- Anilao, taga–Alimodian, Ilonggo (taga-siudad) taga-San Miguel Chabakano, Tausog, Waray.

Some of the patients they found to have different cultural orientations were those from other professions such as doctors, farmers and other professionals. Male nurses find it culturally different to cater to the female patients and same with female nurses to male patients.

There were informants who have stated that those coming from the social class different from them were also culturally different. Younger nurses find it challenging to cater to the older patients and older nurses to the younger patients.

Processes Employed by the Nurses to Identify the Existence of Cultural Differences

There are various ways or processes the informants have shared to determine the kind of patients they have, especially in terms of cultural orientation.

Through Inquiry
Training and Experience
By Establishing Rapport
Observation
Through Media

Sources of Information on Other Cultures as Identified by the Nurses

Majority of the informants revealed that education/training and the media were their sources of information about other cultures. Some shared that they got the information about other cultures through their friends, prior experiences with the family and from their travels; others said that they got it from personal study or interest and continuing education programs.

Most Challenging Experiences the Nurses have when caring for Patients who's Culture Differ from them.

There were various experiences that challenged the nurses' care giving skills, based on their responses and sharing these experiences they were classified according to the following:

Attitude
Language
Beliefs and Practices

Barriers Identified by Nurses in Caring for Patients of Different Culture

Cultural barriers according to informants influence their quality of care.
Informants identified the following as the most common barriers to their nursing care:

Language
Beliefs

Nurses Responses to the Challenging Experiences and the Barriers they have Encountered

Nurses has their own ways of responding to the challenges and barriers, for them rendering quality nursing care is the most essential responses to the challenges and barriers between them and the patients whose culture differ from them. In caring for the patients, informants pointed out that they must develop different approaches; empathize with the situation; provide adequate information to clear his thoughts or doubts; spend more time with the patient; improve communication skills; individualize care regardless of the culture; lengthen one 'patience, understanding them; deal with them with the knowledge regardless of their culture; respond to them by explaining to them in the most simple way they can understand; be sincere and dedicated. As one of the informants shared "I continued to do my job. At the same time, I was encouraged to do better especially in communicating and understanding their need despite our differences. Another informant sincerely said that understanding individual differences, consideration of their preferences, asking them of their special needs, and taking care of them with sincerity."

Caring involves respect, understanding, and sincerity. Nurses from a Christian Hospital find all means to render proper and quality to patients whose culture is different from them.

Identified Needs of the Nurses to Help Provide Culturally Competent Care

Giger and Davidhizar (2008), as a dynamic, fluid, and continuous process of finding meaningful and useful care delivery strategies based on knowledge of cultural heritage, beliefs, attitudes, and behaviors of those to whom care is rendered. In order to provide culturally competent nursing, informants from a Christian hospital have identified the following needs such training/continuing education/classes; resident interpreters; reading materials; exposure to more diverse culture; cultural health fair; more exposure/experience in the community. Based on their observations these needs will really help improve their transcultural nursing care.

Culture Care in a Government Owned Hospital

There were forty (40) respondents majority were male, the age group of 22-25 and 26-29 showed an equal share of the number of informants and also true with ages 30-32 and 33-36. Common features of these informants were, a Bachelor of Science in Nursing degree, a Hiligaynon ethno-linguistic affiliation and a pure Catholic Background. A large amount of the group are residents of Iloilo City proper and quite a very few comes from District two and only one from the province of Negros Occidental.

Transcultural Responses of the Nurses

Cultures Encountered by the Informants

Culture, in its essence and scope is a highly complex matter and its influence to the nursing profession cannot be undermined. Here then, in the pursuit of the Researcher to bring out one facet of Nursing Care, will be found a manifestation of culture unique to a group of people in this particular point in time.

Identified Cultural encounters were with Asians, more specifically, the Arabs, Burmese, Chinese, Indians, Japanese and Koreans. Caucasians like Americans and Australians were frequent clients.

In terms of religion, informants shared having rendered care to patients with different religious backgrounds such as Baptist, Born Again, Hindu, Jehovas witnesses and Muslims. A variation of unique approaches has been called for in these encounters since practices are affected by religious beliefs.

Ethnicities identified by the informants were Capiznon, Cebuanos, Kapampangan, Igorot, indigenous people and Tagalog.

Processes employed by the Nurses to Identify the Existence of Cultural Differences

Through Inquiry
By establishing Rapport
Experiences
Protocol

Most Challenging Experiences the Nurses have when caring for Patients whose Culture Differ from them

There were a mixture of experiences that challenged the nurses' care giving skills, based on their responses and sharing these experiences was classified according to the following:

Beliefs
Attitudes
Language

Barriers Identified by Nurses in Caring For Patients of Different Culture

Cultural barriers according to informants influence their nursing care such as language and communication, superstitious beliefs and food preferences.

Nurses Responses to the Challenging Experiences and the Barriers they have Encountered

Nurses find ways to respond positively to the challenges and barriers they have encountered.

Familiarization
Updates

Identified Needs of the Nurses to Help Provide Culturally Competent Care

In order to provide culturally competent nursing care, informants from this hospital have identified the following needs such as Training/Continuing Education/ Classes, exposure to more diverse culture, more exposure and experience in the community, reading materials and even interpreters and culture health fair.

CONCLUSIONS

The Ilonggo nurse understood that transcultural encounters are tough and challenging. The reason why he/she takes on a multi-factorial resource unit to respond positively to transcultural encounters. These included basic assessment skills, relationship capacities, and experiences from day to day life with family and friends providing insights on people's needs and specific situations. In other words, the Ilonggo nurse understands that a transcultural encounter requires initiative, receptivity and open-mindedness which is why he/she takes all the possible insights and benefit from resources both internal and external. This is an active role the Ilonggo nurse assumes because he/she stands on a professional responsibility that any patient is entitled to appropriate care regardless of race, culture, orientation or religion.

The Ilonggo nurse is highly value-oriented. A stand out characteristic has been observed from the informants bringing emphasis to personal values such as respect, empathy, compassion from which they draw relevant guidelines in their transcultural encounters.

The Ilonggo nurse is by nature truly committed. The barriers he/she recognizes in varying situations seem to always arouse new creativity, flexible responses and strengthens professional outlook. In all the addition, this all the more encourages him/her to sustained commitment the nursing profession.

The Ilonggo nurse lacks support and equipping. The evidences that the informants took on active roles in confronting encounters is beyond debate; however, the lack of professional support and equipping for the Ilonggo nurse to be more effective is definitely obvious and requires serious attention. Generally, the Ilonggo nurse is highly responsive to Transcultural events but the level of his/her competence needs further assessment and enhancement.

The Makibagay Theory is a Consolidation of the Ilonggo Nurse Professional traits championing the 'tender loving care" with the consistency of values inherent to the culture of Ilonggo. This model emerged from the responses of the informants and the unique approaches they employed to make sense out of transcultural encounters.

RECOMMENDATIONS

In view with the above findings and conclusions, the following recommendations were made:

This study recommends that in the light of the "Makibagay Theory" culture care be afforded to all patients with utmost respect and consideration to their specific needs. It is with the best hope that through this study, Ilonggo nursing care will turn out to be substantially evidence-based and culture sensitive. Nurses and other health care providers embrace a solid background on transcultural aspects of nursing through the insights from "Makibagay Theory", thereby confidently rendering care to various ethnicities without hesitation or apprehension of their effectivity in knowledge, skills and attitude.

The Nursing Colleges and Health Care Institutions reflect on the implications of this study and conduct an appraisal among its constituents in the light of their transcultural care capacities and competencies. In addition, Institutions are hereby advised to provide concrete enabling or trainings to their faculty in the event that there are evidences of a lack of knowledge, skill or attitudes towards culture care in the majority of its faculty. This is a crucial role considering that transcultural preparedness takes roots in the academic training.

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ONLINE COURSE MANAGEMENT SYSTEM: TOOL FOR IMPROVING CLASSROOM PERFORMANCE IN GENERAL PSYCHOLOGY

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ABSTRACT

The study aimed to design, implement, and evaluate a MOODLE supported teaching environment for General Psychology. Four classes were matched based on the result of a diagnostic test. Two classes were assigned to a MOODLE environment teaching on selected topics for the duration of a semester while the other two went to the classroom environment group without access to resources in MOODLE. Both groups yielded very significant difference between their pretest and posttest scores. In the MOODLE environment group, a mean difference of 3 points was consistent across three grading periods. In the classroom environment group, the lowest mean difference was 1 point while the highest was 4 points. Comparing the posttest scores of the MOODLE and the classroom groups, a significant difference was noted in the last grading period with the MOODLE group scoring 2 points higher. These indicate that the interaction between teacher and other learners that take place in the classroom resulted to a greater improve ment in classroom performance. However, efficacy and confidence in using the computer to access resources in MOODLE give students better chance in improving classroom performance.

Keywords: *Online Course Management System, classroom performance, general psychology*

INTRODUCTION

Improvements in technology have offered an unprecedented opportunity to improve learning and teaching within the higher education system (Turney, et al., 2009). Oliver and McLoughlin (2001) present a theoretically grounded argument that web-based environments can 'scaffold' learning in a unique way (cited by Frederickson et al., 2005). Frederickson et al. (2005) enumerated the many ways in which Information and Communication Technology (ICT) can be used to support teaching and learning. It includes: (1) classroom-based teaching supplemented by lecture notes posted on a website or by electronic communication; (2) availability of materials and interactions occurring exclusively through networked technologies (Salmon, 2000); (3) provision of additional forums to support the traditional face-to-face contexts; and (4) enhanced opportunities that facilitate collaboration, e.g. tutor monitoring of and contribution to simultaneous discussion groups.

The CEU Department of Psychology ventured into this teaching innovation of taking advantage of electronic and information technology. The vehicle was the use of Modular Object-Oriented Dynamic Learning Environment (MOODLE), a free and open-source software program. MOODLE has improved and enhanced student performance by promoting and organzing communication between students and teaching thus reducing distractions and roadblocks to science learning (Perkins, Pfaffman, 2006). This study aimed to test the efficiency of using a MOODLE supported teaching environment in improving classroom performance in General Psychology.

METHODOLOGY

This undertaking came about in two phases. First was the training and development phase. Four teachers handling General Psychology classes were trained in the use of the features of the MOODLE. Part of the training was to decide on specific lessons and design a teaching module with exercises which were uploaded in the MOODLE. The topics chosen were Human Development, Personality, and Emotions and Motivation. This phase was concluded after trying it out with a summer class in General Psychology. The feedback from the teacher and the students were utilized in revising the instruction handout for the students' enrolment and access to MOODLE as well as in revising the teaching modules and exercises uploaded in the

MOODLE. The second was the implementation phase. A diagnostic test in General Psyc hology was administered to all classes in General Psychology for the first semester of the school year 2011-2012. This aimed to establish comparability. Out of the four classes with statistically comparable scores in the diagnostic test, two classes were assigned to the MOODLE environment group which were taught to enroll and access lessons and exercises in the MOODLE; and the other two to the classroom environment group where lessons were discussed face to face with the teacher and classmates. Both groups were facilitated by the same teacher. The three topics were spread in the three grading periods: Human Development for Prelim, Motivation, and Emoti on for Midterm, and Personality for Finals. Pretest and posttest was given for each topic.

RESULTS AND DISCUSSION

Mean, the mean difference, and the test of significance between the pretest and the posttest scores in the two types of the teaching environment.

Inspection of these data showed that there was an increase in the posttest scores for both types of environment. The MOODLE group displayed consistent 3-point gain with a 95 percent confidence interval of 2 to 3 points. The classroom group, though not consistent in mean difference across the three grading periods, registered a higher gain of 4 points and a higher confidence interval of 3 to 5 points compared to the MOODLE group.

Evaluation Measures for the Two Types of Teaching Environment

Variable	Grading Period	Measures	Mean(SD)*	Mean Diff.* (95%CI)	p-value
MOODLE Environment	Prelim	Posttest Pretest	12 (5) 9 (2)	3 (2 to 4)	.000
	Midterm	Posttest Pretest	14 (3) 11 (4)	3 (2 to 3)	.000
	Finals	Posttest Pretest	8 (2) 5 (2)	3 (2 to 3)	.000
Classroom Environment	Prelim	Posttest Pretest	11 (3) 9 (2)	3 (2 to 4)	.000
	Midterm	Posttest Pretest	14 (4) 10 (3)	4 (3 to 5)	.000
	Finals	Posttest Pretest	6 (2) 5 (1)	1 (1 to 2)	.000

*Quiz scores rounded off.

The data suggests that the interaction with teacher and classmates afforded in the classroom environment results to higher gain in quiz score of knowledge and comprehension. Feedback from the teacher revealed that students in the MOODLE group requested that the topics be talked openly in class aside from access to MOODLE resources.

Comparison of the Students' Performance on the Two Types of Teaching Environment

Data showed very significant difference only in the third grading period with the MOODLE group scoring 2 points better.

Time of Evaluation (Posttest)	Variable	Mean (SD)*	Mean Diff.*	p-value
Prelim	MOODLE Environment	12 (5)	.41	.510
	Classroom Environment	11 (3)		
Midterm	MOODLE Environment	14 (3)	.12	.833
	Classroom Environment	14 (4)		
Finals	MOODLE Environment	8 (2)	2	.000
	Classroom Environment	6 (2)		

*Quiz scores rounded off.

Feedback from the teacher revealed that it took time for the students to be confident and efficient in using computers and accessing MOODLE. The teacher had to conduct additional MOODLE demonstration sessions during Prelim and get help from the students confident of their ICT skills to encourage and tutor the majority in the class during Midterm. The teacher reported that students remarked to have the confidence and efficiency in accessing MOODLE resources during Finals. This improvement over time in using MOODLE and the availability of the teacher for consultation and the interaction with the more computer savvy classmates could account for the significant difference in the classroom performance of the students in the MOODLE environment.

Discussion

The results showed that there were gains in knowledge and comprehension whether the lesson was taken through electronic means or modified lecture in the classroom. Inspection of the mean difference and confidence interval, however, showed that higher gain occurred in the classroom environment condition. This corroborates the findings of Sarkozi (2001). That although there was no significant difference in the test performance of college students who attended traditional classroom and those enrolled in an on-line version; the discrepancy in the scores was found in the quality of student learning. Results show that the kind of discussions experienced by the students in the classroom was more substantive. Sarkozi (2001) concluded that although technology could provide the information instantly, it takes time to ponder and give the interpretation to this information. Based on the feedback given by the teacher handling both MOODLE supported and classroom environment set-up; students in the MOODLE environment requested that the topics they access on-line be still talked about in the classroom where students could express themselves and listen to the ideas and experiences of classmates. This is similar to the study of Maki et al. (cited in Frederickson et al., 2005) where the lecture course in the classroom received higher satisfaction ratings. This points to the importance of teacher and peer factors, vis-a-vis interaction, in scaffolding learning. Perkins and Pfaffman (2006) concluded that MOODLE has improved and enhanced student performance by promoting and organizing communication between students and teaching. In this study, however, training in maximizing these features of the MOODLE which facilitate triadic communication (teacher-student-peer) was cut short.

When the gains between the MOODLE environment and the classroom environment were compared, a very significant difference was noted in the third grading period in favor of the MOODLE environment. This can be accounted for by the improvement in computer use and MOODLE access acquired over time. Feedback from the teacher revealed that additional MOODLE demonstration session was given and help from confident students with good IT skills to tutor less confident students with poor IT skills were solicited. This fostered interaction between teacher and students and between peers which facilitated learning about MOODLE features and also about the lectures uploaded in it. Thus, successful use of technology should consider an audit of ICT skills of users as well the confidence of users in its features. In the study of Frederickson et al. (2005) where qualitative data about what helped and what hindered learning in web-based environment and classroom (lecture) environment was gathered; the top notable helpful feature was provision of resource material under the web-based environment. The capacity to access available materials posted on the web at the students own pace and frequency could account for the better performance of the MOODLE environment group over classroom environment group in the last grading period. This could have been corroborated had qualitative data were gathered from the students . Further, feedback from the teacher revealed that the students showed reluctance in using MOODLE for the selected topics and were convincing the teacher to just present the topics in class. Thus, it is not just ICT skills that matters but also rules of practice to make effective use of a new tool for learning that somehow impacts on the role of the students as learners and the division of responsibility between them (learners) and the teacher for the learning of a course material (Issroff and Scanlon, 2002, cited in Frederickson et al., 2005).

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PHILHEALTH – ACCREDITED PRIMARY BIRTHING FACILITIES IN A SOUTHERN PHILIPPINE REGION: POST ACCREDITATION STATUS

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ABSTRACT

Forty primary birthing facilities in Northern Mindanao (Region X) that are accredited by the Philippine Health Insurance Corporation are reviewed in this study to determine their post accreditation status. Birthing facility health workers and/or owners were interviewed to obtain profiles and feedbacks on the birthing facilities. Standard instruments of two government agencies and a checklist were the main instruments used for this study, which gathered data through survey interviews with owners or key persons of each birthing facility. Results noted an imbalance of the number of birthing facilities in each province of the region. Many lapses and inadequacies were observed in the birthing facilities in terms of their services, personnel, infrastructure, equipment, and supplies. Birthing facilities were viewed playing an important role, particularly in far-flung municipalities where access to hospitals is difficult thus serving as alternatives to a hospital or home deliveries. Attempt ed to examine the relationship between income class of municipalities and cities on one hand and status of birthing facilities, on the other hand, reveals the income class of the locale of the birthing facilities matters. The income class of the locale is positively associated with a better status of said facilities which is true in most instances in clinical and ancillary services, programs available for clients, infrastructure, physical plant, other physical facilities, environment and logistics, means of transport for the conduct of patients, equipment and materials, etc. Despite positive feedback, the main recommendation of this research is to continuously monitor each birthing facility to ensure that what is required to provide quality care and service to the pregnant mothers and children is not only for accreditation purpose; instead, the provision of the highest quality of care to the patients specifically mothers and children must always be the thrust of each birthing facility.

***Keywords**:*

INTRODUCTION

The need to promote maternal well-being was formally recognized by the United Nations during the 2005 World Summit in New York. Thus the concern to improve maternal health or in particular to reduce maternal mortality ratio and for universal access to reproductive health became one of the goals of the Millennium Development Goals (MDG).

The Philippines' maternal mortality ratio (MMR) is placed at 230 maternal deaths per 100,000 live births by the 2008 United Nations Population Fund study (http.//www.unfpa.org/swp/2008/includes/images/pdf_swp/monitoring_ICPD_goals.pdf). This ratio is significantly higher than the MMRs of the Southeast Asian countries like Vietnam (150), Thailand (110) and Singapore (14). Tobin (as cited by IRIN, 2009), said that the same ratio reflects that the Philippines has not made sufficient progress relative its goal of improving maternal health. In relation to this, Estopace (2009) reported the UNFPA concern that the Philippines might not be able to meet its goals under Millennium Development Goal 5 by 2015, which is reduce maternal mortality to 52 from its current MMR of 230.

The UNFPA observes that the Philippines were only able to experience a 22% reduction in its maternal mortality rate in the past decade (Estopace, 2009). It is against this background and the many other research findings that a measure of ensuring access to skilled care or attendance at birth through the establishment of both private and public birthing facilities in the Philippines was conceived, planned, and implemented. This is to encourage mothers to give birth in health facilities where they are attended by a team of skilled health providers and thus lower maternal mortality rate.

It is for the above reason that this research endeavors to get a picture of the birthing facilities of the Northern Mindanao Region of the Philippines within the past 12 months beginning 2010 to 2011.

METHODOLOGY

Research Design

The study utilized the descriptive survey research design involving the use of both qualitative and quantitative methods. Through this design, the study is able to get the information needed to get a picture of a profile of the birthing facilities.
Two groups of respondents: birthing facilities represented by owners or health care deliverers, and birthing facility clients. Total enumeration of forty (40) PhilHealth-accredited primary birthing facilities in Northern Mindanao was covered in the study. Thus a total population of forty (40) owners or health care deliverers was taken as one set of respondents of the study. The data obtained this category of respondents served as the respondents of the paper dealt with in this paper.

Instrumentation

The main instruments used were the Department of Health's Assessment Tool for Licensing of Birthing Home and Philippine Health Insurance Corporation form MCPC-FC-2, Application for Accreditation: Non-Hospital Health Facility for the Maternity Care Package. With these two government forms, this research came up with the following: Form 1: Modified version of PhilHealth's MCPC-AF-2 form; Form 2: Original form of the Department of Health's Assessment Tool for Licensing of Birthing Home.

Ethics Observed

Ethics of research were observed right from the very beginning when the interviewer said his/her greetings and introduce him/her, the project and the purpose of the project. The interviewer asked his/her first question requesting for permission or approval to gather information about the birthing facility. The respondents were assured that the results of the research will be disseminated in both oral and written form to appropriate audience for utilization. The Respondent Consent Form comprised the first part of each of the instruments that were used in the study.

RESULTS AND DISCUSSION

Type of Birthing Facility and Province

Of the forty (40) primary birthing facilities accredited by PhilHealth a majority by 67.50% or 17 birthing homes are public established as part of the Rural Health Units (RHUs). Thirteen (13 or 32.50%) are private birthing facilities.

Of the thirteen private birthing homes, nine (9) are single proprietorship. One (1) is run by a foundation. The remaining three (3) are corporations. The province of Bukidnon listed the most number of birthing facilities (17) most of which are of public type and are part of the Rural Health Units of the province's municipalities and cities. In contrast, both Camiguin and Misamis Occidental have only one primary birthing facility each accredited with PhilHealth.

Misamis Oriental came second to Bukidnon with 11 birthing facilities but listed the most number of private birthing facilities accredited by PhilHealth. A look at the addresses of these private birthing homes reveals that all are located in Cagayan de Oro City. Lanao del Norte closely followed with ten birthing facilities, again, mostly part of the Rural Health Units of the Province's municipalities.

Apparently, there is an uneven distribution of birthing facilities in the region. While one province has established birthing facilities in half of its municipalities and cities, other provinces have only one such kind of facility in the entire province that's accredited by PhilHealth. Moreover, the initial finding of this research shows that the majority of private birthing facilities are concentrated in the city of Cagayan de Oro.

It looks like the Department of Health needs to put into action its thrust which is to provide such health facilities in the widest area possible.

Bed Capacity

The biggest number of beds available for the 40 birthing facilities is 29 . These are in the only private PhilHealth accredited primary birthing facility in Ozamis City of Misamis Occidental. Three public birthing homes have only one bed. When viewed in aggregate, more than half of the total number of birthing facilities covered by the study have five (5) beds or below. The highest number in both public and private birthing facilities has 3 beds, 22.22% for public and 23.08 for private.

Each birthing facility has an authorized bed capacity at the start of its operations. Table 3 shows the distribution of the 40 facilities operating within, above or below the authorized bed capacity. Half of all the forty birthing facilities indicated that they are following the authorized or approved bed capacity. Of note, there are more birthing facilities that are operating with a lesser number of beds than what is authorized. This means that one in every five birthing facilities is operating below its expected bed capacity. Also of interest are the 10 birthing facilities that are either unable to show documents as proofs of their authorized bed capacity or did not give any response with regards to their bed capacity.

Services and Programs

Department of Health Administrative Order No. 147 s. 2004 (http://www.who.int/medical_devices/survey_resources/medical_devices_by_facility_philippines.pdf) defines birthing home as a health facility that provides maternal services on prenatal and postnatal care, normal spontaneous delivery, and care of newborn babies. Based on this definition, Table 4 shows that all of the forty surveyed birthing facilities provide the required services such as the prenatal and postnatal care, normal spontaneous delivery, care of newborn babies and health education.

Per respondent's report, prenatal and postnatal care is usually scheduled once or twice a week. Health educations are almost always verbal in nature in most birthing facilities surveyed. Only one facility offers a mother's class on Mondays. Two birthing facilities are giving health education as they give the discharge slip to the clients.

Clinical Services Offered at the Birthing Facilities

Only half of the birthing facilities offer a clinical laboratory. Of these 20 birthing facilities that indicated presence of clinical laboratory, only six (6) were able to show documentary proof (i.e., valid license) for the operations of such a laboratory. As for the presence of a pharmacy at the birthing facility, only eleven (11) birthing facilities indicated that they do indeed have a pharmacy. Similarly, only a few (four birthing facilities) were able to show a license as documentary proof for the operation of a pharmacy in their premises. A far fewer number of birthing facilities operates a radiology department. Of the three (3) birthing facilities that indicated presence of radiology service, only two (2) were able to show a valid license as documentary proof. Both birthing facilities offering licensed radiology services are privately-owned in the province of Bukidnon.

Ancillary Services Offered at the Birthing Facilities

The health promotion and disease prevention programs in the forty birthing facilities are summarized in Table 6. All the forty birthing facilities have a health promotion and disease prevention program that include the following: breastfeeding, family planning and rooming-in. These programs are mandated through republic acts in the Philippines. Hence, it is encouraging to note that the birthing facilities in Northern Mindanao are providing the mandated health promotion and disease prevention programs.
However, one birthing facility carries no immunization program in its premises, which the rest of the birthing facilities professed to have. In addition, newborn screening is not in four birthing facilities. Two of these hospitals stated that they refer clients to go to major hospitals in the area or instruct clients to go to the city hospital for newborn screening. One birthing facility shared that the personnel for newborn screening is still on training. Health promotion and disease prevention programs are a crucial part of a birthing home; hence, a complete offering of these programs are greatly needed, especially that these programs are already mandated by Philippine laws.

Health Promotion and Disease Prevention Programs

Documents related to standard family planning-maternal and child health programs are contained in Table 7. Four birthing facilities were not able to show a logbook for consultations/admissions. Moreover, six birthing facilities do not have complete patient's clinical record and referral forms. The absence of such documents might become a hindrance to the proper care of the patients since they are important basis for diagnosis and decisions for each patient. Patient education is also an integral part of the provision of health care, be it verbal or through printed materials. It is encouraging to note that only three birthing facilities have no printed materials/posters for patient education.

Presence of Standard Family Planning–Maternal and Child Health Records/Reports/Materials in the Birthing Facilities

The clinical service operations of the birthing facilities can be seen in Table 8. In only one (1) clinical service operation do all the forty birthing facilities share in common: Birth certificate forms are properly and completely filled with required information. This particular result is highly encouraging given the importance of birth certificates in a Filipino's life. Errors in birth certificate information have led many Filipinos to spend huge amount of money just to correct these errors. Hence, having all these forty birthing facilities completely and properly filling up birth certificates suggests a positive side, which could greatly raise confidence in the services of these birthing facilities.

Clinical Service Operations

However, a mere 45.00% or 18 birthing facilities are able to update ultrasound/x-ray report in the patient charts. This result could be tied to the fact that only three birthing facilities have radiology in their premises. This would mean that patients have to go to other health facilities for their ultrasound/x-ray needs. The collection of such reports at the birthing facilities might not be strictly enforced resulting to this low number of birthing facilities who have updated ultrasound/x-ray reports on their patient charts.

Documented policies and procedures for prenatal care, normal spontaneous delivery, and care of newborn are missing in only four birthing policies. In other words, proper documentation of existing policies and procedures can easily be accessed in 36 birthing facilities, ensuring a smooth transition of these policies and procedures in case a personnel is not present. Questions on policies and procedures could also be easily responded given the existence of these documents in the birthing facilities.

What is quite alarming perhaps is that not all of the forty birthing facilities are able to properly and completely fill up patient charts with up-to-date information. Patient charts are important medical records that provide information on the condition and status of the patient. Incomplete patient charts might lead to medical misdiagnoses or inaccurate diagnosis and inappropriate medication. Hence, a patient chart that is properly and completely filled-up is one thing that is imperative in any health facility such as a birthing home.

Manpower

The manpower resources of the forty birthing facilities are summarized in Table 9. Two birthing facilities have no administrators. One of these two is momentarily run by a barangay council. Three privately birthing facilities have administrators who, at the same time, are the owners. Among the public birthing facilities, the administrators' doubles up as a nurse, midwife, or physicians.

To round up the manpower for the general administrative services, 33 birthing facilities have a clerk/utility worker. As reported by the respondents, the midwives or the nurses also take on the role as clerk/record-keeper. On the other hand, 28 birthing facilities have drivers for their transport service. For one private birthing facility, the family driver also serves as a clinic driver who is on call 24 hours. For several public birthing facilities, it is the barangay driver who also serves for the transport needs of the birthing facility using the barangay mobile car while a few of the public birthing facilities have drivers on the job order.

As for clinical service manpower, only two birthing facilities have no midwives. In their place, a physician serves the birthing facility on an on-call basis. On the other hand, two birthing facilities have no on-call physicians an d are only served by midwives. Clinic aides are present in 18 or 45% of the birthing facilities included in this study. Results for the clinical service manpower suggests that four birthing facilities have no pairing of physician (on call) and midwife as required by law.

Personnel and Staff in the Birthing Facilities

The compliance of the birthing facilities to the personnel requirements of the Department of Health is indicated in Table 10. An Administrator is required in each birthing facility yet two (2) of the forty birthing facilities have no designated Administrator. As already indicated in the discussion of the preceding table, one birthing facility is run by the Barangay Council and other indicated that it has no Administrator since it is a government facility. Such explanations might not be enough because the Barangay Council could only supervise but an on-site Administrator would still be needed, and even though, it is a government facility, it still should have an Administrator as the rest of the public birthing facilities in the study have done.

In accordance with the Department of Health regulations, birthing facilities with five or less authorized bed capacity are not required to have a clerk/utility worker while those with more than five authorized bed capacity should have a ratio of five beds to one clerk/utility worker. With reference to Table 2, more than ten birthing facilities operate a bed capacity of less than five. However, in Table 9, only six have not complied the requirement of having a clerk/utility worker for every five beds. This means that although some birthing facilities are not required to have a utility worker/clerk, they still have personnel taking such position in the facility.

The Department of Health requires that a birthing facility must have one physician on call. In this study, two birthing facilities are found to have not complied with this requirement. The rule on midwives as set by the Department of Health states that birthing facilities with less than five authorized bed capacity must have one midwife and another midwife on call while birthing facilities with more than five or more authorized bed capacity must have one midwife and another one as reliever. Only three of the forty birthing facilities have not been able to comply with this rule.

Compliance to DOH - Required Number of Personnel and Staff in the Birthing Facilities

Administrators serve on a full-time capacity in 35 birthing facilities while in two birthing facilities the administrators are on a part-time basis (Table 11). Except for the administrator, only 40% to 65% of the birthing facilities employ manpower on full-time basis. The rest either have part-time employees or preferred to give no response to the query on the employment status of their manpower.

Employment Status of the Personnel and Staff in the Birthing Facilities

Of the 40, 35 (87.50%) birthing facilities orient new personnel on the essential components of the services offered in each birthing facility. A lesser number of birthing facilities (80.00) identify and document duties and responsibilities of the personnel. This suggests that the personnel are quite clear in the delineation of their duties and responsibilities. A far lesser number of birthing facilities (75%) validate professional qualifications prior to employment. Given this, one in every four birthing facilities might have the possibility of employing unqualified manpower.

Manpower – related Practices in the Birthing Facilities

Clinic Factors

The features of the physical plant of the birthing facilities are shown in Table 13. Only one (1) birthing facility has no waiting area. Based on observation, however, four (4) birthing facilities have a waiting area outside the birthing facility, and another four (4) birthing facilities have inadequate space for their waiting area to accommodate clients. Further observed was the fact that no fewer than seven birthing facilities have inadequate lighting and ventilation in their respective waiting areas.

Two (2) birthing facilities have no place devoted as admitting, records and business area. Of those with an admitting, records and business area, nine (9) birthing facilities were observed to have inadequate lighting and six (6) with inadequate ventilation. One birthing facility has this particular area found beside it. As observed, birthing facilities occupy very limited space, with most of the public birthing facilities just one part of a rural health unit. Hence, these results might not be unexpected.

Twelve (12) birthing facilities have no private consultative/examination room or cubicle. The lack of a private consultative/examination room might again be due to a limited space occupied by the birthing facilities. Still, the lack of such area to ensure privacy of clients is a critical issue given the sensitive nature of pregnancies.

All the forty birthing facilities have birthing area, the core of its operations since without it they might as well not exist. However, six birthing facility have no areas designated for scrub-up and newborns. Seven birthing facilities have no recovery area with beds and four have no patient room. Given the limited areas usually occupied by birthing facilities as observed in this study, one area serves different purposes in some of the birthing facilities. Such lack of areas designated for specific aspects of the birthing process might result to a not so comfortable experience for mothers giving birth with care less than what it is supposed to be.

More intriguing are the three birthing facilities that indicated no toilet facility inside its clinic. Such facility addresses very sensitive needs of mothers, especially those who are about to give birth and the lack of such facility might cause discomfort among the patients. Moreover, twelve birthing facilities have no area solely for cleaning of instruments. At the least, it is good to note that only four birthing facilities have no equipment and supply storage area.

Physical Plant of the Birthing Facilities

Fire safety provision in terms of the presence of fire extinguisher) are observed in only half of the birthing facilities. Basic necessities like light and water are found to be inadequate in six and eight birthing facilities, respectively. A far fewer number of birthing facilities have standby generators in case of power interruptions. A much more dismal result is the absence of covered garbage containers with color-coded segregation in around half of the birthing facilities in this study. Such basic necessities as light, water, garbage disposal and others are important in ensuring quality care of the patients. As such, their absence suggests a lack of high quality of care for patients in birthing facilities.

General Infrastructure of the Birthing Facilities

Most of the birthing facilities are readily accessible to the community depending upon the location of such facilities (Table 15). This is consistent with the findings that many of the birthing facilities are attached to rural health units, particularly at the municipal level. Most of the private birthing facilities are also located in central areas that patients can readily access. However, the cleanliness of birthing facilities might be in question with ten birthing facilities found to be not free from undue noise, smoke, dust, foul odor or even flooding; although, only four are found to be not in generally clean environment.

Non-compliance to local zoning ordinances in terms of its location is observed in ten birthing facilities. Although all forty birthing facilities are found to provide and maintain a safe environment for all its stakeholders, specific provisions for the maintenance of such a safe environment are found to be still wanting in some birthing facilities. Table 15, for example, indicates that seventeen birthing facilities do not have the minimum requirement of two exits for each floor of its building. In addition, these exits do not terminate directly at an open space outside the building in nine birthing facilities.

Physical Facilities, Environment, and Logistics

Security is ensured and ventilation adequate in most of the birthing facilities. Four birthing facilities have not complied with RA 9211 (Tobacco Regulation Act of 2003) that strictly prohibits smoking throughout any health facility. Thus, patients and personnel in these four birthing facilities might be put at risk by exposure to tobacco smoke. Another result worth noting is the nine birthing facilities that provide ramps or elevators for clinical services located in the upper floor. This finding could be explained by the observation that many of the birthing facilities occupy one floor of a building. Hence, ramps or elevators to the upper floors might not be necessary.

In terms of patient movement, ten birthing facilities have not provided adequate space to allow patients and personnel to move safely around patient bed area. This finding corroborates the findings in Table 12 wherein space are so limited that one area serves multiple services. Thirteen birthing facilities are found to have no passageways that can accommodate bed, equipment, and escorts of patients who need to be transferred between rooms or service on their beds. Such space (with 1.83-meter required width) might not be seen as necessary in these birthing facilities since as shown in Table 12, some birthing facilities do not have patient rooms or recovery rooms. In these particular birthing facilities, one area may have been used for multiple purposes, eliminating the need to transfer the patient to another room for another service.

As has been earlier discussed, several birthing facilities have no provision for an area intended for private consultation/examination room. This earlier finding is supported by the data in Table 15 below wherein adequate privacy for patients is not provided in fourteen birthing facilities. Power and water supply are deemed adequate except in four birthing facilities. Still, only eighteen birthing facilities were able to show records of water analysis, particularly bacteriological examination.

Similarly, as has been discussed earlier, waste management is another concern that needs to be addressed in several birthing facilities. Fourteen birthing facilities have no multi-chambered septic tank for its liquid waste. Around half of the birthing facilities have no black and green trash bag. More alarming is the finding that only fourteen of the birthing facilities have yellow trash bags, which are for the disposal of infectious (pathological) wastes. Such absence increases the risk of contamination brought about by such infectious wastes.

A dismal result can be observed among the birthing facilities when it comes to sanitation, specifically pest and vermin control, with only fifteen birthing facilities signifying that they have an in-house pest and vermin control while only one hires a contractor for the same purpose (Table 15). Moreover, records of such endeavors are available in only three birthing facilities.

Sixteen birthing facilities do not regularly maintain and update a building/facility inventory while thirteen are observed to have floors, walls, and ceiling that are not made of sturdy materials. Around half of the birthing facilities have all the necessary permits and current licenses for safe and effective operations. This finding is noteworthy since such documentation ensures that the birthing facility is offering quality health care services that their patients deserve. Except for one, all the birthing facilities have permits to increase bed capacity or change its classification. On the other hand, only a few birthing facilities have permit s to construct, renovate, alter or expand the existing facility.

Birthing facilities are required by the Department of Health to have a means to transport patients in case of complications that needs treatment in a bigger health facility. This study found thirty-two birthing facilities that have a referral system for transport in the movement of patients (Table 16). Of these thirty-two, only thirty provided their own vehicle. The remaining two does not have a transport vehicle directly provided by the birthing facility. When referenced with Table 12, only twenty-nine of these thirty birthing facilities employ their own driver for such a transport vehicle.

However, only six birthing facilities have a document to show a formal contract service for ambulance services. This small number might be explained by the observation that most birthing facilities rely on their respective local governments for the transport services while the privately-owned birthing facilities provide their own transport vehicle. Hence, the need to establish a contract with an ambulance service provider might be seen to be unnecessary.

Means of Transport for the Conduct of Patients

Equipment, Materials, and Supplies

An inventory of the equipment and materials in the birthing facilities were conducted in this study (Table 17). All the forty birthing facilities have the following: blood pressure apparatus, pickup forceps, straight forceps 10”, needle holder, pail, tape measure, and wall clock with second hands. On the other hand, the mercury-containing thermometer is available in only nineteen birthing facilities. This proves to be a positive result given the advocacy to minimize the use of such type of thermometer, which is hazardous to use.

Interestingly, the following are missing in one birthing facility (i.e., only thirty-nine birthing facilities indicated that they have these items): delivery table, instrument table, IV stand, Kelly pad, rubber suction bulb syringe, stainless steel instrument tray with cover, stethoscope, oral thermometer, suction apparatus, straight surgical scissors and weighing scale for adult and infant.

Although only a single birthing facility has no delivery table and instrument, this result is worth noting given the importance of such equipment in a birthing facility. This result leads to the question as to what equipment is being used when a patient delivers a baby. With delivering babies as the main purpose of a birthing facility, having no delivery table must be a huge disadvantage to its patients. A successful delivery of its services might not be possible if key equipment, such as a delivery table, is not present. Key equipment in the birthing process is the vaginal speculum. However, four birthing facilities do not carry a vaginal speculum.

An inventory of supplies available in the birthing facilities was also conducted in this study. All the forty birthing facilities carry the following supplies: 70% Isopropyl Alcohol, plaster, Povidone iodine, sterile cord clips/ties for baby, and sterile gauze. These are all basic supplies in a birthing facility. At the same time, the contraceptive, DMPA, is the least common supply among the forty birthing facilities with only twenty-four having DMPA in their supply cabinets.

Equipment and Materials Present in the Birthing Facilities

Information Dissemination

Information dissemination of the birthing facilities is summarized in Table 18. The forty birthing facilities are all accredited with PhilHealth. Three birthing facilities do not have the sign indicating it as a PhilHealth provider. This might not be surprising that the same three birthing facilities do not have space for a large and clear sign bearing their respective names as a birthing facility. In addition, more birthing facilities do not have space for a large sign enumerating components of the maternity care package than those who have. Such lack of vital information might not help either birthing facility or clients. Knowledge of available maternity care package could help the clients make informed decisions on forming a birth plan and other pregnancy-related undertakings. Such information could also help birthing facilities sell themselves through advertising their services and packages.

Information Dissemination of the Birthing Facilities

Quality Assurance Activities

Records management is the most common quality assurance activity as it is done by thirty-five birthing facilities. On the other hand, satisfaction surveys for employees and patients are the least common quality assurance activity with only six birthing facilities conducting such surveys. In general, Table 19 discloses a rather downbeat result when it comes to the quality assurance activities of the birthing facilities. More than half of the birthing facilities fail to conduct activities that would assure that their services are of quality.

Quality Assurance Activities of the Birthing Facilities

Income Class of Municipalities and Cities and Status of Birthing Facilities

An attempt to investigate to see if the post-accreditation status of birthing facilities is associated with the income class of municipalities was done. The result reveals that income class of the locale of the birthing facilities matters. The income class of the locale is found positively associated with better status of said facilities which is true in most instances in clinical and ancillary services, programs available for clients, infrastructure, physical plant, other physical facilities, environment and logistics, means of transport for conduct of patients, equipment and materials, etc. (Please refer to the Tables in Appendix.) For instance, more birthing facilities (18) in first class municipalities or 45.0 percent of all birthing facilities covered by this study, excluding those that were unclassified by the source of data, NSO, offer clinical services such as prenatal care, normal spontaneous delivery, care of newborn baby, and health education than birthing facilities belonging to 2nd to 5th class municipalities. More birthing facilities based in first class municipalities and cities are also found to be offering ancillary services such as a clinical laboratory and even radiology and pharmacy.

Health programs like breastfeeding, family planning, immunization, newborn screening and rooming in are made available to clients of birthing facilities in first class municipalities than in other income classes of municipalities. The same is true for clinical service operations such as prenatal care, post natal care, care of the newborn, physical examination, ultrasound / x – ray, referral system and referral notes and consultation, medication / treatment, obstetrical record, etc. The physical plant, general infrastructure, other physical facilities, environment, and logistics are likewise associated with birthing facilities in first class municipalities and cities.

Results of this examination of relationships between income class and status of birthing facilities in the Northern Mindanao region affirms and so, therefore, lends support to the commonplace observation that well off places or communities have better or, at least, better-equipped health facilities than those that are not well of.

Health – Related Statistics of Birthing Facilities

Case Fatality Rate and Postpartum Complications The forty birthing facilities were asked to relate their respective case fatality rates in the past twelve months. Data shared by the birthing facilities presented an encouraging result. Among the forty birthing facilities, only one has an infant death due to fetal distress upon delivery. Three maternal fatalities were shared by two birthing facilities. Another two maternal deaths occurred in a hospital after they were referred by the birthing facility. Few postpartum complications were reported by the forty birthing facilities. These include one case of vulvar hematoma, four cases of postpartum bleeding, and an overdue pregnancy. A practice of the birthing facilities could have kept the case fatality rate and postpartum complication at these low numbers. This practice calls for the birthing facilities to accept only those with normal spontaneous vaginal deliveries. Such practice is coupled by what was shared by the birthing facilities that they do an immediate referral to hospital in cases of abnormalities in pregnancy.

CONCLUSION

Birthing facilities in Northern Mindanao do play an important role, particularly in far-flung municipalities where access to hospitals might be difficult, if not impossible. Hence, the effort of one province in Northern Mindanao to setup birthing facilities in most of its municipalities is indeed laudable.

Although the birthing facilities covered in this study are accredited by PhilHealth, several lapses in their services, personnel, infrastructure and other aspects of its organization and operations have been observed. This suggests that although they have undergone accreditation, the maintenance of its quality has not been sustained through the one-year accreditation period.

RECOMMENDATIONS

Derived from the findings and conclusion of this study, the following recommendations are formulated:

1. The presence of birthing facilities in the provinces. Provinces like Camiguin and Misamis Occidental should have more birthing facilities. If government resources for the establishment of these facilities are lacking, the private sector should be encouraged by providing incentives to establish these birthing facilities in the said localities.

2. Ancillary services. Government entities strongly need to check the compliance of the birthing facilities in terms of their ancillary services. In particular, appropriate permits have to be validated to ensure that such ancillary services are at par with government standards.

3. Services. A system of monitoring have to be in place to ensure that basic procedures such as charting and staffing (particularly, those who do the necessary recording of important information) are carried regularly and accurately since keeping and maintaining patient records are vital responsibilities of any health facility.

4. Personnel. Having the midwives or nurses taking on the role as clerk/record-keeper presents an unhealthy picture since there might be a possible conflict of roles and interests in these roles that they are taking simultaneously. Thus, appropriate personnel have to be present in each birthing facility as outlined in the guidelines of concerned government agencies like the Department of Health and PhilHealth. In addition, an Administrator for each birthing facility should be hired or be put in place to ensure a smooth operation of the facility. This would also ensure that responsibilities are clear among the personnel.

5. Additionally, qualifications of the personnel in the birthing facilities have to be attended to ensure proper qualifications of these personnel. All documents necessary to verify the qualifications of the personnel have to be regularly checked. Checking with proper authorities to validate such claims of qualifications should be done or made by the birthing facility administration.

6. Infrastructure. Results strongly point towards the need to improve clinic facilities. Basic necessities as light, water, garbage disposal and others are important in ensuring quality care of the patients. As such, these necessities should be provided or complied.

7. In general, accreditation should be done similar to what other government entities like the Commission on Higher Education (CHED) is doing to colleges and universities or the programs offered by accrediting institutions in the field of education. These accreditations must be continuing and must be regularly monitored so that all birthing facilities seeking accreditation from either DOH or PhilHealth should strive to improve according to what these organizations require them to comply. Furthermore, the implementation of a Quality Management System in accordance with international standards should be enforced to ensure quality services, facilities, equipment, personnel and others resulting to birthing facilities that are of the highest quality.

8. To this, the present study would like to specifically mention the need for the observance of the Department of Health Administrative Order 2008-0021. This is in relation to the surprising revelation that 19 birthing homes covered by this research are still using the banned devices such as thermometers containing mercury.

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STUDENT SERVICES PROGRAM OF THE ISABELA STATE UNIVERSITY

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ABSTRACT

The research found out that the students availed of the following Student Services program: the library services, guidance services, food services, medical and dental services, scholarship services, student organization services, admission and testing services, socio-cultural services, registration services, recreation, sports and welfare services, safety and security services, information services, and student publication services. Students often availed of the said Student Services Program. They evaluated the Students Services programs as efficient. Hence, the more frequent is the availment of the services program, the more the student services become efficient. The study deems it is necessary to recommend that the administration should offer more scholarship and assistantship programs from private benefactors, political parties, or private benevolent individual The OSS should become more efficient by improving its services. If budget warrants, the Campus Administration should offer Housing Services and cater to those students and faculty members who resides outside Cauayan.

Keywords*: Student Services Program, Efficient, Frequent, Isabela State University*

INTRODUCTION

Students are the raison de etre for the existence of any academic institution. Thus, the university has the responsibility to cooperate with the family and other institutions to develop the total personality of the students. Quality student services offered to studentry could attract a great number of enrollments. Students' satisfaction with the services according to them could contribute to their high academic standing. It is in this line that this research was designed to determine the student services program of the Isabela State University.

Statement of the Problem

The study aimed to answer the following questions:

1. What are the student services offered by ISU Cauayan Campus?

2. How often do students avail of the student services program?

3. How efficient is the student services programs that are availed of by the students?

4. Is there a relationship between the frequency of availment and efficiency of the student services program?

METHODOLOGY

The descriptive research method was used in the study involving the twenty-five percent or 2,210 students who enrolled this First Semester school Year 2012-1013 from First Year to Fourth Year College students coming from the 6 colleges, school/ institutes of the Isabela State University Cauayan Campus who served as respondents of the study broken down as follows: Polytechnic School with 306; Institute of Agricultural Technology with 482 or120; There were 331 respondents coming from the School of Arts and Criminology; 353 respondents from the College of Computing and Information Technology; 949 respondents from the College of Business Management and 151 students from the Institute of Teacher Education.

The questionnaire was used to gather data of the study. It consisted of two parts. The first part is composed of items to elicit information on the respondents' awareness as regards the Student Services Program that is available in the Isabela State University Cauayan City Campus. The second part included items to elicit information on how frequent do students avail of the Student Services Program and how efficient is the delivery of these student services program to the college students. The questionnaire was administered to the selected respondents in six colleges/school institutes, namely: College of Computing and Information Technology (CCIT), College of Business and Management (CBM), Scool of Arts and Criminology (SAC), Institute of Teacher Education (ITE), Polytechnic School (PS), and Institute of Agricultural Technology (IAT) These will be collected after the students shall have accomplished them.

Frequency, percentage, ranking and the weighted mean will be used to describe the data of the study. To describe the frequency of availment and efficiency of the students on the Student services Program, the following arbitrary level, and descriptions were used:

Arbitrary Level	Frequency	Efficiency
4.50-5.00	Always	Very Efficient
3.50-4.49	Often	Efficient
2.50-3.49	Sometimes	Moderately Efficient
1.50-2.49	Rare	Less Efficient
1.00-1.49	Never	Inefficient

The Spearman rank correlation was used to determine if there is a relationship between the frequency of availment and efficiency of the Student Services Program. The hypotheses of the study were tested at .05 level of significance.

RESULTS AND DISCUSSIONS

Available Student Services Program as Perceived by the Students

The different student services program as perceived by the students are the following: library services, guidance services, food services, medical and dental services, student organization services, admission and testing services, socio-cultural services, registration services, recreation, sports and welfare services, safety and security services, information services, and student publication services.

The Student Services Program, particularly the admission and testing services, registration services, guidance and counseling services, food services, health services, library services, library services student organization services, socio-cultural services, recreation and sports services, student publication, information services, and safety and security services are often availed of by the students while the scholarship services are sometimes availed of by the students.

Moreover, the students evaluated the Student Services programs such as admission and testing services, registration services, guidance and counseling services, food services, health services, library services, library services student organization services, socio-cultural services, recreation and sports services, information services, and safety and security services as efficiently delivered to the students, while the scholarship services are found to be moderately efficient.

The students often availed of the student services program, and they evaluated it as "efficient" with the mean of 3.91. This implies that the student services are often catered, and it is being rendered as efficient.

Frequency and Efficiency of the Delivery of the Student Services Program

There is a high and positive correlation between the availability and efficiency of the Student services program. The more frequent the student services program is extended, the higher it becomes efficient in the delivery of its services to the students.

CONCLUSIONS

The library services, guidance services, food services, medical and dental services, scholarship services, student organization services, admission and testing services, socio-cultural services, registration services, recreation, sports and and welfare services, safety and security services, information services, and student publication are the available Student Services Program offered by the Isabela State University, Cauayan Campus. Students often availed of the Services Program; Students assessed that Student Services Program is Efficient; the more frequent the students availed of the Student Services Program, the more efficient it is in the delivery of the services offered to its students.

RECOMMENDATIONS

The Isabela State University, Cauayan Campus administration should offer more scholarship opportunities and venture other assistantship from private benefactors so that more students could avail these scholarship opportunities.

The Office of the Student Services should improve the quality of its services to students by responding to their needs; The OSS should become more efficient in the delivery of its student services; The Student Publication Office should regularly publish a School paper for at least one copy in every semester. The Campus Administration should offer Housing Services and cater such housing services to those students and faculty and staff that are from a far place.

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TEACHER'S COMPETENCY IN TECHNOLOGY INTEGRATION IN BACHELOR OF SCIENCE IN ACCOUNTANCY PROGRAM AT THE UNIVERSITY OF SANTO TOMAS (UST)

Irene Taguinod

ABSTRACT

The University of Santo Tomas Alfredo M. Velayo College of Accountancy is the business school specialized in Accountancy and Management Accounting. The accountancy program was started in 1993 and a consistent top performing accountancy school in the Philippine Certified Public Accountants (CPA) licensure examinations. This research was conducted to evaluate the level of Information Technology Integration in the Bachelor of Science in Accountancy program specifically on the following aspects: basic computer operations skills, computer usage, motivation, confidence, goals and ethical use. Descriptive research was used as the research methodology and convenience sampling applied in the data gathering. The findings have implications for the maintenance and improvement of the program.

Keywords:

INTRODUCTION

True enough the advent of Information and Communication Technology (ICT) "have reshaped the educational landscape by transforming the content and modes of delivery and acquisition of learning as well as how the educational institutions operate." As a matter of fact one visible change in the educational system is the introduction of computer technology in all school levels which implies that as change occurs, educational reforms like the integration of new technologies into the curriculum must be instituted.

Indeed, curriculum improvement is a crucial responsibility for schools if they are to respond head on to actual realities and situations, the bottom line of which is curricular redirection that this time and age of new learning demands, for just as Mark (Prensky 2006) asserts:

"Educators have slid into the 21st century and the digital age, still doing many things the old way. It is now high time for education leaders to raise their heads above the daily grind and observe the new landscape that has emerged. Recognizing and analyzing its` characteristics can help define the education leadership with which we should be providing our students, both now and in the coming decades."

Undoubtedly, with technology integration ongoing in schools, dramatic changes have been seen to have happened which appears to be a growing interest of teachers and students in the use of technology tools or "educational technology machines" that can help students develop the necessary technology skills to become globally competitive. Nonetheless, this ongoing transformation in the teaching-learning process poses an enormous challenge for the academe to continuously upgrade teaching-learning standards, approaches, and strategies that fit the needs of technological advancement and demands.

However, despite schools' educational efforts to optimize technology integration levels nationwide and to make learning highly meaningful and effective, it cannot be denied that problems and other constraints abound in the system which needs to be properly addressed. Through this evaluation study, the rate of success, as well as the program's strengths and weaknesses, can be determined. Consequently, program revisions can be effected and a more enhanced curricular program evolved.

Today, it is believed that growing awareness of ICT use in the classroom has largely contributed to improving teacher performance and teaching effectiveness as well as lessened teachers' workload. Familiar with these glaring realities in the school arena for long years of teaching ICT subjects, the researcher conducted an evaluative investigation on the status of teacher's competency in technology integration in the BSA curriculum, to determine program flaws and shortfalls that can serve as baseline data for future program enhancement. This effort could redound to the benefit of the students, the larger community, and country.

Statement of the Problem

The study aimed to evaluate the Teacher's Competency in Information Technology Integration in BSA program at UST. The results of which shall be the basis for program enhancement.

Specifically; the study sought answers to the following questions:

1. What is the level of teachers' teaching competency in technology integration as perceived by the teachers themselves and student-participants in terms of the following:
   1.1 Basic Computer Operation Skills;
   1.2 Computer Usage;
   1.3 Motivation;
   1.4 Confidence;
   1.5 Goals; and
   1.6 Ethical Standards?

METHODOLOGY, RESULTS AND DISCUSSION

Statistical Analysis

Weighted Means on Teachers' Competency in Basic Computer Operation Skills as Rated by Both Teacher and Student-Participants

On file management, participants' responses got a weighted mean of 4.55 with a verbal interpretation of "very much knowledgeable", on manipulation and navigation of operating system like Microsoft Windows the respondents responses got a weighted mean of 4.31 with a verbal "very knowledgeable", On item number 3, manipulation and navigation of web browser like Internet Explorer, Mozilla Firefox etc. the respondents' responses got a weighted mean of 4.30 with a verbal interpretation of "very knowledgeable, as to item number 4 on manipulation of electronic mail the respondents' responses got a weighted mean of 4.39 with a verbal interpretation of "Very Knowledgeable", on item number 5, creation of electronic presentation the students rating got a weighted mean of 4.37 with a verbal interpretation of "very knowledgeable, as to item number 6 on knowledge in Microsoft office application like word processor and electronic spreadsheet, the students rating weighted mean is 4.14 with a verbal interpretation of "Very Knowledgeable" and teacher-responses got a rating of 4.33 with a verbal interpretation of "Very Knowledgeable". The general weighted mean for participants' responses is 4.37 with a verbal interpretation of "Very Knowledgeable."

Based on the data gathered, teachers teaching computer subjects in BSA programs are very much knowledgeable in file management while very knowledgeable in manipulation and operation of the operating system, manipulation, and navigation of web browsers, creation of electronic presentation and knowledge in word processing and electronic spreadsheet.

On the study of Aureus (2005) entitled "Validity of Power Point Presentation in Techniques of Integration" educators are encouraged to use or apply technology like PowerPoint presentation in teaching especially during lecture classes for clear discussion of the topics. Findings of the study also showed that technology integration into teaching enhances the skills and intellect of the students based on the post-test.

Weighted Means on Teachers' Competency in Computer Usage as Rated by both Teacher and Student- Participants

On item number 1 assigns daily or weekly computer-related tasks that support the curriculum, participants' responses got a weighted mean of 3.39 with a verbal interpretation of "Rarely." On provides short-term assignments using the classroom computer(s) that emphasize the use of different software applications the respondents' responses got a weighted mean of 3.27 with a verbal interpretation of "Rarely." On item number 3, uses and surfs the Internet for accounting topics and researches the respondents' responses got a weighted mean of 3.15 with a verbal interpretation of "Rarely." As to item number 4 on uses basic software applications for laboratory exercises in accounting the respondents' responses got a weighted mean of 3.58 with a verbal interpretation of "Frequently." As to item number 5, encourages students to use the Internet for collaboration with others especially students from other school or other members of the organization the participants' response rating got a weighted mean of 3.13 with a verbal interpretation of "Rarely." As to item number 6 on integrates the most current research on teaching when using the computer laboratory respondents' responses rating with a weighted mean is 3.50 with a verbal interpretation of "Frequently ." On item no 7, actively participates in online collaboration and discussion on accounting issues, respondents responses got a weighted mean of 3.02 with a verbal interpretation of "Rarely." On item number 8, allows students to eagerly pursue the use of computers at the computer laboratory the respondents' responses got a weighted mean of 3.68 with a verbal interpretation of "Frequently." As to item number nine on allows students to use the Internet for collaboration, with others part joint publishing, communicating and undertaking research to solve authentic problems the respondents' responses of got a weighted mean of 3.20 with a verbal interpretation of "Rarely." On item number 10, allows students to have access to all forms of technology and computers at any given time during the instructional days, respondents' responses got a weighted mean of 3.33 with a verbal interpretation of "Rarely." The general weighted mean on students' responses from item 1 to 10 on Table 2 is 3.32 with a verbal interpretation of "Rarely."

As to item 1 (assigns daily or weekly computer related tasks that support the curriculum), 2 (provides short-term assignments using the classroom computer(s) that emphasize the use of different software applications) and 3 (uses and surf the Internet for accounting topics and researches) with a verbal interpretation of "Rarely".

Perhaps it is much better if the teachers would add extra effort to give students assignments like, guided activities using the Internet and additional exposure in using Microsoft Office because these include productivity tools like word processing and electronic spreadsheet that are designed to make people more effective and efficient while performing daily activities.

It is also stated in the Journal of Computer Information Systems(2004) that "Developing and teaching a class with multiple Web-based technologies has a great respect for knowledge that comes from a variety of sources, more sophisticated views on issues, and a greater awareness on how to monitor one's learning."

As to item number 5, encourages students to use the Internet for collaboration with others especially students from other school or other members of their organization the weighted mean is 3.13 with a verbal interpretation of "Rarely" which is also similar to Bolotaolo's study (1999) on the "Integration Use of Computers in Teaching in Selected State Higher Learning Institutions in Metro Manila: An Assessment" which revealed that students rated the use of e-mail by the members of the campus as means of communication with colleagues both on and off the campus is of little extent. Perhaps there are schools where no Internet connection is an obsolete or has limited access to the Internet.

In order to know the importance or effect of the Internet in the school one of the studies in the literature by Duffy et. al. (2008) study in the College of Business of Illinois State University stated that "The Internet provides the most effective and efficient set of tools to implement a learning community. Surveyed results confirmed that students had very positive attitudes towards the Web-based support technologies."

According to the recommendation of Ferdido's (2005), students should be given the opportunity to be exposed to the use of ICT tools in teaching and learning process to enhance under the supervision of teachers to enhance their skills and abilities.

It is also stated on Machnaiks (2002) study on "Investigating the Effect(s) of Technology Integration on Teaching Practices That May Lead to the Development of a Community of Learners" that technologies afford the students the tools to explore, experiment, construct, converse and reflect on what they are doing, so that they may learn from their experiences.

According to ISTE NETS "Integrating a curriculum with technology involves making technology into a tool to enhance learning in a content area of multidisciplinary setting. The technology should become an integral part of how the classroom functions, as accessible as all other classroom tools. Even counting the number of classes set in a computer-intensive "laboratory" setting may be inadequate as a measure of integration, since only technology –specific skills may be taught there. Instead, the measurement should be based on observing actual access and usage.

Weighted Means on Teachers' Competency According to Motivation as Rated by both Teacher and Student-Participants

As to item number 1, uses computer(s) in the classroom for lectures, respondents' responses got a weighted mean of 3.83 with a verbal interpretation of "Frequently." On seeks professional development that maximizes the use of computers and technology available on students the respondents' responses got a weighted mean of 3.40 with a verbal interpretation of "Rarely." On item number 3, seeks out activities that promote increased problem solving and critical thinking analysis using the classroom computer(s) the respondent s' responses got a weighted mean of 3.50 with a verbal interpretation of "Frequently." As to item number 4 on uses, IT-enhanced curriculum units for integration in classroom instruction for authentic assessment and student relevancy the respondents' responses got a weighted mean of 3.37 with a verbal interpretation of "Rarely." As to item number 5, integrates students' interests, experiences, and desires to solve authentic problems when planning computer-related activities in the classroom the respondents' responses rating got a weighted mean of 2.88 with a verbal interpretation of "Rarely." Item number 6 on uses laboratory computer(s) primarily to answer email respondents' responses rating with a weighted mean of 2.84 with a verbal interpretation of "Rarely." On item no 7, relies on others (student assistant, close friend) to do computer related task for the classroom , respondents' responses got a weighted mean of 3.45 with a verbal interpretation of "Rarely." On item number 8, uses the computer for their continuing education the respondents' responses got a weighted mean of 3.41 with a verbal interpretation of "Rarely,"

The general weighted mean on respondents' responses from item 1 to 8 on Table 3 is 3.33 with a verbal interpretation of "Rarely."

Item number 6, (uses laboratory computer(s) primarily to answer email) got a verbal interpretation of "Rarely" from the groups of respondents, factors like a.) Availability of the computer laboratories and b) availability and access to the Internet connections of the school like Wi-Fi maybe the reason for the interpretation.

According to the National Technology Standards (NETS) one of the cited literature of the study, teachers need to meet certain standards in the successful integration like Educational Technology Operations and Concepts wherein teachers used to develop introductory information and technology literacy knowledge and skills and extend information and educational technology skills and knowledge to increase the learning productivity which conflicts on the result of items number 2 seek professional development that maximizes the use of computers and technology available on students, number 3 seek out activities that promote increased problem solving and critical thinking analysis using the classroom computer(s), and number 5 integrate students' interests, experiences, and desires to solve authentic problems when planning computer-related activities in the classroom.

Another concept from NETS is to Plan and Design Learning Environment and Experiences, wherein teachers need to plan and design effective learning environment and experiences supported by technology in order to design developmentally appropriate learning opportunities matching effective instructional strategies and technology use with the diverse needs of learners which also conflicts on the output of item number 4 uses IT-enhanced curriculum units for integration in classroom instruction for authentic assessment and student relevancy rather than building my units from scratch and item number 6 uses laboratory computer(s) primarily to answer e-mail.

Weighted Means on Teachers' Competency According to Confidence as Rated by both Teacher and Student-Participants

As to item number 1 alters the instructional use of the classroom computer(s) to gain new knowledge of software applications and research on teaching and learning, respondents' responses got a weighted mean of 3.61 with a verbal interpretation of "Frequently." On item number 2, merges IT technology with integrated curricula, respondents' responses got a weighted mean of 3.53 with a verbal interpretation of "Frequently." On item number 3, comfortable using a computer in teaching accounting subjects with laboratory, respondents' responses got a weighted mean of 3.84 with a verbal interpretation of "Frequently." The general weighted mean on student's responses from item 1 to 3 on Table 4 is 3.66 with a verbal interpretation of "Frequently."

According to different studies cited training, exposure and use of Information Technology may increase the confidence level of the user.

Ferido (2005) study entitled "A Comparative Assessment of the Use and Non-Use of Information and Communication Technology in Mathematics: Implication to Curriculum Enhancement" stated in the findings that " The students, especially the third and fourth year, gained more self-confidence in the use of ICT tools because of their exposure. The study shows that the use of ICT integration in Mathematics can improve the different skills of students in the cognitive and non-cognitive aspect of learning."

It was also stated on the recommendation that "Teachers must harness their skills with more confidence through practice to keep themselves abreast of the present times and they must realize that students are exposed to a more technologically advanced environment that captured their curiosity."

On the Australian Journal of Educational Technology topic about "Assessing Technology Integration: its Validity and Value for Classroom Practice and Teacher Accountability" stated that "Teachers are expected to employ technology, as well as to demonstrate their competence using behaviors that are extensive. They are the judge in terms of how much they know about instructional technology, the skills they use, and how well they apply their knowledge and skills. Thus, they must demonstrate a variety of abilities in a variety of context. They are also expected to engage students as willing partners in technology in the classroom. Teachers are expected to integrate productivity tools with instruction, and also integrate the Internet, email, the use of mobile devices, educational software and more. They are expected to create learning environments in which students are actively engaged and where students demonstrate their competence using technology.

It is evident based on the output of the survey that teachers teaching in IT subjects are confident in teaching the subjects.

Weighted Mean on Teachers' Competency According to Goal as Rated by both Teacher and Student-Participants

As to item number 1 students to be able to use the computer as another tool for learning, respondents' responses got a weighted mean of 3.84 with a verbal interpretation of "Frequently." On item number 2, use the computer laboratory a priority this school year, respondents' responses got a weighted mean of 3.18 with a verbal interpretation of "Rarely." On item number 3, more professional development in order to design student-centered, integrated curriculum that maximizes the use of the computer laboratory, respondents' responses got a weighted mean of 3.56 with a verbal interpretation of "Frequently." The general weighted mean on students' responses from item 1 to 3 is 3.52 with a verbal interpretation of "Frequently."

On the website nces.ed.gov/ pubs2003, it was stated that "Integrating technology is what comes next after making the technology available and accessible. It is in a goal process, not an end-state. "It was also stated that "The goal of placing technology in the classroom is to provide new ways for students to learn. Proper integration of technology will make the technology, support these new ways of learning transparently."

On the book Integrating Technology into the Curriculum by SEIR-TEC, it was stated that "Information Technology such as computers, software applications, video, audio/visual multimedia, and telecommunications can be integrated into virtually any classroom situation. The key is to start with your curriculum goals and then to match them with appropriate technology tools."

On the same book integration defined as the use of technology by students and teachers to enhance teaching and learning and to support existing curricular goals and objectives.

Perhaps the respondents know the importance of goal in integrating IT in BSA programs. The table shows that respondents frequently give importance in terms of the goals in IT integration. Literature also supports the idea that facilities and pieces of equipment are not enough; there must be goals to purchase in order to obtain proper Integration.

Weighted Means on Teachers' Competency According to Ethical Use as Rated by both Teacher and Student-Respondents

As to item number 1, recognizes the ethical use of technology, respondents' responses got a weighted mean of 3.93 with a verbal interpretation of "Frequently." On item number 2, models the use of ethical technology, respondents' responses got a weighted mean of 3.94 with a verbal interpretation of "Frequently." The weighted mean of respondents' responses from item 1 to 2 on Table 6 is 3.93 with a verbal interpretation of "Frequently."

[13]The study entitled "Effect of Technology Integration and Human Values in Teaching Problem Solving in Mathematics Among Fourth-Year Students in St.Mary's Academy of Nagcarlan, Nagcarlan Laguna", much sought to determine the status of technology integration in teaching and problem solving the rating was "very satisfactory", the same rating was given on the level of integrating human values. Likewise, the result of this study in terms of ethical use is similar to the result of Lucido's study which gave a positive output. Data show that teachers' practice professional ethics in using the technology.

CONCLUSIONS

Based on the findings of the study, the following conclusions are made:

Those teachers' are very much knowledgeable in terms of basic computer operation skills. They rarely integrate IT in terms of computer usage. The participants "rarely" motivate students in doing IT integration. That they show their confidence in teaching IT subjects frequently. They frequently prioritize IT integration in reaching the goal or objective of the subject. The participants frequently applied the ethical standards in using IT.

RECOMMENDATIONS

1. Always motivate students to use Information Technology in their respective subjects.

2. Always motivate teachers to use Information Technology in teaching BSA subjects.

3. There must be faculty development program about IT integration into BSA curriculum.

4. Continue to maintain and improve the IT integration in the BSA program at UST to produce more and more IT literate CPAs in the future.

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TUBERS: ECO-FRIENDLY BATTERY

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ABSTRACT

The research aimed to determine alternative sources of an eco-friendly battery out of tuber crops that can supply electrical energy. This was conducted as a response to the thrusts of the University on environmental stewardship and served as an initiative to help alleviate economic crises in general. More specifically, the limited importation of commercialized batteries calls for the utilization of locally available raw materials as possible substitutes. The use of the tuber crops as sources of electrolyte to power-up an eco-friendly battery is very important due to increasing demand for battery. The presence of alternatives found in natural resources is needed to reduce or eliminate the use of synthetic electrolytes found in commercialized batteries such as titanium, lithium, and nickel-cadmium. These electrolytes are considered heavy metals that are toxic and can pose environmental concerns. The tuber crops consist of cassava or kamoteng kahoy (Manihot exculenta Crantz), sweet potato or camote (Ipomoea batatas L.), taro or gabi (Colocasia esculenta), ginger or luya and potato or patatas (Solanum tuberosum L.). These tuber crops are good sources of electrolytes. However, they will produce only small amount of energy. It cannot support any electrical device that requires a high amount of electrical consumption because it only generates a small amount of voltage. Their life span also depends on their freshness or how long they have been harvested. The power efficiency output of the tuber crops could be affected by several factors like size and the form when it was tested such as its juice and in osteorized form and the electrical device rate of power consumption. Tuber crops are only designed for small energy consuming devices. Hence, this study aimed at developing alternative sources of electrolyte found in tuber crops that would aid in the generation of electrical energy to power-up an eco-friendly battery.

***Keywords**: Tubers, Eco-friendly battery*

INTRODUCTION

Last school year 2012- 2013 first semester, the of Bachelor of Science in Electronics Communication and Computer Science (BSEECS) 5th-year students of St. Paul University Philippines (SPUP) Tuguegarao City, Cagayan, had their project implementation under Engr. Norman G. Tallud as their adviser. One of the projects to be implemented was the “Potato Battery in case of Calamity.” This project was conceptualized by four male students and a female student in the person of, Miss Pinky Berbano as the project leader. From the study, the group found out that potatoes can generate electricity. Thus it can run small devices powered by a commercialized battery. Considering the impact of the above-mentioned study, the researchers were inspired to enhance the “Potato Battery by considering plants within the family of Tuber crops. These tuber crops consist of Cassava or kamoteng kahoy (Manihot esculenta Crantz), Sweet potato or camote (Ipomoea batatas L.), Taro or gabi (Colocasia esculenta), Ginger or luya and Potato or patatas (Solanum tuberosum L.) as the baseline or control group/ subject of the study. Batteries have become a common power source for many types of equipment such as household, medical equipment, and industrial applications. Making electricity from chemicals is based on the same scientific principle on which all modern batteries work. They generate electricity through a chemical reaction between two different electrodes and one electrolyte. Use of Copper and Zinc electrodes and Sulfuric acid as electrolyte is a proven method for this process. This study would like to look into the above-mentioned tuber crops aside from potato as a source of electrolyte . The tuber crops which are the test subjects of this study has the same characteristics and nutritional values like the Potatoes. They contain vitamins, minerals, and phytochemicals. They are best known for their carbohydrate content. The predominant form of this carbohydrate is starch. Starch is a carbohydrate consisting of a large number of glucose units joined by glycosidic bonds. This polysaccharide is produced by all green plants as an energy store. Tuber crops battery is an electrochemical battery or an electrochemical cell. An electrochemical cell is a cell in which chemical energy is converted to electric energy. This is achieved when spontaneous electron transfer is occurring.

The common battery or the commercialized one contains synthetic electrolytes such as titanium, lithium, and nickel-cadmium. These electrolytes are considered heavy metals and known to be toxic. These commercialized batteries are one of the composition of electronic wastes or E-wastes, when discarded they pose environmental concerns. Considering the importance of environmental preservation, it is in this context that the researchers were impelled to study possible tubers as alternative sources of eco-friendly battery.

Statement of the Problem

The project aims to develop alternative sources of an eco-friendly battery out of tuber crops that can supply electrical energy.

The researchers answer the following problems:

1. What are the possible tuber crops that can be used as alternative sources of an eco-friendly battery?

2. What is the extent of efficiency of the identified tuber crops being used as possible alternative sources of electricity?

3. What is the volume of the identified tuber crops being used as an alternative source of electricity?

4. What is the possible voltage that can be derived from the identified tuber crops with regard to its volume?

5. Which among the identified tuber crops produce high voltage and amperage using the same volume?

6. Is there a significant difference of using processed with respect to solid form of the identified tubers in producing voltage and amperage?

METHODOLOGY

The method used in this study is the experimental method of research. It has been used to observe the efficiency of the tuber crops, and to be able to identify the factors that can hamper the production of electrolyte from the tuber crops which will hinder the electrical flow. The sources of energy are not only from fossil fuel, coal and renewable sources or energy such as solar, wind, and wave. In this experiment, the researchers created a chemical r eaction between the phosphoric acid content of the tuber crops as an electrolyte and the two metals zinc and copper as the electrode to create electrical energy - enough to power a small light and other small battery operated devices.

In addition, one of the great advantages of the tuber crops, they are abundant in all tropic countries just like the Philippines. The by-product of the Tuber crop battery is environment friendly. Likewise, tuber crops if given opportunities will be considered as high-value crop that will help alleviate poverty.

Experimental Design

The Tuber crops are expected to supply electrolyte that will aid in the production of electricity into a device using Tuber crop eco-friendly battery. The maximum voltage is rated in 1.5V in every one piece of Tuber crop . The zinc-coated nail and the copper wire are inserted into the Tuber crop which is connected in series to generate the desired voltage that will be used to power-up, act as battery to the devices which will be tested .

Materials

Name	Complete Description	Unit	Quantity
(Tuber crops) *Cassava, Sweet Potatoes, Ginger and Taro(gabi)*	Medium sized; Clean, Fresh, whole/slice, ground/juice	pc	1 each
Weighing scale	Digital	pc	1
Blender		pc	1
Connecting wire	With alligator clips	pc	5
Nail	Zinc coated	pc	4
Copper	Wire, 3 inches long	pc	4
Multimeter/Voltmeter	Milliampere	pc	1
Spatula	Metal	pc	1
Knife	Sharp	pc	1
Containers	Test tubes/beaker or equivalent	pc	8

Circuit diagram

Figure 1: Series connection in lighting the LED

Figure 1 illustrates the main structure of the connection of the devices or materials used in the project. It shows the flow on how the Tuber crop generates current in the circuit connection. The tuber and the electrodes generate a chemical reaction that causes current to flow. The tubers like the potatoes are connected in series to produce much voltage that would light the device work.

Figure 2: Diagram showing the Measurement of the Voltage Generated

The measuring of the produced voltage is discussed in this section, and to be able to understand more on how to do it, a schematic diagram is shown in figure 2. It explains how to measure the voltage produced by the tuber battery.

The copper wire represents the positive terminal of the device, and the galvanized iron nail represents the negative terminal of the device. The polarity is important because this determines the Direct Current (DC). Afterward, the negative terminal of the probe is connected to the galvanized iron nail and the positive terminal probe to the copper wire. One has to make sure that the multimeter is in DC voltage setting. The more tuber battery connected in series, the more voltage the tuber battery will produce.

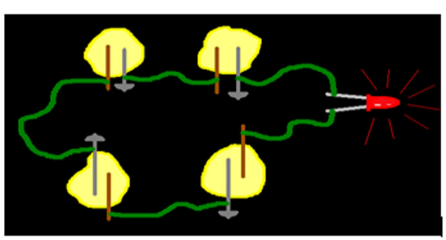


Figure 3: Schematic Diagram of the Connections of the Potato Battery

Figure 3 shows the schematic diagram of the connection of the tuber Battery as it produces current. Construction and Development.

This section discusses the procedure of the experiment. The things the researchers did were the following:

All the materials needed for the project were bought and gathered together. Galvanized iron nail and the copper wire were used as battery terminals. The galvanized iron nail and the copper wire were inserted in such a way that they become very close together but without touching each other. Using the connecting wires, the galvanized iron nail was connected to the copper wire in another tuber crop like the cassava, and it created a series (See figure 3). The two ends of the copper wires were connected to the Multimeter/voltmeter that is set in DC volt setting. The voltage of each variety of tuber crops at an average of 1.6 volts per variety of the same size. Finally, a low voltage analog clock was connected to the positive and negative terminal of the series connected tuber crops.

TESTING, OBSERVATION AND RESULTS

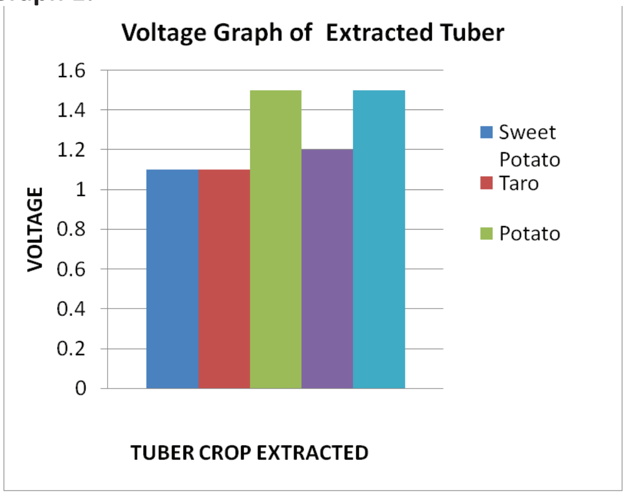
During the experimental period of the study, several test and observation were made to determine the performance of the project. The results were recorded and analyzed for the improvement of the project.

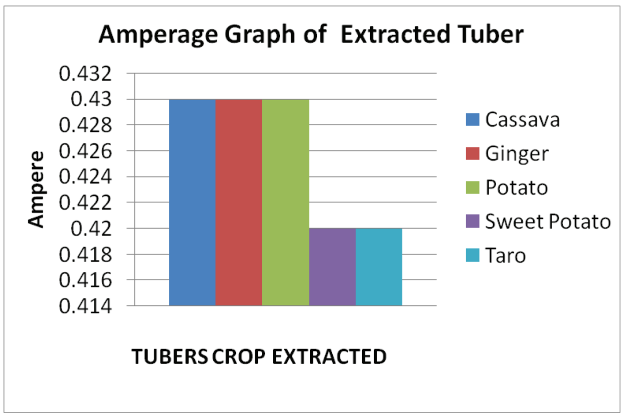
TEST 1: The researchers had their first testing on June 29, 2013, the ability of the following using extracted tuber crops with volume equal to 50 ml; Cassava, Sweet Potatoes, Ginger, and Taro, were compared to the ability of the potatoes being the control tuber, were tested and they all generated electricity. The circuit was made to see if all the tuber crops identified produced electricity. The researchers used digital analog clock as their testing device.

Observation: The LED bulb worked properly with four whole potatoes but did not work when the potato was less than four. However, the light in the Lamp Shade was fluctuating with seven potatoes.

Results: The amount of the voltage generated by the potato battery must be equal to the amount of voltage required by the device to work well.

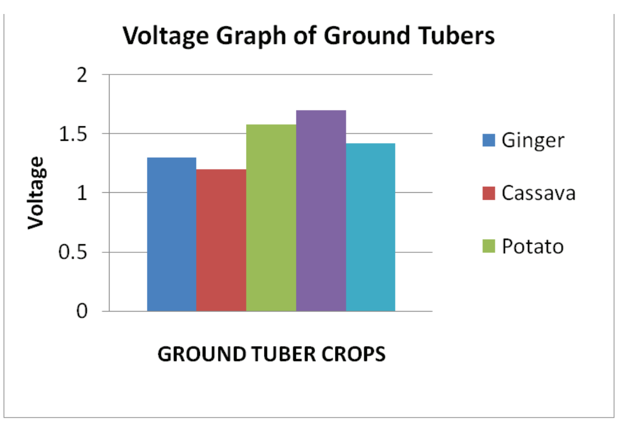
Graph 1:

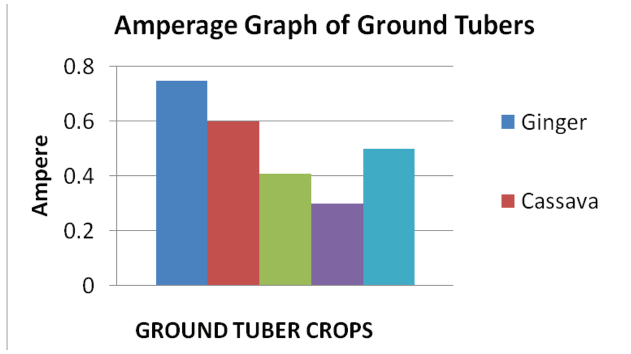




TEST 2: The researchers tested the device again after a week by using ground tuber crops with different weights to see if the analog clock worked properly this time.

Weights of Ground Tubers
Ginger= 123.15 grams, Potato = 325.10 grams
Cassava= 231.50 grams, Taro = 231.50 grams,
Sweet potato = 412.25 grams





TEST 3: Last October 2013, the project was tested in its duration of powering the digital clock. In the next page, Table 3 shows the duration when the battery worked.

Observation: The digital clock worked with extracted and grounded tuber crops with a fluctuating voltage averaging to 2.1 volts.

CONCLUSIONS

The voltage appearing on the tuber crops depends on the given tuber protein and the kind of terminals used like galvanized iron nail and copper electrode. The tubers contain phosphoric acids which cause a chemical reaction between the two terminals. This causes an excess electron to flow from the galvanized iron nail, and when a wire is connected to it, then electrons will flow.

This flow of the electrons is the electrical current that makes the digital clock function. The theory is that the phosphoric acid in the tubers would react with the zinc on the galvanized nail and react with the copper on the copper electrode to produce enough electricity to make the digital clock work. The tuber battery would produce 1.65 volts, which is almost the same as any AA sized battery and able to produce enough electricity to make the clock work.

RECOMMENDATIONS

This project was effectively and efficiently made and designed that the designer would like to recommend the following:

1. Further screening of the extract should be done to determine the bioactive compounds present in the identified tubers.

2. Further studies to enhance the project.

3. Further studies using other tubers.

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VALIDATION, EFFECTIVENESS AND ACCEPTABILITY OF WORKTEXT IN ANALYTIC GEOMETRY

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ABSTRACT

The study used descriptive research design utilizing adapted questionnaire-checklist to determine the level of acceptability of the worktext; experimental research design to test the work text's effectiveness with two groups of student respondents equated in terms of sex and final grade in College Algebra gathered through documentary analysis; and, Spearman rho, mean and t-test to statistically treat gathered data. Content-validated pretest/posttest underwent item analysis to determine difficulty and discrimination index; and, the test-retest method for its reliability index. The study found the pretest/posttest valid and reliable; there's a significant difference on the performance level of respondents in all learning areas as revealed by their pretest and posttest mean; no significant difference on their performance level as revealed by their posttest mean; in the seven learning areas of the work text, it is more effective in three areas; equally effective in one area as revealed by the mean increments; and, the work text as an instructional material of exemplary acceptability.

Keywords*: validation, acceptability, effectiveness, pretest/posttest, performance level*

INTRODUCTION

It is a universal belief that the success of a society is determined not only by the quality of teachers but also by the quality of instructional materials used to attain quality, functional and relevant education. It is the role of a teacher to prepare instructional materials that would enhance the effectiveness of the learning process (Bustos, 1997). Teachers have to keep themselves abreast with the continuous changes and innovations in classroom teaching and one way to realize this is through exposure of the students to new or innovative instructional materials to further enhance their knowledge and skills, thus, delivering an education that is of quality and relevance (Ramos, 1996). In addition, the use of instructional materials in teaching is really a great factor to catch the interest and understanding of the students (Bitong, 2002).

The researcher, having the thought of how she can contribute to the academic community in facilitating the teaching-learning process and how she can give her share in significantly developing independent learning among the students, was prompted to undertake this study that aimed to develop and validate the effectiveness and acceptability of a worktext in Analytic Geometry. Having been in the teaching profession for almost three decades, she had embraced the profession as a vocation and had wanted to serve as an agent of change towards improved teaching of Mathematics. With her research-oriented output, a validated worktext in Analytic Geometry, it is the conviction of the researcher that the use of it will speed-up the learning process, and therefore, help improve students' mathematical skills and competencies.
Geometry

Statement of the Problem

The study was conducted during the SY 2011-2012 aiming to develop a worktext in Analytic Geometry and to validate its effectiveness and acceptability.

Specifically, it sought answers to the following questions:

1. What are the indices of difficulty and discrimination; and, the reliability index of the researcher-made pretest/posttest?

2. What is the level of performance of the experimental and control group of student respondents as revealed by the pretest and posttest mean with respect to the following learning areas:
   2.1 Basic Concepts;
   2.2 Angle of Inclination and Slope of Line;
   2.3 Locus and Equation of a Line;
   2.4 Conic Sections and Circle;

2.5 Parabola;
2.6 Ellipse; and
2.7 Hyperbola?

3. Is there a significant difference on the level of performance of the experimental group and control group of student respondents in the pretest and posttest with respect to the different learning areas?

4. Is there a significant difference on the level of performance of the experimental group and control group in the posttest with respect to the different learning areas?

5. Which learning areas of the developed worktext are more effective than the existing book in Analytic Geometry as revealed by the mean increments of their performance in the pretest and posttest?

6. What is the level of acceptability of the developed worktext in Analytic Geometry as evaluated by Mathematics experts with respect to the following aspects?
   6.1 Content;
   6.2 Language/Grammar;
   6.3 Organization and Presentation; and
   6.4 Usefulness

METHODOLOGY

Research Design

The study employed, first, developmental research defined as the systematic study of designing, developing and evaluating instructional programs, processes and products that must meet the criteria of internal consistency and effectiveness (http://www.aect.org/edtech/41.pdf).

Second, descriptive research design which concerns with finding new truth or a new method, material or instruction that will uplift production of any kind, a new generation or a new law, the discovery of new causal relationship, and, a more accurate formulation of the problem to be solved (Padua, 2000).

And third, experimental research design which sought to determine whether a program or intervention had the intended causal effect on program participants. A pre-post test design requires that data be collected on the study participants' level of performance before the intervention took place, and that same data will be collected on where study participants are after the intervention took place (http://www.nationaltechcenter.org/index.php/products/at-researchmatters/experimental-study-design/).

Participants of the Study

To test the effectiveness of the worktext, the study used the experimental and control group, each composed of ten (10) freshmen civil and ten (10) electrical engineering students, respectively, equated in terms of gender and their final grade in College Algebra gathered through documentary analysis.

To evaluate the level of acceptability of the worktext, the study got the perceptions of the Mathematics instructors as respondents.

Data Gathering Instrument

1. A valid and reliable 60- item multiple choice type of test in Analytic Geometry was used to determine the level of performance of the two groups of respondents. Results of student performance on the pretest and posttest were interpreted using the formulated range for different test items.

2. The study utilized an adapted questionnaire-checklist to evaluate the level of acceptability of the worktext as instructional material. To interpret the results, the scale, range and verbal interpretation is shown on the next page were used.

Statistical Treatment

The statistics used in the analysis of results are as follows:

1. Test Item Analysis and Spearman rho to determine, respectively, the indices of difficulty and discrimination; and, the reliability index of the researcher-made test.

2. Mean to determine the level of performance of the experimental and control group as revealed

by the pretest and posttest results with respect to the different learning areas. The same statistical tool was used to evaluate the level of acceptability of the developed worktext in Analytic Geometry as an instructional material with respect to content, language/grammar, organization and presentation, and usefulness.

3. T-Test to determine the significant difference on the level of performance of the student respondents in the pretest and posttest before and after exposure to the developed worktext in Analytic Geometry with respect to the different learning areas.

Procedure in Data Gathering

The research procedure consisted of the following:

1. Development of the worktext was done the 1st semester of SY 2011-2012. After developing the worktext using the approved syllabus and other books in Analytic Geometry as references, it underwent content-validation by mathematics experts whose comments and suggestions were all incorporated in its final copy. Then, it was evaluated by mathematics experts for its level of acceptability with respect to the selected aspects using adapted questionnaire checklist.

2. Based on the constructed Table of Specifications, the researcher-made pretest/posttest was content-validated by mathematics instructors. Then, it was subjected to Item Analysis to determine the indices of difficulty and discrimination using 48 third-year civil engineering students; and, the test-retest method for its reliability coefficient utilizing 21 fourth year civil engineering students.

3. To determine the effectiveness of the worktext, both groups were given a pretest at the start of the 2nd semester of the school year. During the experimentation phase of the study, the experimental group was exposed to the worktext while the control group to a long existing book in Analytic Geometry. At the end of the semester, the two groups were given a posttest.

4. Statistical treatment and interpretation of the results followed.

RESULTS AND DISCUSSIONS

The Validity and Reliability of the Researcher-Made Test

To ensure that the 60 items of the researcher-made pretest/posttest are of average difficulty, the very easy and very difficult items and those items with an index of discrimination less than 0.16 were rejected. Item Analysis resulted to 32 items needing minor revisions and 67 were accepted items.

Table 1 reveals that of the 60 items, 10 or 16.7% were easy items, 20 or 33.3% average items, and 30 or 50% difficult items. To have a good quality test, there should be a balance of difficulty, average and easy items (Abarro, 2004).

Table 1 likewise shows 18 items or 30% of the pretest/posttest were taken from the 32 revised items while 42 items or 70% lifted from the 67 accepted items. The validity of the individual test item is determined by the index of discrimination. The validity of a test concerns what the test measures and how well it does so. (Calmorin, 1994). Relative to this, results of the study implied that the researcher-made test was valid enough to which the content of the test is truly a representative of the content of the course.

The reliability of the 60-item instructor-made test was determined using the Test-Retest method. The computed Spearman rho is 0.85, interpreted as one with a marked relationship, revealing that the scores of the 21 fourth year civil engineering student respondents on the first and second administration of the test are highly correlated and there is consistency in their responses even if they took the same test twice. The test, in other words, agrees with itself, is dependable, self-consistent and stable (Calmorin, 1994). Therefore, the 60-item pretest/posttest is valid and reliable, hence, can be used as data gathering instrument to determine the level of performance of the two groups of student respondents.

Level of Performance of the Experimental Group and Control Group as Revealed by the Pretest and Posttest Results with Respect to the Different Learning Areas

With respect to the Different Learning Areas, there is a marked increase in the mean performance of both experimental and control groups in all learning areas. This could be a positive effect of the instructional materials they used in the study of Analytic Geometry and the finding connotes that, in general, the developed worktext and the existing book in Analytic Geometry are both effective materials. This finding is supported by the study of Robles (2004) which found that students acquired knowledge and skills after they were exposed to the developed instructional modules. The present findings are strengthened by the study of Catolos et al., (2009) when they exposed the students to the developed worktext in Plane and Spherical Trigonometry and their findings revealed that there is an increase in the mean performance of the students which could be attributed to their exposure to the developed worktext. Moreover, Marino (2005) supports the present findings when he found instructional materials like worktext used in the teaching of a subject resulted to better performance among the students.

Significant Difference on the Level of Performance of the Experimental and Control Group as Revealed by the Pretest and Posttest Results with Respect to the Different Learning Areas

The level of performance of the experimental group at the t-values of 6.86, 6.47, 8.06, 8.45, 7.33, 9.07, and 6.09, has p-values ranging from 0.000 to 0.002 which are all less than the 0.05 level of significance. Hence, the null hypothesis stating that there is no significant difference in the performance of the experimental group in the pretest and posttest is rejected; and the result is significant.

Significant Difference on the Level of Performance of the Experimental and Control Group as Revealed by the Posttest Mean with Respect to the Different Learning Areas

There is no significant difference on the performance in the posttest of both experimental and control group in all the learning areas at t-values of 1.72, 0.45, 1.19, 0.19, 0.29, 0.19, and 1.25; and with the p-values of 0.103, 0.658, 0.251, 0.850, 0.773, 0.851, and 0.229 which are all greater than the 0.05 level of significance. The study failed to reject the null hypothesis stating there is no significant difference on the performance of the experimental and control groups as revealed by the posttest means.

This finding implies that the instructional materials used by both the experimental and control group contributed positively and provided them with an effective learning tool in their study of Analytic Geometry.

Level of Effectiveness of the Developed Worktext on the Different Learning Areas as Revealed by the Mean Increments

The experimental group got higher mean increments of 3.3, 3.9 and 4.5 than those of the control group in learning areas Basic Concepts, Angle of Inclination and Slope of Line and Conic Section and Circle, respectively. However, in learning areas, Locus and Equation of a Line, Parabola and Ellipse, the control group got higher mean increments of 5.4, 3.5 and 5.2, respectively. In learning area hyperbola, the two groups of respondents equally performed with 3. nine (9) mean increment.

The findings connote that in learning areas the worktext was found less effective, improvements or modifications are still needed to further increase its level of effectiveness over the existing book in Analytic Geometry used by the control group of respondents.

Level of Acceptability of the Worktext in Analytic Geometry as an Instructional Material as Evaluated by Mathematics Experts with Respect to the Different Aspects

The participants perceived it is an Exemplary acceptable instructional material as revealed by the over-all general mean of 3.84. The mathematics experts' evaluation on the contents of the worktext shows that on the five (5) items under content, they perceived it as exemplary acceptable instructional material as revealed by the obtained general mean of 3.84. The indicators in this aspect are the following: the contents of the worktext are comprehensive and cover the complete scope of the course ($\bar{X}$ = 4.00); the competencies and skills expected to be learned are contained in the different learning areas ($\bar{X}$ = 3.77); facts, figures and other information in the worktext are accurate and updated ($\bar{X}$ = 3.66); a variety of exercises, tasks or activities for reinforcement and mastery of concepts and skills is provided ($\bar{X}$ =3.88); and, the contents and illustrations/examples provided in the worktext are appropriate to the intellectual level of the users as well as their needs and interests ($\overline{X}$ = 3.88).

These findings imply that the content of the developed worktext met the content requirement of the approved syllabus of the course.

Language/Grammar. The worktext was evaluated as an instructional material of exemplary acceptability with respect to the used language/ grammar as evidenced by the general mean of 3.75. Specifically, the respondents assessed the developed instructional material as exemplary acceptable on the following items: the worktext uses simple and appropriate vocabularies and grammar that is easy to comprehend by the users ($\overline{X}$ = 4.00); the worktext contains statements that are free of grammatical errors and inconsistencies ($\overline{X}$ = 3.66); the language used is appealing to the readers ($\overline{X}$ = 3.55); The language presents detailed information ($\overline{X}$ = 3.66); and the language structure used prevents or avoids misinterpretations ($\overline{X}$ =3.88).

The findings imply that the significance of the language/grammar used in the developed worktext cannot be ignored and it plays a vital role in providing motivation and enjoyment to the student users of the developed instructional material.

Organization and Presentation. The evaluators assessed the worktext as exemplary acceptable with respect to organization and presentation as confirmed by the general mean of 3.82. The indicators in this aspect include the following: the topics in the worktext are organized and show inter-relationship ($\overline{X}$ = 3.77); the presentations of the topics are made interesting through various techniques such as figures, illustrations, tables and other graphic arts ($\overline{X}$ = 3.88); the sequence of topics is presented logically from simple to complex ($\overline{X}$ = 3.66); the objectives of every learning area are started in behavioral terms ($\overline{X}$ = 3,.88); and, the varied exercises are sufficient enough to realize the objectives ($\overline{X}$ = 3.88).

It could be deduced from the results that the respondents viewed the presentation of the topics as well-organized. Furthermore, this implies that the organization and presentation of the topics made answered and met the needs of the students in their study of the Analytic Geometry and will be beneficial to the instructors in their teaching of the course.

Usefulness. The developed worktext with regard to usefulness got a general mean of 3.93, verbally interpreted Exemplary acceptable. The indicators that registered to the evaluators of the worktext as one of exemplary acceptability with respect to usefulness are as follows: the worktext can be very useful to the teachers in teaching the learning competencies ($\overline{X}$ = 4.00); students can learn from the worktext independently or even with minimal/without the supervision of the teacher ($\overline{X}$ = 3.66); the worktext is suited to the expected users ($\overline{X}$ = 4.00); the worktext can also serve as a reference material to other related subjects ($\overline{X}$ = 4.00); and, the worktext includes illustrative examples and enhancement exercises that might be given in the licensure examinations. ($\overline{X}$ = 4.00).

The results imply that the developed worktext in Analytic Geometry is very useful in the teaching and learning of the course. Furthermore, these suggest that the activities in the developed worktext are beneficial to the students in motivating and challenging them to learn.

All the above findings evidently manifest that the developed worktext will significantly contribute to the teaching and learning of Analytic Geometry. In addition, the findings imply that the worktext possesses the characteristics of instructional material that would help enhance the performance of the students in Analytic Geometry and will facilitate the teaching-learning process.

CONCLUSIONS

Based on the summary of findings, the following conclusions were drawn.

1. The developed worktext in Analytic Geometry helped increase the mathematical performance of the experimental group of student respondents after they were exposed to it.

2. The developed worktext can be used as an instructional material in the study and teaching of Analytic Geometry.

3. The worktext further needs revisions/modifications to make it better effective in all learning areas.

4. The developed worktext is an instructional material of exemplary acceptability in the teaching and learning of Analytic Geometry

RECOMMENDATIONS

In the light of the conclusions made, the following are recommended:

1. The developed worktext be adopted for use by the college students and instructors, respectively, in the study and teaching of Analytic Geometry.

2. The developed worktext be continuously assessed every after use to further improvement to make it better effective in all learning areas.

3. For the administration to evaluate the worktext and recommend funding for its publication to help augment the university's financial resource and efficiency.

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SPUP COMMUNITY EXTENSION SERVICES: DEGREE OF IMPACT AND NEEDS SATISFACTION ASSESSMENT

The Community Development Center (CDC)

ABSTRACT

St. Paul University Philippines-Community Extension Services (SPUP-CES) has already established a community development program that coordinates all extension and outreach activities and ensures the proper and efficient implementation of programs in partner barangays. Since its inception, it has actively assisted thirty-seven (37) barangays in Cagayan Province. Previous research entitled "Impact of SPUP-CES on the Living Conditions of Some Selected Adopted Communities" was initially conducted. The present study; "SPUP-CES: Degree of Impact and Needs Satisfaction Assessment" seeks to determine the extent of impact and needs satisfaction on the lives of the beneficiaries specifically on the five training programs, namely: Personal Values and Spiritual Formation; Economic Development; Political Development; Socio-Cultural Development and Ecological Development. The instrument used in the conduct of the evaluation was a revised version of the tool used in the 2005 study. Part of the revision was the inclusion of activities and services corresponding to the five training programs for development. The tool was translated in the Ilocano dialect for better understanding and was floated in the eighteen (18) partner barangays. The result showed that the training programs and the accompanying activities and services had been rated "very good" in six barangays; "good" in ten other barangays, while "Needs Improvement" in Two. All of the five training programs namely 1) Personal Values and Spiritual Formation, 2) Economic Development 3) Political Development 4) Socio-cultural Development and 5) Ecological Development were described as "Very Good." It is significant to note that the Economic Development Program had the least mean of 2.72. In general, SPUP-CES is rated "Very Good" in the degree of impact and needs satisfaction on the eighteen (18) barangays. Moreover, the training programs and all accompanying activities and services need continual improvement to bring about more empowered communities which are self-reliant, self-sustaining and self-governing.

Keywords:

INTRODUCTION

Evaluation is a planned process that determines whether or not a program or activity has accomplished what had been hoped for or intended. It reviews what have been done to achieve goals and objectives desired. It looks at what did not work, or what could be improved for future programs and activities.

Evaluation should be a natural part of extension programs and should take place during its different phases. The bottom line of evaluation is to show that there are "making a difference" in our program or activity that provides a positive impact or benefit to the stakeholders. There are many methods o and techniques available to evaluate extension programs. They may involve social science research methodologies (surveys, case studies).Others may focus on collecting quantitative (narrative) data. Additionally, the process may be a very formal, statistically-oriented process, or an informal, anecdotal process. There is no one approach or technique in program evaluation. It depends on the audience, program being conducted, as well as the resources that are available to conduct the evaluation.

In 2005, Research on the Impact of the Community Extension Services of St. Paul University Philippines' Community Development Center on the Living Conditions of Some Selected Adopted Communities was conducted particularly in Cataggaman Viejo, Larion Bajo, Tuguegarao, City, Camasi, Peñablanca, Cagayan and Lannig, Solana, Cagayan. Among the recommendations were 1) that the Community Development Center conducts a parallel study involving other partner barangays not included in the research. 2) that the Community Development Center considers the results of the study as bases for further improving the delivery of the extension services and for making strategic or development plans for the center. Also, highly recommended is that there should be more evaluation to be made to assess the programs and services of the Community Development Center.

Statement of the Problem

This study entitled "SPUP COMMUNITY EXTENSION SERVICE: DEGREE OF IMPACT AND NEEDS SATISFACTION ASSESSMENT" seeks to determine the extent of impact and needs satisfaction effected by the Community Extension Services of St. Paul University Philippines, on the lives of the beneficiaries coming from partner communities.

Specifically, it seeks to answer the following questions:

1. What is the overall degree of impact and needs satisfaction made on the lives of the beneficiaries coming from the 18 partner communities of the: Five (5) Training Programs of the SPUP Community Extension Service? Activities and services of each of the training programs?

2. What is the overall degree of impact and needs satisfaction of the five (5) training programs and its corresponding activities and resources on each of the eighteen partner communities?

3. What are the training programs, of the SPUP Community Extension Service that needs to be reinforced in the different partner communities?

4. What are the activities, services, and programs that need to be reinforced in the different partner communities?

METHODOLOGY

This chapter presents the research design, sampling technique, sample size, respondents, the locale of the study, data gathering tools, data gathering procedures and the statistical treatment of data.

Research Design

The descriptive research design was used in this study. The said design was chosen since the study sought to make an assessment of how the different programs and services are given by the Community Development Center of St. Paul University Philippines were implemented in some selected adopted communities. The assessment will ultimately describe the quality of extension services that the Center had given from the perspective of the beneficiaries, the barangay officials, and the residents.

Sample and Sampling Technique

The study made use of the purposive convenient sampling. Only the active members of the different programs of CDC, barangay officials and some residents from the eighteen communities who have knowledge of the different programs implemented in their communities were selected as sample.

Participants of the Study

This study consists of 2 sets of respondents:

1. The Focused group or immediate beneficiaries of the SPUP-CES in the partner barangays.

2. The Barangay Officials and the Community Health Officers (CHO) who are in the know and are supportive of the SPUP-CES in the community.

Data Gathering Instruments

Questionnaire. A non-standardized questionnaire was used to collect the needed data for this research. Two sets of questionnaires were prepared, one for the beneficiary of the program and the other questionnaire was intended for the residents and barangay officials.

Interview. An informal interview was used to validate some of the data collected from the use of the questionnaire. Residents who are unable to read and write were interviewed using the vernacular dialect of the community to solicit their assessment as to the extent to which the different programs of the CDC has contributed to the improvement of the beneficiaries and their community in general.

Data Gathering Procedure

The instrument used by the researchers in the conduct of the assessment was a revised version of the tool used in the study "Impact of the Community Extension Services of St. Paul University Philippines' Community Development Center on the Living Conditions of Some Selected Adopted Communities. Part of the revision was the inclusion of activities and services corresponding to the five training programs for development. The tool was translated into the Ilocano dialect for the greater understanding of the respondents and was floated in the eighteen (18) partner barangays.

Statistical Treatment of Data

To analyze the data collected from the use of the questionnaire, the following statistical tools were used:

1. Frequency count was used in counting/tallying the individual responses of the respondents.

2. The Mean was used in the st atement of the problem numbers 1 and 2.

3. To interpret the Mean response obtained from the use of the questionnaire, the 4-Point Likert Scale was used:

Range of Values	Qualitative Description
3.26 – 4.00	Excellent
2.51 – 3.25	Very Good
1.76 – 2.50	Good
1.00 – 1.75	Needs Improvement

RESULTS AND DISCUSSION

Participants' Assessment of the different training programs of the Community Development Center of St. Paul University Philippines from the eighteen partner barangays

The different training programs and services implemented by the Community Development Center of St. Paul University Philippines in the eighteen partner barangays. In this table, it is shown that all services that the CDC provides had a qualitative category mean of 2.89 described as "very good." It is also reflected in this table that the spiritual services implemented by the CDC have a qualitative mean of 3.02 described as " very good." Compared to the other services that the CDC provided, spiritual activities has the highest mean, and the least is the economic services which have a qualitative mean of 2.72 which is described as "very good." This implies that the CDC has a strong spiritual program and likewise successful in responding to the economic, socio-cultural, health and the political needs of its beneficiaries.

Participants' Mean Assessment of the activities and services on the Five Training Programs implemented by the SPUP Community Extension Services on the eighteen partner barangays

The activities under the different training program components implemented by the Community Development Center of St. Paul University Philippines in the eighteen partner barangays. In this table, it is shown that all activities that the CDC provides had a qualitative category mean of 2.87 described as "very good." It is also reflected in this table that the activities under political program component implemented by the CDC have a qualitative mean of 2.92 described as "very good." Compared to the other activities that the CDC provided, political activities has the highest mean, and the least is the economic services which have a qualitative mean of 2. 64 which is described as "very good." This implies that the CDC has strong activities under the political program and likewise successful in responding to the economic, socio-cultural, health and the political needs of its beneficiaries.

CONCLUSIONS

In general, SPUP-CES is rated "very good" in the degree of impact and needs satisfaction on the eighteen (18) barangays. Moreover, the training programs and all accompanying activities and services need continual improvement to bring about more empowered communities which are self-reliant, self-sustaining and self-governing.

RECOMMENDATIONS

From the summary of findings and conclusions reached, the researchers hereby recommend the following:

1. The Economic development training program and accompanying activities and services should have a priority place in CES program implementation without being less holistic in approach.

2. Impact Evaluation at the end of a program implementation should always be preceded by a pre-evaluation to determine to what extent target objectives have been attained.

3. Research should go hand in hand with the developmental growth of partner communities to

justify interventions and response measures.

4. Collaboration and linkaging with different "expertise" of GO's and NGO's should be present in community development for maximization of resources

5. Consider comments and suggestions of community members in developing CES Programs that involved their communities.

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EFFECTIVENESS OF CONCRETE-LANGUAGE-SYMBOL MODEL IN TEACHING PROBABILITY AND STATISTICS AMONG SECOND YEAR COLLEGE STUDENTS OF ST. PAUL UNIVERSITY PHILIPPINES

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ABSTRACT

This empirical study investigated the effectiveness of the Concrete-Language-Symbol (CLS) model in the Teaching of Probability and Statistics among second-year college students of the School of Information Technology and Engineering. The total enumeration was employed in the selection of the students enrolled in Probability & Statistics, as subjects of the study. The researcher made use of the quasi-experimental method. Activity sheets on selected topics along Probability and Statistics were prepared and used for the experimental group. A pre-post test was administered to both control and experimental groups based on the topics covered during the midterm period, which was drawn from the researcher's bank and subjected to test item analysis. The results of the pre-post test were treated using the t-test for independent means and paired samples to determine the significant difference in the posttest mean performance scores of both groups. The findings of the study revealed that there is a significant difference in the performance of the two groups. Students' exposed to the Concrete-Language-Symbol model performed better than those exposed to the lecture-discussion method. From the preceding findings, the researcher concluded that through CLS model, Mathematics learning is facilitated as the students are exposed to learning situations that are concrete and realistic, thus making learning more meaningful, interesting and engaging.

Keywords: *CLS model, quasi-experimental method*

INTRODUCTION

In the verge of societal innovations, people live in an era filled with complexities, economic and technological advancements. With these rapid developments and changes, it becomes imperative for any individual to be equipped with the desired competencies and skills for them to confidently face more challenging and difficult tasks ahead of them and to meet the demands of the rapidly changing society.

Present day society collectively needs a great deal of the most sophisticated kind of mathematics for its functioning and survival. The highly complex problems of the technological society require complex mathematics to solve them. The demand, therefore, for increased competencies in Mathematics has become a reality for many. Corollary with this is the fact that Mathematics has become indispensable to any person's daily life. Now and then, one is faced with problems that need mathematical solutions be it with the simpl e buying of goods in the store or budgeting the expenses for the day, to a more complicated problem that needs wise and instant mathematical solutions/answers.

Thus, in the previous years, tremendous efforts have been made at the national level to enhance the mathematics curriculum in response to the challenges of the 21st-century learning. The Department of Education has been undertaking continuous curricular development since 2002 geared towards enhancing the Science and Mathematics curricula in order to comply with national and global standards. One of its concerns is to focus on the strategies that will enhance the students' ability to handle abstractions and on the approach to problem-solving. Furthermore, proposals have been made not only on the content of Mathematics but also on instructional materials. New courses of study have been organized, and new text and learning modules have been produced. Many teachers have been back to school to upgrade their knowledge of Mathematics and to learn more innovative and effective teaching-learning strategies, models or approaches to teaching.

However, despite these tremendous efforts made by the Department of Education, that the Philippine educational system achievement rate at the secondary level in Science remained low, and Mathematics was lower in the past two years [2]. Compared to other Asian countries, as cited by King & Guerra (2005), the Philippines is lagging behind in Mathematics and Science. This is further supported by the results of the study of Martin (2004) and report from the Trends in International Mathematics and Science Study (TIMSS, 2004), which was conducted among eighth (8th) graders. Results revealed that the Philippines ranked 36th among 38 countries in 1999 and 43rd among 46 countries in 2003. Further, according to the National Education Testing and Research Center (NETRC), the achievement rates in Mathematics from AY 2005-2006 to AY 2009-2010 were as follows: 47.82%, 39.05%, 42.85%, 38.03% and 39.64%, all of which are below 50% mastery level. (DepEd F-act Sheet, 2011).

In St. Paul University Philippines, it has been a common observation that freshmen college students have not fully mastered the competencies of Secondary Mathematics as revealed in the Math Proficiency Test which is administered upon admission to the University. The results showed that only about 10-20% would obtain 50% mastery level every year, the results of which are alarming [2]. In particular, considering the sample of 54 SITE freshmen students who took the examination, a mean score of 15.31 was obtained out of the 50 item questions; the highest score was 34, and the lowest was 7. Such result reveals poor performance in the Mathematics Proficiency Examination. This further supports the results of educational surveys which indicated that most of our high school graduates do not manifest the 75% mastery level as prescribed by the Department of Education. One of the reasons behind this is their inability to meaningfully comprehend the lessons presented, thus resulting in low performance in Co llege Mathematics [2]. It is also a common classroom observation that students have a short span of attention which causes their limited participation in the classroom activities in Mathematics.

At present, many teachers in college are faced with the alarming fact that a great number of college students do not perform well in Mathematics. Considering, for instance, the performance of the subjects of this study in Algebra and Trigonometry last year, their mean grades were 77.98 and 78.88 respectively. This implies poor performance in the aforementioned subjects. "Studies have shown that poor performance in Mathematics has been caused by the traditional teaching approaches/strategies employed in the teaching-learning process where the students are not adequately provided with meaningful activities and real life experiences, thus, making it difficult for them to understand and master mathematical concepts and processes.", [10].

Research has shown that teaching strategies which are interactive, integrated, experiential, varied, and which show connections of lessons to the students' daily lives, are effective in enhancing students' academic performance in Mathematics. If mathematics is taught in a manner where students are engaged in concrete activities that are meaningful and interesting, then this will lead to the developmental process of learning and meaningful understanding of Mathematics, thereby improving students' Mathematics performance or achievement. Mathematics teachers, therefore, need to explore effective and innovative ways of making mathematics learning more meaningful, interesting, and engaging.

In this regard, students should be provided with activities and experiences that will help them visualize relationships and applications as they are immersed in any mathematical endeavor. This may be realized through the use of the Concrete–Language-Symbolic (CLS) model which is a versatile framework for teaching mathematics. A strategy that is anchored on this model begins with a real-life application of the concept to make the lesson more meaningful to the learners. It uses concrete or visual materials to illustrate the concept before proceeding to the operation of symbols [10].

It is for these reasons that the researcher has thought of coming up with a study that would investigate the effectiveness of the CLS model in the Teaching of Probability and Statistics, particularly in enhancing understanding of mathematical concepts and processes among the second year college students of the School of Information Technology & Engineering.

Statement of the Problem

This study attempted to investigate the effectiveness of the Concrete-Language-Symbol (CLS) model in the Teaching of Probability and Statistics among second-year college students of the School of Information Technology and Engineering (SITE).

Specifically, it sought to find answers to the following questions:

1. What are the pretest and posttest mean scores of the control and experimental groups in Probability and Statistics?

2. Is there a significant difference in the pretest mean scores of the control and experimental groups?

3. Is there a significant difference in the posttest mean scores of the control and experimental groups?

4. Is there a significant difference in the pretest and posttest mean scores of the subjects in the experimental group?

METHODOLOGY

Research Design

The study made use of the quasi-experimental method, specifically, the pre-post test design. This design involved two groups, the control, and experimental groups. A pretest was administered to both groups to ensure equality of their entry requirements before the experimental stage. The lecture-discussion method was employed for the control group while the CLS model was utilized with the experimental group.

Subjects and Sampling Procedure

The study involved two classes of which 30 students were assigned heterogeneously to each class of second-year college students of the School of Information Technology and Engineering who were currently enrolled in Probability and Statistics for the Second Semester of the Academic Year 2012-2013. The total enumeration was employed in the selection of samples since the population of said year level is fewer.

Research Instruments

In order to gather the necessary data for the study, and to facilitate the conduct of the experiment, the following instruments and materials were employed.

Activity Sheets

Activity sheets on selected topics in Probability & Statistics were carefully prepared and used with the experimental group. These served as tools in delivering the topics covered during the midterm period and in facilitating the development of the concepts and processes. These activity sheets were subjected to content validity by the researcher through consultations made with fellow Mathematics teachers and research adviser. Revision and enhancement were done based on their comments and suggestions.

A pre-post test was administered to both control and experimental groups based on the topics covered during the midterm period. The test items were drawn from the researcher's test bank. These items have undergone test item analysis.

To facilitate the selection of the items in the pre-post test which were drawn from the Midterm Test Bank and to ensure the proper distribution of the items in terms of the Higher Order Thinking Skills (HOTS), a table of specifications was prepared. For the content validation of the test items, consultations were made with fellow Math teachers and research adviser.

Data Gathering Procedures

The researcher employed the following procedures in the conduct of the experiment.

1. Pre-treatment Phase

The activity sheets for the CLS model were carefully prepared by the researcher which was based on the course content and competencies as prescribed in the curriculum.

The pre-test was administered to both groups prior to their exposure to the teaching methods. The results of the pretest were recorded and later compared with the results of the post-test.

2. Treatment Phase

The researcher conducted the classes with the two groups employing the lecture-discussion method and CLS teaching model with the control group and the experimental group respectively. Both classes were conducted on the same schedule (3:00-4:30 pm), but the control group was scheduled on Mondays and Thursdays, while the experimental group, Tuesdays, and Fridays, under the same learning environment.

3. Post- Treatment Phase

After exposure to the teaching method/model, the researcher administered the posttest to both the control and the experimental groups. The results of the post-test were compared with the results of the pre-test scores in order to determine whether a significant difference exists in the performance of the two groups and to ascertain which method/model of teaching is effective.

Data Analysis

The data obtained were classified, analyzed and interpreted making use of the following statistical tools such as frequency count, mean and percentages to interpret the pre-post test performance scores of the two groups while t-test for independent means and paired samples was used to determine the significant difference in the following:

1. Pretest mean performance scores of the control and experimental groups.

2. Pretest and posttest mean performance scores of the subjects in the experimental groups.

3. Posttest mean performance scores of the control and experimental groups.

RESULTS AND DISCUSSION

On the basis of the analysis of the data gathered, the following findings were established:

A. Prior to the conduct of the study, the control and experimental groups performed fairly on the items in the pre-test. After the intervention, the control group obtained a satisfactory performance, while the experimental group obtained a very satisfactory performance.

B. There is no significant difference in the pretest mean performance scores of the control and experimental groups. The two groups were comparable with respect to prior knowledge on the topics included in the study before they were exposed to the treatment.

C. There is a significant difference between the posttest mean performance scores of the control and experimental groups. The results revealed that the students who were exposed to the use of the Concrete-Language-Symbol teaching model performed better than those who used the lecture-discussion method.

D. There is a significant difference between the pretest and posttest mean performance scores of the students in the experimental group. The posttest mean performance score of the students is significantly higher than that of their pretest mean performance score. This means that the use of CLS model enhanced students' performance or achievement in Probability and Statistics.

CONCLUSION

From the foregoing findings, the researcher arrived at the following conclusions:

The exposure of the students to the Concrete-Language-Symbol (CLS) teaching model resulted in better performance of the students in Probability and Statistics. This then implies that through the CLS teaching model, Mathematics learning is facilitated as the students are exposed to learning situations that are concrete and realistic, thus making learning more meaningful, interesting and engaging. Effective learning takes place when real life situations are connected to the students' life as this develops a meaningful understanding of mathematical concepts and processes. Students learn best when they are engaged in activities that will lead them to discover concepts and relationships from given tasks. Group work encourages students to learn from each other and make connections.

The CLS model, therefore, tends to enhance students' motivation and enjoyment in learning. It encourages students to actively engage themselves in classroom activities, manifest enthusiasm, learn from each other and make connections.

RECOMMENDATIONS

On the basis of the findings and conclusions derived from the study, the following recommendations were made:

1. Teachers should be encouraged to employ the Concrete-Language-Symbol teaching model, and other innovative teaching-learning approaches in order to enhance students' critical thinking and facilitate conceptual understanding of mathematical concepts and processes. This can be done through the conduct of more meaningful and engaging activities in the classroom, thereby improving their Mathematics performance or achievement.

2. Mathematics teachers should be encouraged to prepare/develop activity sheets for their Mathematics classes as these will facilitate the teaching and learning of Mathematics

3. The administration should continuously support the use of CLS teaching model and other innovative teaching-learning models/approaches/strategies in the teaching-learning of Mathematics in order to achieve the goals of 21st-century learning.

4. Future researchers may conduct parallel studies to verify the results of this investigation not only in Probability and Statistics but also in other Mathematics courses.

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FLOOD PREPARATION AND MITIGATION OF LOCAL GOVERNMENT UNITS OF CAGAYAN

Eva Cagayan-Dela Cruz

ABSTRACT

This study assessed the flood preparedness and mitigation activities of six disasters prone Local Government Units (LGUs) in Cagayan with the end in view of formulating policies to address the problems and needs of these LGUs on flood preparedness and mitigation. The LGUs include Alcala, Amulung, Enrile, Iguig, Solana, and the City of Tuguegarao. Descriptive survey method was employed since the study attempted to determine the status of the disaster programs and activities, best practices, and problems encountered by the LGUs in the implementation of disaster plans. The respondents included the flood-affected community residents, Barangay Disaster Risk Reduction Management Council (BDRRMC) members, the MDRRMC officials and Flood Preparedness and Mitigation implementers. All the six LGUs have disaster risk reduction and management plans but do not have a separate flood preparedness and mitigation plans. Their disaster plans include contingency plans for flooding, erosion, and landslide. There was no separate budget allocated for floods. The majority of the LGUs assessed their budget, equipment, and manpower as inadequate and their flood preparedness as very much prepared. The respondents also positively rated the extent of implementation of their various flood preparation and mitigation activities. Their most pervasive problem include limited financial resources and the refusal of flood victims to be evacuated to safe places. The LGUs find their strong networking and linkages and quick coordination among civic organizations, government, and non-government agencies as one of their best practices. Other practices also include adequate sets of training on Disaster Preparedness and Rescue Operations, provision of soft loan for livelihood programs to affected families and presence of early warning system.

***Keywords**: Flood Preparedness, Flood Mitigation, Best Practices*

INTRODUCTION

The Philippines is identified as a natural disaster-prone country in the world. The International Red Cross and Red Crescent Societies (Post-Disaster Needs Assessment, November 2009) described the Philippines as the fourth most accident-prone country in the world. The two institutions concluded that some 5,809,986 Filipinos were killed or injured as a result of disasters or man-made calamities over a ten-year period from 1992 to 2001.

The Philippine National Red Cross (PNRC) Governor Dante Liban reported that the Philippines is a natural laboratory for floods, typhoons, monsoon rains, earthquakes, volcanic eruptions, and landslides. (Philippine Daily Inquirer, July 10, 2011).

The Province of Cagayan has the second largest population in Region 02 in the 1990 and 1995 Population Commission (POPCOM) survey. Cagayan is basically an agricultural-based province, and its towns have large land areas and/or vast areas of flat land, usually those with large populations like Penablanca, Baggao, Gattaran and Lallo, all east of the Cagayan River, and Allacapan, Lasam, Solana, and Tuao on its west bank.

Tuguegarao, an identified primary growth center of Region 02, is a rapidly urbanizing city that provides socio-economic support services not only for the province of Cagayan but also for the whole Region 02. Sometimes it also includes the provinces of Kalinga and Apayao of the Cordillera Administrative Region.

In Cagayan, municipalities vulnerable to severe flooding include Solana, Amulung, Alcala, Tuguegarao City, Enrile, and Iguig. Other municipalities expecting flash floods and flooding as an effect of three to four days continuous rain are areas near tributaries like Gattaran, Baggao, Sto. Nino, Lasam, Abulug, Piat, Tuao, Rizal, Gonzaga, Claveria, Camalaniugan, Lallo, and Sta. Teresita. Tributaries that can cause flooding and erosion to these municipalities include Cagayan River, the longest and the largest river in the country which traverses from North to South, the Dummun River of Gattaran, Zinundungan River of Lasam, Matalag River of Rizal, Chico River of Piat, Tuao, and Sto. Nino, Pata River of Sanchez Mira, Abulug River, Buguey River, Cabicungan River of Claveria, Pared/Fulay River of Baggao and Alcala, and the Pinnacannauan River of Tuguegarao City (DSWD, R02).

Region 02 was affected by four (4) out of eight (8) cyclones in 2008 leaving behind millions of pesos in damages to properties. The typhoons affected 679 barangays with 56,016 families or 249,790 individuals. Totally damaged houses were reported at 1,961 and partially damaged houses at 11,029.

In December of 2011, the first-ever region-wide flood summit, which was hatched amid the series of floods besetting Cagayan Valley in recent years, was held. The summit dealt with the impact of climate change on the agricultural sector, with emphasis on how to minimize or mitigate the effects of floods brought about by typhoons and torrential rains on food production. This is a concerted effort of all sectors of society, especially the agricultural sector which has been severely affected by recent floods (Philippine Star, 2011).

Cagayan, the country's northernmost mainland province is also a major rice and corn producer, has been on the losing end every time the region is inundated. Since stakeholders noticed that typhoons usually hit the region during the last quarter of every year, some studied the possible rescheduling of the planting season so that the farmers could harvest their crops before the typhoon months. Included in the plan was the dredging of the Cagayan River, the country's longest river system, whose siltation has been blamed for the widespread flooding in the region.

Each year, billions of pesos in the Philippines is spent for aiding typhoon victims and repairing damaged infrastructure nationwide which significantly impedes the country's social and economic development. Thus, one way to cope with the situation is to strengthen disaster risk preparation and mitigation activities, particularly on the reduction of risks in the Philippine archipelago, especially in Cagayan province.

Moreover, ensuring one's safety and security during disasters is a concern of everyone. Psychological, physical, emotional, cognitive and other forms of preparatory support from individuals, families, neighbors, barangays, municipalities, provinces and the government and non-government organizations is a necessity.

Some professionals contend that the impact of natural disasters goes beyond physical effects and often result in a range of stresses. All who have been through a disaster can attest to this fact of life. Stress can be very detrimental to one's health. Stress has often been associated with negative outcomes including illness, loss of motivation and depression. Children, in particular, are very adversely affected by stress that may eventually lead to serious consequences. In the article "Everything You Ever Wanted to Know about Natural Disasters and Mental Health," it said, "The need to seek and receive all forms of preparatory and post-disaster support then becomes essential to lessen the impact of stress. Ensuring mental health (not just physical health or injuries from disasters) needs attention. Because of this, professionals often advise never to underestimate the importance of food, water, shelter, medicines and others alike, to positive physical and mental health preparation and recovery. Families must help families, neighbors must help neighbors, co-workers must help co-workers and so on to prevent or reduce the continued presence or decrease the mental stressors before and after a disaster ", (National Center for PTSD, 2009).

With the Philippines' susceptibility to natural disasters, emergency preparedness has always been a priority concern. The Local Government Units have the primary responsibility to deal with disasters. Under the Local Government Code, the local government serves as the first line of defense. They are expected to prepare contingency plans, invest in prevention, preparedness and mitigation measures, establish a DDC with participation from civil societies, and set aside five percent of their local income for calamity fund. They may also allocate additional human and financial resources from their annual budget to disaster-risk reduction activities and establish the permanent in-house capacity to manage disaster risk on a full-time basis (http://www.pdf.ph/pdna accessed March 12, 2012).

Statement of the Problem

The study aimed to assess the flood preparedness and mitigation activities of six disaster prone areas Local Government Units (LGUs) in Cagayan.

Specifically, it sought to answer the following questions:

1. What is the status of the flood preparedness and mitigation program of disaster prone LGUs with respect to:
   1.1 Municipal Flood Preparedness and Mitigation Plan;
   1.2 Facilities;
   1.3 Manpower Pool; and
   1.4 Fund Allocation?

2. What is the level of preparedness of these LGUs with respect to preparation, mitigation, response, and recovery ?

3. To what extent are these flood preparedness and mitigation activities implemented as perceived by:
   3.1 Community residents; and
   3.2 Flood preparedness and mitigation implementers?

4. What are the best practices of the six selected LGUs in Cagayan with respect to flood preparedness and mitigation?

5. What are the problems encountered by LGUs in the implementation of flood preparedness and mitigation activities?

6. What policies for flood preparation and mitigation can be designed to uniquely address the problems and needs of respondent-LGUs?

METHODOLOGY

Research Design

This study made use of the qualitative survey research as it aimed to explore the views of respondents as expressed in their own words. The descriptive survey was also employed since it attempted to determine the status, disaster programs and activities, and best practices of the LGUs regarding flood preparedness and mitigation and problems they encountered in the implementation of disaster plans.

Participants of the Study

The participants in this research work were the flood-affected community residents, Barangay Disaster Risk Reduction Management Council (BDRRMC) members, the MDRRMC officials and Flood

Preparedness and Mitigation Implementers of the respondent municipalities. The total enumeration was used in taking the respondents. Table 1 shows the profile of respondents.

The study consisted of one thousand and seventy-eight (1078) respondents distributed as follows: 106 MDDRMC members from the six LGUs, 331 BDDRMC members, and 641 Community Residents coming from the forty-six (46) barangays.

Instrumentation

The instrument used was the questionnaire carefully drafted by the researcher after considering other sources as a basis. The sample questionnaire was pre-tested to six MDRRMC members in Solana for validity and reliability. The test group was not included as respondents. Other data like best practices and problems encountered in the implementation of the plans were gathered through interview and general assembly with the respondents.

Data Analysis

Descriptive statistics was used such as frequency, percentage, and mean to analyze the data for the descriptive research questions. The following scale was used to interpret the weighted mean obtained from the questionnaire.

Mean	Qualitative Description
4.20-5.00	Very knowledgeable/very adequate
3.40-4.19	Knowledgeable/adequate
2.60-3.39	Quite knowledgeable/uncertain
1.80-2.59	Fairly knowledgeable/inadequate
1.00-1.79	Ignorant/very inadequate

Mean	Qualitative Description
4.20-5.00	Very Much Prepared
3.40-4.19	Much Prepared
2.60-3.39	Moderately Prepared
1.80-2.59	Less Prepared
1.00-1.79	Least Prepared

RESULTS AND DISCUSSIONS

Status of the Flood Preparedness and Mitigation Program of Disaster-Prone Local Government Units

All the six LGUs have disaster risk reduction and management plans but do not have a separate flood preparedness and mitigation plans. Contingency plans for flooding, erosion, and landslides are incorporated in their disaster plans. There was no separate budget, too, for floods. The majority of the LGUs find their budget, equipment, and manpower to be inadequate.

Flood Preparedness and Mitigation Activities of the LGUs

Common flood preparedness and mitigation activities of LGUs are as follows:

- Construction of Flood control gates preventing backup of high flood waters
- Intensive orientation on RA 10121
- Organization of rescue groups armed with WASAR and BLS skills
- Purchase of complete rescue paraphernalia like rubber boats
- Designation of evacuation centers
- Pre-positioning of food and non-food items to evacuation areas
- Deployment of rescue paraphernalia, such as rubber boats, ropes, etc

Level of preparedness with respect to preparation, mitigation, response, and recovery

The overall mean of the 6 LGUs as regards Preparation Activities is 4.73, described as “very much prepared.”

The six municipalities are “moderately prepared” in the area of flood mitigation.

Of the seven response activities, only Incident Command System got a rating of “moderately prepared” with a mean of 3.19. The other six items had a rating of “much prepared.”

With regard to recovery activities, five of the LGUS are “much prepared.” Only Enrile has a rating of “moderately prepared.”

The extent of Implementation of the Flood Preparedness and Mitigation Activities as Perceived by:

The Community Residents

The overall mean of the 641 community residents representing the 46 barangays in terms of the extent of implementation of the preparedness and mitigation is 4.06, qualified as "great extent" of implementation.

Flood Preparedness and Mitigation Implementers

The overall mean for the extent of implementation of flood preparedness and mitigation activities as perceived by the implementers was 3.35 with the qualitative description of "moderate extent" of implementation.

As revealed in the data, there was a difference in the perception of the community residents and the implementers on the level of preparedness and mitigation measures in all the LGUs.

Best Practices of the Six Selected LGUs in Cagayan with respect to Flood Preparedness and Mitigation

- Strong networking and linkages with coordinating agencies
- Preparedness of the Barangays that are affected by flood
- Adequate sets of training on Disaster Preparedness and Rescue Operations
- Cooperation and coordinated efforts among civic organizations, GOs, and NGOs.
- Provision of soft loan for livelihood programs to affected families
- Quick coordination among member agencies before any calamity occurs
- Delineation of responsibilities to facilitate smooth cooperation and coordination among member agencies, and
- Presence of early warning system

Problems Encountered by LGUs in the Implementation of Flood Preparedness and Mitigation Activities

Major problems encountered by LGUs are as follows:

- Limited resources in terms of finances resulting in their inability to realize some of their plans
- Refusal of flood victims to be evacuated to safe places

Policies for Flood Preparation and Mitigation Designed to Uniquely Address the Problems and Needs of Respondent-LGUs

The following are the proposed policies to address the problems and needs of LGUs uniquely:

- Strengthening of capability building and sets of training from the barangay to the municipal levels with emphasis on rescue operations and evacuation center management
- Forced pre-emptive evacuation
- Reinforcing the implementation of climate change adaptation in schools through the help of CHED and DepEd
- Provision and installation of flood warning signs in strategic places
- Strong information dissemination in schools from the elementary to the tertiary levels
- Tree planting in backyards, vacant public lots and along highways of trees.
- Creation of Barangay and Family Disaster Contingency Plan. The majority of the respondents said their plans remain on status quo since they find them to be effective; however, minor changes were given like:
- Incorporation of more training especially in rescue operations and in managing evacuation centers.
- Specific unique plans to be incorporated into the existing plans based on the problems and needs of the LGUs.
- Conduct of researches especially on the latest topography of the municipality

CONCLUSION

Based on the findings of this study, the following conclusions were arrived at:

There is no specific Flood Preparedness and Mitigation Plans in all the LGUs under study. At present, the majority of the LGUs do not feel the need of additional equipment and manpower. However, continuous sets of training, especially on rescue operations, are highly identified as one of the major needs of the LGUs and the constituent barangays.

In general, all LGUs are considered "prepared" in all the cycles of disaster preparedness, mitigation, response, and recovery.

There is a difference in the perception of the implementers and the community residents on the extent of implementation of the flood preparedness and mitigation activities, that is, it varies from "great extent" to "moderate extent."

The 6 LGUs have unique and common best practices. Studying its adaptability and replicability to a certain LGU is the concern of policy makers. LGUs and barangays lack necessary funds to realize all their plans. Barangay folks resist evacuation because they do not like to leave their homes and property even during disaster events.

RECOMMENDATIONS

In the light of the conclusions, the following recommendations are arrived at:

Comprehensive municipal and barangay flood preparedness and mitigation plans and contingency plans to respond to flood events should be properly prepared and maintained in the operational status where flooding might occur in order to increase response capabilities and preparedness of organizations obliged to perform flood fighting and mitigating activities.

For LGUs to have an integrated approach covering all relevant aspects of water management in their plans.

In the development of a flood plan, decision makers at the municipal and barangay levels as well as stakeholders and civil society should be involved.

For a successful flood preparedness and mitigation planning, it is imperative to learn from the experiences and best practices of other towns and countries for greater collaboration and information sharing to enhance the synergy and to extend the resource base for more effective implementation of flood preparedness programs.

The most common problem identified by LGUs and the barangays is limited resources. It is necessary to train and mobilize local structures to seek to fund outside the community. Teaching communities to generate resources for their flood preparedness through networking and income-generating activities do not only discourage dole out mentality but may assure communities of enhanced livelihood sustainability.

As mentioned by one of the respondent barangays, plans must be built up from the grassroots level, respecting the unique qualities of each community, and from the bottom up, not super-imposed from the top-down and that experiences drawn from communities that have suffered from past hazards must be incorporated in the plans while, at the same time, considering their geographical location and vulnerable conditions.

There is a need for a holistic, coordinated and integrated approach to preparing and mitigating floods in all its systems and components.

To minimize the human, property and environmental losses, along with the social and economic disruption associated with extreme hazards, the critical assessment must be made to address the structural as well as non-structural measures adaptable to the localities under study considering its short-term and long-term impacts.

That all academic institutions, private and public, must offer in their curriculum, Disaster Preparedness, and Climate Change Adaptation as to prepare students in the dispensing of their civic responsibilities and to further strengthen their knowledge and awareness on the issue.

To address agriculture losses and the problem of food insecurity, researches along agricultural production practices that are more appropriate to the local environment, crop adaptability and new planting calendar could be conducted by concerned agencies like the Department of Science and Technology (DOST) and the Department of Agriculture (DA).

That an Incident Command System must be strengthened to improve efficiency and effectiveness of individual agencies as they work toward the common goal of stabilizing the incident and protecting life, property, and the environment.

A broad base participation of the community must be ensured, to attain zero casualties and reduced economic losses in times of disasters.

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ISSN: 2661-4545

SPUP INTERNATIONAL INTERDISCIPLINARY RESEARCH CONFERENCE JOURNAL

Vol. I, No. 1 2014

21st Century Education:
Milestones and Directions

February 5 - 7, 2014